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Devin Ryan

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File #: 167945

July 3, 2019

***VIA HAND DELIVERY***

Rosemary Chiavetta, Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street, 2nd Floor North  
P.O. Box 3265  
Harrisburg, PA 17105-3265

**Re: Cheryl Higgins v. PPL Electric Utilities Corporation**  
**Docket No. C-2018-3005927**

Dear Secretary Chiavetta:

Enclosed for filing is the Motion of PPL Electric Utilities Corporation to Compel Responses to Discovery Propounded on Cheryl Higgins – Set I in the above-referenced proceeding. Copies will be provided as indicated on the Certificate of Service.

Respectfully submitted,



Devin Ryan

DTR/dmc  
Enclosure

cc: Honorable Elizabeth Barnes (w/enclosure)  
Certificate of Service

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Cheryl Higgins,

Complainant,

v.

PPL Electric Utilities Corporation,

Respondent.

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Docket No. C-2018-3005927

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JUL - 3 2019

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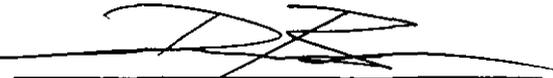
**NOTICE TO PLEAD**

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PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

YOU ARE HEREBY ADVISED THAT, PURSUANT TO 52 PA. CODE § 5.342(g)(1), YOU MAY FILE A REPLY TO THE ENCLOSED MOTION TO COMPEL WITHIN FIVE (5) DAYS AFTER THE DATE OF SERVICE. YOUR REPLY SHOULD BE FILED WITH THE SECRETARY OF THE PENNSYLVANIA PUBLIC UTILITY COMMISSION, P.O. BOX 3265, HARRISBURG, PA 17105-3265. A COPY OF YOUR REPLY SHOULD ALSO BE SERVED ON THE UNDERSIGNED COUNSEL.

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Date: July 3, 2019

Attorneys for PPL Electric Utilities Corporation

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BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION JUL - 3 2019

PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

Cheryl Higgins,	:	
	:	
Complainant,	:	
	:	
v.	:	Docket No. C-2018-3005927
	:	
PPL Electric Utilities Corporation,	:	
	:	
Respondent.	:	

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MOTION OF PPL ELECTRIC UTILITIES CORPORATION TO  
COMPEL RESPONSES TO  
DISCOVERY PROPOUNDED ON CHERYL HIGGINS – SET I

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TO ADMINISTRATIVE LAW JUDGE ELIZABETH H. BARNES:

Pursuant to 52 Pa. Code §§ 5.342(g) and 5.349(d), PPL Electric Utilities Corporation (“PPL Electric” or the “Company”) hereby files this Motion to Compel Responses to Discovery Propounded on Cheryl Higgins (“Complainant”) – Set I. In support of its Motion, PPL Electric states as follows:

**I. INTRODUCTION**

1. On April 11, 2019, PPL Electric served Interrogatories and Requests for Production of Documents on the Complainant – Set I (“PPL to Complainant Set I”) via email and certified mail. A true and correct copy of PPL to Complainant Set I is attached hereto and marked as **Appendix A**.

2. Pursuant to the Commission’s regulations, objections to PPL to Complainant Set I were due on or before April 22, 2019, and responses were due on or before May 1, 2019.

3. After the U.S. Postal Service informed PPL Electric that the certified mail copy was not picked up by the Complaint, the Company sent a copy via first class mail on May 17, 2019.

4. The Complainant never served any objections to PPL to Complainant Set I.

5. On June 4, 2019, the Complainant contacted counsel for PPL Electric and requested an extension until June 25, 2019, to provide her responses to discovery.

6. On June 5, 2019, counsel for PPL Electric informed the Complainant that she could have until June 25, 2019, to provide the discovery responses.

7. On June 24, 2019, the Complainant contacted counsel for PPL Electric again and requested a further extension until Monday, July 1, 2019, to provide her discovery responses.

8. On July 1, 2019, the Complainant served her responses to PPL to Complainant Set I. However, the Complainant did not provide the information and materials requested in PPL to Complainant Set I, Question 3 and did not provide any responses to Questions 5 through 7. A true and correct copy of the Complainant's responses PPL to Complainant Set I is attached hereto and marked as **Appendix B**.

9. On July 2, 2019, counsel for PPL Electric emailed the Complainant about the deficient discovery responses in an effort to resolve the discovery dispute before filing the instant Motion to Compel.

10. To date, the Complainant has never sent complete responses to PPL to Complainant Set I, Questions 3, 5, 6, and 7.

## **II. MOTION TO COMPEL**

11. PPL Electric requests that Administrative Law Judge Elizabeth H. Barnes ("ALJ") compel responses to PPL to Complainant Set I, Questions 3, 5, 6, and 7.

12. Under 52 Pa. Code § 5.321(c), a party is entitled to obtain discovery of any matter not privileged that is relevant to the pending proceeding, or any matter that is reasonably calculated to lead to the discovery of admissible evidence. Discovery is permitted regardless of whether the information sought “relates to the claim or defense of the party seeking discovery or to the claim or defense of another party.” *Id.*

13. Objections to interrogatories and requests for production of documents must be served within 10 days of the date the discovery was served. 52 Pa. Code §§ 5.342(e), 5.349(d). Objecting parties remain under an obligation to provide timely answers to interrogatories or subparts of interrogatories to which they did not object. *Id.* § 5.342(f). Further, objections must be contained in a document separate from an answer. *Id.* §§ 5.342(c), 5.349(d).<sup>1</sup>

14. Answers to written interrogatories must “[a]nswer each interrogatory fully and completely unless an objection is made.” *Id.* § 5.342(a)(4). Answers must be served within 20 days after service of the interrogatories. *Id.* § 5.342(d).

15. Similarly, a party shall serve a response to a request for documents within 20 days after the service of the request. *Id.* § 5.349(d). The requesting party may move to compel a response to a request for documents with respect to a failure to respond to the request. *See id.*

16. As explained herein, the Complainant has failed to comply with the Commission’s discovery rules by failing to provide full and complete responses to PPL to Complainant Set I, Questions 3, 5, 6, and 7 and produce the documents sought by these requests.

17. For the reasons stated in more detail below, the ALJ should direct the Complainant to answer fully PPL to Complainant Set I, Questions 3, 5, 6, and 7. Moreover, should the ALJ grant PPL Electric’s Motion to Compel and the Complainant fail to timely

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<sup>1</sup> The Complainant did not serve objections to discovery. Therefore, Complainant’s failure to provide full and complete responses to discovery requests operate, in effect, as untimely objections.

provide full and complete responses to Complainant Set I, Question 3, 5, 6, and 7, PPL Electric intends to file a Motion for Sanctions pursuant to 52 Pa. Code §§ 5.371(a) and 5.372(a).

**A. PPL TO COMPLAINANT SET I, QUESTION 3**

18. PPL to Complainant-I-3 requests the following:

Please state whether you or any member of your household uses a cell phone. If so, please provide the make and model of each cell phone and, for each phone identified, provide 12 months of phone bills or other records of actual cell phone usage.

19. The Complainant's response to PPL to Complainant-I-3 states:

As stated earlier, we have 4 working cell phones in our house: 19-yr old son and myself: (2) I-Phone 6S, Husband and 17-yr old son: (2) I-Phone X.

20. As explained above, Section 5.342(a)(4) requires a party to fully and completely answer an interrogatory. 52 Pa. Code § 5.342(a)(4). In addition, a party has a duty to amend its prior responses to discovery requests when the information contained therein is incomplete. *Id.* § 5.332(2).

21. The response served by the Complainant was non-responsive and incomplete.

22. As of filing the instant Motion, the Complainant still has not provided the requested cell phone records.

23. Moreover, the information requested about cell phone use is highly relevant to the issues raised in this case.

24. The Complainant claims that she has health concerns about RF fields from AMI meters. As the testimony of PPL Electric's expert witness on RF exposures – Dr. Christopher Davis – will demonstrate, however, the RF exposure received from use of a cell phone (or even standing within 30 feet of another person using a cell phone) is far higher than from an AMI meter.

25. PPL Electric is entitled to: (1) show how the RF exposures from the cell phone use compare to those from the AMI meter; and (2) discover the billing records needed to quantify the amount of time that the Complainant and members of her household choose to use their cell phones.

26. Based on the foregoing, the ALJ should direct the Complainant to answer fully PPL to Complainant Set I, Question 3.

**B. PPL TO COMPLAINANT SET I, QUESTIONS 5, 6, AND 7**

27. PPL to Complainant-I-5, 6, and 7 request the following:

PPL to Complainant-I-5

Please identify each person you plan to call as a fact witness in this proceeding. For each person, please:

- (a) Provide the person's name, home and business address, background, and qualifications;
- (b) Explain in detail the subject matter(s) on which the witness is expected to testify; and
- (c) Provide the source(s) of information relied upon or referenced by the witness.

PPL to Complainant-I-6

Please identify each person you plan to call as an expert witness in this proceeding. For each person, please:

- (a) Provide the person's name, home and business address, background, and qualifications;
- (b) Explain in detail the subject matter(s) on which the witness is expected to testify;
- (c) Provide the source(s) of information relied upon or referenced by the witness; and
- (d) Provide a copy of the expert witness's current curriculum vitae.

PPL to Complainant-I-7

Please provide copies of all exhibits you intend to present or utilize at the evidentiary hearing in this proceeding. For each exhibit to be used as part of your direct case, please identify the witness who will be sponsoring the exhibit.

28. The Complainant provided no responses to these interrogatories.

29. As explained above, Section 5.342(a)(4) requires a party to fully and completely answer an interrogatory. 52 Pa. Code § 5.342(a)(4). In addition, a party has a duty to amend its prior responses to discovery requests when the information contained therein is incomplete. *Id.* § 5.332(2).

30. These interrogatories seek basic information about the Complainant's case, including the witnesses she plans to call, if any, and the exhibits she intends to present at the hearing on July 9, 2019.

31. This is especially important, given that the Complainant never served PPL Electric with copies of any statements, reports, and any direct written testimony of any expert witnesses she intends to call to testify at the hearing, by the May 6, 2019 deadline set forth in the ALJ's Prehearing Order. *See* Prehearing Order ¶ 9 (Feb. 1, 2019).

32. Moreover, PPL Electric recognizes that the Complainant attached a series of documents to her discovery responses, which may be her intended hearing exhibits.

33. However, there still was no written response to Question 7 stating that these are in fact the Complainant's hearing exhibits.

34. For these reasons, the ALJ should direct the Complainant to answer fully PPL to Complainant Set I, Questions 5 through 7.

### **III. NOTICE OF INTENT TO SEEK SANCTIONS**

35. Upon the motion of a party, the presiding officer may make an appropriate order for sanctions if a party fails to answer or otherwise respond to a discovery request or refuses to obey an order of the presiding officer respecting discovery. *See* 52 Pa. Code § 5.371(a).

36. In ruling upon a motion for sanctions, the presiding officer may, among other things, issue: (1) “[a]n order that the matters regarding which the questions were asked, the character or description of the thing or land, the contents of the paper, or other designated fact shall be taken to be established for the purposes of the action in accordance with the claim of the party obtaining the order”; (2) [a]n order refusing to allow the disobedient party to support or oppose designated claims or defenses, or prohibiting the party from introducing in evidence designated documents, things or testimony”; and (3) “[a]n order striking out pleadings or parts thereof, staying further proceedings until the order is obeyed, or entering a judgment against the disobedient party or individual advising the disobedience.” *Id.* § 5.372(a)(1)-(3).

37. Therefore, to the extent that this Motion is granted and the Complainant fails to answer fully PPL to Complainant Set I, or otherwise comply with the ALJ’s order, PPL Electric intends to file an appropriate Motion for Sanctions pursuant to 52 Pa. Code §§ 5.371(a) and 5.372(a).

**IV. CONCLUSION**

For the reasons set forth above, PPL Electric Utilities Corporation respectfully requests that Administrative Law Judge Elizabeth H. Barnes grant this Motion to Compel Responses to Discovery and direct Cheryl Higgins to answer fully PPL to Complainant Set I, as described above within three (3) days from the date of the order.

Respectfully submitted,



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Michael J. Shafer (ID # 205681)  
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Allentown, PA 18101  
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[mjshafer@pplweb.com](mailto:mjshafer@pplweb.com)

Devin T. Ryan (ID # 316602)  
Garrett P. Lent (ID # 321566)  
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Date: July 3, 2019

Attorneys for PPL Electric Utilities Corporation

# **APPENDIX A**

## **Interrogatories and Requests for Production of Documents Propounded by PPL Electric Utilities Corporation on Cheryl Higgins – Set I**

**RECEIVED**

JUL - 3 2019

PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU



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12th Floor  
Harrisburg, PA 17101-1601  
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717-731-1985 Main Fax  
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Devin Ryan

dryan@postschell.com  
717-812-6052 Direct  
717-731-1981 Direct Fax  
File #: 167945

April 11, 2019

**VIA CERTIFIED MAIL (7017 1450 0002 3778 0840)**  
**VIA E-MAIL**

Cheryl Higgins  
404 Main Street  
Avoca, PA 18641

**Re: Cheryl Higgins v. PPL Electric Utilities Corporation**  
**Docket No. C-2018-3005927**

Dear Ms. Higgins:

Enclosed are the Interrogatories and Requests for Production of Documents Propounded by PPL Electric Utilities Corporation on Cheryl Higgins – Set I in the above-referenced proceeding. Copies will be provided as indicated on the Certificate of Service.

Please provide answers to the enclosed discovery within twenty (20) days of the date of service, pursuant to 52 Pa. Code § 5.342.

Sincerely,



Devin Ryan

DTR/jpf  
Enclosures

cc: Rosemary Chiavetta, Secretary (*Letter & Certificate of Service Only*)  
Certificate of Service

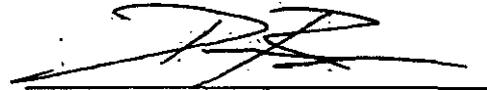
**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

**VIA E-MAIL & FIRST CLASS MAIL**

Cheryl Higgins  
404 Main Street  
Avoca, PA 18641  
E-mail: [chiggins@dshs.com](mailto:chiggins@dshs.com)

Date: April 11, 2019



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Devin T. Ryan

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Cheryl Higgins,	:	
	:	
Complainant	:	
	:	
v.	:	Docket No. C-2018-3005927
	:	
PPL Electric Utilities Corporation,	:	
	:	
Respondent	:	

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**INTERROGATORIES AND REQUESTS FOR  
PRODUCTION OF DOCUMENTS PROPOUNDED BY  
PPL ELECTRIC UTILITIES CORPORATION ON  
CHERYL HIGGINS – SET I**

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Pursuant to 66 Pa.C.S. § 333 and 52 Pa. Code §§ 5.341 *et seq.*, PPL Electric Utilities Corporation (“PPL Electric”) propounds the following Interrogatories and Requests for Production of Documents (hereinafter, “discovery requests”) on Cheryl Higgins (“Complainant”) – Set I.

**INSTRUCTIONS AND DEFINITIONS**

1. The “Responding Party,” “you,” or “your” means the party to which these discovery requests are propounded and/or all attorneys, agents, affiliates, subsidiaries, employees, consultants, members, constituents, and representatives acting on behalf of the Responding Party.
2. “Commission” means the Pennsylvania Public Utility Commission.
3. To “identify” a natural person means to state that person’s full name, title or position, employer, last known address, and last known telephone number.

4. To "identify" a business entity means to state the full name of such business, the form of the business, and its location or address.

5. To "identify" a "document" means to provide all of the following information irrespective of whether the document is deemed privileged or subject to any claim of privilege:

- a. The title or other means of identification of each such document;
- b. The date of each such document;
- c. The author, preparer or signer of each such document; and
- d. A description of the subject matter of such document sufficient to permit an understanding of its contents and importance to the testimony or position being examined and the present or last known location of the document. The specific nature of the document should also be stated (*e.g., letter, business record, memorandum, computer print-out, etc.*).

In lieu of "identifying" any document, it shall be deemed a sufficient compliance with these discovery requests to attach a copy of each such document to the answers hereto and reference said document in the particular interrogatory to which the document is responsive.

6. "Document" means the original and all drafts of all written and graphic matter, however produced or reproduced, of any kind or description, whether or not sent or received, and all copies thereof which are different in any way from the original (whether by interlineation, date-stamp, notarization, indication of copies sent or received, or otherwise), including without limitation, any paper, book, account, photograph, blueprint, drawing, sketch, schematic, agreement, contract, memorandum, press release, circular, advertising material, correspondence, letter, telegram, telex, object, report, opinion, investigation, record, transcript, hearing, meeting, study, notation, working paper, summary, intra-office communication, diary, chart, minutes, index sheet, computer software, computer-generated records or files, however stored, check, check stub, delivery ticket, bill of lading, invoice, record or recording or summary of any telephone or other conversation, or of any interview or of any conference, or

any other written, recorded, transcribed, punched, taped, filmed, or graphic matter of which the Responding Party has or has had possession, custody or control, or of which the Responding Party has knowledge.

7. "Communication" means any manner or form of information or message transmission, however produced or reproduced, whether as a document as herein defined, or orally or otherwise, which is made, distributed, or circulated between or among persons, or data storage or processing units.

8. "Date" means the exact day, month, and year, if ascertainable, or if not, the best approximation thereof.

9. Items referred to in the singular include those in the plural, and items referred to in the plural include those in the singular.

10. Items referred to in the masculine include those in the feminine, and items referred to in the feminine include those in the masculine.

11. The answers provided to these discovery requests should first restate the question asked and identify the person(s) supplying the information.

12. In answering these discovery requests, the Responding Party is requested to furnish all information that is available to the Responding Party, including information in the possession of the Responding Party's attorneys, agents, consultants, or investigators, and not merely such information of the Responding Party's own knowledge. If any of the discovery requests cannot be answered in full after exercising due diligence to secure the requested information, please so state and answer to the extent possible, specifying the Responding Party's inability to answer the remainder, and stating whatever information the Responding

Party has concerning the unanswered portions. If the Responding Party's answer is qualified in any particular, please set forth the details of such qualification.

13. If the Responding Party objects to providing any document requested on any ground, identify such document by describing it as set forth in Instruction 5 and state the basis of the objection.

14. If the Responding Party objects to part of a discovery request and refuses to answer that part, state the Responding Party's objection and answer the remaining portion of that discovery request. If the Responding Party objects to the scope or time period of a discovery request and refuses to answer for that scope or time period, state the Responding Party's objection and answer the discovery request for the scope or time period that the Responding Party believes is appropriate.

15. If, in connection with a discovery request, the Responding Party contends that any information, otherwise subject to discovery, is covered by either the attorney-client privilege, the so-called "attorneys' work product doctrine," or any other privilege or doctrine, then specify the general subject matter of the information and the basis to support each such objection.

16. If any information is withheld on grounds of privilege or other protection from disclosure, provide the following information: (a) every person to whom such information has been communicated and from whom such information was learned; (b) the nature and subject matter of the information; and (c) the basis on which the privilege or other protection from disclosure is claimed.

17. As set forth in 52 Pa. Code § 5.342(g), these discovery requests are continuing, and the Responding Party is obliged to change, supplement, and correct all answers given to conform to new or changing information.

18. "Formal Complaint" means the Formal Complaint filed by the Complainant at Docket No. C-2018-3005927.

**INTERROGATORIES AND REQUESTS FOR  
PRODUCTION OF DOCUMENTS PROPOUNDED ON  
CHERYL HIGGINS – SET I**

**PPL to Complainant-I-1**

**Re: Formal Complaint.**

- (a) Please explain in detail the reasons why you are challenging the Company's installation of the new smart meter.**
- (b) Please describe in detail all health concerns, if any, raised by the Company's new smart meter, state the bases for such claims, and provide all documents relied upon by you in your response.**
- (c) Please describe in detail all safety concerns, if any, raised by the Company's new smart meter, state the bases for such claims, and provide all documents relied upon by you in your response.**
- (d) Please describe in detail all privacy concerns, if any, raised by the Company's new smart meter, state the bases for such claims, and provide all documents relied upon by you in your response.**
- (e) Please describe in detail all reasons you believe the Company's new smart meter violates the law.**

**PPL to Complainant-I-2**

**Please identify all wireless phones, cellphones, microwaves, wireless routers, wifi networks, tablets, computers, Bluetooth speakers, wireless security systems, smart speakers (e.g., Amazon Echo), garage door openers, baby monitors, and walkie talkies that are contained in or used in the house.**

**PPL to Complainant-I-3**

**Please state whether you or any member of your household uses a cell phone. If so, please provide the make and model of each cell phone and, for each phone identified, provide 12 months of phone bills or other records of actual cell phone usage.**

**PPL to Complainant-I-4**

- (a) Please state every health condition you claim was caused by a smart meter or will be caused or worsened by the installation of PPL Electric's new smart meter.**
- (b) Please provide the date that every health condition identified in subpart (a) began.**

- (c) Please provide copies of all your medical records of every health condition identified in subpart (a).
- (d) For each alleged health condition that you do not have medical records for in response to subpart (c), please state whether such condition was diagnosed by a medical professional. If so, please provide the name, address, and telephone number of the medical professional and the date of the diagnosis.
- (e) For each of the alleged health conditions identified in subpart (a), please state whether you have been prescribed any therapy or treatment for the condition by a medical professional. If so, please identify the therapy or treatment, provide the name, address, and telephone number of the prescribing medical professional, and provide the date the therapy or treatment was prescribed.

**PPL to Complainant-I-5**

Please identify each person you plan to call as a fact witness in this proceeding. For each person, please:

- (a) Provide the person's name, home and business address, background, and qualifications;
- (b) Explain in detail the subject matter(s) on which the witness is expected to testify; and
- (c) Provide the source(s) of information relied upon or referenced by the witness.

**PPL to Complainant-I-6**

Please identify each person you plan to call as an expert witness in this proceeding. For each person, please:

- (a) Provide the person's name, home and business address, background, and qualifications;
- (b) Explain in detail the subject matter(s) on which the witness is expected to testify;
- (c) Provide the source(s) of information relied upon or referenced by the witness; and
- (d) Provide a copy of the expert witness's current curriculum vitae.

**PPL to Complainant-I-7**

**Please provide copies of all exhibits you intend to present or utilize at the evidentiary hearing in this proceeding. For each exhibit to be used as part of your direct case, please identify the witness who will be sponsoring the exhibit.**

# APPENDIX B

## Cheryl Higgins's Answers to PPL Electric Utilities Corporation's Interrogatories and Requests for Production of Documents – Set I

RECEIVED

JUL - 3 2019

PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

JUL 03 2019

Cheryl Higgins  
404 Main Street  
Avoca, PA 18641

(570) 954-7792

July 1, 2019

17 North Second Street  
12<sup>th</sup> Floor  
Harrisburg, PA 17101-1601

**Re: Cheryl Higgins v. PPL Electric Utilities Corporation**  
**Docket No. C-2018-3005927**

To Whom it May Concern,

Enclosed are my responses to the Interrogatories and Requests for Production of Documents Propounded by PPL Electric Utilities Corporation.

Sincerely,  
Cheryl Higgins

## **Cheryl Higgins' Response to interrogatories and requests for production of documents propounded by PPL Electric Utilities Corporation:**

I-1:

(a, c, d, e) I am challenging the Company's installation of the new smart meter on my home because the Energy Policy Act of 2005, passed by Congress, stated that smart meters would not be mandated or forced on people, only offered. Smart meters are proven to damage health- the World Health Organization calls them a Class 2B Carcinogen in the same class as lead, diesel, chloroform, and HIV. Smart meters are a proven surveillance tool; smart meters can be easily hacked, and also have caused 1000 house fires. Smart meters send personal data to third parties. Smart meters have proven to save no energy, householders' bills spike, and smart meters are harmful to the environment. Smart meters negatively affect pollinators, plants, and even building materials.

(b) I am concerned that my family will have increased risk of: degradation of immunity, migraines, agitation, insomnia, fatigue, skin disorders, tumors and cancerous issues, memory problems, neurological damage, genetic and hormonal changes. The World Health Organization classifies RF radiation as a class 2B carcinogen.

I-2:

We do not use a microwave in our house for the same reason we do not want a smart meter on our house. The items used in our household are as follows: one wireless router for 1 Wi-Fi network, 4 cell phones, 1 smart watch, 1 I-pad, 3 laptops, 1 Bluetooth speaker, and 1 smart speaker. We do use these devices in our home, but we take precautions by using blocking devices with every one of the previously mentioned devices. There is an "Arm's Length Rule" in my house where each device when possible must be more than an arm's length away when in use. We use Ethernet cords for smaller devices, keep all technology on airplane mode when not in use or throughout the night, and we use Faraday cases for phones that completely protect from EMF/RF energy that the devices give off. Our 19-year old son uses a grounding mat on his bed when he is away at school to protect him from harmful technology use in his dorm room. These precautions can be applied to each of the above devices, but will not help protect from electromagnetic frequencies from a smart meter. Smart meters are attached to your home, their frequencies cannot be blocked, and they pulsate stronger frequencies (depending on the company) up to every half hour. One smart meter can provide up to the full body radiation exposure of 160 cell phones. You can turn off the cell phone, and not use the Wi-Fi, but the meter is on all of the time. Even if you turn off the power to your home, the meter will still be on. Taking every precaution necessary while still being connected to the outside world should be a right to every American, just as shielding yourself from a harm that cannot be lessened should also be a right to every American.

I-3:

As stated earlier, we have 4 working cell phones in our house: 19-yr old son and myself: (2) I-Phone 6S, Husband and 17-yr old son: (2) I-Phone X.

I-4:

- (a) I am concerned for the health condition of my children if a smart meter is installed in my home due to the fact that I have seen, first hand, what harm a Wi-Fi router can do to my child. We moved in to our house 5 years ago and my 5-year old son began having odd health issues that no one could explain. My son developed warts all over his hands and fingers; his eyes became sunken in and developed deep dark circles; any insect bite he would get became infected; he was constantly drained of any energy; twice within 2 years, my son's face blew up like the elephant man due to a minor sickness his little body could not fight. His pediatrician could not explain it and a holistic practitioner could not figure out the cause either. Our older children started to think the house was making him sick, an idea we jokingly dismissed. I began researching day and night as to why my son was suffering like this. I came across information regarding electromagnetic frequencies and health issues. When we moved into our home, we had the wireless router installed in our 5-year old son's room because his room was the prime location for best use. I immediately told my husband of the possible issue and he did not believe me because it seemed so off-the-wall to be true. I had to try this because I had no other answers and our child was suffering going on almost 3 years. I called Comcast to move the router from his room to the downstairs foyer. They removed the router from his room within the week. Before the month was over, all 13 warts completely vanished from his hands, his face regained it's natural color, his immunity is now extremely strong, his energy picked up tremendously and he has not had one recurring issue with swollen lymph nodes since removing the router. This incident has allowed me to see the harm that can occur to children when not protected from technology in the home. Exposure is cumulative and children will have a lifetime to be exposed. We have 4 children (ages 19, 17, 10, and 2). From this situation endured, I have taken every precaution I can to ensure my children have the least exposure to harmful radiation now that we are aware of what it can do.
- (b) We moved into our home in October of 2014. My son suffered many health issues that were not documented because medical doctors could not diagnose any of his 'minor' ailments. No one knew why this was happening. The information is not clearly understood by the medical community. These issues may have been seen as minor ailments from a medical perspective, but to a mother watching her child suffer the way he did, it was not a minor issue. I spent many nights comforting my crying child asking why these things were happening to him.
- (c) (See section I-4 (b))
- (d) Many minor issues created a major life crisis for my young child. Thank goodness I took the time and researched the "lesser known" information or he would still be suffering to this day. Regardless of what your paid experts have to say, most issues are not documented and cannot be proven simply because they are not acknowledged. This situation has brought me to realize I must take charge when it

comes to the health of my children; I have recently been certified as a Natural Health Professional through Trinity School of Natural Health and, in the near future, will be joining the American Association of Drugless Practitioners. I am now aware of the harm that all technology can create, especially for children. It is my duty as their mother to fight for the safety of my children.

- (e) My 3<sup>rd</sup> son was given various health suggestions from his holistic practitioner that all helped to ease his health issues, but none removed the issues until the router was physically removed from his room.

# CONGRESS.GOV

## H.R.6 - Energy Policy Act of 2005

109th Congress (2005-2006)

**Sponsor:** [Rep. Barton, Joe \(R-TX-6\)](#) (Introduced 04/18/2005)  
**Committees:** House - Energy and Commerce; Education and the Workforce; Financial Services; Agriculture; Resources; Science; Ways and Means; Transportation and Infrastructure  
**Committee Reports:** [H. Rept. 109-190 \(Conference Report\)](#)  
**Latest Action:** 08/08/2005 Became Public Law No: 109-58. ([TXT](#) | [PDF](#)) ([All Actions](#))  
**Roll Call Votes:** There have been [43 roll call votes](#)  
**Tracker:** Introduced    Passed House    Passed Senate    Resolving Differences    To President    Became Law

[Summary\(3\)](#) [Text\(7\)](#) [Actions\(376\)](#) [Titles\(53\)](#) [Amendments\(266\)](#) [Cosponsors\(2\)](#) [Committees\(8\)](#) [Related Bills\(7\)](#)

There are 3 summaries for H.R.6. [Public Law \(08/08/2005\)](#) ▼

[Bill summaries](#) are authored by [CRS](#).

### Shown Here:

#### Public Law No: 109-58 (08/08/2005)

Energy Policy Act of 2005 - Sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Indian energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

**Title I: Energy Efficiency - Subtitle A: Federal Programs - (Sec. 101)** Directs the Architect of the Capitol to develop and implement a cost-effective energy conservation and management plan for all facilities administered by Congress.

(Sec. 102) Amends the National Energy Conservation Policy Act (NECPA) to revise energy reduction goals and performance requirements for federal buildings, including: (1) a timetable for reduced energy consumption; (2) metering of energy use; (3) federal procurement guidelines for energy efficient products, including Energy Star products and Federal Energy Management Program (FEMP) designated products; and (4) extension of federal agency authority to enter into energy savings performance contracts.

(Sec. 106) Authorizes the Secretary of Energy (the Secretary throughout this bill, unless otherwise named) to enter into voluntary agreements with one or more persons in industrial sectors that consume significant amounts of primary energy per unit of physical output to reduce the energy intensity of their production activities. Directs the Secretary to recognize and publicize the achievements of participants in such voluntary agreements.

(Sec. 107) Instructs the Secretary to establish an Advanced Building Efficiency Testbed demonstration program for advanced engineering systems, components, and materials to enable innovations in building technologies. Authorizes appropriations for FY2006-FY2008.

(Sec. 108) Amends the Solid Waste Disposal Act to prescribe procedural guidelines for increased use of recovered mineral component in federally funded projects involving procurement of cement or concrete.

(Sec. 109) Amends the Energy Conservation and Production Act (ECPA) to direct the Secretary to establish, by rule, revised federal building energy efficiency performance standards meeting specified requirements.

(Sec. 110) Amends the Uniform Time Act of 1966 to extend standard daylight time from March to November (currently it runs from April to October). Requires the Secretary to report to Congress on the impact of this extension upon energy consumption in the United States. Retains the right of Congress to revert Daylight Saving Time back to the 2005 time schedules.

(Sec. 111) Requires the Secretaries of the Interior, of Commerce, and of Agriculture to seek to: (1) incorporate energy efficient technologies in public and administrative buildings associated with management of the National Park System, National Wildlife Refuge System, National Forest System, National Marine Sanctuaries System, and other public lands and resources they manage; and (2) use energy efficient motor vehicles, including those equipped with biodiesel or hybrid engine technologies, in such management.

**Subtitle B: Energy Assistance and State Programs - (Sec. 121)** Amends the Low-Income Home Energy Assistance Act of 1981 and ECPA to extend the low-income home energy assistance and weatherization programs through FY2007 and FY2008, respectively.

Authorizes the states to purchase renewable fuels, including biomass, to implement the Low-Income Home Energy Assistance programs.

(Sec. 123) Amends ECPA to increase from 10% to 25% mandatory state energy efficiency goals in calendar year 2012 as compared to calendar year 1990.

(Sec. 124) Prescribes guidelines for: (1) a state energy efficient appliance rebate program; (2) federal grants to the states for energy efficient public buildings; (3) a low income community energy efficiency pilot program; and (4) a State Technologies Advancement Collaborative.

(Sec. 128) Amends ECPA to prescribe guidelines for state building energy efficiency codes incentives.

**Subtitle C: Energy Efficient Products** - (Sec. 131) Amends ECPA to: (1) establish a voluntary program at the Department of Energy (DOE) and the Environmental Protection Agency (EPA) to identify and promote energy-efficient products and buildings (Energy Star Program); (2) direct the Secretary to implement a consumer education program for homeowners and small business owners on energy efficiency benefits of air conditioning, heating, and ventilation systems; (3) direct the Secretary to convene a conference to promote a national public energy education program; and (4) direct the Secretary to implement an energy efficiency public information initiative.

(Sec. 135) Prescribes energy conservation standards for additional products, including: (1) testing requirements for ceiling fans and ceiling fan light kits, as well as (together with energy conservation standards for) refrigerated bottled or canned beverage vending machines, commercial refrigerators, freezers, and refrigerator-freezers; and (2) definitions and test procedures for the power use of battery chargers and external power supplies. Prescribes the bases for test procedures for illuminated exit signs, distribution transformers (including the low voltage dry-type), traffic signal modules, and medium base compact fluorescent lamps.

(Sec. 137) Directs the Federal Trade Commission to consider the effectiveness of the current consumer products labeling program, and changes to labeling rules.

(Sec. 138) Instructs the Administrator of General Services to study and report to Congress on the advantages and disadvantages of employing intermittent escalators in the United States.

(Sec. 139) Directs the Secretary to study and report to Congress on: (1) state and regional policies that promote cost-effective programs to reduce energy consumption by state-regulated utilities and nonregulated utilities; and (2) failure to comply with deadlines for new or revised energy conservation standards.

(Sec. 140) Directs the Secretary to establish a pilot program of financial assistance to between three and seven states to implement energy efficiency pilot projects.

**Subtitle D: Public Housing** - (Sec. 151) Amends the United States Housing Act of 1937 to include among the capital and management activities for which assistance may be made available to public housing agencies from the Public Housing Capital Fund, the improvement of energy and water-use efficiency by certain energy and water conserving fixtures and fittings, and integrated utility management and capital planning to maximize energy conservation and efficiency measures.

(Sec. 152) Requires a public housing agency to purchase energy-efficient appliances designated as Energy Star products or FEMP products unless it is not cost-effective to do so.

(Sec. 153) Amends the Cranston-Gonzales National Affordable Housing Act with respect to energy efficiency standards.

(Sec. 154) Requires the Secretary of Housing and Urban Development to report to Congress on development and implementation of an integrated energy strategy to reduce utility expenses through cost-effective energy conservation and efficiency measures and energy efficient design and construction of public and assisted housing.

**Title II: Renewable Energy - Subtitle A: General Provisions** - (Sec. 201) Instructs the Secretary of Energy to: (1) publish annual reports based upon assessments of renewable domestic energy resources, including solar, wind, biomass, ocean (tidal and thermal), geothermal, and hydroelectric energy; and (2) undertake new assessments as necessary, taking into account changes in market conditions, available technologies, and other relevant factors.

(Sec. 202) Amends the Energy Policy Act of 1992 to revise requirements for incentive payments for renewable energy production facilities. Instructs the Secretary to assign 60% of appropriated funds for any given year to facilities that use solar, wind, geothermal, or closed-loop (dedicated energy crops) biomass technologies to generate electricity if there are insufficient appropriations to make full payments for electric production from all qualified renewable energy facilities.

Authorizes appropriations for FY2006-FY2026.

(Sec. 203) Requires federal purchases of renewable energy to escalate in accordance with certain percentage guidelines.

(Sec. 204) Sets forth procedural guidelines under which the Administrator of General Services is authorized to establish a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems for electric production in new and existing public buildings.

(Sec. 205) Amends the Farm Security and Rural Investment Act of 2002 with respect to mandatory preference in federal agency procurements for items composed of the highest percentage of biobased products practicable.

(Sec. 206) Amends ECPA to direct the Secretary to establish criteria governing renewable energy systems installed under the Weatherization Assistance Program.

Instructs the Secretary of Energy to establish a program providing rebates for consumers for expenditures made for the installation of a renewable energy system in connection with a dwelling unit or small business.

Authorizes appropriations for FY2006-FY2010.

(Sec. 207) Authorizes FY2006 appropriations for the installation of a photovoltaic system for the DOE headquarters building (Forrestal Building) in the District of Columbia.

(Sec. 208) Establishes in the Environmental Protection Agency (EPA) the Sugar Cane Ethanol Pilot Program. Directs the Administrator of EPA to establish a pilot project in multiple states to study the production of ethanol from cane sugar, sugarcane, and sugarcane byproducts.

(Sec. 209) Amends the Public Utility Regulatory Policies Act of 1978 to authorize the Secretary to provide grants to: (1) increase energy efficiency, siting, or upgrading transmission and distribution lines serving rural areas; or (2) provide or modernize electric generation facilities that serve rural areas.

(Sec. 210) Authorizes a grants program to improve the commercial value of forest biomass for electric energy, useful heat, and transportation fuels.

(Sec. 211) Expresses the sense of Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on enactment of this Act, seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity.

**Subtitle B: Geothermal Energy** - John Rishel Geothermal Steam Act Amendments of 2005 - (Sec. 221) Amends the Geothermal Steam Act of 1970 (GSA) to revise competitive lease sale requirements.

(Sec. 222) Directs the Secretary of the Interior to: (1) accept nominations at any time from qualified companies and individuals; (2) hold biennial competitive lease sales for lands located in areas for which such nominations are pending; and (3) make available for noncompetitive leasing for a two-year period any tract for which a competitive lease sale is held, but for which no competitive lease sale bids have been received. (Currently, noncompetitive leasing is reserved for the lands not within any known geothermal resources area.)

Makes it a priority for the Secretary, and for the Secretary of Agriculture with respect to National Forest System land, to ensure timely completion of administrative actions, including amendments to applicable forest plans and resource management plans necessary to process applications for geothermal leasing pending on the date of enactment of this Act.

Requires all future forest and resource management plans for areas with high geothermal resource potential to consider geothermal leasing and development.

Authorizes the Secretary to offer the several parcels for bidding as a block in the competitive lease sale, if a geothermal resource that could be produced as a single unit likely underlies more than one parcel.

(Sec. 223) Requires a fee schedule in lieu of royalties for direct use of geothermal resources used for purposes other than commercial generation of electricity.

(Sec. 224) Reduces lease royalty percentages accruing from electricity produced using geothermal steam and associated geothermal resources.

Authorizes a credit against royalties owed to a lessee, in certain circumstances, equal to the value of electricity provided (in-kind payment) under contract to certain state or county governments entitled to a portion of such royalties.

Revises requirements for the disposal of moneys from sales, bonuses, rentals, and royalties. Requires payment to the county where leased lands or geothermal resources are or were located of 25% of any such monies deposited in the Treasury.

(Sec. 225) Directs the Secretaries of the Interior and of Agriculture to enter into a Memorandum of Understanding that establishes: (1) administrative procedures to expedite geothermal lease applications; (2) an updatable five-year program for geothermal leasing; (3) a program for reducing the backlog of pending geothermal lease applications; and (4) a joint lease and permit application data retrieval system.

(Sec. 226) Requires the Secretary of the Interior, acting through the Director of the U.S. Geological Survey and in cooperation with the states, to submit to Congress an update of the 1978 Assessment of Geothermal Resources.

(Sec. 227) Revises requirements for: (1) cooperative or unit plans of development or operation of geothermal fields; and (2) royalties on byproducts.

(Sec. 229) Revises requirements governing the authority of the Secretary of the Interior to readjust rentals and royalties of certain geothermal leases.

(Sec. 230) Credits certain annual rentals towards royalty payments.

(Sec. 231) Revises lease duration terms and work commitment requirements to: (1) replace 40-year renewable lease extensions with five-year renewable extensions; and (2) specify contents of regulations prescribing minimum work commitment requirements.

Revises conditions and requirements for conversion of a geothermal lease to either a mineral lease or a mining claim.

(Sec. 232) Maintains a geothermal lease in full force and effect for ten years after cessation of commercial production of heat or energy, if the lessee pays advanced royalties at the monthly average rate at which they were paid during production.

(Sec. 233) Prescribes a scale of annual rental rates for leases awarded in a competitive lease sale of \$2 per acre or fraction for the first year, \$3 for the second through tenth years, and \$5 for each subsequent year. Limits the \$1 per acre or fraction annual rental on a noncompetitive lease to ten years.

Requires the Secretary to terminate any lease whose rental is not paid more than 45 days after the due date.

(Sec. 234) Requires deposit into a separate account in the Treasury of amounts received by the United States in the first five fiscal years after the enactment of this Act as rentals, royalties, and other payments required under geothermal leases, excluding funds required to be paid to state and county governments. Authorizes the Secretary to: (1) use them to implement the Geothermal Steam Act of 1970 and this Act; and (2) transfer such funds to the Forest Service for coordination and processing of geothermal leases and use authorizations on federal land.

(Sec. 235) Amends the Geothermal Steam Act of 1970 to increase the acreage of geothermal leases and to repeal the statutory maximum placed upon such leases.

(Sec. 237) Authorizes the Secretary of Energy, acting through the Idaho National Laboratory, to participate in the Intermountain West Geothermal Consortium to address science and science policy issues surrounding the expanded discovery and use of geothermal energy, including from geothermal resources on public lands.

Instructs the Secretary to provide financial assistance to Boise State University for expenditure under contracts with consortium members to implement consortium activities.

**Subtitle C: Hydroelectric** - (Sec. 241) Amends the Federal Power Act to require the appropriate Secretary, whenever a condition to an applied-for hydroelectric license is deemed necessary for a project works within a federal reservation, to accept an alternative condition proposed by the applicant and any party to the proceeding that meets certain criteria. Applies the same requirement to an alternative fishway proposed by a license applicant or licensee.

(Sec. 242) Requires the Secretary to make specified incentive payments to owners or operators of: (1) certain qualified hydroelectric facilities; as well as (2) hydroelectric facilities at existing dams to make capital improvements directly related to improving facility efficiency by at least 3%. Authorizes appropriations for FY2006-FY2015.

(Sec. 244) Amends Federal Power Act requirements governing Alaska state jurisdiction over small hydroelectric power projects to cite conditions under which Alaska may decline to adopt recommendations proposed for protection of wildlife by federal and state fish and wildlife agencies.

(Sec. 245) Sets forth conditions under which the Federal Energy Regulatory Commission (FERC) is directed to either extend or reinstate for a three-year period a permit for the Flint Creek (Montana) hydroelectric project.

Sets a \$25,000 limit upon charges paid for the use of federal land by any political subdivision of Montana that holds a FERC license for a specified project in Granite and Deer Lodge Counties, Montana, for the use of that land for each year during such entity holds the license.

(Sec. 246) Amends the Public Utility Regulatory Policies Act to redefine an "existing dam" as one constructed before July 22, 2005 (currently, before April 20, 1977).

**Subtitle D: Insular Energy** - (Sec. 251) Amends federal law to revise requirements for mandatory comprehensive energy plans for Caribbean and Pacific insular areas of the United States.

Instructs the Secretary of Energy to: (1) identify and evaluate the strategies or projects with the greatest potential for reducing the dependence on imported fossil fuels used for the generation of electricity, including increased use of specified sources of renewable energy; and (2) submit to certain congressional committees updated plans for each insular area.

Authorizes the Secretary of the Interior to make grants to U.S. territories to implement projects that protect electric power transmission and distribution lines from hurricane and typhoon damage.

(Sec. 252) Directs the Secretary of Energy, upon request of an electric utility located in an insular area that commits to fund at least 10% of the cost, to conduct feasibility studies of projects with potential to significantly reduce the dependence of an insular area on imported fossil fuels, or provide needed distributed generation to an insular area, at a reasonable cost.

**Title III: Oil and Gas - Subtitle A: Petroleum Reserve and Home Heating Oil** - (Sec. 301) Amends the Energy Policy and Conservation Act to make permanent: (1) the authority of the Secretary of Energy to operate the Strategic Petroleum Reserve (SPR); and (2) standby energy authorities, including summer fill and fuel budgeting programs.

Directs the Secretary to fill the SPR to its one billion-barrel capacity.

Requires the Secretary to develop procedures for acquiring petroleum for the SPR, taking into account specified factors.

(Sec. 302) Amends the Energy Act of 2000 to extend for five years the authorization for the National Oilheat Research Alliance.

(Sec. 303) Instructs the Secretary of Energy to complete a proceeding to select sites necessary to enable acquisition of the full authorized SPR volume.

**Subtitle B: Natural Gas** - (Sec. 311) Amends the Natural Gas Act to extend its jurisdiction to: (1) importation or exportation of natural gas in foreign commerce and to persons engaged in it; and (2) liquefied natural gas (LNG) terminals, including all facilities located onshore or in state waters that are used to receive, unload, load, store, transport, gasify, liquefy, or process natural gas that is imported to the United States from a foreign country, exported to a foreign country from the United States, or transported in interstate commerce by waterborne tanker.

Prescribes procedural guidelines governing FERC authorization of siting, construction, expansion, or operation of liquefaction or gasification of natural gas terminals.

Grants FERC exclusive authority to approve or deny, according to specified procedures, an application for the siting, construction, expansion, or operation of a liquefied natural gas (LNG) terminal.

Directs FERC to require a LNG terminal operator to develop an Emergency Response Plan, include a cost-sharing plan, in consultation with the United States Coast Guard and state and local agencies prior to FERC approval to begin construction.

(Sec. 312) Authorizes FERC to permit a natural gas company to provide storage and storage-related services at market-based rates for new storage capacity related to a specific facility placed in service after enactment of this Act, notwithstanding the fact that the company is unable to demonstrate that it lacks market power.

(Sec. 313) Designates FERC as the lead agency for coordinating federal permits and other authorizations and compliance with the National Environmental Policy Act of 1969 (NEPA). Directs FERC to establish a schedule for all federal authorizations.

(Sec. 314) Sets forth increased criminal and civil penalties for violations of the Natural Gas Act and of the Natural Gas Policy Act of 1978.

(Sec. 315) Prohibits manipulative or deceptive service in connection with the purchase or sale of natural gas or the purchase or sale of transportation services subject to FERC jurisdiction.

(Sec. 316) Directs FERC to facilitate price transparency in markets for the sale or transportation of physical natural gas in interstate commerce.

(Sec. 317) Directs the Secretary to convene up to three federal-state LNG forums.

(Sec. 318) Authorizes the court to prohibit from trading and serving as officers of a natural gas company any individuals engaged in violation of the Natural Gas Act .

**Subtitle C: Production** - (Sec. 322) Amends the Safe Drinking Water Act to exclude from the definition of underground injection the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil or gas, or geothermal production activities.

**Subtitle D: Naval Petroleum Reserve** - (Sec. 331) Transfers from the Secretary of Energy to the Secretary of the Interior administrative jurisdiction and control over all but specified public domain lands included within Naval Petroleum Reserve Numbered 2 located in Kern County, California.

(Sec. 332) Establishes in the Treasury the Naval Petroleum Reserve Numbered 2 Lease Revenue Account as the sole and exclusive source of funds available to the Secretary of the Interior to pay for environmental-related costs and expenses incurred by the United States.

(Sec. 333) Conveys to the City of Taft, California, without any payment of consideration by the City, all surface right, title, and interest of the United States to a parcel of real property (a portion of the Naval Petroleum Reserve) located in Mount Diablo meridian, County of Kern, California.

(Sec. 334) Revokes in its entirety Executive Order of December 13, 1912, which created Naval Petroleum Reserve Numbered 2 (thereby revoking the withdrawal of such land).

**Subtitle E: Production Incentives** - ( Sec. 342) Establishes a program for in-kind oil and gas royalties. Authorizes the Secretary of the Interior, in disposing of gas or oil royalty taken in-kind, to grant a preference to any person, including any state or federal agency, for the purpose of providing additional resources to any federal low-income energy assistance program.

(Sec. 343) Prescribes conditions for reductions and termination of of royalty rates on marginal property. Defines as an onshore unit, communization agreement, or other lease that produces on average the combined equivalent of less than 15 barrels of oil per well per day or 90 million British thermal units of gas per well per day.

(Sec. 344) Directs the Secretary of the Interior to promulgate final royalty incentive regulations for natural gas production from deep wells and ultra deep wells in certain shallow waters of the Gulf of Mexico.

(Sec. 345) Suspends royalties for deep water production in certain parts of the Gulf of Mexico and in certain Planning Areas offshore Alaska.

(Sec. 347) Transfers to the Naval Petroleum Reserves Production Act of 1976 certain requirements governing exploration of the National Petroleum Reserve (Reserve) in Alaska.

Revises such requirements to direct the Secretary of the Interior to conduct an expeditious program of competitive leasing of oil and gas in such Reserve. Prescribes leasing guidelines that authorize the Secretary to waive, suspend, or reduce the rental fees or minimum royalty, or reduce the royalty on an entire leasehold, if the Secretary determines that it is in the public interest.

(Sec. 348) Directs the Secretary of the Interior to establish the North Slope Science Initiative to coordinate collection of scientific data regarding the terrestrial, aquatic, and marine ecosystems of the North Slope of Alaska.

(Sec. 349) Directs the Secretary of the Interior, in cooperation with the Secretary of Agriculture, to establish a program to remediate, reclaim, and close orphaned, abandoned, or idled oil and gas wells located on land administered by the land management agencies within the Department of the Interior and the Department of Agriculture. Authorizes appropriations for FY2006-FY2010.

(Sec. 350) Amends the Mineral Leasing Act to authorize the Secretary to issue separately for any area that contains any combination of tar sand and oil or gas (or both): (1) a lease for exploration for and extraction of tar sand; and (2) a lease for exploration for and development of oil and gas.

States that the minimum acceptable bid required for a lease issued for tar sand shall be \$2 per acre.

Authorizes the Secretary to waive, suspend, or alter any requirement that a permittee prospecting for tar sand must exercise due diligence to promote any resource covered by a combined hydrocarbon lease.

(Sec. 351) National Geological and Geophysical Data Preservation Program Act of 2005 - Instructs the Secretary to implement a National Geological and Geophysical Data Preservation Program, including establishment of a data archive system. Authorizes appropriations for FY2006-FY2010.

(Sec. 352) Amends the Mineral Leasing Act to exempt from its oil and gas lease acreage limitation any lease committed to a federally approved unit or cooperative plan, or communization agreement, or for which royalty, including compensatory royalty or royalty-in-kind, was paid in the preceding calendar year. (Thus removes acreage limitations from oil and gas leases granted royalty relief under this Act.)

(Sec. 353) Directs the Secretary of the Interior to grant royalty relief for natural gas produced from gas hydrate resources under certain eligible leases on the Outer Continental Shelf and federal lands in Alaska.

(Sec. 354) Directs the Secretary of the Interior to undertake a rulemaking for royalty reductions for eligible leases, including those for oil and gas.

Instructs the Secretary of Energy to: (1) establish a competitive grant program for oil and gas producers to implement projects to inject carbon dioxide to enhance recovery of oil or natural gas while increasing carbon dioxide sequestration; and (2) assess and report to Congress on the economic implications of the dependence of Hawaii on oil as its principal source of energy.

(Sec. 356) Requires the Denali Commission to use specified funds to implement designated energy programs, including: (1) energy generation and development; (2) fuel cells, hydroelectric, solar, wind, wave, and tidal energy; (3) the replacement and cleanup of fuel tanks; and (4) the construction of fuel transportation networks and related facilities.

(Sec. 357) Directs the Secretary of the Interior to inventory, analyze, and report to Congress on oil and natural gas resources beneath all of the waters of the United States Outer Continental Shelf (OCS).

**Subtitle F: Access to Federal Lands** - (Sec. 361) Requires the Secretary of the Interior to perform an internal review of current federal onshore oil and gas leasing and permitting practices.

(Sec. 362) Prescribes general requirements for management of federal oil and gas leasing programs by, including best management practices of, the Secretaries of the Interior and of Agriculture. Authorizes appropriations for FY2006-FY2010.

(Sec. 363) Requires the Secretary to enter into a memorandum of understanding with the Secretary of Agriculture regarding oil and gas leasing on public lands and National Forest lands under their respective jurisdictions.

(Sec. 364) Amends the Energy Act of 2000 to revise the requirement that the Secretary of the Interior, when inventorying all onshore federal lands, identify impediments or restrictions upon oil and gas development.

(Sec. 365) Instructs the Secretary of the Interior to establish a Federal Permit Streamlining Pilot Project.

(Sec. 366) Amends the Mineral Leasing Act to set deadlines for an expedited permit application process.

(Sec. 367) Instructs: (1) the Secretary of the Interior to update regulations to revise the per acre rental fee zone value schedule by state, county, and type of linear right-of-way use to reflect current values of land in each zone; and (2) the Secretary of Agriculture to make the same revision for linear rights-of-way granted, issued, or renewed on National Forest System land under the Federal Lands Policy and Management Act of 1976.

(Sec. 368) Prescribes guidelines governing energy right-of-way corridors on federal land.

Directs the Secretaries of Agriculture, of Commerce, of Defense, of Energy, and of the Interior (the Secretaries), in consultation with FERC, states, tribal or local governmental entities, affected utility industries, and other interested persons, are directed to consult with each other and to: (1) designate corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on federal land in the 11 contiguous Western States; (2) incorporate the designated corridors into the relevant agency land use and resource management or equivalent plans; and (3) ensure that additional corridors are promptly identified and designated.

(Sec. 369) Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005 - Declares that it is the policy of the United States that U.S. oil shale, tar sands, and other unconventional fuels are strategically important domestic resources that should be developed to reduce the growing U.S. dependence on politically and economically unstable sources of foreign oil imports.

Instructs the Secretary of the Interior to make available for leasing public lands in Colorado, Utah, and Wyoming in order to conduct research and development of technologies for the recovery of liquid fuels from oil shale and tar sands resources.

Instructs the Secretary of Energy to establish a task force to develop a program to coordinate and accelerate the commercial development of strategic unconventional fuels, including oil shale and tar sands resources.

Requires the Office of Petroleum Reserves of the Department of Energy to: (1) coordinate the creation and implementation of a commercial strategic fuel development program for the United States; (2) promote and coordinate federal actions that facilitate the development of strategic fuels in order to address effectively domestic energy supply needs; and (3) work closely with the Task Force and coordinate its staff support.

Amends the Mineral Leasing Act to modify leasing guidelines for: (1) lands within special tar sand areas; (2) oil shale deposits and expanded lease acreage; and (3) lease exclusion from any chargeability limitation associated with oil and gas leases.

Designates the Department of the Interior as the lead federal agency for coordinating all applicable federal authorizations and environmental reviews.

Directs the Secretary of the Interior to implement a national assessment of oil shale and tar sands resources in order to evaluate and map oil shale and tar sands deposits, in the following order of priority: (1) the Green River Region of Colorado, Utah, and Wyoming; (2) the Devonian oil shales and other hydrocarbon-bearing rocks called "shale" located east of the Mississippi River; and (3) any remaining area in the central and western United States (including Alaska) that contains oil shale and tar sands, as determined by the Secretary.

Instructs the Secretary of the Interior to: (1) identify public lands containing deposits of oil shale or tar sands within the Green River, Piceance Creek, Uintah, and Washakie geologic basins; (2) give priority to implementing land exchanges within those basins; and (3) establish royalties, fees, rentals, bonus, or other payments for leases that encourage development of the oil shale and tar sands resources.

Instructs the Secretary of Defense to procure fuel derived from coal, oil shale, and tar sands extracted by either mining or in-situ methods and refined and processed in the United States. Grants the Secretary of Defense multiyear contract authority.

Authorizes appropriations.

(Sec. 370) Withdraws all federal land within the boundary of Finger Lakes National Forest in New York from: (1) all forms of entry, appropriation, or disposal under the public land laws; and (2) disposition under all laws relating to oil and gas leasing.

(Sec. 371) Amends the Mineral Leasing Act to cite conditions for the reinstatement of oil and gas leases terminated for certain failure to pay rentals.

(Sec. 372) Directs the Secretary of Energy to enter into a memorandum of understanding with relevant entities to coordinate all applicable federal authorizations and environmental reviews relating to energy rights-of-way on public land.

(Sec. 373) Expresses the sense of Congress that any regulation of the development of oil, gas, or other minerals in the subsurface of the lands constituting Padre Island National Seashore should be made as if those lands retained the status they had on September 27, 1962.

(Sec. 374) Amends federal law governing the reservation of federal mineral rights in the conveyance of certain lands to Livingston Parish, Louisiana. Directs the Secretary of the Interior to convey the remaining mineral rights to the parties who as of the enactment of the Energy Policy Act of 2005 would be recognized as holders of a right, title, or interest to any portion of such minerals under the laws of Louisiana, but for the interest of the United States in such minerals.

**Subtitle G: Miscellaneous** - (Sec. 381) Amends the Coastal Zone Management Act of 1972 to revise procedural requirements for deadlines and decisions on appeals to the Secretary of the Interior regarding consistency of federal activities with state management programs.

(Sec. 383) Allows a lessee to withhold from payment any royalty due and owing to the United States under any leases under the Outer Continental Shelf Lands Act for offshore oil or gas production from a covered lease tract if, on or before the date that the payment is due and payable to the United States, the lessee makes a payment to the state of 44 cents for every \$1 of royalty withheld.

(Sec. 384) Amends the Outer Continental Shelf Lands Act to revise definitions and guidelines governing the coastal impact assistance program. Sets forth allocation guidelines among producing states and the amount of Outer Continental Shelf revenues.

(Sec. 385) Requires the Secretary to arrange with the National Academy of Sciences to study and report to Congress on short-term and long-term availability of skilled workers to meet the energy and mineral security requirements of the United States.

(Sec. 386) Bans issuance of any federal or state permit or lease for new oil and gas slant, directional, or offshore drilling in or under the Great Lakes.

(Sec. 387) Requires removal of any state currently on the list of Affected States with respect to federal coalbed methane regulation under the Energy Policy Act of 1992 if, within three years after enactment of this Act, the state takes, or before the date of enactment has taken, any of the actions required for removal from the list under such law.

(Sec. 388) Amends the Outer Continental Shelf Lands Act to authorize the Secretary of the Interior to grant, on either a competitive or noncompetitive basis, a lease, easement, or right-of-way on the outer Continental Shelf for activities not otherwise authorized under specified laws, if those activities: (1) support exploration, development, production, transportation, or storage of oil, natural gas; (2) produce or support production, transportation, or transmission of energy from sources other than oil and gas; or (3) use, for energy-related or marine-related purposes, facilities currently or previously used for activities authorized under this Act, unless prohibited by moratorium.

Sets forth implementation requirements.

(Sec. 389) Amends the Oil Pollution Act of 1990 to terminate authorization for funding the Oil Spill Recovery Institute one year after the date on which the Secretary of Energy determines that oil and gas exploration, development, and production in Alaska have ceased. (Currently the authorization will terminate September 30, 2012.)

(Sec. 390) States that action by the Secretary of the Interior in managing the public lands, or the Secretary of Agriculture in managing National Forest System Lands, with respect to certain oil or gas drilling related activities shall be subject to a rebuttable presumption that the use of a categorical exclusion under NEPA would apply if the activity is conducted pursuant to the Mineral Leasing Act for the purpose of exploration or development of oil or gas.

**Subtitle H: Refinery Revitalization** - (Sec. 392) Authorizes the Administrator of the Environmental Protection Agency, upon request, to enter into a refinery permitting cooperative agreement with the state under which each signatory identifies the steps, including timelines, it will take to streamline the consideration of federal and state environmental permits for a new refinery.

**Title IV: Coal - Subtitle A: Clean Coal Power Initiative** - (Sec. 401) Authorizes appropriations for FY2006-FY2014 for a Clean Coal Power Initiative.

(Sec. 404) Directs the Secretary to award competitive, merit-based grants to institutions of higher education for the establishment of clean coal centers of excellence for energy systems of the future.

**Subtitle B: Clean Power Projects** - (Sec. 411) Grants the Secretary loan guarantee authority for a certain project to produce energy from coal of less than 7,000 Btu/lb. using appropriate advanced integrated gasification combined cycle technology, including repowering of existing facilities.

States that such loan guarantees do not preclude the facility from receiving an allocation for investment tax credits under Internal Revenue Code.

(Sec. 412) Authorizes appropriations for the Secretary to provide the cost of a direct loan to the owner of a clean coal technology plant located near Healy, Alaska, constructed under Department cooperative agreement number DE-FC-FY22-91PC90544, in order to place such plant into reliable operation for the generation of electricity. Sets the loan ceiling at \$80 million.

(Sec. 413) Directs the Secretary to carry out a project to demonstrate production of energy from coal mined in the western United States using integrated gasification combined cycle technology.

(Sec. 414) Authorizes the Secretary to provide loan guarantees for: (1) a certain project to produce energy from a plant using integrated (coal) gasification combined cycle technology of at least 400 megawatts in capacity that produces power at competitive rates in deregulated energy generation markets and does not receive a subsidy from ratepayers; and (2) at least five petroleum coke gasification projects.

(Sec. 416) Directs the Secretary to use \$5 million to demonstrate the viability of high-energy electron scrubbing technology on commercial-scale electrical generation using high-sulfur coal.

(Sec. 417) Authorizes appropriations for the Secretary to carry out a program to evaluate the commercial and technical viability of advanced technologies for the production of Fischer-Tropsch and other transportation fuels, manufactured from Illinois basin coal, including the capital modification of existing facilities and the construction of testing facilities.

**Subtitle C: Coal and Related Programs** - (Sec. 431) Amends the Energy Policy Act of 1992 to direct the Secretary to implement a financial assistance program to facilitate production and generation of coal-based power through the deployment of clean coal electric generating equipment and processes that improve energy efficiency or environmental performance consistent with relevant federal and state clean air requirements.

Authorizes appropriations for: (1) generation projects through FY2013; and (2) an air quality enhancement program through FY2011.

**Subtitle D: Federal Coal Leases** - Coal Leasing Amendments Act of 2005 - (Sec. 431) Amends the Mineral Leasing Act to authorize the leaseholder of either coal lands or coal deposits to secure modifications of the original coal lease by including additional coal lands or coal deposits contiguous or cornering to those encompassed in the lease. Repeals the 160-acre limitation for coal leases.

(Sec. 433) Allows the Secretary of the Interior to: (1) establish a period of more than 40 years for the mining plan of a logical mining unit; and (2) modify the conditions for advance royalty payments under coal leases.

(Sec. 435) Repeals the deadline for submission for the Secretary's approval of a coal lease operation and reclamation plan.

(Sec. 436) Prohibits the Secretary from requiring a surety bond or any other financial assurance to guarantee payment of deferred bonus bid installments with respect to any coal lease issued on a cash bonus bid to a lessee or successor in interest having a history of a timely payment of noncontested coal royalties and advanced coal royalties in lieu of production (where applicable) and bonus bid installment payments.

(Sec. 437) Instructs the Secretary of the Interior to review and report to Congress on coal assessments and other available data to identify: (1) federal lands, other than National Park lands, with coal resources available for development; (2) the extent and nature of any restrictions or impediments to the development of coal resources on such lands; and (3) resources of compliant coal and supercompliant coal.

**Title V: Indian Energy** - Indian Tribal Energy Development and Self-Determination Act of 2005 - (Sec. 502) Amends the Department of Energy Organization Act and the Energy Policy Act of 1992 to establish the Office of Indian Energy Policy and Programs to promote Indian energy activities and tribal energy resource development through a program of grants and loans.

(Sec. 503) Revises requirements for Indian tribal energy resource development. Directs the Secretary of the Interior to establish an Indian energy resource development program to assist consenting Indian tribes and tribal energy resource development organizations. Authorizes appropriations for FY2006-FY2016.

Requires the Director of the Office of Indian Energy Policy and Programs, DOE, to establish grant programs to assist consenting Indian tribes in meeting energy education, research and development, planning, and management needs, including specified technology sequestration programs. Authorizes appropriations for FY2006-FY2016.

Authorizes the Secretary of Energy to provide loan guarantees for up to 90% of the unpaid principal and interest due on any loan made to any Indian tribe for energy development. Authorizes appropriations.

Revises requirements for the Indian tribal energy resource regulation grant program.

Prescribes implementation requirements governing leases, business agreements, and rights-of-way involving Indian energy development or transmission. Authorizes appropriations for FY2006-FY2016.

Directs the Administrators of the Bonneville Power Administration, the Western Area Power Administration, and any other pertinent power administration to encourage Indian tribal energy development through programs within their respective Administrations, including power allocations and purchases.

Authorizes appropriations.

Directs the Secretary to study and report to Congress on: (1) tribal use of federal power allocations or sales by specified power administrations; and (2) the cost and feasibility of a demonstration project using wind energy generated by Indian tribes and hydropower generated by the Army Corps of Engineers on the Missouri River to supply firming power to the Western Area Power Administration.

(Sec. 505) Declares the Dine Power Authority (a Navajo Nation enterprise) eligible to receive grants and other assistance for development of a transmission line from the Four Corners Area (Utah, Colorado, New Mexico, and Arizona) to southern Nevada, including related power generation opportunities.

Amends federal law to extend a certain Navajo Electrification Demonstration Program to ten years and to extend the authorization of appropriations to FY2011.

(Sec. 506) Instructs the Secretary of Housing and Urban Development to promote energy conservation in housing that is located on Indian land and assisted with federal resources.

**Title VI: Nuclear Matters - Subtitle A: Price-Anderson Act Amendments** - Price-Anderson Amendments Act of 2005 - (Sec. 602)

Amends the Atomic Energy Act of 1954 to modify and extend through December 31, 2025, indemnification authority and liability limits for Nuclear Regulatory Commission (NRC) licensees, DOE contractors, and for nonprofit educational institutions.

(Sec. 610) Repeals the mandate that the Secretary determine by rule whether nonprofit educational institutions should receive automatic remission of any civil monetary penalties for violation of DOE safety regulations.

Repeals the specific exemption from liability for such penalties affecting certain universities, corporations, and their subcontractors or suppliers. Limits to the total amount of fees paid within any one-year period under the contract under which a violation occurs the total amount of civil penalties incurred within any one-year period by a not-for-profit contractor, subcontractor, or supplier. Defines "not-for-profit"

to mean that no part of the net earnings of the contractor, subcontractor, or supplier inures to the benefit of any natural person or for-profit artificial person.

**Subtitle B: General Nuclear Matters** - (Sec. 621) Amends the Atomic Energy Act of 1954 to specify that a commercial nuclear power utilization or production facility license extends for not more than 40 years (as under current law) from the authorization to commence operations.

(Sec. 622) Authorizes the NRC to establish a Scholarship and Fellowship program to enable students to study, for at least one academic semester or equivalent term, science, engineering, or another field of study in a critical skill area related to the NRC regulatory mission.

(Sec. 624) Authorizes the NRC to exempt from the federal civil service pension offset an annuitant who was formerly a NRC employee and is hired as consultant to the NRC if there is exceptional difficulty in recruiting or retaining a qualified employee.

(Sec. 625) Waives application of federal antitrust law to applications for a license to construct or operate a utilization or production facility.

(Sec. 626) States that a general duty of the NRC is to ensure that sufficient funds will be available to decommission certain licensed production or utilization facilities, including standards and restrictions governing the control, maintenance, use, and disbursement by any former licensee that has control over any fund for the decommissioning of a facility.

(Sec. 627) Prohibits DOE from reimbursing any contractor or subcontractor for legal fees or expenses incurred with respect to a complaint subsequent to an adverse determination or final judgment unless the determination or final judgment is reversed upon further administrative or judicial review.

(Sec. 628) Directs the Secretary to establish a pilot program to decommission and decontaminate the sodium-cooled fast breeder experimental test-site reactor located in northwest Arkansas, in accordance with a specified DOE report relating to the reactor, dated August 31, 1998. Authorizes appropriations.

(Sec. 629) Amends the Energy Reorganization Act of 1974 to extend whistleblower protections to federal employees of either DOE or the NRC, including all contractor and subcontractor employees.

Permits whistleblower complaints to be brought directly in U.S. district court for de novo review if the Secretary of Labor fails to issue a final order within the statutory deadline.

(Sec. 630) Cites conditions under which the NRC may issue an export license for highly enriched uranium for medical isotope production.

(Sec. 631) Instructs the Secretary to submit to Congress: (1) an official notification of the final designation of a DOE entity for completing activities needed to provide a facility for safely disposing of all greater-than-Class C low-level radioactive waste; and (2) a plan to ensure the continued recovery and storage of greater-than-Class C low-level radioactive sealed sources that pose a security threat until a permanent disposal facility is available.

(Sec. 632) Amends the Atomic Energy Act of 1954 to prohibit nuclear exports to countries that sponsor terrorism. Authorizes the President to waive such prohibition under certain circumstances.

(Sec. 633) Instructs the Secretary to take action necessary to ensure continued eligibility to participate in or transfer into certain pension or health care benefit plans if an employee: (1) is involved in providing infrastructure or environmental remediation services at the Portsmouth, Ohio, or the Paducah, Kentucky, Gaseous Diffusion Plant; (2) has been an employee of DOE's predecessor management and integrating contractor (or its first or second tier subcontractors), or of the Corporation, at the Portsmouth, Ohio, or the Paducah, Kentucky, facility; and (3) was eligible as of April 1, 2005, to participate in or transfer into the Multiple Employer Pension Plan or the associated multiple employer retiree health care benefit plans.

(Sec. 634) Directs the Secretary to provide for establishment of two projects in geographical areas regionally and climatically diverse to demonstrate the commercial production of hydrogen at existing nuclear power plants. Authorizes appropriations.

(Sec. 635) Prohibits assumption of liability by the U.S. Government for certain foreign incidents.

(Sec. 636) Authorizes appropriations for this subtitle.

(Sec. 637) Amends the Omnibus Budget Reconciliation Act of 1990 with respect to NRC user fees and annual charges.

(Sec. 638) Authorizes the Secretary to enter into contracts with sponsors of an advanced nuclear facility that cover a total of six reactors consisting of not more than three different reactor designs, in accordance with statutory requirements.

(Sec. 639) Amends the Atomic Energy Act of 1954 to authorize the NRC to enter into a contract, agreement, or arrangement with the DOE or the operator of a DOE facility, if: (1) the conflict of interest cannot be mitigated; and (2) adequate justification exists to proceed without its mitigation.

**Subtitle C: Next Generation Nuclear Plant Project** - (Sec. 641) Instructs the Secretary to establish the Next Generation Nuclear Plant Project consisting of design, construction, and operation of a prototype plant, including a nuclear reactor: (1) based on Generation IV Nuclear Energy Systems Initiative research and development; and (2) used to generate electricity or produce hydrogen, or do both.

(Sec. 642) Requires the Project to be managed in DOE by the Office of Nuclear Energy, Science, and Technology.

Designates the Idaho National Laboratory as the lead laboratory, where the prototype nuclear reactor and associated plant shall be sited.

(Sec. 643) Directs the Secretary to ensure that the Project is structured to maximize the transfer of technologies from other sources, including the nuclear power and chemical processing industries.

Provides guidelines for: (1) international collaboration and assistance; (2) review by the Nuclear Energy Research Advisory Committee; (3) NRC licensing and regulatory authority; and (4) Project timelines.

(Sec. 645) Authorizes appropriations for FY2006-FY2021.

**Subtitle D: Nuclear Security - (Sec. 651)** Amends the Atomic Energy Act of 1954 to direct the NRC to conduct security evaluations at each licensed nuclear facility to assess the ability of a private security force to defend against any applicable design basis threat.

Requires the NRC to initiate a rulemaking proceeding to revise its design basis threats.

Directs the NRC to assign a federal security coordinator to each of its regions to monitor and coordinate security measures among the private security forces at classes of nuclear facilities.

Directs the NRC to require backup power for certain emergency notification systems for nuclear power plants located in specified areas.

Authorizes the NRC to provide grants, contracts, and other contributions to institutions of higher education to support training and curricula pertaining to nuclear safety, security, environmental protection, or other fields critical to the NRC's regulatory mission.

Requires the NRC to: (1) set forth regulatory guidelines for the import or export of radiation sources that include a mandatory tracking system; and (2) submit to Congress the results of a study by the National Academy of Sciences about industrial, research, and commercial uses for radiation sources.

Establishes the Task Force on Radiation Source Protection and Security to evaluate and report to Congress and the President on the security of radiation sources in the United States from potential terrorist threats, sabotage, theft, or use of a radiation source in a radiological dispersal device.

Sets forth guidelines for: (1) transfer and disposal of byproduct material in a disposal facility; and (2) formulation of a plan for transition of regulatory authority between the states and the NRC with respect to byproduct material.

(Sec. 652) Amends the Atomic Energy Act of 1954 to direct the NRC to require fingerprinting for criminal history record checks for individuals permitted unescorted access to a utilization facility, radioactive material, other property subject to its regulations, or certain safeguards information.

(Sec. 653) Authorizes the NRC to authorize the use of firearms by security personnel of NRC licensees and certificate holders.

(Sec. 655) Identifies additional types of nuclear facilities whose sabotage incurs certain federal criminal penalties. Increases such penalties, including imprisonment for up to life without parole.

(Sec. 656) Directs the NRC to establish a system to ensure that byproduct materials, source materials, special nuclear materials, high-level radioactive waste, spent nuclear fuel, transuranic waste, and low-level radioactive waste materials, when transferred or received in the United States by any party pursuant to an import or export license, are accompanied by a manifest describing the type and amount of such materials. Subjects to a security background check each individual receiving or accompanying the transfer of such materials.

(Sec. 657) Requires the NRC, before issuing a utilization facility license, to consult with the Department of Homeland Security (DHS) concerning the potential vulnerabilities of the proposed facility's location to terrorist attack.

**Title VII: Vehicles and Fuels - Subtitle A: Existing Programs - (Sec. 701)** Amends the Energy Policy and Conservation Act to cite circumstances that permit an agency to qualify for a waiver of the alternative fuel use requirement applicable to dual fueled federal light duty vehicles.

(Sec. 702) Changes from discretionary to mandatory the authority of the General Services Administration (GSA), and any other federal agency that procures motor vehicles for distribution to other federal agencies, to allocate the incremental cost of alternative fueled vehicles over the cost of comparable gasoline vehicles across the entire fleet of motor vehicles distributed by such agency.

(Sec. 703) Amends the Energy Policy Act of 1992 to authorize the Secretary of Energy to waive compliance with the fleet requirement program governing federal and state motor vehicle fleets on a showing that the fleet will achieve a reduction in annual petroleum fuel consumption, and complies with all applicable vehicle emission standards.

(Sec. 704) Directs the Secretary to study and report to Congress on the effect that certain alternative fueled vehicle requirements have had upon: (1) the development of alternative fueled vehicle technology; (2) the availability of that technology in the market; and (3) the cost of alternative fueled vehicles.

(Sec. 705) Changes from November 13, 1999, to February 15, 2006, the deadline for the first annual report by each federal agency on its compliance with alternative fueled vehicle purchasing requirements.

(Sec. 706) Instructs the Secretary to establish a program to improve technologies for the commercialization of: (1) a combination hybrid/flexible fuel vehicle; or (2) a plug-in hybrid/flexible fuel vehicle. Authorizes appropriations for FY2006-FY2009.

(Sec. 707) Exempts from the alternative fuel requirements of the Energy Policy Act of 1992 vehicles directly used in the emergency repair of transmission lines and in the restoration of electricity service following power outages.

**Subtitle B: Hybrid Vehicles, Advanced Vehicles, and Fuel Cell Buses - Part 1: Hybrid Vehicles - (Sec. 711)** Requires the Secretary to accelerate efforts directed toward the improvement of batteries and other rechargeable energy storage systems, power electronics, hybrid systems integration, and other hybrid vehicles technologies.

(Sec. 712) Instructs the Secretary to establish a program to encourage domestic production and sales of efficient hybrid and advanced diesel vehicles. Requires the program to include grants to automobile manufacturers to encourage domestic production of efficient hybrid and advanced diesel vehicles.

**Part 2: Advanced Vehicles - (Sec. 721)** Directs the Secretary to establish a competitive grant pilot program through the DOE Clean Cities Program, to provide up to 30 geographically dispersed project grants to state or local governments or metropolitan transportation authorities for acquisition of alternative fueled vehicles, hybrid vehicles, or fuel cell vehicles, including the infrastructure necessary to support them directly.

(Sec. 723) Authorizes appropriations.

**Part 3: Fuel Cell Buses** - (Sec. 731) Directs the Secretary to: (1) establish a transit bus demonstration program to make competitive, merit-based awards for five-year projects to demonstrate up to 25 fuel cell transit buses (and necessary infrastructure) in five geographically dispersed localities; and (2) give preference to projects most likely to mitigate congestion and improve air quality. Authorizes appropriations for FY2006-FY2010.

**Subtitle C: Clean School Buses** - (Sec. 741) Directs the EPA Administrator to establish a grant program on a competitive basis to replace or retrofit certain existing school buses (including repowering, aftertreatment, and remanufactured engines).

(Sec. 742) Instructs the EPA Administrator to establish a program for awarding grants on a competitive basis to governmental entities for fleet modernization programs including installation of retrofit technologies for diesel trucks.

(Sec. 743) Directs the Secretary of Energy to establish a program for entering into cooperative agreements: (1) with private sector developers for the development of fuel cell-powered school buses; and (2) with local government entities using natural gas-powered school buses and such developers to demonstrate the use of such buses. Authorizes appropriations for FY2006-FY2009.

**Subtitle D: Miscellaneous** - (Sec. 751) Directs the Secretary of Energy to establish a cost-shared, public-private research partnership involving the federal government, railroad carriers, locomotive manufacturers and equipment suppliers, and the Association of American Railroads to develop and demonstrate railroad locomotive technologies that increase fuel economy, reduce emissions, and lower costs of operation. Authorizes appropriations for FY2006-FY2008.

(Sec. 752) Instructs the EPA Administrator to report to Congress on the trading of mobile source emission reduction credits for use by owners and operators of stationary source emission sources to meet emission offset requirements within a nonattainment area.

(Sec. 753) Requires the EPA Administrator and the Administrator of the Federal Aviation Administration (FAA) to study and report to Congress on: (1) the impact of aircraft emissions on air quality in nonattainment areas; (2) ways to promote fuel conservation measures for aviation; and (3) opportunities to reduce air traffic inefficiencies that increase fuel burn and emissions.

(Sec. 754) Instructs the Secretary to accelerate efforts to improve diesel combustion and aftertreatment technologies for use in diesel fueled motor vehicles.

(Sec. 755) Establishes within the Department of Transportation the Conserve by Bicycling Program. Authorizes appropriations.

(Sec. 756) Directs the EPA Administrator to: (1) review Clean Air Act mobile source air emission models to determine whether they accurately reflect emissions resulting from long-duration idling of vehicles and engines; (2) review emission reductions achieved by the use of idle reduction technology; (3) revise EPA regulations and guidance as appropriate; and (4) establish a program to support deployment of idle reduction technology. Authorizes appropriations for FY2006-FY2008.

Requires the EPA Administrator to study and report to Congress on all locations at which heavy-duty vehicles stop for long-duration idling.

(Sec. 757) Instructs the Secretary of Energy (Secretary) to initiate a partnership with diesel engine, diesel fuel injection system, diesel vehicle manufacturers, and diesel and biodiesel fuel providers to include biodiesel testing in advanced diesel engine and fuel system technology. Authorizes appropriations for FY2006-FY2010.

(Sec. 758) Directs the Secretary to enter into a cooperative agreement with the National Aeronautics and Space Administration (NASA) for the development of ultra-efficient engine technology for aircraft. Authorizes appropriations for FY2006-FY2010.

(Sec. 759) Amends federal transportation law to require that, in order for any model of dual fueled automobile to be eligible to receive certain fuel economy incentives, a label be attached to the fuel compartment stating that the vehicle can be operated on an alternative fuel and on gasoline or diesel, with the form of alternative fuel stated on the notice.

**Subtitle E: Automobile Efficiency** - (Sec. 771) Authorizes appropriations for FY2006-FY2010 for implementation and enforcement of average fuel economy standards.

(Sec. 772) Amends federal transportation law to extend through model year 2010 manufacturing incentives and the maximum fuel economy increase for alternative fueled vehicles.

(Sec. 773) Directs the Administrator of the National Highway Traffic Safety Administration (NHTSA) to study the feasibility and effects of reducing by model year 2014, by a significant percentage, the amount of fuel consumed by automobiles.

(Sec. 774) Directs the EPA Administrator to update or revise certain adjustment factors to take specified new fuel depleting features into consideration.

**Subtitle F: Federal and State Procurement** - (Sec. 782) Sets a deadline by which the head of any federal agency that uses a light-duty or heavy-duty vehicle fleet shall lease or purchase fuel cell vehicles and hydrogen energy systems to meet prescribed energy savings goals.

Authorizes the Secretary of Energy to: (1) establish a cooperative program with state agencies managing motor vehicle fleets to encourage purchase of fuel cell vehicles by the agencies; and (2) offer incentive payments to a state agency to assist with the cost of planning, differential purchases, and administration.

Authorizes appropriations for FY2008-FY2015.

(Sec. 783) Sets a deadline by which the head of any federal agency that uses electrical power from stationary, portable, or microportable devices shall lease or purchase a stationary, portable, or micro fuel cell to meet prescribed energy savings goals.

Authorizes appropriations for FY2006-FY2015.

**Subtitle G: Diesel Emissions Reduction** - (Sec. 792) Instructs the Administrator of the Environmental Protection Agency to use: (1) 70% of certain allocated funds to provide grants and low-cost revolving loans on a competitive basis to eligible entities to achieve prescribed reductions in diesel emissions; and (2) 30% of certain allocated funds to support grant and loan programs administered by states that are designed to achieve similar diesel emission reductions.

(Sec. 795) Instructs the EPA Administrator to: (1) develop nonfinancial incentives to promote the use of eligible technologies; (2) develop appropriate guidance to provide credit to a state for emission reductions created by the use of eligible technologies through a state implementation plan; and (3) inform foreign countries with air quality problems of the potential of technology developed or used in the United States to provide emission reductions in those countries.

(Sec. 797) Authorizes appropriations for FY2007-FY2011.

**Title VIII: Hydrogen - Spark M. Matsunaga Hydrogen Act of 2005 - (Sec. 804)** Directs the Secretary of Energy to transmit to Congress a coordinated plan for programs directly related to fuel cells or hydrogen.

(Sec. 805) Directs the Secretary to conduct a research and development program on technologies relating to the production, purification, distribution, storage, and use of hydrogen energy, fuel cells, and related infrastructure.

Directs the Secretary to conduct programs in partnership with the private sector that address: (1) hydrogen production from diverse energy sources; (2) use of hydrogen for commercial, industrial, and residential electric power generation; (3) safe delivery of hydrogen or hydrogen-carrier fuels, (4) advanced vehicle technologies; (5) storage of hydrogen or hydrogen-carrier fuels; (6) development of safe, durable, affordable, and efficient fuel cells; and (7) the ability of domestic automobile manufacturers to manufacture commercially available competitive hybrid vehicle technologies in the United States.

Authorizes appropriations for FY2006-FY2020.

(Sec. 806) Directs the President to establish an interagency task force to work toward: (1) a fuel infrastructure for hydrogen and hydrogen-carrier fuels, including one that supports buses and other fleet transportation; (2) fuel cells in government and other applications; (3) distributed power generation; (4) uniform hydrogen codes, standards, and safety protocols; and (5) vehicle hydrogen fuel system integrity safety performance.

(Sec. 807) Establishes the Hydrogen Technical and Fuel Cell Advisory Committee.

(Sec. 808) Directs the Secretary to: (1) fund a limited number of hydrogen and related demonstration projects; and (2) provide grants and contracts to support development of fuel cell safety codes and standards.

Authorizes appropriations for FY2006-FY2020.

(Sec. 811) Directs the Secretary to arrange with the National Academy of Sciences to review: (1) the coordinated plan for programs directly related to fuel cells or hydrogen; and (2) the hydrogen-related programs conducted under this Act.

Authorizes appropriations for FY2006-FY2020.

(Sec. 812) Directs the Secretary to prepare a detailed roadmap for implementing solar and wind energy technologies and associated recommendations, including the establishment of five projects in geographically diverse areas to demonstrate hydrogen production at existing solar and wind energy facilities.

(Sec. 813) Instructs the Secretary to implement programs that provide for the transfer of critical hydrogen and fuel cell technologies to the private sector.

**Title IX: Research and Development - Energy Research, Development, Demonstration, and Commercial Application Act of 2005 -**

**Subtitle A: Science Programs - (Sec. 911)** Directs the Secretary to conduct programs of energy efficiency research, development, demonstration, and commercial application, including: (1) advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles; (2) cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach, including onsite renewable energy generation; (3) advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries; and (4) advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling.

Authorizes appropriations for FY2007-FY2013.

Prohibits the use of such appropriations for any of the following federal programs: (1) issuance and implementation of energy efficiency regulations; (2) the Weatherization Assistance Program; (3) the State Energy Program; or (4) the Federal Energy Management Program.

(Sec. 912) Directs the Secretary to establish and conduct a research, development, demonstration, and commercial application program for a Next Generation Lighting Initiative to support activities related to advanced solid-state lighting technologies based on white light emitting diodes.

(Sec. 913) Instructs the Director of the Office of Science and Technology Policy to establish an interagency group to develop, in coordination with an advisory committee, a National Building Performance Initiative to integrate federal, state, and voluntary private sector efforts to reduce the costs of construction, operation, maintenance, and renovation of commercial, industrial, institutional, and residential buildings.

(Sec. 914) Directs the Secretary to establish a grant and technical assistance program to support the development of voluntary consensus-based standards for high performance buildings.

(Sec. 915) Directs the Secretary to establish: (1) a research, development, demonstration, and commercial application program for the secondary use of batteries in certain circumstances; and (2) an Energy Efficiency Science Initiative for research grants.

(Sec. 917) Directs the Secretary to make grants to nonprofit institutions, state and local governments, or universities to establish a geographically dispersed network of Advanced Energy Technology Transfer Centers.

**Subtitle B: Distributed Energy and Electric Energy Systems - (Sec. 921)** Directs the Secretary to implement programs of research, development, demonstration, and commercial application on: (1) distributed energy resources and systems reliability and efficiency, to improve the reliability and efficiency of distributed energy resources and systems, integrating advanced energy technologies with grid

connectivity; and (2) improved the energy efficiency of high power density facilities, including data centers, server farms, and telecommunications facilities.

(Sec. 923) Directs the Secretary to make competitive, merit-based grants to consortia for the development of micro-cogeneration energy technology.

(Sec. 924) Authorizes the Secretary to provide financial assistance to coordinating consortia of interdisciplinary participants for demonstrations designed to accelerate the use of distributed energy technologies (such as fuel cells, microturbines, reciprocating engines, thermally activated technologies, and combined heat and power systems) in high-energy intensive commercial applications.

(Sec. 925) Directs the Secretary to establish a comprehensive research, development, demonstration and commercial application program and initiative to: (1) promote improved reliability and efficiency of electrical transmission and distribution systems; and (2) focus specifically on utilizing components incorporating high temperature superconductivity.

**Subtitle C: Renewable Energy** - (Sec. 931) Directs the Secretary to conduct programs of renewable energy research, development, demonstration, and commercial application, including: (1) solar energy and photovoltaics; (2) wind energy; (3) geothermal energy; (4) hydropower; (5) ocean and wave energy; and (6) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of wind power and coal gasification technologies.

Authorizes appropriations for FY2007-FY2009.

Instructs the Secretary, to demonstrate the use of renewable energy technologies to assist in delivering electricity to rural and remote locations including: (1) advanced wind power technology, and combined use with coal gasification; (2) biomass; and (3) geothermal energy systems.

(Sec. 932) Directs the Secretary to conduct a program of research, development, demonstration, and commercial application for bioenergy, including: (1) biopower energy systems; (2) biofuels; (3) bioproducts; (4) integrated biorefineries that may produce biopower, biofuels, and bioproducts; and (5) cross-cutting research and development in feedstocks; (6) integrated biorefineries.

Directs the Secretary to establish a demonstration program to determine the feasibility of: (1) the operation of diesel electric power generators, using biodiesel fuels at electric generation facilities owned by institutions of higher education; and (2) using hydrogen propulsion in light-weight vehicles and the integration of the associated hydrogen production infrastructure using off-the-shelf components.

(Sec. 934) Directs the Secretary to: (1) conduct a program of research and development to evaluate the potential for concentrating solar power for hydrogen production, including cogeneration approaches for both hydrogen and electricity; and (2) report to Congress on the economic and technical potential for electricity or hydrogen production, with or without cogeneration, with concentrating solar power, including the economic and technical feasibility of potential construction of a pilot demonstration facility suitable for commercial production of electricity or hydrogen from concentrating solar power.

(Sec. 935) Instructs the Secretary to establish a program for the demonstration of innovative technologies for solar and other renewable energy sources in governmental buildings, and for the dissemination of information resulting from such demonstration.

**Subtitle D: Agricultural Biomass Research and Development Programs** - (Sec. 941) Amends the Biomass Research and Development Act of 2000 to place within its purview fuels and biobased products in lieu of industrial products.

Directs the Secretaries of Agriculture and of Energy to direct research and development toward: (1) feedstock production through the development of crops and cropping systems relevant to production of raw materials for conversion to biobased fuels and biobased products; (2) developing technologies for converting cellulosic biomass into intermediates that can subsequently be converted into biobased fuels and biobased products; and (3) product diversification through technologies relevant to production of a range of biobased products (including chemicals, animal feeds, and cogenerated power) that eventually can increase the feasibility of fuel production in a biorefinery.

Authorizes appropriations for the program for FY2006-FY2015.

Repeals the sunset provision terminating authority under the Act (thus making it permanent).

(Sec. 942) Instructs the Secretary to establish an incentive program for the production of cellulosic biofuels. Prescribes procedural guidelines including auction and reverse auction procedures.

(Sec. 943) Amends the Farm Security and Rural Investment Act of 2002 to modify guidelines for procurement of biobased products.

Directs the Architect of the Capitol, the Sergeant at Arms of the Senate, and the Chief Administrative Officer of the House of Representatives to establish procedures that apply statutory requirements to procurement for the Capitol Complex.

Instructs the Architect of the Capitol to establish in the Capitol Complex a program of public education regarding use by the Architect of biobased products.

(Sec. 944) Directs the Secretary of Agriculture to make available on a competitive basis grants to: (1) certain small manufacturers for biobased product marketing and certification purposes; (2) a certain regional bioeconomy development association, agricultural or energy trade association, or Land Grant institution; and (3) enterprises owned by agricultural producers, for the purposes of demonstrating cost-effective, cellulosic biomass innovations for feedstock preprocessing and crop harvesting, with a requirement to produce ethanol, or for another energy purpose.

Authorizes appropriations for the program for FY2006-FY2015.

(Sec. 947) Directs the Secretary of Agriculture to: (1) establish a program of education and outreach on biobased fuels and biobased products; and (2) report to certain congressional committees on the economic potential for the United States of the widespread production and use of commercial and industrial biobased products through calendar year 2025.

**Subtitle E: Nuclear Energy** - (Sec. 951) Instructs the Secretary to: (1) conduct specified programs of civilian nuclear energy research, development, demonstration, and commercial application, including: (1) a Nuclear Energy Research Initiative; (2) a Nuclear Energy Systems Support Program addressing reliability, availability, productivity, component aging, safety, and security of existing nuclear power plants; (3) a Nuclear Power 2010 Program; (4) a Generation IV Nuclear Energy System Initiative; and (5) reactor production of hydrogen.

(Sec. 953) Directs the Secretary, acting through the Director of the Office of Nuclear Energy, Science, and Technology, to conduct an advanced fuel recycling technology research, development, demonstration, and commercial application program to evaluate fuel recycling or transmutation technologies that are proliferation-resistant and minimize environmental and public health and safety impacts, as an alternative to aqueous reprocessing technologies.

(Sec. 954) Requires the Secretary to conduct: (1) a program to invest in human resources and infrastructure in the nuclear sciences and related fields; (2) a fellowship program for university professors to spend sabbaticals at National Laboratories in the areas of nuclear science and technology; (3) a visiting scientist program in which National Laboratory staff can spend time in academic nuclear science and engineering departments; and (4) operation of infrastructure and facilities to support the nuclear energy research and commercial application programs.

(Sec. 955) Instructs the Secretary to: (1) operate and maintain infrastructure and facilities to support the nuclear energy research, development, demonstration, and commercial application programs, including radiological facilities management, isotope production, and facilities management; (2) conduct a research and development program on cost-effective technologies for increasing the safety and security of nuclear facilities from natural phenomena and deliberate attacks; and (3) submit to Congress the results of a survey of industrial applications of large radioactive sources.

**Subtitle F: Fossil Energy** - (Sec. 961) Directs the Secretary to conduct research, development, demonstration, and commercial application programs in conjunction with industry in the following areas: (1) fossil energy, including reduced emissions from fossil fuel use by developing technologies and precombustion technologies; (2) oil and gas; (3) transportation fuels; (4) fuel cells; and (5) carbon dioxide capture technologies for pulverized coal combustion units.

Authorizes appropriations for FY2007-FY2009. Extends the authorization of appropriations for FY2010-FY2012 for the Office of Arctic Energy.

(Sec. 962) Directs the Secretary to conduct a program of technology research, development, demonstration, and commercial application for: (1) coal and power systems, including programs to facilitate production and generation of coal-based power that employ specified technologies; (2) fuel cells for low-cost, high-efficiency, fuel-flexible, modular power systems; (3) solid oxide fuel cell technology; and (4) carbon dioxide capture technologies on combustion-based systems.

(Sec. 964) Instructs the Secretary to carry out a program for research and development on coal mining technologies and oil and gas.

(Sec. 965) Instructs the Secretary of the Interior to report biennially to Congress on the latest estimates of natural gas and oil reserves, reserves growth, and undiscovered resources in federal and state waters off the coast of Louisiana, Texas, Alabama, and Mississippi.

(Sec. 966) Directs the Secretary to establish: (1) a program of research, development, demonstration, and commercial application to maximize the productive capacity of marginal wells and reservoirs; and (2) a Complex Well Technology Testing Facility, in coordination with industry leaders, at the Rocky Mountain Oilfield Testing Center to increase the range of extended drilling technologies.

(Sec. 968) Amends the Methane Hydrate Research and Development Act of 2000 to revise the methane hydrate research and development program.

Authorizes appropriations for FY2006-FY2010.

**Subtitle G: Science** - (Sec. 971) Directs the Secretary, through the Office of Science, to conduct research, demonstration, and commercial application activities in high energy physics, nuclear physics, biological and environmental research, basic energy sciences, advanced scientific computing research, and fusion energy sciences, including support for facilities and infrastructure, education, outreach, information, analysis, and coordination activities. Authorizes appropriations for FY2007-FY2009.

Authorizes appropriations for FY2005-FY2009 for integrated bioenergy research and development, including for training and education targeted to minority and socially disadvantaged farmers and ranchers.

(Sec. 972) Sets forth research guidelines for: (1) a fusion energy science program; (2) U.S. participation in the international burning plasma fusion research project (ITER); (3) catalysis science research; (4) hydrogen research, including hydrogen generation without the use of natural gas; and (5) solid state lighting in support of the Next Generation Lighting Initiative.

(Sec. 976) Directs the Secretary to conduct an advanced scientific computing research and development program that includes specified activities related to applied mathematics and activities.

Amends the High-Performance Computing Act of 1991 to modify requirements for basic and applied research in high-performance computing and networking. Makes the authorization of appropriations permanent.

(Sec. 977) Directs the Secretary to establish a research, development, and demonstration program in microbial and plant systems biology, protein science, and computational biology. Prohibits biomedical research, however, and declares that nothing in this section authorizes the Secretary to conduct any research or demonstration on human cells or human subjects, or designed to have direct application with respect to human cells or human subjects.

(Sec. 978) Instructs the Secretary to establish research and development programs on: (1) material science issues presented by advanced fission reactors and the DOE fusion energy program; and (2) energy and water-related issues that address the provision of adequate supplies, optimal management, and efficient use of energy.

(Sec. 980) Instructs the Secretary to: (1) update Congress on progress on the Spallation Neutron Source Project; (2) develop an operational plan for the Spallation Neutron Source Facility that ensures that it is employed to its full capability in support of the study of

advanced materials, nanoscience, and other missions of the DOE Office of Science; and (3) commence construction of a Rare Isotope Accelerator by September 30, 2008.

(Sec. 982) Requires the Secretary, through the Office of Scientific and Technical Information, to maintain within DOE publicly available collections of scientific and technical information resulting from DOE-supported research, development, demonstration, and commercial applications activities.

(Sec. 983) Directs the Secretary to award a grant to a Southeastern U.S. consortium of major research universities that currently advances science and education by partnering with National Laboratories, to establish a regional pilot program of its SEEK-16 program for enhancing scientific, technological, engineering, and mathematical literacy, creativity, and decision-making. Requires such consortium to include leading research universities, and universities that train substantial numbers of elementary and secondary school teachers.

(Sec. 984) Directs the Secretary to establish: (1) energy research fellowship programs, including postdoctoral and senior research fellowships; and (2) a Science and Technology Scholarship Program designed to recruit and prepare students for careers in DOE and the National Laboratories.

**Subtitle H: International Cooperation** - (Sec. 985) Instructs the Secretary of Energy to: (1) establish a program to promote cooperation on energy issues with Western Hemisphere countries; and (2) report to certain congressional committees on experience under the United States-Israel Cooperation Agreement for energy research and development in a variety of alternative and advanced energy sectors.

Authorizes appropriations for Western Hemisphere energy cooperation for FY2007-FY2009.

(Sec. 986) Expresses the sense of Congress that energy cooperation between the governments of the United States and Israel is mutually beneficial in the development of energy technology.

(Sec. 986A) Instructs the Secretary to coordinate training and outreach efforts for international commercial energy markets in countries with developing and restructuring economies.

**Subtitle I: Research Administration and Operations** - (Sec. 987) Prescribes guidelines for Research Administration and Operations that include: (1) cost sharing; (2) merit-based competition; (3) external technical review of departmental programs; (4) a biennial report on equal employment opportunity practices at National Laboratories; (5) a strategy and plan for science and energy facilities and infrastructure; and (6) competitive award of management contracts.

(Sec. 991) Prohibits the Secretary from designating as a National Laboratory any but specified laboratories.

(Sec. 994) Directs the Secretary to develop a plan to improve coordination and collaboration in research, development, demonstration, and commercial application activities across DOE organizational boundaries.

(Sec. 996) Directs the Administrator of EPA to conduct a demonstration project to address the effect of transported ozone and ozone precursors in Southwestern Michigan.

(Sec. 997) Directs the Secretary to provide annual grants to a university adjacent to the DOE Arctic Energy Office to establish and operate a university research center to be headquartered in Fairbanks and known as the Arctic Engineering Research Center.

(Sec. 998) Directs the Secretary of Commerce to establish a joint Barrow Geophysical Research Facility in Barrow, Alaska, to support scientific research activities in the Arctic.

**Subtitle J: Ultra-deepwater and Unconventional Natural Gas and Other Petroleum Resources** - (Sec. 999A) Directs the Secretary of Energy (Secretary) to: (1) implement a program of research and commercial application of technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production; and (2) increase the supply of natural gas and other petroleum resources through reducing the cost and increasing the efficiency of exploration and production.

(Sec. 999B) Confers upon the Secretary ultimate responsibility and oversight of all aspects of such program.

(Sec. 999D) Establishes the Ultra-Deepwater Advisory Committee and the Unconventional Resources Technology Advisory Committee.

(Sec. 999H) Authorizes appropriations for FY2007-FY2016.

Establishes the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research Fund for the deposit of federal royalties, rents, and bonuses derived from onshore and offshore oil and gas leases.

**Title X: Department of Energy Management** - (Sec. 1001) Directs the Secretary to: (1) appoint a Technology Transfer Coordinator to advise on all matters relating to technology transfer and commercialization; (2) establish a Technology Transfer Working Group, consisting of representatives of the National Laboratories and single-purpose research facilities; (3) establish an Energy Technology Commercialization Fund; and (4) submit to Congress a technology transfer execution plan updated annually.

(Sec. 1002) Directs the Secretary to: (1) establish a Technology Infrastructure Program to improve the ability of National Laboratories and single-purpose research facilities to support departmental missions; and (2) authorize the director of each National Laboratory or single-purpose research facility to implement the program.

Authorizes appropriations for FY2006-FY2008.

(Sec. 1003) Directs the Secretary to require the Director of each National Laboratory, and authorizes the Secretary to require the Director of a single-purpose research facility, to designate a small business advocate to increase the participation of small business concerns, including those socially and economically disadvantaged, in procurement, collaborative research, technology licensing, and technology transfer activities conducted by the Laboratory or single-purpose research facility.

(Sec. 1004) Requires the Secretary to ensure that each program authorized by this Act includes an outreach component to provide information, as appropriate, to manufacturers, consumers, engineers, architects, builders, energy service companies, institutions of higher education, facility planners and managers, state and local governments, and other entities.

(Sec. 1006) Amends the Department of Energy Organization Act to create the position of Under Secretary for Science to: (1) serve as the Science and Technology Advisor to the Secretary and monitor DOE research and development programs; and (2) a General Counsel.

(Sec. 1007) Authorizes the Secretary, in carrying out research, development, and demonstration projects, to exercise the same authority as the Secretary of Defense to enter into transactions (other than contracts, cooperative agreements, and grants), subject to the same terms and conditions.

(Sec. 1008) Authorizes the Secretary to award cash prizes in recognition of breakthrough achievements in research, development, demonstration, and commercial application that have the potential for application to the performance of the mission of the Department.

(Sec. 1010) Directs the Secretary to report to Congress on the feasibility of promoting collaborations between Doctoral Research Extensive Universities (as listed by the Carnegie Foundation) and other colleges and universities in grants, contracts, and cooperative agreements for energy projects.

(Sec. 1011) Expresses the sense of Congress that: (1) the Secretary should develop and implement more stringent procurement and inventory controls, including controls on the purchase card program, to prevent waste, fraud, and abuse of taxpayer funds by DOE employees and contractors; and (2) the DOE Inspector General should continue to review closely DOE purchase card purchases and other procurement and inventory practices.

**Title XI: Personnel and Training** - (Sec. 1101) Instructs the Secretary to monitor and report to Congress on trends and shortages in the workforce of: (1) skilled technical personnel that support energy technology industries; and (2) electric power and transmission engineers.

Authorizes the Secretary to establish traineeship grants for skilled technical personnel for any workforce category for which such shortage is identified.

Authorizes appropriations for FY2006-FY2008.

(Sec. 1102) Amends the Department of Energy Science Education Enhancement Act to require the Secretary to use a specified amount of funding to promote educational programs in science and mathematics.

(Sec. 1103) Prescribes requirements for the Secretary of Labor to develop model personnel training guidelines to support the reliability and safety of the nonnuclear electric system.

(Sec. 1104) Directs the Secretary to support the ongoing activities of and explore opportunities for expansion of the National Center for Energy Management and Building Technologies to carry out research, education, and training activities to facilitate the improvement of energy efficiency, indoor environmental quality, and security of industrial, commercial, residential, and public buildings.

(Sec. 1105) Instructs the Secretary to give priority to activities that are designed to encourage students from under-represented groups to pursue scientific and technical careers.

Directs the Secretary to require the director of each National Laboratory, and authorizes the Secretary to require the head of any science facility, to increase the participation of historically Black colleges or universities, Hispanic-serving institutions, or tribal colleges in any activity that increases the capacity of such entities to train personnel in science or engineering.

(Sec. 1106) Directs the Secretary to support establishment of a National Power Plant Operations Technology and Education Center to address the need for training and educating certified operators and technicians for the electric power industry.

**Title XII: Electricity** - Electricity Modernization Act of 2005 - **Subtitle A: Reliability Standards** - (Sec. 1211) Amends the Federal Power Act to grant FERC jurisdiction over the Electric Reliability Organization, over regional entities, and over all users, owners and operators of the bulk-power system (except in Alaska and Hawaii), for purposes of approving reliability standards and enforcing compliance.

Prescribes implementation guidelines.

Provides for regional advisory bodies.

Requires federal agencies responsible for approving access to electric transmission or distribution facilities to expedite any federal agency approvals that are necessary to allow the owners or operators of such facilities to comply with any FERC-approved reliability standard that pertains to vegetation management, electric service restoration, or resolution of situations that imminently endanger facility reliability or safety.

**Subtitle B: Transmission Infrastructure Modernization** - (Sec. 1221) Instructs the Secretary to: (1) study electric transmission congestion triennially; and (2) issue a report which may designate any geographic area experiencing transmission capacity constraints or congestion that adversely affects consumers as a national interest electric transmission corridor.

Sets forth implementation guidelines.

Grants the consent of Congress to an interstate compact establishing regional transmission siting agencies in order to: (1) facilitate siting of future electric energy transmission facilities; and (2) implement electric energy transmission siting responsibilities.

Requires the Secretaries of the Interior, of Energy, and of Agriculture, and the Chairman of the Council on Environmental Quality to report jointly to Congress on: (1) all existing designated transmission and distribution corridors on federal land, and the status of work related to proposed transmission and distribution corridor designations under the Federal Land Policy and Management Act of 1976; (2) the number of pending applications to locate transmission facilities on federal land; and (3) the number of existing transmission and distribution rights-of-way on federal land that will come up for renewal within the following five-, 10-, and 15-year periods, and a description of how the Secretaries plan to manage the renewals.

(Sec. 1222) Authorizes the Secretary, acting through the Administrator of the Western Area Power Administration (WAPA), or the Southwestern Power Administration (SWPA), to engage in specified activities with third parties to upgrade new or existing transmission facilities owned by SWPA or WAPA if the Secretary makes specified determinations about the proposed projects.

Provides funding for FY2008-FY2015.

(Sec. 1223) Directs FERC to encourage deployment of advanced transmission technologies.

(Sec. 1224) Authorizes the Secretary to establish an Advanced Power System Technology Incentive Program to deploy certain advanced power system technologies and improve and protect certain critical governmental, industrial, and commercial processes. Authorizes appropriations for FY2006-FY2012.

**Subtitle C: Transmission Operation Improvements** - (Sec. 1231) Authorizes FERC to require an unregulated transmitting utility to provide transmission services: (1) at rates comparable to those that it charges itself; and (2) on other terms and conditions comparable to those under which it provides transmission services to itself, and that are not unduly discriminatory or preferential.

(Sec. 1232) Authorizes the appropriate federal regulatory authority to arrange to transfer control and use of all or part of its transmission system to a FERC-approved Regional Transmission Organization (RTO).

(Sec. 1233) Entitles certain load-serving entities to use firm transmission rights (or equivalent tradable or financial transmission rights) in order to deliver output or purchased energy, or the output of other generating facilities or purchased energy to the extent deliverable using such rights, to the extent required to meet (native load) service obligations.

(Sec. 1234) Instructs the Secretary to study and report to Congress on the benefits of economic dispatch (operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities).

(Sec. 1235) States that FERC is not authorized under the FPA to require a specified entity to convert to tradable or financial rights if as of the date of enactment of this Act such entity holds firm transmission rights: (1) pursuant to contract or by reason of ownership of transmission facilities; or (2) obtained by exercising contract or tariff rights. Identifies such entity as being located in either the Pacific Northwest or in that portion of a state included in the geographic area proposed for a regional transmission organization in Commission Docket Number RT01-35 on the date on which that docket was opened.

(Sec. 1236) Expresses the sense of Congress that FERC should carefully consider the objections of the New England States to a proposed mechanism that would develop and implement a specific type of locational installed capacity mechanism in New England.

**Subtitle D: Transmission Rate Reform** - (Sec. 1241) Directs FERC to establish, by rule, incentive-based (including performance-based) rate treatments for the transmission of electric energy in interstate commerce by public utilities to benefit consumers by ensuring reliability and reducing the cost of delivered power by reducing transmission congestion.

(Sec. 1242) Authorizes FERC to approve a participant funding plan that allocates costs related to transmission upgrades or new generator interconnection, without regard to whether an applicant is a member of a FERC-approved Transmission Organization, if the plan meets certain rate criteria.

**Subtitle E: Amendments to PURPA** - (Sec. 1251) Amends the Public Utility Regulatory Policies Act of 1978 (PURPA) to require each electric utility to make available upon request net metering and time-based (smart) metering service, including credits for consumers with large loads who enter into pre-established peak load reduction agreements that reduce a utility's planned capacity obligations.

(Sec. 1253) Declares that no electric utility shall be required to enter into a new contract or obligation to purchase electric energy from a qualifying cogeneration facility or a qualifying small power production facility (qualifying facility) if FERC finds that the qualifying facility has nondiscriminatory access to: (1) an independently administered, auction-based day ahead and real time wholesale market for the sale of electric energy and wholesale markets for long-term sales of capacity and electric energy; (2) certain transmission and interconnection services administered pursuant to an open access transmission tariff that affords nondiscriminatory treatment to all customers, and competitive wholesale markets that provide a meaningful opportunity to sell capacity and electric energy to buyers other than the utility to which the qualifying facility is interconnected; or (3) wholesale markets for the sale of capacity and electric energy that are, at a minimum, of comparable competitive quality as such markets.

States that no electric utility shall be required to enter into a new contract or obligation to purchase from or sell electric energy to a facility that is not an existing qualifying cogeneration facility, unless it meets FERC criteria for qualifying cogeneration facilities.

Grandfathers existing contracts. Eliminates ownership limitations for such facilities.

(Sec. 1254) Requires each electric utility to make available, upon customer request, interconnection service to any electric consumer it serves (under which an onsite generating facility on the consumer's premises is connected to local distribution facilities).

**Subtitle F: Repeal of PUHCA** - Public Utility Holding Company Act of 2005 - (Sec. 1263) Repeals the Public Utility Holding Company Act of 1935.

(Sec. 1264) Requires federal and state access to the books and records of public utility holding companies and their affiliates and subsidiaries.

(Sec. 1276) Authorizes appropriations.

**Subtitle G: Market Transparency, Enforcement, and Consumer Protection** - (Sec. 1281) Amends the FPA to direct FERC to: (1) facilitate price transparency in markets for the sale and transmission of electric energy in interstate commerce; and (2) conclude a memorandum of understanding with the Commodity Futures Trading Commission (CFTC) relating to information sharing.

Retains the exclusive jurisdiction of the CFTC regarding accounts, agreements, contracts, or transactions in commodities under the Commodity Exchange Act.

(Sec. 1282) Prohibits the willful and knowing reporting to a federal agency of false information relating to the price of electricity sold at wholesale or the availability of transmission capacity, with intent to affect federal data fraudulently.

(Sec. 1283) Prohibits the use of any manipulative or deceptive device or contrivance in contravention of FERC rules and regulations in connection with the purchase or sale of electric energy or the purchase or sale of transmission services subject to FERC jurisdiction.

Denies any private right of action.

(Sec. 1284) Increases civil and criminal penalties for violations of the FPA.

(Sec. 1286) Grants FERC refund authority with respect to a voluntary short term sale of electric energy by the Bonneville Power Administration only if the sale is at an unjust and unreasonable rate.

(Sec. 1287) Authorizes the Federal Trade Commission (FTC) to issue rules: (1) protecting the privacy of electric consumers from the disclosure of consumer information in connection with the sale or delivery of electric energy to an electric consumer; (2) prohibiting the change of selection of an electric utility without the electric consumer's informed consent (slamming); and (3) prohibiting the sale of goods and services to an electric consumer without express authorization by law or the electric consumer (cramming).

(Sec. 1288) Amends the FPA to authorize the court to prohibit individuals engaged in certain violations from serving as officers, directors, and energy traders.

(Sec. 1289) Revises requirements for prior FERC approval of public utility sales, leases, other disposals, mergers, consolidations, purchases, acquisitions, or taking in security. Raises the minimum value of such transactions triggering a prior approval requirement from \$50,000 to \$10 million. (Thus allows any such transactions involving less than \$10 million without prior FERC approval.)

(Sec. 1290) Grants FERC exclusive jurisdiction to determine whether a requirement to make termination payments for power not delivered by the seller (or any successor in interest), is not permitted under a rate schedule, or is otherwise unlawful on the grounds that the contract is unjust and unreasonable or contrary to the public interest.

Declares such jurisdiction applicable to any contract entered into the Western Interconnection prior to June 20, 2001, with a seller of wholesale electricity that FERC has: (1) found to have manipulated the electricity market resulting in unjust and unreasonable rates; and (2) revoked the seller's authority to sell any electricity at market-based rates.

**Subtitle H: Definitions** - (Sec. 1291) Defines specified terms in the Federal Power Act.

**Subtitle I: Technical and Conforming Amendments** - (Sec. 1295) Sets forth conforming amendments to the Federal Power Act.

**Subtitle J: Economic Dispatch** - (Sec. 1298) Directs FERC to: (1) convene joint boards on a regional basis to study the issue of security constrained economic dispatch for the various market regions; and (2) designate the appropriate regions to be covered by each such joint board.

**Title XIII: Energy Policy Tax Incentives** - Energy Tax Incentives Act of 2005 - **Subtitle A: Electricity Infrastructure** - (Sec. 1301) Amends the Internal Revenue Code to extend until 2008 the eligibility of certain renewable energy facilities (i.e., wind, closed and open-loop biomass, geothermal energy, small irrigation power, landfill gas, and trash combustion facilities) for the tax credit for producing electricity from renewable resources. Increases from five to 10 years the credit period for renewable energy facilities placed in service after the enactment of this Act. Adds hydropower and Indian coal as qualifying energy resources for purposes of the tax credit.

(Sec. 1302) Allows certain tax-exempt cooperatives an election to allocate amounts of the tax credit for producing electricity from renewable sources to its members.

(Sec. 1303) Allows a tax credit for investment in clean renewable energy bonds.

(Sec. 1304) Eliminates the termination date (i.e., taxable years beginning after December 31, 2006) for the tax treatment of certain items of income received or accrued by certain taxable cooperatives and tax-exempt rural electric cooperatives.

(Sec. 1305) Extends until 2008 special rules for the tax deferral of gain from certain qualifying electric transmission transactions.

(Sec. 1306) Allows a tax credit for certain levels of production from advanced nuclear power facilities.

(Sec. 1307) Allows a tax credit for investment in qualifying advanced coal projects and certified gasification projects.

(Sec. 1308) Allows a 15-year cost recovery period for the depreciation of certain electric transmission property.

(Sec. 1309) Qualifies certain atmospheric pollution control facilities operating after January 1, 1976, for 84-month amortization.

(Sec. 1310) Modifies special rules for the tax treatment of nuclear decommissioning costs to repeal the cost of service requirement for tax deductible contributions to a nuclear decommissioning fund.

(Sec. 1311) Allows a taxpayer election to carryback net operating losses from transmission property and pollution control investment for a five-year period. Requires such election to be made prior to January 1, 2009.

**Subtitle B: Domestic Fossil Fuel Security** - (Sec. 1321) Extends the tax credit for producing fuel from a nonconventional source to include facilities for producing coke or coke gas.

(Sec. 1322) Classifies the tax credit for producing fuel from a nonconventional source as a business tax credit.

(Sec. 1323) Allows a taxpayer election to expense 50% of the cost of crude oil refinery property with a specified production capacity placed in service before January 1, 2008.

(Sec. 1324) Allows small business refiners an election to allocate a portion of the tax deduction for capital costs incurred by small refiner cooperatives to comply with certain Environmental Protection Agency sulfur regulations.

(Sec. 1325) Assigns a 15-year cost recovery period for the depreciation of natural gas distribution lines.

(Sec. 1326) Assigns a seven-year cost recovery period for the depreciation of natural gas gathering lines.

(Sec. 1327) Exempts from state and local bond arbitrage rules certain prepayments under a contract to acquire natural gas for resale by a government-owned utility.

(Sec. 1328) Revises the definition of certain small crude oil refiners eligible for the exemption from limitations on the percentage depletion allowance for oil and gas wells to provide that such refiners will qualify for the exemption if their average daily refinery runs do not exceed 75,000 barrels (currently, 50,000 barrels).

(Sec. 1329) Allows the amortization of geological and geophysical expenditures for the exploration for, or development of, oil or gas within the United States over a 24-month period.

**Subtitle C: Conservation and Energy Efficiency Provisions** - (Sec. 1331) Allows a tax deduction for energy efficient commercial building property placed in service before 2008. Sets forth standards, special rules, and certification requirements for such property.

(Sec. 1332) Allows certain home contractors a business tax credit for the construction of new energy efficient homes acquired before 2008. Sets forth energy savings and certification requirements for such homes.

(Sec. 1333) Allows individual taxpayers a tax credit for certain residential energy efficiency improvements made before 2008. Imposes a lifetime limitation of \$500 on such credit, less aggregate credit amounts for all prior taxable years.

(Sec. 1334) Allows a business tax credit for the production of certain household appliances (clothes washers, dishwashers, and refrigerators) with a specified energy efficiency rating.

(Sec. 1335) Allows individuals a tax credit for 30% of expenditures made for certain residential energy efficient property, including photovoltaic property, solar water heating property, and fuel cell property placed in service before 2008.

(Sec. 1336) Allows an investment tax credit for the installation of qualified fuel cell property or qualified microturbine property. Terminates such credit after 2007.

(Sec. 1337) Increases the energy tax credit from 10 to 30% for qualified fuel cell property and for solar and geothermal energy property. Makes hybrid solar lighting systems eligible for the energy tax credit until 2008. Disqualifies solar energy property used to heat swimming pools from the energy tax credit.

**Subtitle D: Alternative Motor Vehicles and Fuels Incentives** - (Sec. 1341) Allows a tax credit for investment in alternative motor vehicles technology, including qualified fuel cell, advanced lean burn technology, hybrid, and alternative fuel motor vehicles. Bases the amount of such credit on criteria relating to vehicle weight and fuel efficiency. Terminates such credit after 2014 for qualified fuel cell motor vehicles and after 2010 for advanced lean burn, hybrid, and alternative fuel motor vehicles.

(Sec. 1342) Allows a tax credit for 30% of the cost of installing a commercial or residential refueling property for dispensing certain alternative fuels consisting of at least 85% by volume of ethanol, natural gas and petroleum gases, hydrogen, or biodiesel. Limits the dollar amount of such credit to \$30,000 for commercial property and \$1,000 for residential property. Terminates such credit after 2009 (after 2014 for property relating to hydrogen).

(Sec. 1343) Reduces the motor fuel excise tax for certain water-based mixtures of diesel fuel.

(Sec. 1344) Extends through 2008: (1) the tax credit for biodiesel used as fuel; and (2) excise tax credits and refunds for alcohol fuel and biodiesel mixtures.

(Sec. 1345) Expands the tax credit for biodiesel used as fuel to include a credit amount for the per gallon production of biodiesel by certain small agri-biodiesel producers with a productive capacity of not more than 60 million gallons.

(Sec. 1346) Treats renewable diesel fuel as biodiesel for purposes of the tax credit for biodiesel used as fuel. Defines "renewable diesel" as diesel fuel derived from biomass using a certain thermal depolymerization process.

(Sec. 1347) Revises the definition of eligible small ethanol producer for purposes of the tax credit for alcohol used as fuel to increase the limit on a producer's alcohol production capacity from 30,000 to 60,000 gallons.

(Sec. 1348) Terminates the tax deduction for clean-fuel vehicles and refueling property on December 31, 2005 (currently, December 31, 2006).

**Subtitle E: Additional Energy Tax Incentives** - (Sec. 1351) Modifies the tax credit for increasing research activities to: (1) include expenses related to an energy research consortium; and (2) repeal the limitation on contract research expense paid to small businesses, universities, and federal laboratories.

(Sec. 1352) Provides for a study by the National Academy of Sciences on certain external costs and benefits associated with the production and consumption of energy.

(Sec. 1353) Directs the Secretary of the Treasury, in consultation with the Secretary of Energy, to conduct a study on recycling and to report to Congress on such study by August 8, 2006.

**Subtitle F: Revenue Raising Provisions** - (Sec. 1361) Reinstates the Oil Spill Liability Trust Fund financing rate. Suspends such tax in any calendar quarter if the Secretary of the Treasury estimates that the unobligated balance in the Oil Spill Liability Trust Fund exceeds \$2.7 million as of the close of the preceding calendar quarter. Terminates the tax after 2014.

(Sec. 1362) Extends through FY2011 the Leaking Underground Storage Tank Trust Fund financing rate. Provides that no refunds, credits, or payments for nontaxable fuel uses shall be paid from such Fund, except for exported fuels.

(Sec. 1363) Establishes a special rule for the recapture of gain from the disposition of amortizable business intangibles.

(Sec. 1364) Revises the definition of super single tires for purposes of the excise tax on tires to exclude any tire designed for steering.

Directs the Secretary of the Treasury to conduct a study in 2006 on the excise tax on tires and to report to Congress on such study not later than July 1, 2007.

**Title XIV: Miscellaneous - Subtitle A: General Provisions** - (Sec. 1401) Expresses the sense of Congress that federal agencies assessing risks to human health and the environment from energy technology, production, transport, transmission, distribution, storage, use, or conservation activities shall: (1) use sound and objective scientific practices in assessing such risks; (2) consider the best available science (including peer reviewed studies); and (3) describe the weight of the scientific evidence concerning such risks.

(Sec. 1402) Authorizes a state to provide a tax or fee incentive to entities engaged in production of electricity from coal mined in the state and used in a facility that uses scrubbers or other forms of clean coal technology.

(Sec. 1403) Declares that vegetable oil made from soybeans and used in electric transformers as thermal insulation shall not be regulated as an oil identified under the Edible Oil Regulatory Reform Act.

(Sec. 1404) Requires the Secretary to study and report to Congress on the direct and significant health impacts to persons resulting from living in proximity to petrochemical and oil refinery facilities. Authorizes appropriations.

(Sec. 1405) Establishes the National Priority Project designation, evidenced by a medal bearing the inscription "National Priority Project." Requires the President annually to designate as such projects any organizations that have: (1) advanced the field of renewable energy technology and contributed to North American energy independence; and (2) a renewable energy generation project or an energy efficient and renewable energy building project certified by the Secretary. Authorizes appropriations for FY2006-FY2010.

(Sec. 1406) Authorizes FY2006 appropriations for the Secretary to study the application of radiation to petroleum at standard temperature and pressure to refine petroleum products, with the goal of reducing the capital investment and the operating energy costs for cracking oil, as well as its sulfur content.

(Sec. 1407) Instructs the Secretary to establish an oxygen-fuel system program. Authorizes appropriations for FY2006-FY2008.

**Subtitle B: Set America Free - Set America Free Act of 2005 or the SAFE Act** - (Sec. 1423) Establishes the United States Commission on North American Energy Freedom to make recommendations on a coordinated and comprehensive North American energy policy to achieve energy self-sufficiency by 2025 within the three contiguous North American nation area of Canada, Mexico, and the United States. Authorizes appropriations for FY2005-FY2007.

(Sec. 1424) Directs the President to submit to Congress, within 90 days after receiving and considering the Commission's report, a statement of proposals to implement or respond to its recommendations.

**Title XV: Ethanol and Motor Fuels - Subtitle A: General Provisions** - (Sec. 1501) Amends the Clean Air Act to establish a renewable fuel program consisting of cellulosic biomass and waste-derived ethanol, and biodiesel. Directs the EPA Administrator to promulgate regulations to implement a renewable fuel program to ensure that gasoline introduced into commerce in the United States contains the applicable volume of specified renewable fuel (except in noncontiguous states or territories).

Authorizes the Administrator, upon the petition of a noncontiguous state or territory, to allow the renewable fuel program to apply there.

Prescribes implementation guidelines.

Provides for the generation of credits: (1) by any person that refines, blends, or imports gasoline that contains renewable fuel exceeding the statutory requirement; (2) for biodiesel; and (3) by small refineries.

Cites conditions under which the Administrator may waive requirements for the renewable fuel program, based in part upon an assessment by the Secretary of Energy whether the renewable fuel requirement will likely result in significant adverse impacts on consumers on a national, regional, or state basis in 2006.

Grants small refineries a temporary exemption from the requirements of the renewable fuel program until calendar year 2011.

Permits a small refinery to petition the Administrator for an extension of the exemption based upon disproportionate economic hardship.

Requires the Federal Trade Commission (FTC) to report annually to Congress and the Administrator on a market concentration analysis to determine whether there is sufficient competition among ethanol production industry participants to avoid price-setting and other anticompetitive behavior.

Requires the Administrator, upon notification from a state Governor that the statutory Reid vapor pressure limitation (RVPL) will increase emissions that contribute to air pollution in the state, to apply a substitute RVPL to fuel blends containing gasoline and 10% denatured anhydrous ethanol that are introduced into commerce during the high ozone season.

Directs the Administrator to survey and report annually to Congress on the market shares of conventional and reformulated gasoline containing ethanol and renewable fuel.

(Sec. 1502) Declares that Congress finds that: (1) since 1979 methyl tertiary butyl ether (MTBE) has been used nationwide at low levels in gasoline to replace lead as an octane booster or anti-knocking agent; (2) the Clean Air Act Amendments of 1990 established a fuel oxygenate standard under which reformulated gasoline must contain at least 2% oxygen by weight; and (3) the fuel industry responded to such standard by making substantial investments in MTBE production capacity and systems to deliver MTBE-containing gasoline to the marketplace.

(Sec. 1503) States that claims and legal actions filed after the date of enactment of this Act regarding actual or threatened contamination of MTBE may be removed to federal district court.

(Sec. 1504) Amends the Clean Air Act to repeal general requirements governing the oxygen content of both gasoline and of reformulated gasoline.

Directs the Administrator of EPA to establish, for each refinery or importer, standards for toxic air pollutants from use of the reformulated gasoline produced or distributed by the refinery or importer that maintain the reduction of the average annual aggregate emissions of such pollutants during calendar years 2001 and 2002.

Prescribes implementation guidelines. Authorizes the EPA Administrator to adjust such standards.

(Sec. 1505) Requires the EPA Administrator to study and report to certain congressional committees on the effects upon public health, air quality, and water resources of: (1) increased use of, and the feasibility of using specified substitutes for MTBE in gasoline; and (2) the adjustment for ethanol-blended reformulated gasoline to volatile organic compounds performance requirements.

(Sec. 1506) Directs the Administrator to: (1) publish for public comment an analysis of the changes in emissions of air pollutants and air quality due to the use of motor vehicle fuel and fuel additives resulting from implementation of the Energy Policy Act of 2005; and (2) develop and finalize an emissions model that reflects the effects of gasoline characteristics or components on emissions from vehicles in the motor vehicle fleet during calendar year 2007.

Directs the Administrator to study and report to Congress on the effects of ethanol content in gasoline on permeation, the process by which fuel molecules migrate through the elastomeric materials (rubber and plastic parts) that make up the fuel and fuel vapor systems of a motor vehicle.

Requires such study to include estimates of the increase in total evaporative emissions likely to result from the use of gasoline with ethanol content in a motor vehicle, and the fleet of motor vehicles, due to permeation.

(Sec. 1507) Requires the Administrator, upon application of the Governor of a state in a ozone transport region, to apply certain prohibitions to any area in the state (other than an area classified as a marginal, moderate, serious, or severe ozone nonattainment area) unless the Administrator determines that there is insufficient capacity to supply reformulated gasoline.

(Sec. 1508) Amends the Department of Energy Organization Act to instruct the Administrator of the Energy Information Administration to survey and publish monthly the renewable fuels demand in the motor vehicle fuels market.

(Sec. 1509) Instructs the EPA Administrator and the Secretary to study and report jointly to Congress on federal, state, and local requirements concerning motor vehicle fuels.

(Sec. 1510) Directs the Secretary to establish a program to provide guarantees of loans by private institutions for the construction of facilities for the processing and conversion of municipal solid waste and cellulosic biomass into fuel ethanol and other commercial byproducts.

(Sec. 1511) Amends the Clean Air Act to: (1) authorize funds for certain loan guarantees to implement commercial demonstration projects for cellulosic biomass and sucrose-derived ethanol; and (2) direct the Secretary to issue loan guarantees for up to four projects to commercially demonstrate the feasibility and viability of producing cellulosic biomass ethanol or sucrose-derived ethanol (including use of cereal straw and municipal solid waste as a feedstock).

Authorizes the Secretary to issue additional loan guarantees for a project to cover up to 80% of the excess of actual over estimated project cost but not to exceed 15% of the amount of the original guarantee.

Authorizes appropriations for FY2005-FY2007 for a resource center to develop bioconversion technology using low-cost biomass for the production of ethanol at the Center for Biomass-Based Energy at the Mississippi State University and the Oklahoma State University.

Directs the EPA Administrator to provide grants for research, development, and implementation of renewable fuel production technologies in specified states with low rates of ethanol production, including low rates of production of cellulosic biomass ethanol.

Authorizes the Secretary to provide grants to merchant producers of cellulosic biomass ethanol to build eligible production facilities for the product.

(Sec. 1512) Authorizes the Secretary to provide grants to merchant producers of cellulosic biomass ethanol, waste-derived ethanol, and approved renewable fuels in the United States to assist them in building eligible production facilities for the production of ethanol or approved renewable fuels. Authorizes appropriations for FY2006-FY2008.

(Sec. 1513) Amends the Clean Air Act to cite circumstances under which it shall not be a violation of the Act for a gasoline retailer to blend, at a retail location, batches of ethanol-blended and non-ethanol-blended reformulated gasoline.

(Sec. 1514) Directs the EPA Administrator to: (1) establish an Advanced Biofuel Technologies Program to demonstrate advanced technologies for the production of alternative transportation fuels; (2) give priority to projects that enhance the geographical diversity of alternative fuels production and utilize feedstocks that represent 10% or less of domestic ethanol or biodiesel fuel production during the previous fiscal year; and (3) fund demonstration projects to develop conversion technologies for producing cellulosic biomass ethanol, and for coproducing value-added bioproducts (such as fertilizers, herbicides, and pesticides) resulting from biodiesel fuel production. Authorizes appropriations for FY2005-FY2009.

(Sec. 1515) Amends the Energy Policy Act of 1992 to redefine biodiesel to include biodiesel derived from: (1) animal wastes, including poultry fats and poultry wastes, and other waste materials; or (2) municipal solid waste and sludges and oils derived from wastewater and the treatment of wastewater.

(Sec. 1516) Authorizes funds for, and authorizes the Secretary to issue, loan guarantees to projects to demonstrate commercially the feasibility and viability of producing ethanol using sugarcane, sugarcane bagasse, and other sugarcane byproducts as a feedstock.

**Subtitle B: Underground Storage Tank Compliance - Underground Storage Tank Compliance Act of 2005 - (Sec. 1522)** Amends the Solid Waste Disposal Act to direct the EPA Administrator to distribute to states at least 80% of the funds from the Underground Storage Tank Trust Fund made available each fiscal year for use in paying the reasonable costs for state enforcement efforts pertaining to underground storage tanks.

(Sec. 1523) Prescribes inspection requirements for underground storage tanks.

(Sec. 1524) Instructs the EPA Administrator to publish guidelines that specify training requirements for persons having primary onsite management responsibility for the operation and maintenance of underground storage tanks.

(Sec. 1525) Authorizes funds for: (1) remediation of oxygenated fuel additives; and (2) release prevention and compliance.

(Sec. 1527) Prohibits delivery, deposit, or acceptance of a regulated substance into an underground storage tank at a facility identified as ineligible for fuel delivery or deposit. Prescribes civil penalties for violation of this prohibition.

(Sec. 1528) Revises requirements governing federal agencies with either jurisdiction over underground storage tanks or systems, or engaged in any activity which may result in specified actions regarding such tanks or the regulated substances related to them, including release response activities.

Waives sovereign immunity with respect to substantive or procedural state requirements. Continues the President's authority to exempt any federal tank from compliance with such requirements.

Exempts federal officers, employees, and agents from liability for civil penalties, but not from criminal penalties, for acts or omissions in their official capacity.

(Sec. 1529) Instructs the EPA Administrator, in coordination with Indian tribes, to develop and implement a strategy to take necessary corrective action in response to releases from leaking underground storage tanks on tribal lands. Gives priority to releases that present the greatest threat to human health or the environment.

(Sec. 1530) Directs the EPA Administrator to require each state that receives funding for underground storage facilities to require: (1) tank and piping secondary containment to protect groundwater from contamination; and (2) evidence of manufacturer and installer financial responsibility.

(Sec. 1531) Authorizes appropriations for FY2005-FY2009.

**Subtitle C: Boutique Fuels** - (Sec. 1541) Amends the Clean Air Act to cite conditions under which the EPA Administrator may waive the prohibition against the use of extreme and unusual fuel or fuel additive supplies ("boutique fuels").

Directs the EPA Administrator to determine the total number of approved boutique fuels.

Directs the EPA Administrator and the Secretary of Energy to study and report jointly to Congress on the effects of state provisions adopted pursuant to the Clean Air Act regarding: (1) air quality; (2) the number of fuel blends; (3) fuel availability; (4) fuel fungibility; and (5) fuel costs.

**Title XVI: Climate Change - Subtitle A: National Climate Change Technology Deployment** - (Sec. 1601) Amends the Energy Policy Act of 1992 to direct the President to establish a Committee on Climate Change Technology to: (1) integrate current federal climate reports; and (2) coordinate federal climate change technology activities and programs carried out in furtherance of a national strategy the Committee shall develop to promote technologies and practices that reduce greenhouse gas intensity.

Instructs the Secretary to establish within the Department of Energy the Climate Change Technology Program to: (1) assist the Committee in the interagency coordination of climate change technology research, development, demonstration, and deployment to reduce greenhouse gas intensity; and (2) conduct and publicize an inventory and evaluation of greenhouse gas intensity reducing technologies in order to determine technologies suitable for commercialization and deployment.

Authorizes the Secretary to establish a Climate Change Technology Advisory Committee to identify statutory, regulatory, economic, and other barriers to the commercialization and deployment of greenhouse gas intensity reducing technologies and practices in the United States.

**Subtitle B: Climate Change Technology Deployment in Developing Countries** - (Sec. 1611) Amends the Global Environmental Protection Assistance Act of 1989 to designate the Department of State as lead agency for integrating into U.S. foreign policy the goal of reducing greenhouse gas intensity in developing countries.

Directs the Secretary of State to: (1) report to certain congressional committees on the 25 developing countries that are the largest greenhouse gas emitters; (2) establish baselines and track the progress of such countries in reducing greenhouse gas intensity; and (3) provide financial assistance to such countries specifically for projects to reduce greenhouse gas intensity.

Requires the Secretaries of Energy, of State, and of Commerce to conduct an inventory and report to Congress on greenhouse gas intensity reducing technologies suitable for transfer, deployment, and commercialization in those developing countries.

Directs the U.S. Trade Representative to report to Congress regarding: (1) trade-relations barriers of foreign countries to U.S. export to developing countries of greenhouse gas intensity reducing technologies and practices; and (2) negotiations with such countries for removal of those barriers.

Establishes an interagency working group to implement a Greenhouse Gas Intensity Reducing Technology Export Initiative.

Directs the Secretaries of State and of Energy, and the Administrator of the United States Agency for International Development, to provide assistance for the implementation of technology demonstration projects in at least 10 eligible countries.

Instructs the Secretary of State, in coordination with the Secretary of Energy, the Secretary of Commerce, and the EPA Administrator, to carry out fellowship and exchange programs for officials from developing countries to visit the United States to acquire expertise and knowledge of best practices to reduce greenhouse gas intensity in their countries.

Authorizes appropriations.

**Title XVII: Incentives for Innovative Technologies** - (Sec. 1702) Directs the Secretary of Energy to make guarantees for certain projects, including gasification and liquefaction projects, that: (1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued.

Authorizes appropriations.

**Title XVIII: Studies** - (Sec. 1801) Directs the Secretary of Energy to study and report to Congress on designated subjects, including: (1) petroleum and natural gas storage capacity and operational inventory levels, nationwide and by major geographical regions; (2) whether the goals of energy efficiency standards are best served by measurement of energy consumed and efficiency improvements at the actual site of energy consumption, or through the full fuel cycle, beginning at the source of energy production; and (3) domestic energy conservation implications of widespread telecommuting by federal employees.

(Sec. 1804) Instructs the Secretary of Health and Human Services to report to Congress on how the Low-Income Home Energy Assistance Program (LIHEAP) could be used more effectively to prevent loss of life from extreme temperatures.

(Sec. 1805) Directs the Secretary and the Administrator of EPA to study the benefits of oil bypass filtration technology in reducing demand for oil and protecting the environment.

(Sec. 1806) Instructs the Secretary to: (1) study the benefits of total integrated thermal systems in reducing demand for oil and protecting the environment; and (2) examine the feasibility of using total integrated thermal systems in federal motor vehicle fleets.

(Sec. 1807) Instructs the Secretary to report annually to certain congressional committees on energy export development in Latin America and federal efforts to promote energy integration with Latin America.

(Sec. 1808) Directs the Secretary to make a grant to an organization of oil and gas producing states, specifically those containing significant numbers of marginal oil and natural gas wells, to conduct an annual study of low-volume natural gas reservoirs.

(Sec. 1809) Directs the FTC to investigate and report to Congress if the price of gasoline is being artificially manipulated by either reducing refinery capacity, or by any other form of market manipulation or price gouging practices.

Requires the Secretary to direct the National Petroleum Council to conduct an evaluation and analysis to determine whether, and to what extent, environmental and other regulations affect new domestic refinery construction and significant expansion of existing refinery capacity.

(Sec. 1810) Directs FERC, until the Alaska natural gas pipeline commences operation, to submit periodic status reports to Congress: (1) describing the progress made in licensing and constructing the pipeline; and (2) any issue impeding that progress.

(Sec. 1811) Directs the Secretary of the Interior to arrange with the National Academy of Sciences to study, for a report to Congress, the effect of coal bed natural gas production (coal bed methane) on surface and groundwater resources, including groundwater aquifers, in Montana, Wyoming, Colorado, New Mexico, North Dakota, and Utah.

(Sec. 1812) Instructs the Secretary to study and report to Congress on the effect of obtaining and maintaining liquid and other fuel backup capability at: (1) gas-fired power generation facilities; and (2) other gas-fired industrial facilities.

(Sec. 1813) Requires the Secretary and the Secretary of the Interior to study and report jointly to Congress on issues regarding energy rights-of-way on tribal land.

(Sec. 1814) Requires the Secretary to submit a report to Congress that: (1) identifies any policies or procedures of a contractor operating a National Laboratory or single-purpose research facility that create disincentives to the temporary or permanent transfer of scientific and technical personnel among the contractor-operated National Laboratories or single-purpose research facilities; and (2) provides recommendations for improving interlaboratory exchange of scientific and technical personnel.

(Sec. 1815) Establishes an interagency Electric Energy Market Competition Task Force to study and report to Congress on competition within the wholesale and retail market for electric energy in the United States.

(Sec. 1816) Directs the Secretary to study and report to Congress and the President on the benefits of using mobile transformers and mobile substations to rapidly restore electrical service to areas subjected to blackouts.

(Sec. 1817) Directs the Secretary to study and report to Congress and the President on the potential benefits of cogeneration and small power production.

(Sec. 1818) Instructs the Secretary to report to Congress a comprehensive analysis of natural gas supply and demand in the United States for the period between January 1, 2004, and December 31, 2015.

(Sec. 1819) Requires the Secretary to report to Congress on: (1) methodologies to ensure the widest participation practicable in setting goals and milestones under the DOE hydrogen program, including international participants; and (2) the likely effects of a transition to a hydrogen economy upon overall employment in the United States.

(Sec. 1821) Directs the Secretary to arrange with the National Academy of Public Administration to assess, for a report to Congress, best management practices for DOE research, development, and demonstration programs.

(Sec. 1822) Requires the Secretary to enter into a contract with the National Academy of Sciences for the Academy to determine the effect that electrical contaminants (such as tin whiskers) may have on the reliability of energy production systems, including nuclear energy.

(Sec. 1823) Directs the Secretary to report to Congress on the potential of biodiesel and hythane to become major, sustainable, alternative fuels.

(Sec. 1824) Directs FERC to: (1) seek to conclude its investigation into the unjust or unreasonable charges incurred by California during the 2000-2001 electricity crisis as soon as possible; (2) seek to ensure that refunds owed to the state of California are paid; and (3) report to Congress on actions taken and timetables for further actions.

(Sec. 1825) Directs the Secretary to contract with the National Academy of Sciences and the National Research Council to study fuel cell technologies in order to provide a budget roadmap for the development of fuel cell technologies and the transition from petroleum to hydrogen in a significant percentage of the vehicles sold by 2020.

(Sec. 1826) Directs the Secretary to study and report to Congress on: (1) the range of levelized costs of avoided electricity for passive solar technologies (PST); (2) the quantity of electricity displaced using PST; and (3) the projected energy savings from PST in five year

increments if certain incentives are provided.

(Sec. 1827) Requires the Secretary to arrange with the National Academy of Sciences to assess and report to Congress and the Secretary on the implications on energy use and efficiency of land development patterns in the United States.

(Sec. 1828) Directs the Secretary to study, compile, and verify existing science regarding the risks or benefits presented by cumulative impacts of multiple offshore liquefied natural gas facilities reasonably assumed to be constructed in an area of the Gulf of Mexico using the open-rack vaporization system.

(Sec. 1829) Instructs the Architect of the Capitol to study and report to Congress on: (1) an evaluation of the energy infrastructure of the Capitol complex to determine how to augment it to become more energy efficient; and (2) the feasibility of installing energy and water conservation measures on the rooftop of the Dirksen Senate Office Building. Authorizes appropriations for FY2006-FY2010.

(Sec. 1830) Directs the Secretary to: (1) arrange with the National Academy of Sciences to study, for a report to Congress, the short-term and long-term availability of skilled workers to meet the energy and mineral security requirements of the United States.

(Sec. 1831) Directs the Secretary to study and report to Congress on the effect of certain programs under the Energy Policy Act of 1992 upon: (1) the development of alternative fueled vehicle technology; (2) the availability of that technology in the market; and (3) the cost of alternative fueled vehicles.

(Sec. 1832) Requires the Secretary to study and report to Congress and the states on: (1) procedures currently used by electric utilities to perform economic dispatch; (2) possible revisions to those procedures to improve the ability of nonutility generation resources to offer their output for sale for inclusion in economic dispatch; and (3) the potential benefits to residential, commercial, and industrial electricity consumers if economic dispatch procedures were revised to improve the ability of nonutility generation resources to do so.

(Sec. 1833) Directs the Secretary of the Interior to contract with the National Academy of Sciences to study for a report to Congress on: (1) the potential of developing wind, solar, and ocean energy resources on federal land and the Outer Continental Shelf; (2) federal law and regulations relating to development of those resources; and (3) statutory and regulatory mechanisms recommended to develop those resources.

(Sec. 1834) Directs the Secretaries of the Interior, of Energy, and of the Army to study and report jointly to certain congressional committees on the potential for increasing electric power production capability at federally owned or operated water regulation, storage, and conveyance facilities.

(Sec. 1835) Instructs the Secretary of the Interior to review: (1) current policies and practices with respect to management of federal subsurface oil and gas development activities and their effects upon the privately owned surface; and (2) federal and state laws in order to resolve any conflict relating to the Powder River Basin in Wyoming and Montana between the development of federal coal and the development of federal and nonfederal coal bed methane.

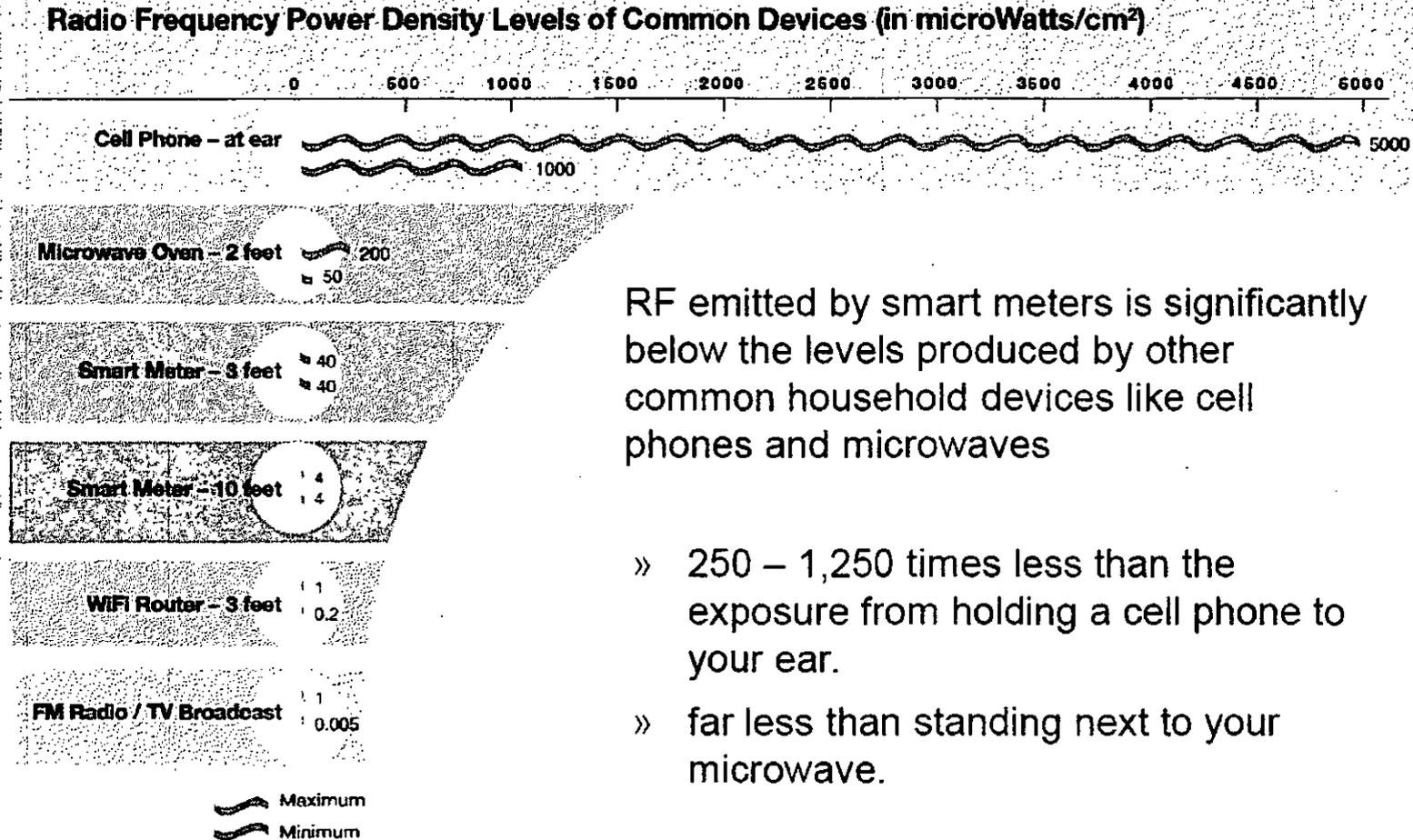
(Sec. 1837) Requires the Secretary to review and report to Congress and the President on the growing energy requirements of the People's Republic of China and the implications of such growth on the political, strategic, economic, or national security interests of the United States.

(Sec. 1838) Requires the Secretary to study and report to Congress on the energy and environmental benefits of re-refining used lubricating oil, including recommendations of specific steps that can be taken to improve collections of used lubricating oil and increase re-refining and other beneficial reuse of such oil.

(Sec. 1839) Requires the Secretary and FERC to study and report to Congress on establishment of a system to make available real-time information on the functional status of all transmission lines to all transmission system owners and Regional Transmission Organizations within the Eastern and Western Interconnections.

(Sec. 1840) Directs the Secretary of the Interior to report to certain congressional committees on the status of potential hydropower facilities included in water surface storage studies for projects that have not been completed or authorized for construction.

# SMART METER RF EMISSIONS VS. OTHER COMMON DEVICES



RF emitted by smart meters is significantly below the levels produced by other common household devices like cell phones and microwaves

- » 250 – 1,250 times less than the exposure from holding a cell phone to your ear.
- » far less than standing next to your microwave.

Source: Electric Power Research Institute (EPRI) Field Measurement Study "Radio Frequency Exposure Levels for Smart Meters: A Case Study of One Model, February 2011.

# International Agency for Research on Cancer



World Health  
Organization

PRESS RELEASE  
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## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

Lyon, France, May 31, 2011 -- The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as **possibly carcinogenic to humans (Group 2B)**, based on an increased risk for **glioma**, a malignant type of brain cancer<sup>1</sup>, associated with wireless phone use.

### Background

Over the last few years, there has been mounting concern about the possibility of adverse health effects resulting from exposure to radiofrequency electromagnetic fields, such as those emitted by wireless communication devices. The number of mobile phone subscriptions is estimated at **5 billion globally**.

From **May 24–31 2011**, a **Working Group of 31 scientists from 14 countries has been meeting at IARC in Lyon, France, to assess the potential carcinogenic hazards from exposure to radiofrequency electromagnetic fields**. These assessments will be published as Volume 102 of the IARC *Monographs*, which will be the fifth volume in this series to focus on physical agents, after **Volume 55** (Solar Radiation), **Volume 75** and **Volume 78** on ionizing radiation (X-rays, gamma-rays, neutrons, radio-nuclides), and **Volume 80 on non-ionizing radiation (extremely low-frequency electromagnetic fields)**.

The IARC Monograph Working Group discussed the possibility that these exposures might induce long-term health effects, in particular an increased risk for cancer. This has relevance for public health, particularly for users of mobile phones, as the number of users is large and growing, particularly among young adults and children.

The IARC Monograph Working Group discussed and evaluated the available literature on the following exposure categories involving radiofrequency electromagnetic fields:

- occupational exposures to radar and to microwaves;
- environmental exposures associated with transmission of signals for radio, television and wireless telecommunication; and
- personal exposures associated with the use of wireless telephones.

International experts shared the complex task of tackling the exposure data, the studies of cancer in humans, the studies of cancer in experimental animals, and the mechanistic and other relevant data.

<sup>1</sup> **237 913 new cases of brain cancers** (all types combined) occurred around the world in 2008 (gliomas represent 2/3 of these). Source: **Globocan 2008**

## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

### Results

The evidence was reviewed critically, and overall evaluated as being *limited*<sup>2</sup> among users of wireless telephones for glioma and acoustic neuroma, and *inadequate*<sup>3</sup> to draw conclusions for other types of cancers. The evidence from the occupational and environmental exposures mentioned above was similarly judged inadequate. The Working Group did not quantitate the risk; however, one study of past cell phone use (up to the year 2004), showed a 40% increased risk for gliomas in the highest category of heavy users (reported average: 30 minutes per day over a 10-year period).

### Conclusions

Dr Jonathan Samet (University of Southern California, USA), overall Chairman of the Working Group, indicated that "the evidence, while still accumulating, is strong enough to support a conclusion and the 2B classification. The conclusion means that there could be some risk, and therefore we need to keep a close watch for a link between cell phones and cancer risk."

"Given the potential consequences for public health of this classification and findings," said IARC Director Christopher Wild, "it is important that additional research be conducted into the long-term, heavy use of mobile phones. Pending the availability of such information, it is important to take pragmatic measures to reduce exposure such as hands-free devices or texting. "

The Working Group considered hundreds of scientific articles; the complete list will be published in the Monograph. It is noteworthy to mention that several recent in-press scientific articles<sup>4</sup> resulting from the Interphone study were made available to the working group shortly before it was due to convene, reflecting their acceptance for publication at that time, and were included in the evaluation.

A concise report summarizing the main conclusions of the IARC Working Group and the evaluations of the carcinogenic hazard from radiofrequency electromagnetic fields (including the use of mobile telephones) will be published in The Lancet Oncology in its July 1 issue, and in a few days online.

<sup>2</sup> '*Limited evidence of carcinogenicity*': A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by the Working Group to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.

<sup>3</sup> '*Inadequate evidence of carcinogenicity*': The available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of a causal association between exposure and cancer, or no data on cancer in humans are available.

<sup>4</sup> a. 'Acoustic neuroma risk in relation to mobile telephone use: results of the INTERPHONE international case-control study' (the Interphone Study Group, *In Cancer Epidemiology, in press*)  
 b. 'Estimation of RF energy absorbed in the brain from mobile phones in the Interphone study' (Cardis et al., *Occupational and Environmental Medicine, in press*)  
 c. 'Risk of brain tumours in relation to estimated RF dose from mobile phones – results from five Interphone countries' (Cardis et al., *Occupational and Environmental Medicine, in press*)  
 d. 'Location of Gliomas in Relation to Mobile Telephone Use: A Case-Case and Case-Specular Analysis' (*American Journal of Epidemiology*, May 24, 2011. [Epub ahead of print].

## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

For more information, please contact

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Link to the audio file posted shortly after the briefing:

[http://terrance.who.int/mediacentre/audio/press\\_briefings/](http://terrance.who.int/mediacentre/audio/press_briefings/)

### About IARC

The International Agency for Research on Cancer (IARC) is part of the World Health Organization. Its mission is to coordinate and conduct research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer control. The Agency is involved in both epidemiological and laboratory research and disseminates scientific information through publications, meetings, courses, and fellowships.

If you wish your name to be removed from our press release e-mailing list, please write to [com@iarc.fr](mailto:com@iarc.fr).

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## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

### ABOUT THE IARC MONOGRAPHS

#### What are the IARC Monographs?

The IARC Monographs identify environmental factors that can increase the risk of human cancer. These include chemicals, complex mixtures, occupational exposures, physical and biological agents, and lifestyle factors. National health agencies use this information as scientific support for their actions to prevent exposure to potential carcinogens. Interdisciplinary working groups of expert scientists review the published studies and evaluate the weight of the evidence that an agent can increase the risk of cancer. The principles, procedures, and scientific criteria that guide the evaluations are described in the Preamble to the IARC Monographs.

Since 1971, more than 900 agents have been evaluated, of which approximately 400 have been identified as carcinogenic or potentially carcinogenic to humans.

### Definitions

#### Group 1: The agent is *carcinogenic to humans*.

This category is used when there is *sufficient evidence of carcinogenicity* in humans. Exceptionally, an agent may be placed in this category when evidence of carcinogenicity in humans is less than *sufficient* but there is *sufficient evidence of carcinogenicity* in experimental animals and strong evidence in exposed humans that the agent acts through a relevant mechanism of carcinogenicity.

#### Group 2.

This category includes agents for which, at one extreme, the degree of evidence of carcinogenicity in humans is almost *sufficient*, as well as those for which, at the other extreme, there are no human data but for which there is evidence of carcinogenicity in experimental animals. Agents are assigned to either Group 2A (*probably carcinogenic to humans*) or Group 2B (*possibly carcinogenic to humans*) on the basis of epidemiological and experimental evidence of carcinogenicity and mechanistic and other relevant data. The terms *probably carcinogenic* and *possibly carcinogenic* have no quantitative significance and are used simply as descriptors of different levels of evidence of human carcinogenicity, with *probably carcinogenic* signifying a higher level of evidence than *possibly carcinogenic*.

#### Group 2A: The agent is *probably carcinogenic to humans*.

This category is used when there is *limited evidence of carcinogenicity* in humans and *sufficient evidence of carcinogenicity* in experimental animals. In some cases, an agent may be classified in this category when there is *inadequate evidence of carcinogenicity* in humans and *sufficient evidence of carcinogenicity* in experimental animals and strong evidence that the carcinogenesis is mediated by a mechanism that also operates in humans. Exceptionally, an agent may be classified in this category solely on the basis of *limited evidence of carcinogenicity* in humans. An agent may be assigned to this category if it clearly belongs, based on mechanistic considerations, to a class of agents for which one or more members have been classified in Group 1 or Group 2A.

## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

### Group 2B: The agent is possibly carcinogenic to humans.

This category is used for agents for which there is *limited evidence of carcinogenicity* in humans and less than *sufficient evidence of carcinogenicity* in experimental animals. It may also be used when there is *inadequate evidence of carcinogenicity* in humans but there is *sufficient evidence of carcinogenicity* in experimental animals. In some instances, an agent for which there is *inadequate evidence of carcinogenicity* in humans and less than *sufficient evidence of carcinogenicity* in experimental animals together with supporting evidence from mechanistic and other relevant data may be placed in this group. An agent may be classified in this category solely on the basis of strong evidence from mechanistic and other relevant data.

### Group 3: The agent is not classifiable as to its carcinogenicity to humans.

This category is used most commonly for agents for which the evidence of carcinogenicity is *inadequate* in humans and *inadequate* or *limited* in experimental animals.

Exceptionally, agents for which the evidence of carcinogenicity is *inadequate* in humans but *sufficient* in experimental animals may be placed in this category when there is strong evidence that the mechanism of carcinogenicity in experimental animals does not operate in humans.

Agents that do not fall into any other group are also placed in this category.

An evaluation in Group 3 is not a determination of non-carcinogenicity or overall safety. It often means that further research is needed, especially when exposures are widespread or the cancer data are consistent with differing interpretations.

### Group 4: The agent is probably not carcinogenic to humans.

This category is used for agents for which there is *evidence suggesting lack of carcinogenicity* in humans and in experimental animals. In some instances, agents for which there is *inadequate evidence of carcinogenicity* in humans but *evidence suggesting lack of carcinogenicity* in experimental animals, consistently and strongly supported by a broad range of mechanistic and other relevant data, may be classified in this group.

### Definitions of evidence, as used in IARC Monographs for studies in humans

The evidence relevant to carcinogenicity from studies in humans is classified into one of the following categories:

**Sufficient evidence of carcinogenicity:** The Working Group considers that a causal relationship has been established between exposure to the agent and human cancer. That is, a positive relationship has been observed between the exposure and cancer in studies in which chance, bias and confounding could be ruled out with reasonable confidence. A statement that there is *sufficient evidence* is followed by a separate sentence that identifies the target organ(s) or tissue(s) where an increased risk of cancer was observed in humans. Identification of a specific target organ or tissue does not preclude the possibility that the agent may cause cancer at other sites.

## IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

**Limited evidence of carcinogenicity:** A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by the Working Group to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.

**Inadequate evidence of carcinogenicity:** The available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of a causal association between exposure and cancer, or no data on cancer in humans are available.

**Evidence suggesting lack of carcinogenicity:** There are several adequate studies covering the full range of levels of exposure that humans are known to encounter, which are mutually consistent in not showing a positive association between exposure to the agent and any studied cancer at any observed level of exposure. The results from these studies alone or combined should have narrow confidence intervals with an upper limit close to the null value (e.g. a relative risk of 1.0). Bias and confounding should be ruled out with reasonable confidence, and the studies should have an adequate length of follow-up. A conclusion of *evidence suggesting lack of carcinogenicity* is inevitably limited to the cancer sites, conditions and levels of exposure, and length of observation covered by the available studies. In addition, the possibility of a very small risk at the levels of exposure studied can never be excluded.

In some instances, the above categories may be used to classify the degree of evidence related to carcinogenicity in specific organs or tissues.

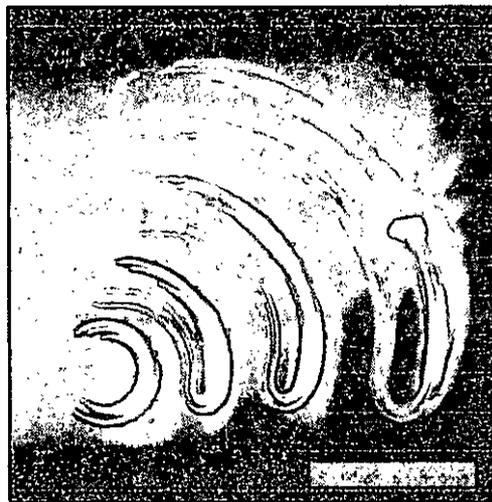
## Smart Grid Awareness

A Website by SkyVision Solutions, Consumer Protection Advocate

**Raising Public Awareness to Smart Grid, Smart Meter, and Radiofrequency (RF) Concerns: Privacy, Health, Cybersecurity, Safety, Economics, Societal Impacts, Environmental Impacts, Consumer Choice and Rights**



### Smart Meter RF Emissions vs. Other Common Devices



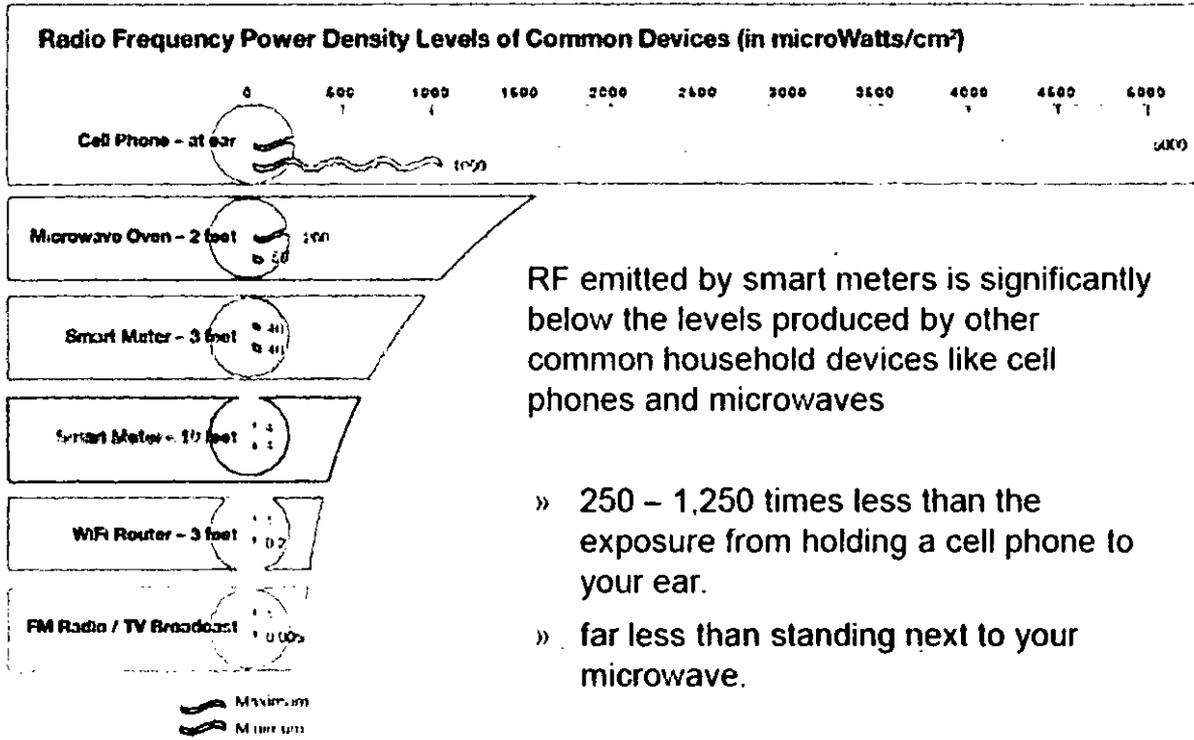
*by K.T. Weaver, SkyVision Solutions, Updated October 2018*

When you want to promote the safety of a product, it is common to use a chart in an attempt to put in perspective the safety of "your" product in comparison with other products. Unfortunately, you are sometimes forced to compare "apples with oranges" in these endeavors, and depending on your level of bias, two different organizations can arrive at totally different charts using basically the same data.

The chart shown below is one taken from a PowerPoint slide presentation prepared by Itron (a major manufacturer of smart meters) for a workshop held on September 20, 2012, with the Florida Public Service Commission. The workshop was entitled, "Smart Metering Technology Overview."

The chart compares radiofrequency power level densities for "common devices." The primary source for the information in the chart is given as a case study for one model of smart meter conducted by the Electric

# SMART METER RF EMISSIONS VS. OTHER COMMON DEVICES



RF emitted by smart meters is significantly below the levels produced by other common household devices like cell phones and microwaves

- » 250 – 1,250 times less than the exposure from holding a cell phone to your ear.
- » far less than standing next to your microwave.

Source: Electric Power Research Institute (EPRI) Health Assessment Study: Radio Frequency Emission Levels for Smart Meters. A Case Study of One Model. February 2011

What does the chart show? Initially taking the chart at face value:

- Cell phone radiation emissions are much greater than for other wireless devices.
- Smart meter radiation exposures are somewhat less than the exposure from a microwave oven.
- Smart meter exposures are higher than for Wi-Fi routers and FM/TV broadcasts.

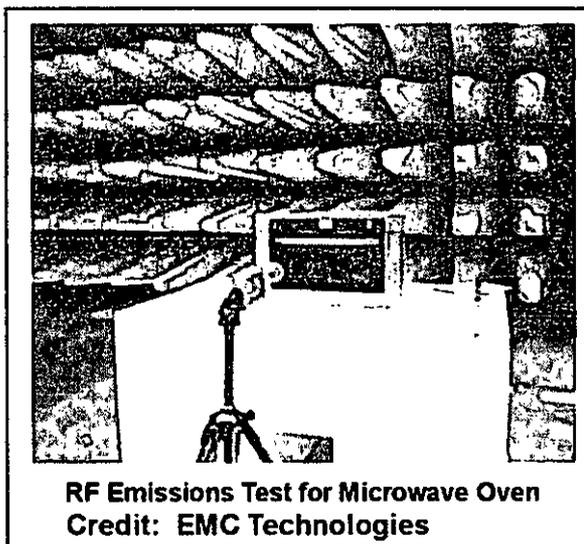
Varying levels of criticism can be offered for this chart. Although the above chart is definitely biased in trying to present a comparison of RF emissions for various devices, there are other charts that are even more biased than this one. In some other charts, data will be graphed in a way that shows instantaneous peak values for all sources except the smart meters. For smart meters, an average power density is then shown on the graph, based upon an assumed duty cycle (the percentage of time a meter transmits a signal), making the smart meter value look unreasonably low by comparison. The above chart, to its credit, at least avoids the controversial issue of duty cycles and compares all devices based upon instantaneous or peak power densities.

On the other hand, one obvious problem with the above chart is the description that the smart meter

radiation levels are as "far less than standing next to your microwave." This is not an accurate characterization of the actual numbers on the chart. Look at the distances. If the smart meter radiation levels had been reported for a 2-foot distance, as the microwave, there may have been little difference at all between the two devices. And who actually stands next to their microwave when warming up a dinner, etc., for the entire period of use? The above chart shows the smart meter radiation levels at 3 feet and 10 feet. Why not show the microwave levels at the same distances?

In fact, I was able to confirm by extrapolating EPRI smart meter data for 3 feet and 10 feet, that the radiation level for a smart meter at a distance of 2 feet would be 200 microwatts per cm<sup>2</sup>, the same value as given by EPRI for the **upper** level exposure for a microwave at a 2-foot distance. But not only that, the collective evidence from three separate (non-EPRI but yet industry-related) references would substantiate that a radiation level of 10 microwatts per cm<sup>2</sup> could be listed for a microwave oven measured at 3 feet. Then we would have the smart meter listed with a higher radiation level than the microwave oven at 3 feet. ... Of course we couldn't have that! ... Here are the references:

- Richard Tell Associates performed measurements on two (2) separate microwaves during a study in the state of Vermont. The test results were almost identical at a distance of 3 feet, indicating a power density of 10 microwatts per cm<sup>2</sup>. [Reference: "An Evaluation of Radio Frequency Fields Produced by Smart Meters Deployed in Vermont," by Richard Tell Associates, Inc., dated, January 14, 2013.]



- EMC Technologies also performed measurements for a microwave that showed a results of 6.1 microwatts per cm<sup>2</sup> at one (1) meter. [Reference: "AMI Meter Electromagnetic Field Survey," EMC Technologies, Final Report, October 20, 2011.]
- Richard Tell Associates in a document entitled, "Summary Discussion of RF Fields and the PG&E SmartMeter System (2005 Report and 2008 Supplement)," quotes a value for a "Typical RF field in kitchen with operating microwave [1 meter]" as 10 microwatts per cm<sup>2</sup>.

What needs to be also acknowledged, however, is that a chart as shown above omits much of the crucial

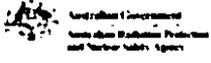
information from the original EPRI source document. The full document name was: EPRI Document # 1022270, "Radio-Frequency Exposure Levels from Smart Meters: A Case Study of One Model," February 2011. The RF source information consisted of a **table** (not a chart) of various RF sources with several columns. It was never appropriate to graph the information from the EPRI table because you cannot do so with omitting much of the qualifying information. The table below is a close facsimile of the original EPRI table.

Table Derived from Information Contained in Table 1 of EPRI Document # 1022270, "Radio-Frequency Exposure Levels from Smart Meters: A Case Study of One Model," February 2011

Source	Exposure Level ( $\mu\text{W}/\text{cm}^2$ )	Distance	Time	Spatal Characteristics
Cell Phone	1,000 to 5,000	At ear	During call	Highly localized
Microwave Oven	50 to 200	2 feet	During use	Localized, non-uniform
Local Area Networks	0.2 to 1.0	3 feet	Constant when nearby	Localized, non-uniform
Radio/ TV broadcast	0.005 to 1.0	Far from source in most cases	Constant	Relatively uniform
Smart Meter	40	3 feet	When in proximity during transmission	Localized, non-uniform
Smart Meter	4	10 feet	When in proximity during transmission	Localized, non-uniform

As you can see, a simple chart or graph cannot properly portray that the cell phone exposure is limited to the duration of a phone call or that the cell phone exposure is characterized as "highly localized," while exposure to a smart meter can potentially become a source of chronic exposure to a larger portion of the whole body, i.e., for several hours per day, every day. Likewise a chart containing EPRI's reported microwave exposure level values from 50 to 200 microwatts per cm2 cannot visibly convey the information that its exposure potential is limited to "during use," at distance of two feet, for however long a person might actually stand at that distance from the microwave.

An additional point to be made for the EPRI data in the original table is that it characterizes typical cell phone radiation levels for individuals as being in the range of 1,000 to 5,000 microwatts per cm2. To my knowledge, these numbers were *calculated* by EPRI using assumptions and rationale that have never been fully revealed for scrutiny. They are *not measured* values. Furthermore, I have come to a conclusion that the reported value of 5,000 may be unnecessarily high.



**Fact Sheet 3**

**Mobile Telephones Scientific Background**

**Electromagnetic Power Flux Density**  
 The rate of flow of electromagnetic energy per unit area is used to measure the amount of radiation at a given point from a transmitting antenna. This quantity is expressed in units of watts per square meter ( $\text{W}/\text{m}^2$ ) or milliwatts per square cm ( $\text{mW}/\text{cm}^2$ ). The maximum exposure level for members of the public exposed to RFR from different mobile phone technologies is 0.4-1.0  $\text{mW}/\text{cm}^2$ .

For example, the Australian government has published a fact sheet that indicates that "the maximum exposure to members of the public exposed to RFR from different mobile phone technologies is 0.4-1.0

mW/cm<sup>2</sup>." This value range converts to 400 to 1,000 microwatts per cm<sup>2</sup>. I mention this because it is usually the EPRI calculated value of 5,000, when used by various organizations to create their own "fact sheets," that seems to make it look so lopsided in terms of cell phone exposure being substantially greater compared to exposures from other sources. For the chart above, look at how much different it would appear if the cell phone exposures were plotted to range only from 400 to 1000 microwatts per cm<sup>2</sup>.

In addition, if you study the technical aspects of power output for cell phones, you'll find that all hand-held cell phones in use today utilize "adaptive power control," which means they transmit with the lowest possible power to allow communication with the nearest base station. Smart meter advocates never tell you this! Although adaptive power control has the effect of lowering RF exposure, it was primarily developed in order to conserve battery power as well as reducing interference problems that would otherwise occur if all phones were transmitting at maximum power all the time. Based upon the information reviewed, it is safe to say that the typical cell phone call will typically result in radiation levels significantly less than 1000 microwatts/cm<sup>2</sup> to the head area.

As a further follow-up, refer to a 2015 article at this website, "A Critical Review of the ComEd Radiofrequency 'Fact Sheet,'" that establishes how the cell phone power density value could have been plotted as low as 20 microwatts per cm<sup>2</sup> instead of 1000 to 5000 microwatts per cm<sup>2</sup>. Link to article:

<https://smartgridawareness.org/2015/06/11/review-of-comed-radiofrequency-fact-sheet/>

In summary, with a straightforward and impartial review, the broad assertion made in the above colorful chart that "RF emitted by smart meters is significantly below the levels produced by other common household devices," is just not supported by the evidence. In fact, it was inappropriate to even create the chart in the first place since it leaves out important qualifying information from the original EPRI table. The qualifying information in the EPRI table dealing with distance, time, and spatial characteristics is essential for proper interpretation of the data.

Here is another important note. Because of the focus on colored charts and graphs on the subject of smart meter emissions comparison with other wireless devices, people don't have a chance to read the actual accompanying words written in the source document, namely EPRI Document # 1022270. In the conclusion section of that EPRI document it states the following: "The average exposure levels from smart meters, as measured in the current study, are at levels similar to those that are present from other common RF sources, both indoor and outdoor." So although there may be some inaccuracies in the original source document table that has spawned a number of other comparison charts, the EPRI document did not overtly attempt to over-exaggerate the differences between smart meters and other devices. ... But other smart grid advocates certainly have done so.

Finally, for those of us who oppose the installation of wireless smart meters, there is also an element of principle involved. Exposures to RF emissions from cell phones, microwave ovens, and Wi-Fi routers in our homes can be voluntary experiences while the smart meter exposures are not. A person can eliminate or curtail the use of the other common devices in the home, but in most cases across the country, for the wireless smart meter, a person cannot. If there is an "opt-out" provision, a fee is usually involved in order for a person to prudently avoid a newly added source of RF emissions for the home. From a principled standpoint, those who oppose smart meter installations do so on the grounds that people should not have to pay penalty fees in order to avoid the various risks associated with such meters which not only include RF radiation but also privacy and data security risks as well.

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**Nine Reasons Why Today's Smart Meter Systems Are a Mistake**

In "Smart Grid, Smart Meters, and RF Emissions"

**Smart Meter Transmission Frequency Claims - "Misinformation" or "Missing Information"?**

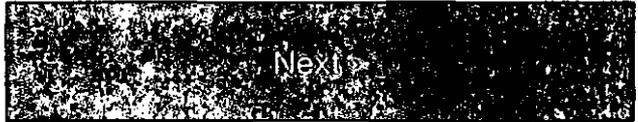
In "Smart Grid, Smart Meters, and RF Emissions"

**New Report on Possible Biological Effects from Smart Meters and Appliances**

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Rob on November 6, 2015 at 08:09

Are the smart meter measurements taken 3 to 10 feet out front of the smart meter, or behind it through the wall and other household clutter?

↩ Reply



SkyVision Solutions on November 6, 2015 at 09:16

For this particular article, the measurements would represent values in front of a smart meter. Remember in some cases, particularly older homes, utility meters may be located inside of the home. A rule of thumb is that values are attenuated by about a factor of 10 by passing through a wall.

For more detailed information on possible smart meter mounting configurations and indoor versus outdoor measurements, please refer to the following link:

<https://smartgridawareness.org/rf-health-effects/comparison-values/>. Also note possible reporting of RF values in different units, sometimes  $\mu\text{watts/cm}^2$  and sometimes  $\text{mW/m}^2$ .

↩ Reply



Impartial Observer on November 28, 2017 at 11:56

So you are complaining about omitting information at fail to mention this major fact in your analysis? The vast majority of meters are outside and the ones that are inside are generally in a basement or non-living space. Also the back of the meters face the home typically and are enclosed in a metal, almost like a Faraday cage with the exposed part facing away form the home.

If you are going to call out people look at your own biases as well.



SkyVision Solutions on November 28, 2017 at 21:15

With a name like "Impartial Observer," I doubt you are unbiased yourself as you surf around making comments at blogs. When evaluating an issue from a safety perspective, one does not normally just consider what would probably be true for the "majority" of meters or people. We cannot ignore the issue because only a few people might be affected. There are lots of possible configurations of how smart meters may affect residents. One (actual home) is discussed at <https://smartgridawareness.org/2013/09/20/smart-meter-home/> as an example.



Terri on May 15, 2013 at 09:17

Great new site! Thank you for putting this together – it is definitely needed.

Here's one professor's view of the comparison of radiofrequency radiation emissions. Hope it is helpful to you: [http://www.committeetobridgethegap.org/pdf/110212\\_RFrad\\_comments.pdf](http://www.committeetobridgethegap.org/pdf/110212_RFrad_comments.pdf).

↳ Reply



SkyVision Solutions on July 25, 2013 at 08:26

Mr. Hirsch makes a number of great points in his analysis of the CCST report. Particularly his analysis is a good one which accounts for the fact that people don't use their cell phones or microwave ovens continuously (24/7). In Figures 3 and 4, Mr. Hirsch attempts to address the fact that reported cell phone exposure values are limited to the ear while smart meter exposures are somewhat more uniform in nature to the whole body (which obviously has a greater surface area). Technically however, Mr. Hirsch makes some assumptions in developing

Figures 3 and 4 that are not easily supported with a good technical basis. In addition, Mr Hirsch in his document even states that "*It should be stressed that neither this estimate [Figure 3] nor that in Figure 4 using a different approach is intended to be a definitive figure,...*"

↳ Reply

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Smart meters are digital display, electric utility meters that transmit information wirelessly to the utility companies using RF (radio frequency) signals.

Analog meters are the "old style" of meter (with the small dials on the front) and do NOT transmit or communicate wirelessly.

Some states have implemented an "opt-out" process that allows customers to continue using an analog meter on their homes.

Smart meters are harmful to humans and pets, and they also cause fires and explosions and can be used for surveillance.

This page focuses on the health effects of devices that transmit using RF (radio frequency) signals. Here is a partial list:

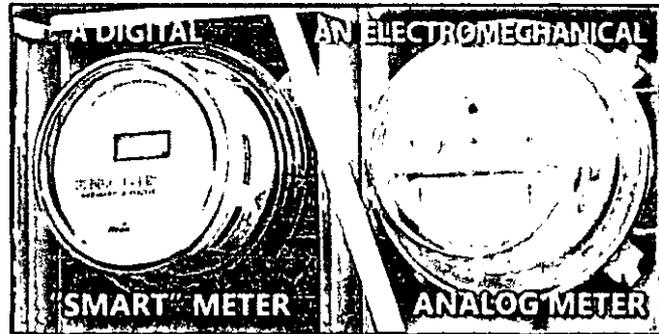
- Tumors and cancer
- Neurological damage, memory problems
- Genetic and hormonal changes, sperm damage
- Degradation of immunity
- Detached (or torn) retinas (seeing flashing lights in your eyes)
- Eye pain, vision problems
- Migraines, pressure in the head
- Agitation
- Damages DNA
- Tinnitus (ringing in the ears)
- Nausea
- Disturbance of voltage-gated calcium channels
- Numbness
- Dizziness
- Pregnancy complications, miscarriages
- Damages the blood-brain barrier
- Heart palpitations
- Inability to sleep, insomnia, fatigue
- Tingling, burning skin, rashes
- Involuntary muscle contractions, spasms, cramps

Note: A more complete list of health effects can be found in the next column under the 1971 report by the Naval Medical Research Institute.

The following information is from an article titled "Smart Meters--Not So Smart; How Dangerous and Expensive Became "Smart"--An Expose' of the Smart Grid."

*Across the U.S. installers continue to replace comparatively safe analog (mechanical) utility meters with digital "smart" meters for electrical, gas and water services. Most of the new meters are wireless two-way transmitters that pulse signals to communicate continuously between your home, school, or workplace and utility companies miles away. The new meters are part of a nationwide project dubbed Advanced Metering Infrastructure (AMI). Most folks call this evolving make-over the "smart grid."*

*The AMI "smart" meter records electrical consumption data and sends the information wirelessly to energy system managers. "Smart" meters can be programmed to read and transmit data monthly, or up to every*



Smart meters (on the left) are harmful to humans and pets. They are digital display, electric utility meters that transmit information wirelessly to the utility companies using RF signals. Analog meters are the "old style" of meter (with the small dials on the front) and do NOT transmit or communicate wirelessly. Some states allow customers to opt-out and use an analog meter on their homes.

## Smart Meters are NOT Mandatory (in the United States)

Despite what you are told by utility companies, smart meters are NOT mandatory. In many states, consumers spoke out and were able to get an opt-out through their public utility commission. An opt-out allows you to choose to have an electro-mechanical, non-transmitting, non-digital, analog meter.

On February 1, 2011, press officer Thomas Welch of the U.S. Department of Energy press officer responded to questions about whether the federal government has made the installation of wireless smart meters mandatory. He wrote:

*No. The Federal government, including DOE, does not have any role in regulating the installation of smart meters, nor does it have a policy about the mandatory adoption of smart meters.*

On July 16, 2009, FERC issued a Policy Statement on Smart Grid Policy that acknowledged that EISA does not make any such standards mandatory and gave FERC no new authority to enforce such standards. Smart Grid Policy Statement, 128 F.E.R.C. ¶61,337, at 61,060-359 (Jul. 16, 2009).

*There is no federal security mandate for smart meters, according to George W. Arnold the national coordinator for smart-grid interoperability at the National Institute of Standards and Technology. This agency of the U.S. Department of Commerce is said not to be involved in regulations but is only tasked with promoting standards among industries.*

While both the 2005 and 2007 energy bills were codified into public laws, NO part of them creates a federal law pertaining to individual consumers or dictating that the public must be forced to comply with provisions of SMART Grid."

*and a ubiquitous network of antennas on utility poles and cell towers in urban and rural neighborhoods. Neither the federal government nor grid profiteers have undertaken a single public health study about the long-term health effects of exposure to electromagnetic radiation (EMR) from "smart" meters. Yet medical literature is now loaded with peer-reviewed studies about the non-thermal biological effects of exposure to EMR.*

*Peer-reviewed studies report DNA damage, abnormal genetic and hormonal changes, sperm damage, pregnancy complications, weakening of the blood-brain barrier, disturbance of voltage-gated calcium channels (for example, in the heart), degradation of immunity, and certain types of cancers.*

*Especially worrisome, says AAEM, is mounting evidence that inescapable electromagnetic fields exposure from smart meters places children at particular risk for altered brain development and for impaired learning and behavior. These concerns are corroborated by the blockbuster BioInitiative Report 2012. Produced by twenty-nine medical and public health experts from ten countries, the BioInitiative Report offers a meta-analysis of over eighteen hundred new scientific studies showing that chronic exposure to both ELF and microwaves poses a serious health hazard.*

*In addition, some residents within AMI mesh networks may also have "Medusa" meters on their property. One investigator reports: "A utility whistle blower told us about a special smart meter—a mini cell phone tower. This collection device receives data and more radiation from five hundred to seven hundred surrounding meters and uses the customer's premises to serve as a relay station to transmit other neighbors' data along the mesh network to collection points. These Medusa meters are deployed upon properties without the owner's knowledge or consent. The utilities select a property for this meter based upon easy meter access to the street, no locked gates or dogs and good customer payment history. . . Utilities reward good customers with a Medusa meter and bathe their homes with additional toxic radiation."*

**Source: January 19, 2015, report titled "Smart Meters--Not So Smart; How Dangerous and Expensive Became "Smart"--An Expose' of the Smart Grid. Click [here](#).**

## World Health Organization

The World Health Organization's International Agency for Research on Cancer (IARC) lists radiofrequency electromagnetic fields as a Class 2B carcinogen.

This is the first time in history that a known carcinogen has been mandated (by the government) to be placed on all homes, schools and buildings.

**Source: World Health Organization press release issued May 31, 2011. Click [here](#).**

## Smart Meters Cause Massive Changes to the Heart. July 25, 2018.

*There is no obligation or requirement to have a smart meter installed.*

**Source: May 2, 2017, article on [thisismoney.co.uk](#). Click [here](#).**

## Some U.S. States are Rejecting Smart Meters

Some U.S. States have voted against the AMI (smart meter) program.

Here are a few excerpts from an article about the state of Virginia voting to reject smart meters.

*Virginia regulators on Thursday rejected large portions of Dominion Energy's grid transformation proposal, including smart meter deployment and other modernization efforts.*

*The denial follows a trend of states balking at the cost of smart meters and a slowdown in the deployment of advanced metering infrastructure (AMI), which is often considered fundamental to the next generation electric grid.*

*Virginia regulators joined their counterparts in Kentucky and Massachusetts in denying smart meter proposals, part of a trend that has seen AMI deployment flatline at roughly 50% of electric customers.*

**Source: January 18, 2019, article on [utilitydive.com](#). Click [here](#).**

## Smart Meters can Report False Readings (up to 582% higher than actual energy usage)

*Some electronic energy meters can give false readings that are up to 582% higher than actual energy consumption. This emerged from a study carried out by the University of Twente (UT), in collaboration with the Amsterdam University of Applied Sciences (AUAS).*

*For quite some time now, rumours have been rife about electronic energy meters that give excessively high readings in practice. This prompted Prof. Leferink to investigate electronic meters, to see whether they can indeed give false readings. Together with co-workers Cees Keyer and Anton Melentjev from AUAS, he tested nine different electronic meters in this study. The meters in question were manufactured between 2004 and 2014.*

*The inaccurate readings are attributed to the energy meter's design, together with the increasing use of modern (often energy-efficient) switching devices. Here, the electricity being consumed no longer has a perfect waveform, instead it acquires an erratic pattern. The designers of modern energy meters have not made sufficient allowance for switching devices of this kind.*

**Source: March 3, 2017, article about published on [sciencedaily.com](#). Click [here](#).**

## Health Effects of Radiofrequency Radiation in a report from the Naval Medical Research Institute (NRMI). October 4, 1971

symmetrical. But during times when it spiked to 139.3 – this being the time when the smart meter initiated data transmissions – Woodward's EKG pattern changed dramatically in response.

In other words, when the smart meter was not sending high amounts of power, Woodward's EKG readings were normal and natural. But when it kicked into higher output mode, the changes were "massive."

Brief periods of alteration to normal heart rhythm aren't much to worry about. But when these irregularities are ongoing, the heart can end up working too hard, resulting in fatigued cardiac function.

Dr. Gilberto Leon, a holistic medicine doctor from Chandler, Arizona, warns about this. He says that changes to the heart caused by smart meters are anything but symptomless or "silent," and that major damage can take place without people even realizing it.

The constant bombardment of microwave radiation from smart meters represents "an unnatural sequence of events that we're not programmed to respond to," he says. Long-term exposure to smart meters, he says, can be extremely damaging to normal myocardial function.

Source: July 25, 2018, article published on [newstarget.com](#). Click [here](#).

### Comments from Dr. William Rea, Thoracic and Cardiovascular Surgeon, Environmental Medicine

Dr. William Rea shares insights about electrical hypersensitivity gleaned from nearly thirty years of working with environmentally ill patients.

Rea opened by saying that human beings are all antennas with different levels of sensitivity.

He has observed a high correlation with sensitivity to metals like zinc, copper, stainless steel, titanium, molybdenum, manganese, and magnesium. Metal implants like dental fillings, metal jaws, shoulder joints, etc. will contribute to electrical sensitivity, because they act as antennas.

Source: WEEP News article, January 31, 2012. Click [here](#).

Wireless smart meters typically produce atypical, relatively potent and very short pulsed RF/microwaves whose biological effects have never been fully tested. They emit these millisecond-long RF bursts on average 9,600 times a day with a maximum of 190,000 daily transmissions. Imagine what is happening to the human body!! (See Myth #6 from the utility companies in the right-hand column.)

### American Academy of Environmental Medicine (AAEM). July 12, 2012. Recommendations regarding Electromagnetic and Radiofrequency Exposure.

- Changes in physiologic function (muscle contraction, alteration of diameter of blood vessels, changes in oxidative processes, liver enlargement, decreased sperm, altered menstrual activity and fetal development, decreased lactation, increased electrical resistance of skin, altered blood flow rate, EKG changes, sensitivity to light, sound and olfactory stimuli, changes in the eyes, necrosis, hemorrhage in lungs, liver, gut and brain, degeneration of body tissue, loss of anatomical parts, dehydration, death)
- Central nervous system (headaches, insomnia, restlessness, EEG changes, cranial nerve disorders, vagomimetic action of the heart, seizures, convulsions)
- Autonomic nervous system (fatigue, neuro-vegetative disorders, structural alterations in the synapses of the vagus nerve, inhibition of the sympathetic nervous system)
- Peripheral nervous system (effects on locomotor nerves)
- Psychological disorders (depression, impotence, anxiety, lack of concentration, dizziness, insomnia, loss of memory, chest pain, tremor of the hands)
- Behavioral changes (reflexive, operant, avoidance and discrimination behaviors)
- Blood disorders (changes in blood, bone marrow, hemolysis, sedimentation rate, blood glucose concentration, cholesterol and lipids, number of eosinophils, albumin/globulin ratio)
- Vascular disorders (thrombosis, hypertension)
- Enzyme and other biochemical changes (changes in activity of cholinesterase, phosphatase, transaminase and amylase, protein denaturation; toxin, fungus and virus inactivation; tissue cultures killed, alteration in rate of cell division, increase concentration of RNA in lymphocytes and decreased concentration in brain, liver and spleen)
- Metabolic disorders (sugar in urine, increase in urinary phenol, alteration of rate of metabolic enzymatic processes)
- Gastro-intestinal disorders (anorexia, loss of appetite, epigastric pain, constipation, altered secretion of stomach digestive juices)
- Endocrine gland changes (altered pituitary function, hyperthyroidism, thyroid enlargement, increased uptake of radioactive iodine by thyroid gland, altered adrenal cortex activity, decreased corticosteroids in blood, hypogonadism)
- Histological changes (changes in tubular epithelium of testicles, gross changes)
- Genetic and chromosomal changes (chromosome aberrations, mutations, mongolism, somatic alterations, tumors)
- Pearl chain effect (intracellular orientation of subcellular particles and orientation of cellular and other non-biologic particles)
- Miscellaneous effects (sparking between dental fillings; metallic taste in mouth; changes in optical activity; loss of hair; brittleness of hair; sensations of buzzing, vibrations, pulsations about the head and ears; copious perspiration, salivation and protrusion of tongue; changes in the operation of implanted cardiac pacemakers; changes in circadian rhythms)

and/or symptoms.

**Source: American Academy of Environmental Medicine (AAEM), July 12, 2012. Recommendations regarding Electromagnetic and Radiofrequency Exposure. Click [here](#).**

*Genetic damage, reproductive defects, cancer, neurological degeneration and nervous system dysfunction, immune system dysfunction, cognitive effects, protein and peptide damage, kidney damage, and developmental effects (from RF exposure) have all been reported in the peer-reviewed scientific literature.*

**Source: American Academy of Environmental Medicine (AAEM) position statement titled Electromagnetic and Radiofrequency Fields Effect on Human Health. Click [here](#).**

### **Comments from Jerry Flynn, a retired Canadian Armed Forces captain with specialized training and 22 years of experience in Electronic Warfare and Signals Intelligence.**

Flynn has worked with U.S. and NATO armies in this specialized capacity. He writes:

*"Pulsed non-thermal radiation, which is emitted by smart meters, is far more damaging at the body's cellular level to all life forms than any other technology ever devised by man. Militaries of the world have known for more than 50 years that RF/microwaves are the perfect weapon. Today, democratic governments are knowingly and callously authorizing untested (for safety) smart meters to operate (emitting pulsed non-thermal radiation) at the most lethal frequencies known to man."*

**Source: April 20, 2016 article titled "Smart Meter Dangers, Who Knew and Did Not Sound the Alarm?" Click [here](#).**

### **Comments from Dr. David O. Carpenter and 50 International Experts**

*We, the undersigned are a group of scientists and health professionals who together have coauthored hundreds of peer-reviewed studies on the health effects of electromagnetic fields (EMFs). We wish to correct some of the gross misinformation found in the letter regarding wireless "smart" meters that was published in the Montreal daily Le Devoir on May 24. Submitted by a group Quebec engineers, physicists and chemists, the letter in question reflects an obvious lack of understanding of the science behind the health impacts of the radiofrequency (RF)/microwave EMFs emitted by these meters.*

*The statement that "Thousands of studies, both epidemiological and experimental in humans, show no increase in cancer cases as a result of exposure to radio waves of low intensity..." is false (1). In fact, only a few such studies — two dozen case-control studies of mobile phone use, certainly not thousands, have reported no elevations of cancer, and most*

*has been led to them. This propoganda is not merely biased, but includes willful omissions of facts, misleading claims and statements that are not true.*

*The smart meter industry and utilities are playing a shell game with the facts, and you are the ones who can call them on it.*

*The pulsed microwave emissions from wireless smart meters being used in grid modernization systems result in involuntary household microwave exposure, and:*

- *are not adequately regulated by the FCC (this has been confirmed by the EPA)*
- *have been classified as a possible human carcinogen by the WHO*
- *have not been tested for human safety*
- *have been the cause of unusual and severe insomnia, headaches, tinnitus and heart arrhythmias in thousands of persons*
- *peer-reviewed research publications from all over the world have shown that similar emissions have potentially hazardous effects*
- *smart meters utilizing wireless communications present an extremely dangerous combination of open portals, wireless hacking, power cutoff switches and adverse health effects*
- *safe alternatives do exist.*

*The old analog electro-mechanical meters emit no RF, are safe, secure, private, accurate, efficient and reliable and should be the reference standard that any new system should match or exceed in all its parameters.*

#### **Safeguards**

*There has been an enormous amount of deception by smart meter manufacturers, utilities and installers, and also strong-arm tactics on the part of utilities and installers: using the police to force installation in Naperville (Illinois) and arresting homeowners who resisted; disregarding City Council bans on smart meters in California and continuing to install; disguising a smart meter as a mechanical analog meter; cutting off a homeowner's power if they refuse a smart meter or refuse to pay opt-out fees or if they re-install their own analog meter etc. Therefore safeguards to prevent these violations of human rights must be included in legislation.*

#### **Excerpts from the Conclusion**

*To any honest scientist who reads the research literature, especially the results of European studies, it becomes clear that non-thermal levels of pulsed microwaves definitely pose a risk to human beings. Many non-thermal effects have been found that should raise red flags, but instead these are ignored by our regulatory bodies as if they simply do not exist.*

*The smart meter industry and utilities are playing a shell game with the facts, and you are the ones who can call them on it.*

**Source: Letter from Dr. Richard H. Conrad, Biochemist, to State Legislators. Click [here](#).**

### **Comments from Dr. Richard H. Conrad, Ph.D., Biochemist, Exhibit D: Smart Meter Health Effects**

exposed to microwaves for at least ten years. Children and youths are especially vulnerable (2). For example, the 2009 Hardell-Carlberg study reported a consistent association between use of mobile or cordless phones and two types of head tumors, astrocytoma grade I-IV and acoustic neuroma. The authors found an especially high risk for persons that started use of mobile or cordless phones before the age of 20 years, although based on low numbers."

Source: June 11, 2012, article titled "Smart Meters: Correcting the Gross Misinformation." Click [here](#).

## Comments from Dr. William Rea, Thoracic and Cardiovascular Surgeon, Environmental Medicine

Dr. William Rea shared insights about electrical hypersensitivity gleaned from nearly thirty years of working with environmentally ill patients.

Rea opened by saying that human beings are all antennas with different levels of sensitivity, and finding safe places for sensitive people is like trying to "reinvent the cave."

He has observed a high correlation with sensitivity to metals like zinc, copper, stainless steel, titanium, molybdenum, manganese, and magnesium. Metal implants like dental fillings, metal jaws, shoulder joints, etc. will contribute to electrical sensitivity, because they act as antennas.

Source: WEEP News article, January 31, 2012. Click [here](#).

## Comments from Dr. Vini G. Khurana, Associate Professor of Neurosurgery

Adverse neurological effects have been reported in people who sustain close proximity to wireless meters, especially under 10 feet (3 metres).

A wireless smart meter produces radiofrequency microwave radiation with two antennas in approximately the same frequency range (900 MHz to 2.4 GHz) as a typical cell tower. But, depending on how close it is to occupied space within a home, a smart meter can cause much higher RF exposures than cell towers commonly do. If a smart meter is located on a common wall with a bedroom or kitchen rather than a garage wall, for example, the RF exposure can be the same as being within 200 to 600 feet distance of a cell tower with multiple carriers. With both cell towers and smart meters, the entire body is immersed by microwaves that go out in all directions, which increases the risk of overexposure to many sensitive organs such as the eyes and testicles. With a cell phone, people are exposed to microwaves primarily in the head and neck (unless using speaker mode), and only when the device is turned on or in standby mode.

Wireless smart meters typically produce atypical, relatively potent and very short pulsed RF/microwaves whose biological effects have never been fully tested. They emit these millisecond-long RF bursts on average

Before smart meters, nearly 79% of respondents were using computers without symptoms while about 20% were using computers despite having symptoms from computer use. Following smart meter exposure, those able to operate a computer without symptoms dropped (from 79%) to 39% (about one-half of before), while those showing symptoms from computer use nearly tripled (from 20%) to 57%.

### WiFi Use:

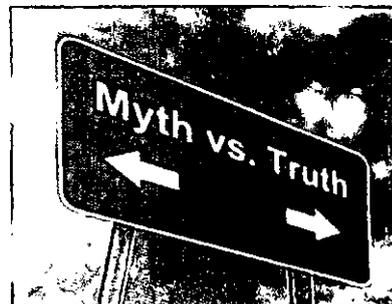
Before smart meters, about 40% of respondents were using wifi without symptoms. 11% were using wifi but with symptoms from it, and 17% were not using wifi because it had caused symptoms in the past. Following smart meter exposure, those able to use wifi without symptoms dropped (from 40%) to 18% (less than one-half of before) while those continuing to use wifi but with symptoms from it nearly tripled (from 11%) to 28%. The number of respondents who could not use wifi at all because of symptoms more than doubled (from 17%) to 41%.

### Cell Phone Use:

Before smart meters 50% of respondents were using cell phones without symptoms, while 18% used cell phones but with symptoms. 14% of respondents did not use cell phones because of symptoms. Following smart meters, those able to use cell phones without symptoms dropped (from 50%) to 24% (about one-half of before), and those with symptoms from cell phone use more than doubled (from 18%) to 39%. After smart meters, those who did not use cell phones at all because of symptoms nearly doubled (from 14%) to 26%.

Obviously the inability to use these modern tools severely inhibits our respondents in their personal and economic lives. Their ability to live normal lives in the 21st century has been severely compromised. This change in ability to use these devices is directly correlated to smart meter exposure.

Source: Dr. Richard H. Conrad, Ph.D. Biochemist, report for the Maine Coalition to Stop Smart Meters, January 2013. Click [here](#).



## Myths told by Utility Companies

The utility companies have used a campaign of mis-statements, mis-directions and mis-information regarding smart meters.

They have many different ways to spin the facts. Six of those myths are presented here, but there are many others.

installation and operation may violate even the out-of-date US public safety standards which only consider acute thermal effects. This can happen when a person stands close to the meter to read the power consumption, or touches it, or shades the meter face with a hand to better read it. Emissions are also increased by reflective materials, such as stainless steel, other metals and mirrors, which can re-radiate stronger than the otherwise unaltered background. Microwaves are absorbed and dissipated by partially conductive materials, such as cement and special RF shielding paints and fabrics.

In addition to the erratic bursts of modulated microwaves emitted by wireless smart meters transferring usage data to electric, gas and water utilities, wireless as well as wired smart (powerline communication) meters are also a major source of "dirty electricity" (electrical interference of high frequency voltage transients typically of kilohertz frequencies). Some scientists, such as American epidemiologist Sam Milham, believe that many of the health complaints about smart meters may also be caused by dirty electricity generated by the "switching" power supply activating all smart meters. Since the installation of filters to reduce dirty electricity circulating on house wiring has been found to relieve symptoms of EHS in some people, this method should be considered among the priorities aimed at reducing potential adverse impacts. Indeed, the Salzburg State (Austria) Public Health Department confirms its concern about the potential public health risk when in coming years almost every electric wire and device will emit such transient electric fields in the kilohertz-range due to wired smart meters.

**Source: June 11, 2012, article titled "Smart Meters: Correcting the Gross Misinformation." Click [here](#).**

## Effects of Non-ionizing Radiation on Mold

The research is fascinating on this topic. At the forefront is Dr. Dietrich Klinghardt, MD., PhD., noted for his successful treatment of neurological illness and chronic pain. In his video, Dr. Klinghardt talks about a mold plate experiment which compared a mold plate shielded from electromagnetic fields to an unprotected mold plate exposed to ambient electromagnetic fields.

The unprotected mold plate showed a dramatic increase in the number of biotoxins produced – more than 600 times. Dr. Klinghardt concludes that indoor mold contaminants as well as other biotoxins are highly sensitive to electromagnetic fields. EMFs therefore easily step up neurotoxin production and have a major impact on the immune system.

Dr. Thomas Rau, medical director of the Paracelsus Clinic in Switzerland, shares his assessment of the microbial connection with EMFs in an interview featured on the website *Electromagnetic Health*. Not only do the artificially produced electromagnetic waves cause toxic mold to grow faster, they suppress the production of beneficial microbes.

Toxic mold in homes grows much faster under the load of high electromagnetic loads. They grow much faster in a disturbed milieu.

There are other studies that highlight the connection between electromagnetic radiation and microbial multiplication.

two minutes. A post-exposure examination with dark field microscopy showed that all volunteers had developed one of these blood pathologies:

- Marked degradation of cells with some cell walls broken;
- Corrugated formation in which blood cells become crimped like bottle caps;
- A rouleaux condition in which the red blood cells clump abnormally together. Dietrich Klinghardt, MD, PhD, who practices medicine in Washington State, says, "It is our experience as doctors that everybody is equally electro-sensitive." Dr. Klinghardt finds the same inflammatory markers in the blood of every EMR-exposed person, both those who feel bad from exposure and those who notice no preliminary ill effects.

**Source: WestonAPriceFoundation. Click [here](#).**

**Myth #2: Some utility companies will claim they can't make adjustments remotely to individual smart meters.**

**Truth:**

Smart meters use wireless communication technologies to communicate with other remote devices to share data and respond to commands. The utility companies monitor the smart meters using computers, and energy usage is broadcast back to the utility companies over computer networks. So, utility companies receive data from smart meters, and they can also transmit "commands" to those meters (i.e., two-way communication).

Remote "adjustments" have been made to individual smart meters in other states, so it seems likely that all utility companies can make adjustments remotely to individual smart meters. For example, in Texas, the utility contractor could turn down the signal output for all of the smart meters in a specific area because one of the residents was being severely affected. He checked on this frequently and could make the adjustments while he was sitting in his car...using his laptop computer.

**Myth #3: The exposure level of smart meters is "lower than the average RF exposure of a cellular phone, cordless phone, microwave oven, Wi-Fi system to the human body."**

**Truth:**

The figures for RF exposure given by utilities are time-averaged numbers which hide the peak power of the "smart" meter, and disguise the fairly continuous nature of the pulses. "Smart" meters are unlike cell phones or WiFi in their bizarre pattern of sharp spikes of RF.

By time averaging, they can bring down the total peak level that they claim the meters emit. This is bogus science. If you time-average the strong millisecond pulses of a strobe light, they "equal" a low-wattage light bulb continuously on; but no one would legitimately make such a claim. Strobe lights have distinct neurological effects in many people—headaches, dizziness, and for some—epileptic seizures.

Source: July 10, 2015, Article by It-Takes-Time. Click [here](#).

## 2013 Documentary film by Josh del Sol titled "Take Back Your Power"

Josh del Sol's award winning documentary investigates so-called "smart" utility meters, uncovering shocking evidence of in-home privacy invasions, increased utility bills, health & environmental harm, fires and unprecedented hacking vulnerability... and lights the path toward solutions.

### Excerpts from the website:

Based upon my review of peer-reviewed literature over the past few years, one of the studies that helped convince me that exposure to low-level electromagnetic fields (EMFs) could indeed be harmful included "Electromagnetic Hypersensitivity: Evidence for a Novel Neurological Syndrome." One of the authors of that study was Andrew A. Marino, Ph.D. [1]

The authors concluded that "EMF hypersensitivity can occur as a bona fide environmentally inducible neurological syndrome."

The abstract of this paper by Dr. Marino can be found [here](#).

Recently, it is my understanding that Dr. Marino submitted an "expert report" as part of a case before the Pennsylvania PUC. In this proceeding several consumers have alleged that their health is being negatively affected by smart meters installed by PECO Energy Company [2].

The conclusions reached by Dr. Andrew Marino and presented in his expert report (dated August 8, 2016) are as follows:

"First, [there] is a reasonable basis in established science for the Complainants' concern regarding risks to human health caused by man-made electromagnetic energy in the environment, including the type of electromagnetic energy emitted by smart meters. These health risks are heightened in the very young, the very old, and in those with preexisting diseases or disorders.

Second, electromagnetic hypersensitivity is a documented neurological condition in which the affected person experiences musculoskeletal, immunologica, and/or neurological symptoms that noticeably flare or intensify upon exposure to man-made electromagnetic energy in the environment. About 5-10% of the general public are self-reported to suffer from this disorder.

Third, the Complainants were forced into the almost impossible position of conducting experiment[s] on themselves to prove to PECO's satisfaction that their claims of a link between their symptoms and electromagnetic energy from smart meters were sufficiently credible as to warrant some remediable action by PECO.

reproductive effects, DNA damage, and more.

Source: [StopSmartMeters.org](#). Click [here](#).

Myth #4: The RF exposure rates of smart meters is "far less than the FCC exposure limit."

### Truth:

For the military in the 1950s and 1960s, for the wireless industry in the 1990s, and for utilities deploying "smart" meters now, these biological effects are not convenient to their purposes, and have been dismissed. "The FCC sets the guidelines," has been the cry of utilities commissions. But those guidelines were set largely without regard to the subtler effects or the consequences of long-term exposure, and before much of this research was done.

The BioInitiative Report, which is recognized by the European Parliament, The European Environment agency and the Breast Cancer Fund, scientifically documents evidence of health effects far below the FCC safety standards.

The Federal Communications Commission (FCC) RF radiation safety standards are for short term thermal effects (5 and 30 minutes), and are configured for a 6'2" 200 pound male. The meters are assessed for safety compliance in isolation, not in a mesh network, in which they are designed to operate, or in combination with multiple meters, and other RF sources.

This statement by the utility companies neglects to consider many other factors. For example, the effect of "collector meters," the effects of "continual exposure," the combined effects of all RF devices in the area or the fundamental scientific properties of reflection and additivity. In addition, smart meters can produce excessively elevated RF exposures, depending on where they are installed.

Source: [StopSmartMeters.org](#). Click [here](#).

In the late 1980s, the EPA radiation division, staffed with practicing biologists and epidemiologists, decided on a safe limit for human exposure. Before the announcement was made, industry intervened, federal funding for that division of the EPA was cut, and the FCC was given the task of setting the RF/microwave guidelines for the public. The FCC, made up of bureaucrats and engineers, had no experience or training in setting "health related" guidelines. Therefore, from the beginning, FCC guidelines were set at a limit that was too lenient to protect the general population.

Source: April 20, 2016 article titled "Smart Meter Dangers, Who Knew and Did Not Sound the Alarm?" Click [here](#).

Myth #5: Smart meters emit less radiation than my cell phone or WiFi.

### Truth:

The figures for RF exposure given by utilities are time-averaged numbers which hide the peak power of the "smart" meter, and disguise the fairly continuous nature of the pulses.

essentially physiological process that occurs in living organisms. A large literature in nonexperimental biology shows that man-made electromagnetic energy, including that from smart meters, is associated with a plethora of human diseases. People who suffer from pre-existing conditions are particularly vulnerable, and all the Complainants suffer from such conditions.

Sixth, PECO's claim that the FCC has pronounced smart meter safe is spurious because the FCC has made that statement only with regard to the heating and cooking effects of electromagnetic energy. The Complainants have made no claims that smart meters are like microwave ovens.

Seventh, PECO has claimed that expert committees have pronounced smart meters safe, but PECO has not acknowledged the blatant conflicts-of-interests that infect such committees nor the serious limitations on their reports, such as the failure to address much of the relevant literature.

Eighth, PECO proposes to expose human beings to smart-meter electromagnetic energy over their objection under conditions that would not be acceptable to any institution in the United States where human experimentation can lawfully be performed. Consequently, coercing the Complainants to endure the risks and uncertainties of such exposure is unwarranted, unjustified, and would amount to involuntary human experimentation by PECO."

Regarding the exposure guidelines of the Federal Communications Commission (FCC), Dr. Marino states that:

"According to the FCC, smart meters and cellphones are safe when manufactured according to the presently mandated emission levels. But the FCC defines an emission level as 'safe' if it doesn't result in adverse biological effects caused by heating or cooking of the exposed subject. Nowhere does the FCC say that smart meters are safe with regard to physiological changes [caused] by physical processes other than heating or cooking. That claim is unsupported and counter-scientific, and has not been made by the FCC."

To the contrary:

"There is a very large data base of empirical studies in experimental biology that demonstrates beyond reasonable doubt that biological effects can occur at levels of man-made electromagnetic energy actually present in the environment."

Source: 2013 Documentary by Josh del Sol titled "Take Back Your Power." Click [here](#).

## Expert Witnesses Used by Utility Companies

Utility companies used "expert witnesses" to support their claims that smart meters are not harmful. One of the organizations that provided "expert witness" testimony is a company called Exponent.

This is for the convenience of your utility, and its effects on you (and other living things) apparently were not even considered when they were designing the mesh network.

Source: [StopSmartMeters.org](#). Frequently Asked Questions. Click [here](#).

## Myth #6: Utility companies say that smart meters have low RF emissions.

Truth:

The calculations used to arrive at the low RF exposure numbers that most utilities published are arrived at by time-averaging.

Smart meters have an unusual, unpredictable pattern of RF emissions, usually referred to as "pulses"—sudden high levels of RF followed by no emissions. Each pulse is about 2 milliseconds (2/1000th of a second) long.

By time averaging, they can bring down the total peak level that they claim the meters emit. This is bogus science.

PG&E's own documents revealed that their meters pulse between 10,000 and 190,000 times per day.

Another PG&E executive told us "off the record" that at least 90% of the emissions from a "smart" meter are NOT user data, but mesh-network "chatter."

Source: [StopSmartMeters.org](#). Frequently Asked Questions. Click [here](#).

A wireless smart meter produces radiofrequency microwave radiation with two antennas in approximately the same frequency range (900 MHz to 2.4 GHz) as a typical cell tower. But, depending on how close it is to occupied space within a home, a smart meter can cause much higher RF exposures than cell towers commonly do.

If a smart meter is located on a common wall with a bedroom or kitchen rather than a garage wall, for example, the RF exposure can be the same as being within 200 to 600 feet distance of a cell tower with multiple carriers. With both cell towers and smart meters, the entire body is immersed by microwaves that go out in all directions, which increases the risk of overexposure to many sensitive organs such as the eyes and testicles.

Wireless smart meters typically produce atypical, relatively potent and very short pulsed RF/microwaves whose biological effects have never been fully tested. They emit these millisecond-long RF bursts on average 9,600 times a day with a maximum of 190,000 daily transmissions and a peak level emission two and a half times higher than the stated safety signal, as the California utility Pacific Gas & Electric recognized before that State's Public Utilities Commission.

Thus people in proximity to a smart meter are at risk of significantly greater aggregate of RF/microwave exposure than with a cell phone, not to mention the cumulative exposure received by people living near multiple meters mounted together, pole-mounted routers or utility collector meters using a third antenna to relay RF signals from 500 to 5,000 homes.

*after field, year after year, conclusions that might support regulation are always disputed. Animal data are deemed not relevant, human data not representative, and exposure data not reliable. Whatever the story—global warming, sugar and obesity, secondhand smoke—scientists in what I call the "product defense industry" prepare for the release of unfavorable studies even before the studies are published. Public relations experts feed these for-hire scientists contrarian sound bites that play well with reporters, who are mired in the trap of believing there must be two sides to every story. Maybe there are two sides—and maybe one has been bought and paid for.*

*Having cut their teeth manufacturing uncertainty for Big Tobacco, scientists at ChemRisk, the Weinberg Group, Exponent, Inc., and other consulting firms now battle the regulatory agencies on behalf of the manufacturers of benzene, beryllium, chromium, MTBE (methyl tertiary-butyl ether), perchlorates, phthalates, and virtually every other toxic chemical in the news today. Their business model is straightforward. They profit by helping corporations minimize public health and environmental protection and fight claims of injury and illness. In field after field, year after year, this same handful of individuals and companies comes up again and again.*

**As David Michaels said in his book:**

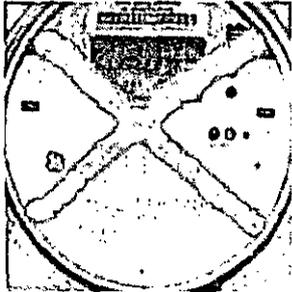
*Exponent's scientists are prolific writers of scientific reports and papers. While some may exist, I have yet to see an Exponent study that does not support the conclusion needed by the corporation or trade association that is paying the bill.*

**Source: Book titled "Doubt is Their Product" by David Michaels.**

Because Exponent is a product defense firm with a decades-long history of writing reports that support the position of corporations who are looking to deny the health effects of their products, their testimony should not have been allowed.

# Smart Meters

[mashshare]



Electric smart  
meter



Gas smart  
meters

Utility companies around the world are replacing electric, gas and water analog meters with pulsed radiation smart meter networks, which are costing us money, privacy, and our health and safety.

Smart Meters, (also called AMI, or AMR) eliminate meter reader jobs and are part of the "Smart Grid", which is an expensive wireless system installed on our homes, businesses, and in our environment that customers pay for. It's being installed without informed consent and without full disclosure of how they work, and what they can do with the personal data they collect. Customers and the media report serious complaints about Smart Meters for the following reasons:

## Cybersecurity threat

Former CIA director James Woolsey says the hacking vulnerabilities of the Smart Grid render it "*a really really stupid grid*". Cyber security expert David Chalk says: "*There is not a power meter or device on the grid that is protected from hacking – if not already infected – with some kind of Trojan horse that can cause the grid to be shut down or completely annihilated.*"

## Privacy invasion

Smart Meters are a surveillance device. They are a search without a warrant. They collect detailed energy usage, for instance: when you cook, watch TV, whether you are home or not, when you turn on a light, or if you have guests. This data is very valuable because it can reveal patterns about what you do and when. California utility companies admitted they are providing smart meter data to the government and third parties. More on smart grid privacy: Electronic Privacy Information Center

## Health hazard

6/24/2019

Smart Meters – EMF Safety Network

The World Health Organization classifies RF as a 2B carcinogen, same as DDT and lead. Military studies here and here show pulsed radiation can cause serious health problems, including tinnitus, memory loss and seizures. Thousands of studies link biological effects to RF radiation exposure, including increased cancer risk, damage to the nervous system, adverse reproductive effects, DNA damage, and more. The top public health official in Santa Cruz County California prepared this report, confirming Smart Meters pose a health risk. The American Academy of Environmental Medicine (AAEM) sent this letter to the CPUC calling for a halt to wireless smart meters. See also this letter from Dr. Carpenter, endorsed by 50+experts.

Read about customers smart meter health complaints, which include sleep problems, headaches, nausea, anxiety, heart palpitations, tinnitus and ear pain, concentration and memory problems, dizziness, immune, nervous and hormonal system impacts.

Vulnerable groups include people with EMF sensitivities, medical implants, compromised immune systems, children, pregnant women, seniors and the environment! If you have a pacemaker PG&E warns you to stay 6 inches away from a Smart Meter.

## **Fires, explosions and burnt out appliances**

Smart meter installations are causing fires, explosions and burnt out appliances in homes across the US Canada and Australia. See the shocking compilation of reports: Smart Meter Fires and Explosions

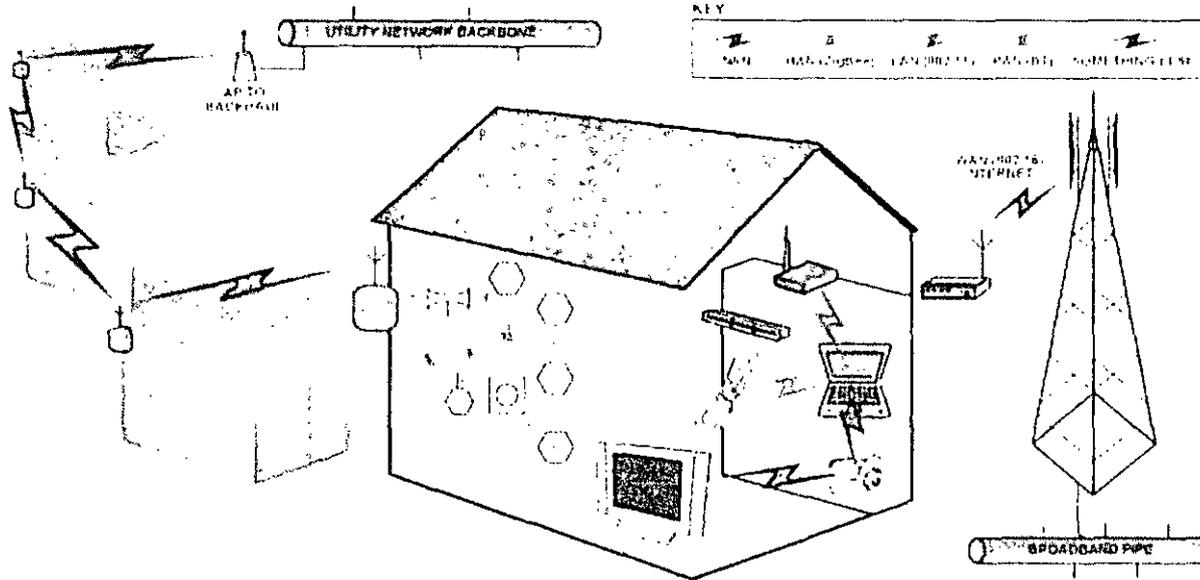
## **Cost increases**

There have been widespread reports of smart meter billing overcharges. Smart meters are also failing and needing to be replaced. In 2010, PG&E reported over 43,000 Smart Meter problems of one kind or another. A lawsuit filed was against PG&E in California.

Read customers Smart Meter Complaints about cost and other problems including interference. Time of use metering raises many concerns: The Need for Essential Consumer Protections

## **How they work**

Utility companies are using our homes and businesses for their microwave networks! The electric meter operates around 900 mhz and 2.4Ghz. It constantly transmits and repeats data from 500 +/- homes in a mesh network, which includes collectors which repeat signals back to the utility via cell towers. Depending on where your home is located within the mesh network will determine how much radiation your meter transmits. PG&E finally admitted that the electric meters send an average of 10,000 pulses per meter per day, at a peak power of 2 1/2 watts and a maximum of 190,000 per day! You can hear the constant pulses in this video below, and see the damage to the environment.



Smart Grid proponents are expecting consumers will install a Home Area Network (HAN) and new smart appliances. Installing the HAN will

allow the utility company to further monitor your electric usage and control the grid, by turning off certain appliances during peak use time, as they need.

## FCC Protection?

The Federal Communications Commission (FCC) RF radiation safety standards are for short term thermal effects (5 and 30 minutes), and are configured for a 6 ft 2" 200 pound male. The meters are assessed for safety compliance in isolation, not in a mesh network, in which they are designed to operate, or in combination with multiple meters, or other sources of RF, such as wi-fi, DECT phones, cell phones, cell towers, baby monitor etc. Sage Associates study found the meters can violate FCC safety guidelines in the manner deployed and operated. In addition the meters can also violate FCC safety conditions. The new FCC chairman is a wireless industry leader, Tom Wheeler.

## Legal Efforts in California

The EMF Safety Network filed a California Public Utilities Commission (CPUC) Application in April of 2010 asking for a moratorium on the deployment, public health hearings and an RF emissions study. In December of 2010 the CPUC dismissed the application even though no hearings were held in case. An appeal was filed in January of 2011. The CPUC denied the appeal and on July 11, 2012 we filed a lawsuit against the CPUC. In 2012 the CA court denied the lawsuit, without comment. The CPUC and Federal Communications Commission (FCC) have rubber stamped utility safety claims that the meters transmit a few times a day at 1 watt.

The CPUC finally ordered Investor Owned Utilities (IOU's) to allow customers to opt out of Smart Meters in 2012. However they are charging customers fees, calling the opt-out program a service. In Vermont customers can keep analog meters at no cost, and so can customers in Los Angeles, CA. The EMF Safety Network is fully participating in the CPUC opt out proceeding. The most current filing can be read here.

## Smart Grid Awareness

A Website by SkyVision Solutions,  
Consumer Protection Advocate

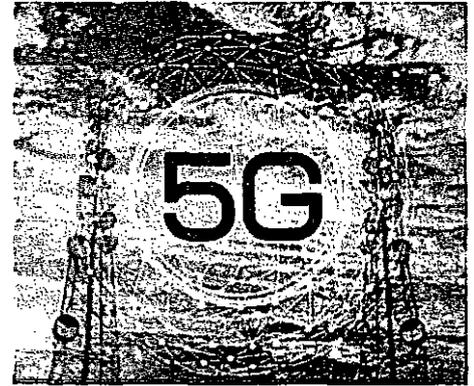
# The Dangers of 5G to Children's Health

Twitter: [@skyvision](#)

*[SkyVision Solutions Editor's Note: Smart Grid Awareness primarily discusses health and security risks related to implementation of costly electric grid modernization efforts. Even more risky will be implementation of so-called 5G technology, which in theory would eventually include utility smart meters and every Internet-enabled device on the planet.]*

## By the Children's Health Defense Team

Mobile and wireless technologies are a ubiquitous feature of modern life. Most U.S. adults own smartphones, a growing proportion are "smartphone-only" Internet users and over a fourth report being online "almost constantly." As for children, a 2014 survey of high-income nations reported that almost seven in ten children used a mobile phone, and two-thirds of those had a smartphone, usually by age 10. As described by Nielsen, it is now as common to see "a kid with a smartphone in their hand" as it was to see "a kid playing with a yo-yo in the years before the digital age."



The enthusiasm with which the public has embraced each new mobile and wireless technology—most of which have never undergone any appropriate safety testing or standards development—suggests that consumers rarely stop to consider the health implications of the infrastructure shoring up their ability to browse, stream and download anytime and "on the go." Consumers are not entirely to blame for their lack of awareness—it is not easy to disentangle the technologies' health risks in the face of the telecommunications industry's steady and calculated disinformation efforts and a captured Federal Communications Commission (FCC) that "follows the script of fabulously wealthy, bullying, billion-dollar beneficiaries of wireless."

**"... powerful 5G (fifth-generation) networks and technology are about to subject everyone, on a continuous basis, to unprecedented forms and amounts of mandatory irradiation—without prior study of the potential health impact or any assurance of safety.**

Now, however, a global 5G "frenzy" is upon us and is coming into full force. The rollout of "blazing fast" 5G technology will "dramatically increase the number of transmitters sending signals to cellphones and a host of new Internet-enabled devices." The time is ripe for greater grassroots awareness of the undisclosed tradeoffs between convenience and 5G's potentially catastrophic health effects. Far from a simple "next-gen" upgrade, powerful 5G (fifth-generation) networks and technology are about to subject everyone, on a continuous basis, to unprecedented forms and amounts of what retired U.S. government physicist Dr. Ronald Powell calls "mandatory irradiation"—without "prior study of the potential health impact" or any assurance

of safety. Considering that young people (with their smaller body mass and developing brains) are particularly vulnerable to radiation, the Environmental Health Trust has termed 5G “the next great unknown experiment on our children”—and the entire human population.

### Early warnings

In fact, the “giant uncontrolled experiment” on children and adults has already begun, despite an urgent international appeal by tens of thousands of scientists, doctors, environmental organizations and citizens calling for a halt to 5G deployment. In 2018, telecom carriers in the U.S. and Europe began rolling out 5G technology in dozens of cities. Focusing (for now) on “dense urban and high-traffic areas” in the U.S., AT&T began positioning its 5G infrastructure in major cities in eight states, and Verizon started offering 5G home broadband service in “select neighborhoods” in a handful of cities.

**“... health problems such as insomnia, miscarriage, memory problems and other neurological issues, and there are widespread reports of annihilation of insect and bird populations.**

For the most part, health concerns have ranked as a tiny footnote in the midst of the massive hoopla about 5G's speed and capacity, although trade magazines admit that there may be “some objections” to 5G due to “concerns over potential health risks.” In both Europe and the U.S., however, individuals living and working in proximity to newly installed 5G towers and antennas are telling a different story. Many have immediately started experiencing health problems such as insomnia, miscarriage, memory problems and other neurological issues, and there are widespread reports of annihilation of insect and bird populations.

A United Nations whistleblower recently drew attention to 5G's dramatic impact on health in a widely circulated series of comments about 5G's “seemingly overnight” rollout in Vienna, Austria. Describing 5G as a “silent war,” she commented:

*“...Children are the most vulnerable to 5G depredation because of their little bodies. Friends and acquaintances and their children in Vienna are **already reporting the classic symptoms of EMR [electromagnetic radiation] poisoning**; nosebleeds, headaches, eye pains, chest pains, nausea, fatigue, vomiting, tinnitus, dizziness, flu-like symptoms, and cardiac pain. They also report a tight band around the head; pressure on the top of the head; short, stabbing pains around the body; and buzzing internal organs.”*

Current reports about 5G's health risks should have been anticipated based on warning signs dating back to 2G cellular technology. In a 2004 pilot study involving functional brain scans of fire fighters who had worked for up to five years in fire stations with 2G cell towers, the researchers concluded that the only plausible explanation for the firefighters' symptoms—“slowed reaction time, lack of focus, lack of impulse control, severe headaches, anesthesia-like sleep, sleep deprivation, depression, and tremors”—was the radiofrequency radiation exposure from the towers. The International Association of Fire Fighters then went on record as opposing “the use of fire stations as base stations for towers and/or antennas for the

conduction of cell phone transmissions until a study with the highest scientific merit and integrity...is conducted and it is proven that such sightings are not hazardous to the health of our members."

### **Above and below**

One of the novel dangers introduced by 5G technology is its reliance on high-frequency millimeter waves (MMWs), a bountiful and not previously commercialized portion of the electromagnetic spectrum. While 5G's enthusiasts are quick to promise support for literally billions of devices, there is one catch—the shorter millimeter wavelengths cannot travel as far as the lower frequencies used for earlier generations of mobile technology. Thus, while there were about 300,000 wireless antennas on U.S. cell towers and buildings as of 2016 (a doubling since 2002), 5G will require "exponentially more"—*millions* of small cell towers every 500 feet "on every street corner."

**"... even in the home environment, 5G technology [will] blast through walls and cribs, making a mockery of the notion that 'your home is your castle' in which you are supposed to be safe.**

Organizations concerned about the health hazards of wireless radiation note that "Right now, you don't have to live next to a cell tower....but once they have these [5G] cell antennas everywhere, you won't be able to [move away]." Unfortunately, the "nowhere to hide" aspects of 5G are even more serious, because ground-based 5G systems will be supplemented by satellite-based systems. In March, 2018, the FCC approved the initial launch of over 4,400 low-Earth-orbit 5G communication satellites, to be followed by thousands more over the next two years—with the eventual result being 11 times more satellites orbiting the Earth than currently. The satellites will send "tightly focused beams of intense microwave radiation at each specific 5G device that is on the Earth," while each device then sends "a beam of radiation back to the satellite."

In practical terms, this means that in crowded locations such as airports, individuals' bodies "will be penetrated by numerous beams of radiation as they walk or as other people walk around them with their 5G smartphones." But even in the home environment, "5G technology [will] blast through walls and cribs," making a mockery of "the notion that 'your home is your castle' in which you are supposed to be safe."

### **More than skin-deep**

Scientists, doctors and experts from around the world have issued repeated warnings about 5G's risks, drawing on published research on MMWs as well as thousands of studies showing the harms caused by other mobile and wireless technologies.

In this context, industry and government claims that 5G technology is safe are completely disingenuous. In fact, the health effects of MMWs are already quite familiar to the U.S. military and defense agencies around the world. The U.S. has at its disposal non-lethal crowd control weapon systems (euphemistically named Active Denial Systems) that use millimeter waves to penetrate the skin of targeted individuals, "instantly producing an intolerable heating sensation that causes them to flee." In research commissioned by the U.S.

Army "to find out why people ran away when the beam touched them," they discovered that targets "feel like [their] body is on fire." Researchers also have warned that "the same parts of the human skin that allow us to sweat also respond to 5G radiation much like an antenna that can receive signals."

### **Moratorium urgently needed**

When the FCC endorsed the transition to 5G in 2016, then-Chairman Tom Wheeler (a former telecom industry lobbyist) vowed "to allow new [5G] technologies and innovations to evolve and flourish without needlessly prescriptive regulations." Thus, even though 5G represented a radical shift in technology, the FCC proposed no further safety studies, instead continuing to rely on its "outdated, excessively permissive, and thus widely criticized, radiation-exposure guidelines that...are based primarily on a 30-year-old analysis...many years before the emergence of most of the digital wireless technology in use today." A recent government study by the National Toxicology Program—which determined that cell phone radiation causes cancer—deemed the three-decade-old guidelines "unprotective."

**"... children who began using either cordless or mobile phones regularly before age 20 had more than a fourfold increased brain tumor risk.**

5G poses risks to all life on the planet—people, animals, insects and plants. However, it is clear that fetuses and children are among the most vulnerable members of the human population. Even prior to 5G, Swedish researchers concluded that "children are indeed more susceptible to the effects of EMF exposure at microwave frequencies" and reported that children who began using "either cordless or mobile phones regularly before age 20" had more than a fourfold increased brain tumor risk. Describing brain cancer as "the proverbial 'tip of the iceberg,'" the researchers also observed that "no other environmental carcinogen has produced evidence of an increased risk in just one decade."

The UN whistleblower states, "People's first reaction to the idea that 5G may be an existential threat to all life on Earth is usually disbelief and/or cognitive dissonance. Once they examine the facts, however, their second reaction is often terror. We need to transcend this in order to see 5G as an opportunity to empower ourselves, take responsibility and take action." Some of the actions that people have taken include signing the International Appeal; learning about the multiple reasons to be concerned about 5G radiation and telling others; talking to legislators about why rushing legislation that streamlines the deployment of 5G small cells is a bad idea (and also raising the awareness of legislators and state utility commissions about the risks of smart meters); and changing their relationship to their devices, including using wired rather than wireless Internet connections (or turning off WiFi routers at night) and adopting other simple steps.

5G promises to create an even "denser soup of electrosmog," with incalculable health effects. In fact, any sane person who examines the evidence must concur with the authors and over 40,000 signatories of the International Appeal to Stop 5G on Earth and in Space, who agree that the rush to blanket the planet with 5G "constitutes an experiment on humanity and the environment that is defined as a crime under international law."

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**About SkyVision Solutions**

Raising public awareness and finding solutions for smart grid issues related to invasions of privacy, data security, cyber threats, health and societal impacts, as well as hazards related to radiofrequency (RF) radiation emissions from all wireless devices, including smart meters.

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**1 Response to *The Dangers of 5G to Children's Health***



**Liz Gordon says**

April 17, 2019 at 10:08 AM

I would like to get more involved in this movement

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# Wireless Industry Confesses: "No Studies Show 5G is Safe"

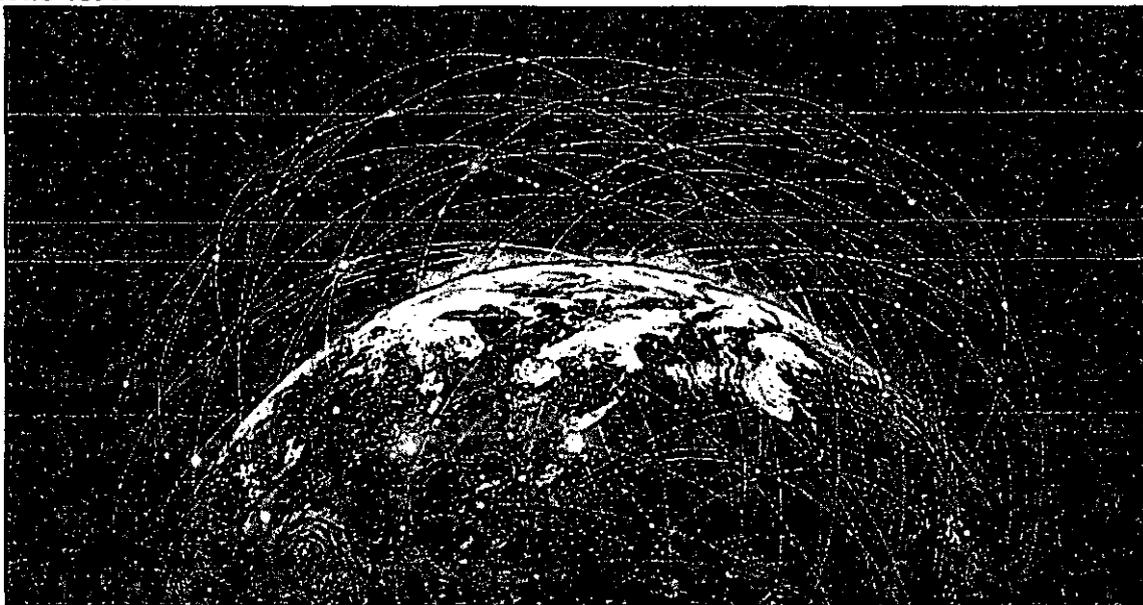
Posted on:

Monday, February 18th 2019 at 12:30 pm

Posted By:

GMI Reporter

Views 18007



Originally published on [www.takebackyourpower.net](http://www.takebackyourpower.net)

***Last week, U.S. Senator Richard Blumenthal grilled wireless industry representatives, who admitted the industry has done ZERO health & safety studies on 5G technology. Meanwhile, dozens of independent studies indicates that 5G is a risk to all biological life. Watch the video above, on YouTube here, or on Facebook here***

[WASHINGTON, DC]— During today's Senate Commerce, Science, and Transportation Committee hearing on the future of 5G wireless technology and their impact on the American people and economy, U.S. Senator Richard Blumenthal (D-CT) raised concerns with the lack of any scientific research and data on the technology's potential health risks.

Blumenthal blasted the Federal Communications Commission (FCC) and the Food and Drug Administration (FDA)—government agencies jointly-responsible for ensuring that cellphone technologies are safe to use—for failing to conduct any research into the safety of 5G technology, and instead, engaging in bureaucratic finger-pointing and deferring to industry.

In December 2018, Blumenthal and U.S. Representative Anna G. Eshoo (CA-18) sent a letter to FCC Commissioner Brendan Carr seeking answers regarding potential health risks posed by new 5G wireless technology. At today's hearing, Blumenthal criticized Carr for failing to provide answers, and instead, just echoing, **"the general statements of the FDA, which shares regulatory responsibility for cell phones with the FCC."** Blumenthal also decried the FDA's statements as **"pretty unsatisfactory."** **A PDF of Carr's complete response is available [here](#).**

During an exchange with wireless industry representatives, Blumenthal asked them whether they have supported research on the safety of 5G technology and potential links between radiofrequency and cancer, and the industry representatives conceded they have not.

Blumenthal stated:

***If you go to the FDA [website](#), there basically is a cursory and superficial citation to existing scientific data saying 'The FDA has urged the cell phone industry to take a number of steps, including support additional research on possible biological effects of radio frequency fields for the type of signals emitted by cell phones.' I believe that Americans deserve to know what the health effects are, not to pre-judge what scientific studies may show, and they also deserve a commitment to do the research on outstanding questions."***

***"So my question for you: How much money has the industry committed to supporting additional independent research—I stress independent—research? Is that independent research ongoing? Has any been completed? Where can consumers look for it? And we're talking about research on the biological effects of this new technology."***

At the end of the exchange, Blumenthal concluded,

***So there really is no research ongoing. We're kind of flying blind here, as far as health and safety is concerned."***

In November 2018, the National Toxicology Program released the final results of the longest and most expensive study to date on cellphones and cancer. Those studies found "some evidence" of a link to cancer, at least in male rats. However, the study only focused on the risks associated with 2G and 3G cell phones.

The latest 5G wireless technology relies on the **deployment of many more new antennas and transmitters that are clustered lower to the ground and closer to homes and schools.** There has been even more limited research with respect to the health ramifications of 5G technology, and **the FCC has thus far failed to adequately explain how they have determined 5G is safe.**

## **Additional Notes**

Senator Blumenthal is speaking to industry witnesses in the Senate hearing video:

- Mr. Brad Gillen, Vice President, CTIA
- Mr. Steve Berry, President and CEO, Competitive Carriers Association

- Mr. Shailen Bhatt, President and CEO, Intelligent Transportation Society of America
- Mr. Michael Wessel, Commissioner, U.S.-China Economic & Security Review Commission
- Ms. Kim Zentz, Chief Executive Officer, Urbanova

**Letter from Blumenthal and Eshoo to FCC Commissioner Brendan Carr asking about the Safety of 5G**

**Response from FCC Commissioner Carr to Blumenthal on 5G**

## **Resources from December Blumenthal Press Conference**

**Comments by: B. Blake Levitt, Communications Director, The BerkshireLitchfield Environmental Council, Invited Guest by U.S. Senator Richard Blumenthal**

**Blake Levitt 5G Information Sites for Media**

**Video of Blumenthal Press Conference, 12/3/18, Legislative Office Building, Hartford, CT, Room 1B, 11:00 AM.**

Connecticut Post "**Blumenthal Urges Cancer Study of 5G Technology**" 12/3/ 2018

**WFSB3 News Video: Lawmakers raise concerns over 5G technology**

News WTNH 8 "**Senator Blumenthal pushes to investigate link between 5G wireless tech and cancer**"

## **Resources on 5G and Health:**

**Facts On 5G: What You Need To Know About 5G Wireless And "Small" Cells**

**Resources to Take Action on 5G**

### **Scientific Evidence**

EHTrust: **Scientific Research on 5G, Small Cells and Health**

Dr. Martin Pall's free e-book: "**5G: Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them**" (PDF, 90 pages)

Dr. Joel Moskowitz: "**5G Wireless Technology: Cutting Through the Hype**"

Electric Sense: "**5G Radiation Dangers – 11 Reasons To Be Concerned**"

Health resources summary from **WhatIs5G.info**

Health resources summary from **TelecomPowerGrab.com**

EMF interview by Luke Storey: **Dr. Jack Kruse**

SaferEMR: **Summary 400 new EMF scientific studies, Aug 2016 to present**(EMF in general)

Research from **Magda Havas**

News from **Clear Light Ventures**

Articles from **BN Frank at ActivistPost**

**Grassroots Communities & Organizations**

*Note: Several of the organizations listed below are still promoting actions limited to contacting your elected representatives and pleading for help. With that being said, there is a resounding increase in awareness that a firmer response is now required.*

**5G Space Appeal: An International Appeal to Stop 5G on Earth and In Space**(sign it)

InPower Movement: **Watch Episode 1: A Mass Action of Liability**

InPower Movement: **Watch Episode 2: Notice of Liability Walkthrough**

**Environmental Health Trust**

**Parents For Safe Technology**

**Physicians For Safe Technology**

**EMF Safety Network** (California)

**Our Town, Our Choice**

**Americans For Responsible Technology**

**Scientists For Wired Technology**

**Dr. Jack Kruse** (website & community)

**Disclaimer:** This article is not intended to provide medical advice, diagnosis or treatment. Views expressed here do not necessarily reflect those of GreenMedInfo or its staff.

# Doctors, Experts Call for Delaying Deployment of 5G Due to Health Risks

By Arek Rusek | June 6, 2019



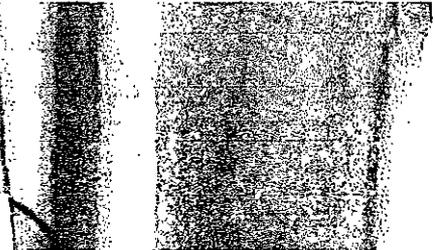
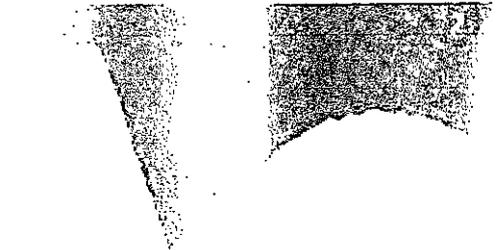
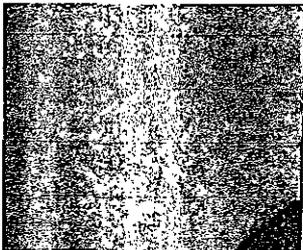
**MATTRESS**  
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TORONTO, Canada—Although 5G, or fifth generation wireless technology, promises faster download speeds and conveniences that most of us have never dreamed of, we'll also be blanketed with a new type of radiation called "millimeter waves," according to health experts who warn of the rising risks associated with the rollout of 5G.

At the Wireless Technology Symposium in Toronto on May 31, experts discussed evidence of adverse health effects from 5G technology and answered questions from the audience.

"It's not been made clear to the public that 5G won't just be another number and a letter on your cell phone," said Frank Clegg, former president of Microsoft Canada. "It requires an entirely new infrastructure of thousands of small cellular antennas to be erected throughout the cities where it's going to be installed."

What would 5G infrastructure look like? Small cell antennas could be placed as close as every third utility pole.





Dr. Anthony Miller, professor emeritus of the University of Toronto and advisor to the World Health Organization at the Wireless Technology Symposium in Toronto, Canada on May 31, 2019. (Courtesy of Queen's Park Gallery)

Scientists from 42 countries are warning their governments about the emerging health problems associated with wireless radiation, and Canadian doctors and scientists have added their concerns.

"The most prevalent symptoms include headache, fatigue, decreased ability to concentrate, tinnitus, irritability and insomnia," said Dr. Riina Bray, an environmental health consultant. "Impacts on the heart and nervous system are also of concern."

Bray has been working at the Provincial Environmental Health Clinic for 15 years, and she's seen the number of people suffering adverse effects from electromagnetic exposure rising.



**MATTRESS**  
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SLEEP BETTER



Protestors against 5G mobile network gather in Bern, Switzerland on May 10, 2019. (Stefan Wermuth/AFP/Getty Images)

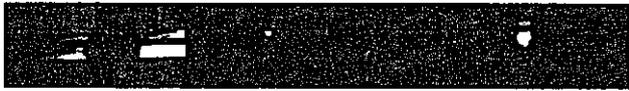
“We predict that the number of people who develop the symptoms I just mentioned will rise in the places where 5G is first installed,” said Bray.



**CBCLondonMorning**

NEXT. 5G wireless technology is on the way. But some doctors are warning of its potential health risks. They want the province to act. We'll talk to one of those doctors, coming up next. Riina Bray is our guest at 6:48. [More here:](#)





5G is the future of wireless. Here's what's at st...

With news Dutch Telecom is keeping Huawei out of its core 5G network, Canada is under even greater



share

Dr. Magda Havas, Ph.D. is a leading expert in the field of electromagnetic pollution.

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Professor and researcher Dr. Magda Havas is internationally recognized for her studies on the biological effects of electromagnetic pollution. She said that at high intensities these waves cause intense heat and pain because sweat glands on the surface of our skin act like mini antennas.

“At lower intensities scientists are predicting damage to eyes, loss of insect populations which are already declining, antibiotic resistance in bacteria, and physiological effects on the nervous system and the immune system,” said Havas.





Dr. Magda Havas at the Wireless Technology Symposium in Toronto, Canada on May 31, 2019. (Courtesy of Queen's Park Gallery)

Radiation from radio frequencies is classed in the same category of carcinogens as lead.

Dr. Anthony Miller, an advisor to the World Health Organization said there's now enough evidence that if they were to re-evaluate radiofrequency (RF) radiation, it would be labeled as carcinogenic to humans.

"Governments could not possibly ignore that," said Miller.

Some say the scientific debate about the health effects of RF radiation is over. But the question remains: Can we afford to take this risk?

Medical doctors are requesting delayed 5G deployment until testing can be conducted on the long-term biological effects of the technology.

**How much did you enjoy this article?**



# What You Need To Know About 5G Wireless and “Small” Cells

Wireless antennas emit microwaves — non-ionizing radiofrequency radiation — and essentially function as cell towers. Each installation can have over a thousand antennas that are transmitting simultaneously.

The Federal Communications Commission estimates that millions of these wireless transmitters will be built in our rights-of-way, directly in front of our homes.

5G will not only utilize current 3G and 4G wireless frequencies already in use but also add higher frequency — submillimeter and millimeter waves — in order to transmit data at superfast speeds.

Communities are being stripped of their right to make decisions about this new technology. “Streamlining” means almost automatic approval. Public notice and public hearings are being eliminated. Even if every homeowner on the block opposes the antennas on their street, the opposition will be disregarded.

Over 200 scientists and doctors issued a declaration calling for a moratorium on the increase of 5G cell antennas citing human health effects and impacts to wildlife.

Peer reviewed, published science indicates that exposures to wireless radiation can increase cancer risk, alter brain development and damage sperm. Most people are unaware that wireless technology was never tested for long-term safety, that children are more vulnerable and that the accumulated scientific evidence shows harm.

Studies show property values drop up to 20% on homes near cell towers. Would you buy a home with a mini cell tower in the yard?

Unions have already filed comments that workers were injured, unaware they were working near transmitting antennas. How will HVAC workers, window washers, and tree cutters be protected? The heavy large equipment cabinets mounted on poles along our sidewalks also present new hazards. Cars run into utility poles, often, what then?

Worldwide, many regions are investing in wired fiberoptic connections which are safer, faster, more reliable, provide greater capacity, and are more cyber-secure. Read by the National Institute for Science, Law & Public Policy

## KEY RESEARCH AND REPORTS

Physicists found that the higher millimeter frequencies intended for 5G use are preferentially absorbed into the sweat duct at much higher rates than other organ tissues. Read two published studies

Millimeter frequencies have the capacity to cause a severe burning sensation in the skin and are used by the U.S. Department of Defense in \_\_\_\_\_ called \_\_\_\_\_

The NTP \_\_\_\_\_ male rats exposed for two years to cell phone radiation developed significantly increased gliomas (brain cancer) and schwann cell tumors, the very same types of tumors increased in long-term human cell phone users. NIH/NTP \_\_\_\_\_ results states "exposure to RFR has the potential to induce measurable DNA damage under certain exposure conditions."

A published study compared people living close and far from cell antennas and found people living closer to cellular antennas had changes in blood that predicts cancer development. Read \_\_\_\_\_ . Read a \_\_\_\_\_

Scientific literature documents evidence of nonthermal cellular damage from wireless radiation used in telecommunications to DNA integrity, cellular membranes, gene expression, protein synthesis, neuronal function, the blood brain barrier, melatonin production, sperm damage and immune dysfunction.

Published research finds the frequencies alter bird navigation and disturb honeybee colonies.

## RESOURCES

local, state and federal elected officials in person.

this information with your friends, family and community.

for government policy that reduces RFR exposure to the public.

**Citizens in all states must organize and take action to halt legislation that increases cell antennas in neighborhoods.**

- Street lights
- Trashcans
- Utility poles
- Bus stops
- Sides of buildings

- Increased radiation near homes
- Refrigerator-sized equipment cabinet
- Drop in property values
- Taller poles
- Fixtures weigh hundreds of pounds

"If radio frequency emissions from wireless handsets or equipment on our wireless infrastructure are demonstrated to cause negative health effects, potential future claims could adversely affect our operations, costs or revenues... We currently do not maintain any significant insurance with respect to these matters."

\_\_\_\_\_ from Crown Castle, Verizon and other wireless companies.

"An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing:

- Headaches
- Memory problems
- Dizziness
- Depression
- Sleep problems"

AAP on \_\_\_\_\_

"There is a substantial body of evidence that this technology is harmful to humans and the environment. The 5G millimeter wave is known to heat the eyes, skin and testes... Of particular concern are the most vulnerable among us — the unborn, children, the infirm, the elderly and the disabled. It is also expected that populations of bees and birds will drastically decline."

- Headaches
- Sperm damage
- Altered brain development
- Depression
- Neurological symptoms
- Hormone changes
- Memory problems
- Sleep problems
- Cancer

## **INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS**

- *"The IAFF opposes the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."*
- The IAFF Official Position *Against* Cell Towers on Fire stations passed in 2004
- This Position was initiated after increasing complaints among firefighters with cellular antennas on their stations coupled with the California study showing neurological damage in California firefighters conducted by Dr. Gunnar Heuser. The pilot study (2004) of California firefighters showed brain abnormalities, cognitive impairment, delayed reaction time, and lack of impulse control in all 6 firefighters tested ( ). This study led to the overwhelming passage of Resolution 15 by the International Association of Firefighters in Boston in August 2004. Res. 15 called for further study and was amended to impose a moratorium on the placement of cell towers on fire stations throughout the US and Canada.

### **L.A. County Firefighters Local 1014**

- Local 1014 has a webpage dedicated to stopping towers because of a plan to install them on over 200 of their stations.
- "As firefighters and paramedics, we live in these firehouses. What effect will these towers have on us? What are the risks to our neighbors? It's a no-brainer that LA County should at least have done a proper study before before putting 200-foot high-power microwave antennas on top of our heads."

*President, LA County Firefighters Local 1014*

- *The Firefighter's Website in 2015*

### **United Firefighters of Los Angeles City Local 112 IAFF-CIO-CLC Opposes Cell Towers on Their Stations.**

- "It is inexcusable that once again our firefighters in the field were the last to know about a massive 150 million dollar project that could jeopardize their health and safety. ... nobody talked to us and we have not heard from one single expert who has told us that this project will be safe."
- "UFLAC will strongly oppose the use of Fire Stations as base locations for cell towers and/or antennas"
- Download the letter from this [link](#) *UFLAC Firefighters (Union Local 112) and not by our name which has been used on fire stations.*
- 

**See list of Medical Doctor Consensus Statements at this link**

**Examples of Other Government Advice or Information That Does Not have Precautionary Policy**

seniors, pregnant women and other susceptible populations should be the guide for a District policy on WiFi installation and use in the worksites."

The \_\_\_\_\_ states now that:

- Wi-Fi free zones should be available.
- On/Off routers recommended and record any adverse Wi-Fi health effects.
- Minimal or non-use within elementary schools.

**2008** Lucerne Elementary Secondary Arrow Lakes District SD 10 New Denver BC, Canada Opts for "No WIFI

**2001 Fletcher Hills PTA Resolution submitted to the California State PTA**

- "RESOLVED, that the California PTA supports local municipal zoning setback rules of at 1000 feet or more from an operating wireless transmitter and a school or residential area; and be it further
- RESOLVED that the California PTA supports encouraging schools to use cable lines for all communications services on campus and to avoid the endorsement, purchase or use of wireless local area network systems on campus; and be it further
- RESOLVED that the California PTA recommend that teachers and students should limit use of cellular phones or other mobile devices on school property to emergencies and that cellular phones, pagers and other mobile phones be turned off and placed out of sight while the individual is on school property"
- Resolution on Wireless Equipment/Cellular Phones and Antennas

**DOCTORS AND SCIENTISTS APPEAL FOR STRICTER WIRELESS TECHNOLOGY REGULATION**

1998	2005	2013
2000	2005	
2000	2006	2014
2002	WiMax Appeal 2006	2014
2002	Schlüchterner appeal	(International Doctors) 2014
2002	Brussels Appeal 2007	
2004	2008	
2004	2008	
	2009	
2004	Dutch Appeal 2009	2015
2005	2010	
2005	2010	
2005	2010	
2005	2011	2015 Over 200
2005	2011	Scientists
2005	2012	, 2017
Parish Kirchner Appeal 2005		2017
Saarlander Appeal 2005	2012	2017
		2018

**Firefighter Unions Opposing Cell Towers**

**Environmental Health Trust**

- Voice B

### Los Angeles California Public Schools LAUSD

**The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits:** The OEHS supported a precautionary threshold level that is 10,000 times lower than the current Federal Communications Commission standard. Read the RF Report the LA School District Used to recommend a cautionary exposure level.

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**The LA School District Prohibits Cell Towers on School grounds-** as stated in their

2009 LA School Board Resolution Banning Cell Towers from schools and recommending against WiFi.

- "The Board supports responsible deployment of fiberoptic broadband technology which is superior to wireless in speed, reliability, security, durability and protections it affords people and the environment from the potential hazards of exposure to radio frequency radiation."
- 
- 
- 2009 December Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school.  
*Cell Tower Resolution*  
"As long as questions exist as to the adequacy of these federal regulations, local governments should have the ability to include consideration of health and environmental effects of these facilities." (referring to cell towers)
- Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich

### 2000 LA School Board Resolution Opposing Cell Tower Placement on Schools

- 
- Resolution calls for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce "health effects" at "very low field" intensities'

**Safety Issues Related to the LAUSD RFR Thresholds :** Los Angeles School District states they use precautionary RFR guidelines- however even a threshold at 10,000 times lower than FCC limits is not safe because peer reviewed published scientific research has shown harm at levels *hundreds of thousands times* lower than FCC limits. The school district is in fact increasing wireless exposures with Wi-Fi access points and increasing exposure to students and staff. LAUSD is not ensuring safety with these actions. In addition the LAUSD measures the radiation in the building by averaging the power density which masks areas of high intensity and peak exposures. From a human health standpoint, the RFR measurements need to include peak readings in addition to the cumulative length of time children are exposed to RF radiation in order to fully understand their exposure. Until these measures are taken, one cannot adequately evaluate the EMF environment.

**Note on Safety: Digital Device "Best Practices"** that still allow Wi-Fi access points in classrooms- *still allow* microwave exposures to the children and such practices are not adequately protective to children. These District actions seem to be *acknowledgment that wireless device expose the body to radiation*. However, such "Best Practices" still allow access points to be powered on and thus are always exposing the students and staff to continuous microwave radiation regardless of the devices being in use or not. In addition, devices are also continuously transmitting during student use of the internet and no procedure is in place to ensure that Best Practices are followed so that the transmissions are turned off when the internet is not needed. Therefore these "Best Practices" *do not* mitigate the risk nor do they protect students from School District created wireless exposures.

### 2010 Greater Victoria Teachers' Association

"The GVTA recommends a precautionary approach to the School District with regard to provision of wireless internet in schools. The precautionary approach comes from the environmental movement and has been adopted as common practice in areas regarding potential environmental, ecological or biodiversity damage. It suggests that the lack of significant evidence is not enough of a reason to be unconcerned. The fact that many other countries have instituted regulations to protect children,

Environmental Health Trust

2013

Issued a position statement

"There is cause for concern for members' health and safety, especially women," said Sandra Wash, a teacher representing the Peel district when the Federation issued supporting an Expert Panel recommendation that Health Canada provide the public with more information about radiofrequency energy, and the safe use of wireless technology.

to:

- Turn cell phones off in classrooms
- Label the location Of Wi-Fi access points.
- Research Radio Frequency radiation.
- Develop a hazard control program related to wireless microwave radiation through JHSC.

2012

(45,000 Ontario teachers)

- The Teacher Association recommends a wired infrastructure as WIFI "may present a potential Health and Safety risk or hazard in the workplace...The safety of this technology has not thoroughly been researched and therefore the precautionary principle and prudent avoidance of exposure should be practiced."
- "Controls for Wi-Fi would best be guided by the ALARA principle (As Low As Reasonably Achievable) as well as by applying the concept of prudent avoidance (staying away from it)

2013

- "The ISTE supports members who are suffering from Electromagnetic Hypersensitivity by ensuring their medical needs are accommodated in the workplace."
- Proposed Resolutions "the World Health Organization's classification of radiofrequency/electromagnetic fields emitted by wireless devices as a 2B possible cancer risk to humans; that the BCTF ensures all teachers have the right to work in a safe environment, including the right to work in a Wi-Fi/ wireless-free environment."
- Recommendation to the Ministry of Education that school boards "begin immediate installation of on/off switches for Wi-Fi routers in schools, thereby reducing microwave radiation exposure and reducing health risks to members, and/or provide safer Ethernet cables or fibre optics".
- Daily News Coverage:
- 
- 

2013

BCCPAC) of 821 Advisory Councils representing over

500,000 parents in British Columbia passed two resolutions.

- Resolution:
- Resolution 17 "calls on each Board of Education to have one public school at each education level that is free of Wi-Fi, cordless phones and cell phones. This school will only be equipped with wired computers and wired telephones for personal, educational and administrative purposes."
- Resolution 18 calls on Boards of Education to "cease to install Wi-Fi and other wireless networks in schools where other networking technology is feasible." passed with a clear majority.

2010

20,000 members

- Read the
- "Voice has advocated that new Wi-Fi systems should not be installed in schools, that existing systems should be turned off when not required and that schools should consider whether they really need to use Wi-Fi, which was developed to facilitate Internet access on the move rather than to be used as a convenient alternative to cables in dedicated IT facilities."
- " In the light of what has happened to one of our members [who has developed sensitivity to electro-magnetic radiation], I am concerned that so many wireless networks are being installed in school and colleges without any real understanding of the possible long-term consequences."- Voice General Secretary Philip Parkin

"Wireless radiation is emitted by the myriad of wireless devices we encounter every day. It was once thought to be relatively harmless. However, we now know that wireless radiation can cause non-thermal biological effects as well, including damage to cells and DNA, even at low levels.

Some tips to reduce your exposure to wireless radiation.

Taking certain precautions around wireless radiation is appropriate for our most vulnerable populations, including pregnant women.

Curiously in March of 2016, this statement was removed and replaced with site *still posts* how to reduce exposure.

However the

- Resources posted on their site still include Dr. Moskowitz' *Health and Safety Concerns of Electromagnetic Interference* and the BabySafe Project brochure *Health and Safety Concerns of Electromagnetic Interference*. "Taking certain precautions around wireless radiation is appropriate for our most vulnerable populations, including pregnant women."

**2014 New York State Teachers Union NYSUT: A federation of more than 1,200 local unions.**

*"We have enough evidence to justify taking action and we are not willing to wait until our members, their children and the students suffer health consequences from not doing anything."* -Paul Pecorale, Vice President of the New York State United Teachers Union.

- 
- Download the
- NYSUT hosted a

Published for NYSUT

**2014 National Education Association**

- 
- "The National Education Association believes that all educational facilities must have healthy indoor air quality, be smoke-free, be safe from environmental and chemical hazards, *and be safe from hazardous electromagnetic fields.*"
- "Students and/or their parents/guardians, education employees, and the public should be notified of actual *and potential hazards.*"
- "School districts should conduct periodic testing for harmful water *and airborne particles/agents* that are detrimental to the health of students and education employees and shall report the results publicly."
- "The Association also believes in the development and enforcement of health and safety standards specifically for children."

**2013 Canadian Teachers' Federation Brief (200,000 elementary and secondary school teachers)**

- "CTF is concerned about the lack of definitive research regarding the adverse health effects of Wi-Fi.
- "We propose a prudent approach to the use of Wi-Fi, especially where children are present."
- "We recommend an education program regarding the relative safety of Wi-Fi exposure and that appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi access points and devices."
- "Pedagogical needs could be met in schools with an approach that limits exposure to Wi-Fi."
- Read the Briefing
- 2015: *Canadian Teacher's Magazine* published

**2013 United Teachers of Los Angeles, representing 40,000 teachers and staff**

- Resolution passed: "I move that UTLA will abide by current National NEA Policy for Environmentally Safe Schools which states that all employees and stakeholders should be informed when there are changes in their exposure to environmental hazards including electromagnetic radiation and that all stakeholders and the public should be notified of any actual and potential hazards. UTLA will advocate for technological solutions that maintain technology upgrades while not increasing employees exposure to electromagnetic radiation."
- Health and Human Services Committee 3-6-13 #1: Moved by Kevin Mottus, seconded by John Cabrera.
- UTLA Newsletter *United Teachers of Los Angeles* 3/6/13

Environmental Health Trust

- The development of best practices for mobile devices to reduce RF in San Francisco schools
- Publishing the CDPH cell phone guidelines through various outlets for all San Francisco educators and parents
- Posting RF safety guidelines in every classroom

**2017: Hillsmere Elementary School PTA Writes Letter To Anne Arundel County Opposing a Small Cell Near The School and cites the EMF Scientists.**

**2016: New Jersey Education Association (NJEA) published the article** in the September 2016 NJEA Review. Adrienne Markowitz and Eileen Senn detail how to reduce physical health risks from devices including risks from radiation exposure:

- *Keep devices away from the body and bedroom.*
- *Carry phones in briefcases, etc., not on the body.*
- *Put devices on desks, not laps.*
- *Hard wire all devices that connect to the internet.*
- *Hard wire all fixed devices such as printers, projectors and boards.*
- *Use hard-wired phones instead of cell or cordless phones.*
- *Text rather than call.*
- *Keep conversations short or talk in person.*
- *Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling Bluetooth, GPS, phone calls, and WiFi.*
- *Use speaker phone or ear buds instead of holding the phone next your head.*
- *Take off Bluetooth devices when not using them.*
- Read the online NJEA article

**2016: Phoenicia Elementary School Onteora School District, New York State**

The PTA wrote a letter to the Onteora School District calling for the Wi-Fi to be turned off as a precautionary action

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- Read News Report:

**2016: Ontario Secondary School Teachers Federation**

The Federation has issued a new call for a moratorium on WIFI and in the Limestone School District and they have taken the issue to the school trustees in that District. "The Teacher Union's president says there is a growing mountain of evidence that WIFI can pose health risks." Andrea Loken/OSSTF District President stated in a 3/2016 news interview that, "There are thousands of published peer reviewed papers that are indicating adverse health effects from WIFI and we are seeing an increased awareness around this issue worldwide."

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- Watch t
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**2016: Elementary Teachers Federation of Ontario**

A 3/2016 News Report states that they are calling for a "WIFI moratorium until further health studies are done, and lawmakers can catch up with new regulations."

- Watch t
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**2014 United Federation of Teachers (Teachers, nurses and professionals working in New York City).**

In 2014 their d:

**Environmental Health Trust**

2011 in Quesnel, B.C., removed Wi-fi .  
2011 in Ontario no WiFi.  
2011 Wayside Academy, Peterborough, Ontario no Wi Fi.  
2010 Surrey, removed Wi-Fi.  
2010 Ontario St. Vincent Euphrasia elementary school: Parents voted to turn off Wi-Fi.  
2009 HEROUVILLE-SAINT-CLAIR wi-fi networks removed.

### **School Cell Phone Bans**

This list covers bans of cell phones that occurred after the schools found cell phones in classrooms to be distracting and problematic. It is not necessarily because of the radiofrequency and health issues. This is not a complete list but rather a list as stories *make the news starting in 2017*. *Hyperlinks go to news source*

**France:** Cell Phones totally banned in schools for students up to 14 years old. The ban includes hallways, playgrounds and in between classes. [and read the 2017 news article in Le Monde](#)

The policy will be in place by September 2018.

**Israel:** Cell Phones were BANNED in Israel School Classrooms in 2016.

**Victoria Middle School, Canada**

### **USA**

**Mansfield City Schools, Ohio, USA, July 2017 News article “**

- The first of the two new policies bans use of cell phones or other personal communication devices not only in the classroom but also before and after school, at lunch and in between classes. Unless approved by a teacher or administrator, the devices must be “powered completely off” and stored out of sight.

**Portage High in Wisconsin USA:** Read the 2017 news article: [P](#)  
[and](#)

**Highland Middle School, Illinois USA**

**Collinsville IL Middle School, Illinois USA:** Read “

**Paris Maine Schools News article:**

**Framington Massachusetts,**

**Lakeview High School in Battle Creek Michigan.** Read the 2016 News article,

**Lewiston Middle School Maine USA,**

[nd also](#)

**Corona Del Mar Middle School in Newport-Mesa Unified School District California USA 2017 News article,**

**Old Rochester Regional High School:**

The above US bans are not related to cell phone radiation issues but instead- the way that cell phones disrupt educations.

## **Teacher Unions and Parent Teacher Organizations**

**2018: United Educators of San Francisco passes Resolution on Safer Technology**

The Union represents more than 6,000 employees of the San Francisco Unified School District including teachers, nurses, paraeducators, counselors, instructional aides, substitutes, psychologists, therapists, social workers and speech pathologists throughout San Francisco.

The resolution, expected to be on the Labor-Management Health and Safety Committee agenda for review and planning of next steps, calls for:

- A discussion of the CDPH cell phone guidelines

**Environmental Health Trust**

- all internet connections are hard wired

Vejlernes private school - no wifi  
Kastanjely kindergarten - no wifi

2016:

- and
- Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school.

2016: The Piemonte Region has adopted a resolution to limit EMF exposure

- 
- Resolution limits the use of wifi in schools and is considerate to the problem of EHS people.

2015: Ashland Public Schools, Mass (USA)

Ashland is the first school district to vote to enact "Best Practices" in classrooms and publicly post these instructions which include turning off Wi-Fi when not in use and keeping devices in a table, not a lap  
News article on these

- 
- discussing the process
- 

2016: I, Australia, 100% Wi-Fi Free School

2016: Australia, WiFi Free Classrooms

2016: Linuwei School, Australia, WiFi in some classrooms, Can accommodate children with EHS.

2016: Cairns Hinterland Steiner School, Australia, WiFi Free Classrooms (may be available in other areas)

2016: Wild Cherry School, Australia, 100% Wi-Fi Free

2015: St. Cajetan School, Belgium: Wired Internet installed and wireless removed.

2015: Washington Waldorf School, Maryland, USA: Removed Wi-Fi Routers from Buildings, Ethernet installed.

2015: Freshwater Creek School, Australia, 100% Wi-Fi Free

2015: London, Acorn School: Screen Free.

2015: Lorient Novalis School, Australia, 100% Wi-Fi Free School Preschool to 12th grade.

2015: Cairns Hinterland School, Australia, WiFi Free Classrooms for EHS

2014: Acorn Hill School, Maryland: Reducing exposure to Wi-Fi. In process.

2014: Friends Community School: Wi-Fi turned off in wing for lower elementary school students. WiFi routers moved OUT of classrooms into hallways for older grades to reduce EMF exposure. Ethernet wires made available in classrooms for families who want children on corded (not wireless) computers. Unknown if this is still in place.

2014: Hardwired internet to younger grades, limited Wi-Fi Router exposure to older grades.

2014: Portland Oregon, USA, WiFi removed from elementary school

2014: Braintree Massachusetts, USA, WiFi replaced with ethernet.

2014: Ghent, Belgium,

2014: Australia.

2014: The in Italy turned off Wifi and goes back to Wires.

2013, B.C. Canada turned off WiFi.

2013 New Zealand Replaced WIFI with cable-based internet.

2013 School Board BC (One school without Wi-Fi)

2013, Switzerland. Teachers vote to remove WiFi.

2012 in Ylivieska Finland bans phones and minimizes Wireless.

2012: in Burlington Vermont: Remaining free of Wireless Radiation

2011 WiFi taken out. Minneapolis, Minnesota USA

2011 Aurora School in Ontario removed Wifi and replaced with hardwired.

Environmental Health Trust

## Schools Worldwide Removing the WiFi and Reducing Exposure

**2017:** : Wi-Fi removed in elementary school classrooms.

**2017: Worcester Massachusetts, School Committee voted to approve "precautionary options" to be posted on the Worcester District Website.**

**2017: San Diego California USA Waldorf School:** Adopted CHPS guidelines wired internet/electronic free zones/and hardwired phones per article published in

**2017: Sacramento California USA Waldorf School:** WiFi will be turned off when not in use starting in Fall 2017.

**2017: Wi-fi OFF Switches Installed in the Fiskars primary school.**

**2017: Cyprus Bans Wi-Fi from kindergartens, removes Wi-Fi from elementary classrooms and halts deployment.**

**2016: Haifa, Israel:** Haifa Mayor Yona Yahav (of Israel's 3rd largest city) ordered all schools to have wireless removed and replaced with wired connections.

- : Haifa Cuts off Wi-Fi in Schools
- : Haifa to Shut School Wireless Networks
- 
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### **2016 Lowell School, Washington DC**

- In the kindergarten wing in 2016, the Wi-Fi hotspots were removed and the teachers are given ethernet and adapters so that computers and class technology can be ethernet connected (corded) to reduce RF-EMF exposure.

**2016 Italy:** Turin Mayor Chiara Appendino laid out plans "to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people's health".

- News Report

### **2016: Onteora School District in New York State USA**

- 
- District adopts "Best Practices with Wi-Fi stating:
- "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

### **2016 Italy:**

- "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children."
- The Local Newspaper article -
- Torino News Article -

### **2016:**

- Children use ipads in flight mode on desk and parents may request that their child use an Ethernet cord. Children are taught about the health precautions as part of their cyber citizenship.

### **Denmark Schools that have removed or reduced wireless exposure**

Bjedstrup elementary School og Børnehus, (school and kindergarten) Student must hand over cell phones before classes + no wifi in school premises

- 2015 : An Act relative to a special commission to study electric and magnetic fields. *Bills Still in Process as of August, 2015.*

**2015 - Nassau County Proposed a Wireless Router Labeling Act**

- The act would place visible warning signs in all county buildings and facilities where a wireless router is located.
- 

2014 "The Wireless Information Act"

- The act passed the State Senate and House but then failed to pass the second vote. The Bill requires manufacturer's information on radio-frequency exposure be visible on the outside of the cell phone's product packaging.
- 
- News Article -
- 

**2011 -**

- Ordinance requires cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and how consumers can minimize their exposure. The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's fees.
- The City

**2014 -**

- Senate bill was introduced calling for a warning label encouraging consumers to follow the enclosed product safety guidelines to reduce exposure to radiation that may be hazardous to their health.
- This 2011 legislation would have required retailers to include notices on product packaging that cell phones emit radio frequency (RF) energy. A second notice would be posted at the point of sale when purchasing online or in a physical store.
- This 2011 proposed law request the Department of Health and the Department of Environment to study and review all available literature and reports on the effects of cell phone radiation on human health.
- This 2011 proposed law would require warning labels on cell phones "to inform all citizens about possible health dangers that have been linked to microwave radiation that is emitted by cellular telephones and the steps that can be taken to mitigate those dangers, especially as they relate to children and pregnant women."
- Dr. Ronald B. Herberman, former director of the University of Pittsburgh Cancer Institute (UPCI) and the UPMC Cancer Center offered testimony at a PA House Democratic Policy Committee hearing.
- 
- 

**Oregon**

- This 2011 proposed law would require warning labels for all new cell phones and cell phone packaging.
- 
- In 1999 Congressman Bernie Sanders sponsored H.R. 2835 (106th): To require an assessment of research on effects of radio frequency emissions on human health.

as children, pregnant women, those with compromised immune systems and hypersensitivity reactions, men and women of reproductive age, and the elderly;

2. disseminate research results to the general public; and
3. report findings and conclusions to Congress.

Directives:

- Directs the Federal Communications Commission (FCC) to promulgate regulations to allow a subscriber to access personally or to give consent to allow researchers with institutional review board approval to access specific usage data required to investigate the link between electromagnetic radiation exposure and potential adverse biological effects in humans.
- Directs the EPA to promulgate regulations establishing maximum exposure level goals and maximum exposure levels for exposure to electromagnetic fields generated by mobile communication devices.
- Directs the Commissioner of Food and Drugs (FDA) to promulgate regulations to provide for labeling (including exposure ratings and the maximum allowable exposure levels and goals) on mobile communication devices, packaging, instruction manuals, and at points of sale in stores and on websites.
- Requires the Secretary of Health and Human Services (HHS) to increase: (1) the number and size of grants to institutions for training scientists in the field of examining the relationship between electromagnetic fields and human health; and (2) the number of career development awards for such training for health professionals pursuing careers in pediatric basic and clinical research, including pediatric pharmacological research.
- Amends the Public Health Service Act to establish a graduate educational loan repayment program and authorize national awards for researchers in such fields.
- Amends the Communications Act of 1934 with respect to the prohibition on state or local government zoning regulation of personal wireless service facilities on the basis of the environmental effects of radiofrequency emissions.
- Excludes from such prohibition state or local regulation based on the adverse human health effects of emissions of radiofrequency electromagnetic fields.

Oregon

- 2017 Legislation about to be introduced.
- This proposed legislation directs the Department of Education to prepare statement that discloses potential health risks of wireless technology and requires public and private schools to distribute statement to employees and parents of students. It declares an emergency effective July 1, 2015.
- This proposed legislation states that cell phones must have a visible written label that advises consumers of possible risks and steps that consumers can take to reduce the risk of radiofrequency radiation exposure from cellular telephone use. Read it here.

Massachusetts

- **2017/2018: Three Massachusetts Senators and one Representative introduced bills to examine wireless radiation and protect the public.**
  - **2017: Resolve creating a special commission to examine the health impacts of electromagnetic fields (Senator Karen E. Spilka).**
  - **2017: An Act relative to utilities, smart meters, and ratepayers' rights (gives people the no-fee choice of keeping their non-radiation-emitting water, gas and electrical meters instead of "smart" utility meters; Senator Michael O. Moore).**
  - **2017: An Act relative to disclosure of radiofrequency notifications (requires warning labels on radiation-emitting products; Senator Julian Cyr).**
  - **2017: An Act relative to the safe use of hand-held devices by children (proposes specific language on packaging, mandated by manufacturing manufacturers placed in Congress; California, Senate Bill 1010, SB 1010, is the best example in best management practices for children in schools and public institutions of higher education under the Department of Elementary and Secondary Education in order to protect children from all schools. Representative Charles Johnson).**
- **2016 Proposed Bill MA 2016-001: An Act relative to the health impacts of electromagnetic fields.**

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**2011 - Maine, Portland Mayor Mavodenes, Jr. declared October "Cell Phone Awareness Month"**

**2010 Philadelphia, Pennsylvania**

- On December 2, 2010, the Philadelphia City Council passed a resolution ( ) that authorized the Committee on Public Health and Human Services "to hold hearings on the potential health risks from cell phone radiation and the actions the city of Philadelphia can take to better educate all cell phone users, particularly children and teens, on ways to reduce radiation exposure by using headsets, speaker phones, and texting."

**2009 - Governor of Colorado issued a Proclamation on Electrical Hypersensitivity.**

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- *"Electromagnetic Sensitivity is a painful chronic illness of hypersensitive reactions to electromagnetic radiations.*
- *WHEREAS, the symptoms of EMS include, dermal changes, acute numbness and tingling, dermatitis, flashing, headaches, arrhythmia, muscular weakness, tinnitus, malaise, gastric problems, nausea, visual disturbances, severe neurological, respiratory, speech problems, and numerous other physiological symptoms.*
- *WHEREAS, Electromagnetic Sensitivity is recognized by the Americans with Disabilities Act, the US Access Board and numerous commissions;"*

**2009 - Governor of Connecticut issued a Proclamation on Electrical Hypersensitivity.**

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- *"WHEREAS, the health of the general population is at risk from electromagnetic exposures that can lead to illness indicted by electromagnetic radiations; and, WHEREAS, this illness may be preventable through the reduction or avoidance of electromagnetic radiations, in both outdoor and indoor environments and by conducting further scientific research..."*

**2009 - Broward County, Florida; The Mayor issued a Proclamation on Electrical Hypersensitivity.**

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- *"WHEREAS, as a result of global electromagnetic pollution, people of all ages in Broward County and throughout the world have developed an illness known as Electromagnetic Sensitivity..."*

**US Proposed Legislation**

**2012**

- The Act was introduced receiving strong support from many organizations including the American Academy of Pediatrics. This legislation called for labels on mobile devices at point of sale, a comprehensive national research program to study whether exposure to wireless devices causes adverse biological effects directed by NIEHS and the EPA and exposure level regulation.
- Congressional hearings in 2009 provided expert testimony to Congress.
- 
- **Library of Congress Summary:** Written by the Congressional Research Service
- **Cell Phone Right to Know Act -** Requires the Director of the National Institute of Environmental Health Sciences and the Administrator of the Environmental Protection Agency (EPA) to:
  1. conduct or support a comprehensive research program to determine whether exposure to electromagnetic fields from mobile communication devices causes adverse biological effects in humans, including vulnerable subpopulations such

exposure limits for wireless devices to levels that do not cause human or environmental harm based on scientific research.”

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**2014 - The Connecticut Department of Public Health issued specific recommendations to reduce exposure to cellphone radiation.**

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- It is notable that the Department has provided information more in depth than the CDC, EPA and FDA in detailing 7 steps on *how* people can reduce exposure. Furthermore, the Department states *“It is wise to reduce your exposure to radiofrequency energy from cell phones whenever possible.”*

**2014 - Greenbelt, Maryland City Council voted unanimously for the following policy actions:**

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- Alert citizens about the fine print warnings and possible health risks of cell phones and wireless devices By sharing the *Environmental Health Trusts 10 Steps to Safe Tech and Doctors Advice on Cell Phones Brochure* in City health fairs and city centers.
- Send the FCC Chairman a letter urging the adoption of “radiation standards that will protect human health and safety.”
- Oppose cell towers on school grounds and write a letter to the local school board and County Executive.
- Press Release -

**2011 - San Francisco, California; Cell Phone Radiation (How to Reduce Exposures) Webpages launched**

- Webpage -
- San Francisco developed the following public health information resources:
  - Answers on \_\_\_\_\_ to cell phone radiation.
  - A \_\_\_\_\_ on Cell Phones and RF Radiation
  - A \_\_\_\_\_ for the Public
  - \_\_\_\_\_ for Cell Phone packaging.

**2012 and 2010 - Jackson Hole, Wyoming issued a Proclamation of Cell Phone Awareness**

The proclamation cites concern over long term health effects as well as the increased risk that the radiation poses to children.

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**2012 - Pembroke Pines, Florida passed Resolution**

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- Resolution expresses the City's "Urgent Concerns" about Wireless Radiation and Health and which encourages citizens to read their manuals and presents information on how to reduce exposure by using a headset or speakerphone. Jimmy Gonzalez, an attorney who had developed brain cancer after heavy cell use, initially petitioned the Commission.

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**2011- California: Burlingame California City Council** voted to include cell phone safety \_\_\_\_\_ in their Healthy Living in Burlingame initiative which gives recommendations on how to reduce exposure and states:

“The Federal Communications Commission (FCC) mandates that all cell phone manuals caution users to hold the phone a short distance (.6 inch to 1 inch) from the body. (See your manuel's fine print.)

While scientists continue to research and debate this matter, here are some simple things you can do to minimize your exposure to cell phone emissions” Read the

**Environmental Health Trust**

- Exercise caution when using a phone or texting while walking or performing other activities. "Distracted walking" injuries are also on the rise.
  - If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.
  - Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it gives off. It's better to wait until you have a stronger signal before using your device.
  - Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases.
  - Remember that cell phones are not toys or teething items.
- 
- This webpage states: "Cell Phones: In recent years, concern has increased about exposure to radio frequency electromagnetic radiation emitted from cell phones and phone station antennae. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing: *Headaches, Memory problems, Dizziness, Depression, Sleep problems.*"
  - "Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment."

*"The AAP urges the FCC to adopt radiation standards that: Protect children's health and well-being. Children are not little adults and are disproportionately impacted by all environmental exposures, including cell phone radiation. Current FCC standards do not account for the unique vulnerability and use patterns specific to pregnant women and children. It is essential that any new standard for cell phones or other wireless devices be based on protecting the youngest and most vulnerable populations to ensure they are safeguarded throughout their lifetimes."*

**2012 AAP Letter to FCC calling for the FCC to open Review of Human Exposure Guidelines.**

**2012 AAP Letter to US Representative Dennis Kucinich in Support of the Cell Phone Right to Know Act**

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**2012 - AAP published Pediatric Environmental Health, Textbook of Children's Environmental Health**

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**2011 AAP News Article -**

**2014 - The California Medical Association Passed a Wireless Resolution**

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- "Whereas scientists are increasingly identifying EMF from wireless devices as a new form of environmental pollution ... Whereas peer reviewed research has demonstrated adverse biological effects of wireless EMF including single and double stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and brain tumors; and...Resolved, That CMA support efforts to implement new safety

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**Documents From the March 2017 Release of the California Public Health Documents After The Court Order Before the Department officially released them**

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prepared by the California Department of Public Health (CDPH) initially revised multiple times through January, 2015 released by the California Attorney General's Office to Joel M. Moskowitz, Ph.D. of the School of Public Health University of California, Berkeley. Dr. Moskowitz sued the CDPH for the release of these guidelines. Dr. Moskowitz states that California State never adopted this fact sheet nor released it to the public due to what Dr. Moskowitz refers to as suppression by "political appointees".

- The California document recommends people keep the phone away from the brain and body especially for children stating, "EMFs can pass deeper into a child's brain than an adult's. Also, the brain is still developing through the teen years, which may make children and teens more sensitive to EMF exposures."

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- San Francisco Chronicle News Article -
- San Francisco Examiner News Article - "
- NBC Bay Area News Article - "
- San Francisco Chronicle News Article - "

**2017: Monterey County California Resolution Proclaiming Electromagnetic Sensitivities Awareness Month.**

**2016 - American Academy of Pediatrics Issues Recommendations to Reduce Exposure**

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- The webpage reiterated children's unique vulnerability to cell phone radiation stating, "Another problem is that the cell phone radiation test used by the FCC is based on the devices' possible effect on large adults—not children. Children's skulls are thinner and can absorb more radiation."
- The AAP issued the following cell phone safety tips specifically to reduce exposure to wireless radiation:
- Use text messaging when possible, and use cell phones in speaker mode or with the use of hands-free kits.
- When talking on the cell phone, try holding it an inch or more away from your head.
- Make only short or essential calls on cell phones.
- Avoid carrying your phone against the body like in a pocket, sock, or bra. Cell phone manufacturers can't guarantee that the amount of radiation you're absorbing will be at a safe level.
- Do not talk on the phone or text while driving. This increases the risk of automobile crashes.

**Note on Safety: Digital Device "Best Practices"** that still allow Wi-Fi access points in classrooms- *still allow* microwave exposures to the children and such practices are not adequately protective to children. These District actions seem to be *acknowledgment that wireless device expose the body to radiation*. However, such "Best Practices" still allow access points to be powered on and thus are always exposing the students and staff to continuous microwave radiation regardless of the devices being in use or not. In addition, devices are also continuously transmitting during student use of the internet and no procedure is in place to ensure that Best Practices are followed so that the transmissions are turned off when the internet is not needed. Therefore these "Best Practices" *do not* mitigate the risk nor do they protect students from School District created wireless exposures.

## US HEALTH ADVICE TO THE PUBLIC

**2017 - California Department of Public Health publishes advice on cell phone radiation after withholding the information for almost a decade.**

- December 14, 2017: The California Department of Public Health (CDPH) just long-awaited recommendations to reduce microwave radiation exposures from especially for children. Spurred by a lawsuit and research suggesting that "long-term, high use may impact human health," the CDPH includes guidance on why and how to reduce cell phone radiation. The CDPH drafted more than of this advice since 2008, but December 13, 2017 was the first time CDPH published it online. The CDPH original referred to the University of Pittsburgh Cancer Institute and also included recommendations for to microwave radiation from cell phones as well as home and office cordless phones. The newly released guidance focuses only on cell phones cautioning that "children may be more at risk" because they will be exposed to cell phone radiation for a "lifetime" and with radiation exposures deeper into their brain.
- "Children's brains develop through the teenage years and may be more affected by cell phone use," said CDPH Director and State Public Health Officer Dr. Karen Smith. The new three-page includes practical steps to reduce exposure to cell phone radiation, including keeping the phone away from the body, reducing cell phone use when the signal is weak, reducing the use of cell phones to stream videos and not sleeping with your cell phone. The guidance also states:
- "Laboratory experiments and human health studies have suggested the possibility that long-term, high use of cell phones may be linked to certain types of cancer and other health effects, including: brain cancer and tumors of the acoustic nerve and salivary glands, lowered sperm quality and inactive or less mobile sperm, headaches and effects on learning and memory, hearing, behavior and sleep."

Documents From the December 2017 Publishing of the Advice By The Department of Health

### December 2017 News Reports After Official Release

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- Parents raised the issue of wireless health risks with the district for years and this new policy was put in place in 2016. However- as this policy still does not protect the students health, parents continue to advocate for a safe school environment and signed a petition which can be found at
- The Petaluma 2016 iPad Best Practices state: "Keep it on the Desk: The best place for your iPad to sit during use is on a desk, table or other flat surface."
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**2016 - Oteora School District in New York State Adopts "Best Practices with Wi-Fi**

Oteora "

- The states: "Best Practices For Wi-Fi: Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use (switch on side, or airplane mode on iPad). Always place the device on a solid surface Viewing distance should be a minimum of 12 inches from the screen."

Oteora

- The " Employees to enforce the "Best Practices For Wi-Fi."
- "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

**2015 - Ashland Public Schools, Massachusetts Institutes "Best Practices"**

- Ashland was the first o institute "Best Practices" to turn the Wi-Fi off when not in use and keep devices away from the body
- used for teacher/staff training.
- discussing the process.
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**Los Angeles, California Public Schools Recommends Cautionary Exposure Levels**

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits:
- - LA School board wrote a resolution banning cell towers from schools and recommending against WiFi.
- Motion by Supervisors Zev Yaroslavsky and Michael Antonovich
- -- Calls for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce "health effects" at "very low field" intensities'

**Safety Issues Related to the LAUSD RFR Thresholds :** Los Angeles School District states they use precautionary RFR guidelines- however even a threshold at 10,000 times lower than FCC limits is not safe because peer reviewed published scientific research has shown harm at levels *hundreds of thousands times* lower than FCC limits. The school district is in fact increasing wireless exposures with Wi-Fi access points and increasing exposure to students and staff. LAUSD is not ensuring safety with these actions. In addition the LAUSD measures the radiation in the building by averaging the power density which masks areas of high intensity and peak exposures. From a human health standpoint, the RFR measurements need to include peak readings in addition to the cumulative length of time children are exposed to RF radiation in order to fully understand their exposure. Until these measures are taken, one cannot adequately evaluate the EMF environment.

- Encourage students, when appropriate, to customize their device screens using tools such as designed to reduce potential eye strain and fatigue
- Consider providing students with options for good behavior that include physical activity and social interaction rather than “device time”;
- When requested, provide paper alternatives for take-home class work.

**Additional Resources:**

- Maryland Children’s Environmental Health and Protection Advisory Council (CEHPAC):
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- New Jersey Education Association (NJEA):
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**2017 The Montgomery County School Chromebook Policy states that laptops should stay on tables and not on laps.**

**2017: Worcester Massachusetts, School Committee voted to approve “precautionary options” to be posted on the Worcester District Website**

“It is the Administration’s view that existing government regulating agencies should be setting proper exposure levels and offering best practices, such as the EPA and FCC”.

“Based on the guidance from these agencies, the Administration proposes the following:

If you are concerned about radiation or heat from electronic devices, follow these guidelines:

- Consider increasing the distance between electronic devices and your body
- Consider keeping your cellphone, tablet, or laptop in your purse, backpack, or briefcase case instead of keeping it on or close to your body
- If talking on a cellphone, consider using speakerphone or a hands free headset or reduce the number or length of calls
- When not using wireless or Bluetooth, consider shutting off these services on the device or put the device in Airplane mode
- Consider not placing the device directly on your lap. Instead consider placing it on a hard surface such as a desk or bo

Note: This initiative was supported by a local community organization called Worcester Info Team for Health whose Mission Statement was “... to support Worcester decision makers and others in learning about and mitigating the public health risks posed by the rapid roll-out of wireless devices and infrastructure, emphasizing the Precautionary Principle and seeking collaboration on creative solutions.”

**Press Release on Worcester Massachusetts precautionary Options**

**News Articles on the Worcester School Committees Actions on Wi-Fi**

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September 3, 2016

” Worcester Magazine May 18, 20  
 Telegram.com October 2016  
 Go Local Worcester,

**2016 - Petaluma Public Schools, California USA: Public school district adopts “Digital Device Practices”**

Environmental Health Trust

- “New school construction and renovations to include wired cabled connections: “If a new classroom is to be built, or electrical work is to be carried out in an existing classroom, network cables can be added at the same time, providing wired (not wireless) network access with minimal extra cost and time.”
- “The Maryland State Department of Education should recommend that local school systems use strategies to minimize exposures: “Have children place devices on desks to serve as barrier between the device and children’s bodies; Locate laptops in the classroom in a way that keeps pupil heads as far away from the laptop screens (where the antennas are) as practicable; Consider using screens designed to reduce eyestrain; Consider using a switch to shut down the router when it is not in use.”
- “The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure: Sit away from WiFi routers, especially when people are using it to access the internet. Turn off the wireless on your laptop when you are not using it. Turn off WiFi on smartphones and tablets when not surfing the web. Switch tablets to airplane mode to play games or watch videos stored on the device.”
- “The General Assembly should consider funding education and research on electromagnetic radiation and health as schools add WiFi to classrooms.”
- The Maryland Department of Health and Mental Hygiene should “ask the United States Department of Health and Human Services to formally petition the FCC to revisit the exposure limit to ensure it is protective of children’s health and that it relies on current science.”
- “The Report should be shared with the United States Department of Health and Human Services, Federal Communications Commission, Maryland State Department of Education and Maryland General Assembly.”
- CEHPAC’s health experts include Governor appointed pediatricians, Maryland State House/Senate appointees and representatives of the Department of Education and Department of Health.

#### LINKS

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- Public News Service article on CEHPAC Recommendations
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#### 2017/2018 - Montgomery County Maryland

In January 2018, the Chief Technology Officer of Montgomery County Maryland, one of the top School Districts in the country shared information on Digital Device Safety to all staff in a memo. Read the Memo here.

##### 1/12/2018 Memo “Digital Safety At School And At Home”

The MCCPTA Safe Technology Subcommittee would like to share the following recommendations for using technology at school and at home. For Students at School:

- Consider placing Chromebooks/laptops on desks and tables rather than in laps;
- Don’t forget to shut down and log off of Chromebooks/laptops when moving from classroom to classroom;
- Consider turning off cell phones and keeping them in backpacks or lockers off when not in use;
- If necessary, take eye breaks, 1-to 2 minutes in length, approximately every 15 minutes;
- Attend to task! Avoid distractions such as reading email, playing games, or browsing the Internet;
- Engage in face-to-face socialization, especially at free time, lunch, and recess;
- Always use the Internet and devices for educational purposes in accordance with MCPS’s responsible use policies;
- Use resources that do not infringe on another’s copyright or trademark rights.

For Students at Home:

- “Disconnect” at least one hour before bedtime. This includes all forms of media and requires online-based homework to be done well in advance of bedtime;
- Keep electronic devices out of bedrooms for a sounder sleep.

For Teachers:

- the CTIA's request for an injunction to block Berkeley's cellphone ordinance.
- October 11, 2017, the 9th U.S. Circuit Court of Appeals denied an *en banc* hearing to the Wireless Industry's challenge to the Berkeley cellphone right to know act. The CTIA has until January 9, 2018 to petition the Supreme Court for a hearing.
- Environmental Health Trust's

## NEWS RESOURCES

- with an investigation finding cell phones tested against the body violate current safety standards.

**2014 - Wireless Router Labeling in all Suffolk, NY Public buildings:** Legislation requires all county buildings to post notices that wireless routers are in use such as, "Notice: Wireless technology in use." The resolution, sponsored by Legis. William Spencer (a physician), warns that every wireless device emits radio frequency radiation or microwave radiation. It notes that studies "that have looked at the effects of low-level RFR radiation on human cells and DNA have been inconclusive."

- Newsday News Article -

**2010- A Passed "Right To Know" Ordinance by the City of San Francisco required cell phone retailers to distribute an educational sheet:** Educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and details how consumers can minimize their exposure. However implementation was blocked after a and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's' fees.

- Although implementation was halted, the remains online.
- Press Release: " V

at the San Francisco Commonwealth Club.

Cellphone cancer victims tell their personal stories and those of their lost loved ones.

- San Francisco developed the following public health information resources:
  - City Webpage -
  - Answers on to cell phone radiation.
  - A on Cell Phones and RF Radiation
  - A for the Public
  - for Cell Phone packaging.

## US PUBLIC SCHOOLS

**2017 - Maryland State Children's Environmental Health And Protection Advisory Council Recommendations For Wired Internet In Schools and Minimizing RF Classrooms:**

- (CEHPAC) issued a Report advising the Department of Education to recommend local school districts reduce classroom wireless radiation exposures by providing wired—rather than wireless—internet connections.
- The Children's Environmental Health and Protection Advisory Council recommendations:
- "The Maryland State Department of Education should recommend that local school systems consider using wired devices" "WiFi can be turned off" and instead "a wired local area network (LAN) can provide a reliable and secure form of networking...without any microwave electromagnetic field exposure."

2014 - Director General of Tanzania Atomic Energy Commission (TAEC), Mr Idy Mkilaha publicly endorses precaution.

- "Mr Mkilaha says that when weighing up this convenient tool with the questionable health impact control, caution and measures must be taken to reduce one's exposure from radio frequency (RF) emissions from the cell phone to prevent health hazards."
- "According to TAEC, we should use hands-free devices or wireless headset to increase the distance between the phone and our heads. This is the best approach because it creates distance between us and the radiating phone... We should also keep phone away from us when dialling. Phones use more radiation during connection time, says TAEC."

#### News Reports

- AllAfrica News Article: "
- AllAfrica News Article:

#### Tanzania Commission for Science and Technology Newsletter Details how to reduce cell phone exposure

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- After complaints were raised by residents about health effects the Commission co-authored a published paper that reviews national RF level profiles of the radiation emitted from base stations.
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- The paper states: "*In 2016, and at this time EHT is unable to find the Reports or official warnings as mentioned in the news reports on the current webpage.*"

## Romania

#### Recommendations Of The Consumers Protection Association Of Romania On Cell Phones And Wireless

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- The Association for Consumer Protection in Romania launched a national campaign of information and awareness of consumers entitled "SOS electromagnetic pollution."
- "*Do not allow children younger than 12 years how to use a cell phone, except for emergencies. Developing bodies are more susceptible to negative influences from exposure to electromagnetic fields*".

## United States

Legislation has been introduced at the state and national level. Some Communities have issued proclamations, resolutions and and started initiatives to inform the public of wireless health issues.

**May 12, 2015 Berkeley Adopted the Cell Phone "Right to Know" Ordinance on a Unanimous Vote.** Berkeley is the first city in the nation to require cell phone retailers to provide those who purchase a new phone an informational fact sheet which informs buyers to read the user manual to learn the cell phone's minimum separation distance from the body. The text states:

"The City of Berkeley requires that you be provided the following notice: To assure safety, the Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. If you carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is ON and connected to a wireless network, you may exceed the federal guidelines for exposure to RF radiation. Refer to the instructions in your phone or user manual for information about how to use your phone safely."

- Dr. Moskowitz blog on the Ordinance
- Environmental Health Trust's Page on the Ordinance
- featuring Harvard Law professor Lawrence Lessig.
- from November 8, 2011 on the need for cell phone guidelines.
- 

-- This the hearing considering whether to overturn the district court's decision that denied

*the urban landscape and the goodwill of the neighborhoods, the new law takes care of the most important: the health of people in a precautionary manner as recommended by the World Health Organization, setting strict limits on the powers of the antennas. Chile is setting standards in this regard."*

- RCRWireless News Article - "

## Ireland

### **Department of the Environment, Community and Local Government Gives Advice to Reduce Exposure**

The department has a webpage on Electromagnetic fields which directs people to the advice of the Chief Medical Officer.

- "Advice from the Chief Medical Officer on mobile phone use: We may not truly understand the health affects of mobile phones for many years. However, research does show that using mobile phones affects brain activity. There is general consensus that children are more vulnerable to radiation from mobile phones than adults. Therefore the sensible thing to do is to adopt a precautionary approach rather than wait to have the risks confirmed. In the light of these findings, the Chief Medical Officer of the Department of Health and Children strongly advises that children and young people who do use mobile phones, should be encouraged to use mobile phones for "essential purposes only" All calls should be kept short as talking for long periods prolongs exposure to radiofrequency electromagnetic fields. All mobile phone users can reduce their exposure to radiofrequency energy by making fewer calls, reducing the length of calls, sending text messages instead of calling, using cell phones only when landline phones are unavailable, using a wired "hands free" device so that the phone need not be held against the head and refraining from keeping an active phone clipped to the belt or in the pocket".

### **Irish Doctors Environmental Association Recommends Wired Connections**

- The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school: "We urge you to use wired technologies for your own safety and that of your pupils and staff."

## Denmark

### **Denmark Board of Health Provides Recommendations to Reduce Exposure**

- "As a precautionary measure, the Board of Health recommends a series of simple steps you should follow to reduce exposure from mobile phones:

*Use the headset or handsfree with earbud, conversation, or use the speakerphone feature*

*When possible, use text instead of call*

*Limit the duration of calls*

*Did not sleep with the phone close to the head*

*Limit conversations during low reception and while in transport.*

*Do not cover the phone with aluminum foil, special covers, etc.*

*Compare phones' SAR value. Lower SAR require less exposure*

**Denmark Schools that have removed or reduced wireless exposure;** Bjedstrup elementary School og Børnehus, (school and kindergarten) Student must hand over cell phones before classes + no wifi in school premises;

- all internet connections are hard wired; Vejlernes private school - no wifi; Kastanjely kindergarten - no wifi

## Tanzania

children be discouraged from [literally translated, learn not to trust] using cell phones. The above statement is supported by the following:

1. Up to about the age of 16, the nervous system of the human body is in the process of development. Consequently, it's totally possible (although not conclusively proven by relevant scientific research) that up until this age, human beings are more sensitive to any number of factors/elements/determinants.
2. Younger people have more years ahead of them than older persons during which the long-term effects of mobile phones can be manifested.
3. Environmental factors/elements have a greater general impact on the health of children than on the health of adults."

### **Athens Medical Association**

2017 the Athens Medical Association voted to issue 16 recommendations to reduce human exposure to wireless radiation.

#### **16 RULES FOR SAFER USE OF WIRELESS COMMUNICATION**

- Use your cell phone with caution and make brief calls as necessary
- Children under the age of 14 should make limited use of cell phones
- Do not put your cell phone in contact with your head
- Do not use your cell phone inside a car, train, aeroplane, or elevator
- Restrict cell phone use when children or pregnant women are near
- Keep mobile phones away from your body
- When using your cell phone keep a safe distance from others
- Do not carry or keep your cell phone inside your pockets
- At bedtime, disable WiFi on your router and switch off your mobile phone
- Do not play games on-line; and if you will, first switch to airplane mode
- Hands-Free option is always preferable though may not be completely safe
- Wireless connections may increase your exposure to microwave radiation
- Limit WiFi connectivity and use hard-wired connection whenever possible
- When signal strength is weak do not attempt to make a call
- If a corded landline is available make use of this as a preferred option
- Disable WiFi, Bluetooth & Data options from your cell phone and other mobile device(s) when not needed.

these recommendations.

whereby doctors voted to issue

## **Chile**

### **2012 "Antennae Law" prohibiting cell antennae/towers in "sensitive areas"**

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- 'Regulates the installation of antennas used for the emission and transmission of telecommunications services' This law limits the power of antennas, reduces urban impact of towers through 'infrastructure sharing' opens up a process for citizen participation in the approval or denial process, establishes mitigation measures in areas that are saturated with antennas and prohibits towers near "sensitive areas" institutions serving children, the elderly and medically compromised.
- Sensitive areas are those areas that demand special protection due to the presence of educational institutions, nurseries, kindergartens, hospitals, clinics, nursing homes or other institutions of similar nature.
- Chile's Minister of Transportation and Telecommunications Pedro Pablo Errazuriz stated, "...in addition to protecting

## Ghana

### Advice of the Radiation Protection Institute of the Ghana Atomic Energy Commission

Dr. Joseph Kwabena Amoako, Ghana's Deputy Director of the Radiation Protection Institute of the Ghana Atomic Energy Commission (holding a PhD in Physics) is advising that children reduce exposure to cell phone radiation.

Read the Business News article

24th May 2018

"Amoako recommends that if children have to stay on their mobile phones for longer than 40 minutes at a time, it was best to do so using the hands-free kit or break the conversation after 30 minutes and go back to their chat later.

Dr. Amoako explained that children were at risk of cancer and their brain activity affected from the long term use of mobile phones because their immune system was not fully developed.

He said in an interview that constant use of mobile phones by children could affect their brain activity.

"Their sleep pattern could be affected because the electromagnetic fields (electrical waves) from the phones will keep interfering with their sleep."

Read the May 23, 2018

that states "Children

below 15 years have been advised not to spend more than 30 minutes continuously on mobile phone because exposure to it for a long time could expose them to serious health problems."

Dr. Joseph Kwabena Amoako is also coauthor on several published studies on exposures in Ghana entitled " " and "

## Greece

### Greek law mandates lower RF exposures near schools, nurseries and hospitals

- The exposure limits in Greece are at 70% of the official European limits. In areas less than 300 m from schools, hospitals and nurseries the exposure limit is lower at 60% of the official European limits. Cell antennae are prohibited from being on top of schools and nurseries.

2012 - The Greek government website materials recommend reducing cell phone radiation to children under 16 and they inform citizens of non-ionizing radiation power levels in their community.

- - Interactive web portal linked to a network of 500 fixed measurement stations throughout Greece that continuously monitor the EMF levels from all kinds of antenna stations in the frequency range 100 kHz – 7 GHz.
- ELF and EMF Site Measurements can be looked up for various locations at
- The Greek government funds research as detailed on the
- 

*Even though it hasn't been proven conclusively that children are more sensitive/reactive than adults to exposure to radiation, nevertheless, the direct/pointed recommendation of international organizations is that*

## Taiwan

**2015 - Government Updated their Protection of Children and Youths Welfare and Rights Act to Ban Cell Phones for Young Children.**

- Complete ban on children under the age of two from using electronic devices such as iPads, televisions and smartphones.
- Parents can be fined NT\$50,000 (about \$1600 US Dollars)
- The new law also states that parents must ensure that under-18s only use electronic products for a 'reasonable' length of time.
- Daily Mail News Article - “
- Teen Safe News Article - “ ”

## Namibia

**2011/2012 - Namibia's atomic energy review report states that current so called "safety" standards DO NOT protect citizens from long term health effects.**

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- “ICNIRP guidelines do not guarantee adequate protection against the long term effects of exposure, such as increased risk of cancer.” - Republic of Namibia:Atomic Energy Board

## Turkey

**The Ministry of Health has issued public information brochures that recommend limiting exposure especially for pregnant women and children.**

- 
- The Brochure starts by saying the research on cell phone radiation shows low levels of electromagnetic frequencies “may cause cancer”. 13 Recommendations to Reduce Exposure *which include:* Pregnant women and children (under 16) are more vulnerable and they should use the phone only when necessary, Prefer speaker or headset, Decrease time on phones, Use low SAR phone, Keep phone away from the body, Keep phones out of baby and children’s bedroom, Turn phone off when you sleep or keep it one meter away from bedside, using phones in cars increases your EMF exposure so it is not recommended.

**Education on Safer Phone Use Project**

- The project is mentioned in the following document:
- Turkey has begun an educational project funded by Ministry of Internal Affairs, accomplished by Temkoder (Prevention, Measurement of Electromagnetic Pollution and Training Organization), which has resulted in secondary school student training in the safer usage of cellular phones.

**Development of regulations prohibiting children’s cell phone use.** In 2014, the Ministry of Health started working on new regulations to prohibit cellphone usage for children under 14 year-old children.

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- However by 2016 the regulation was weakened and in 2016 Turkey stated that they are developing regulations that only would pertain to children under 7 years old.
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**The Ministry of Communications and Maritime Affairs monitors Electromagnetic fields around the schools and homes.**

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- The EMF in schools is monitored and the public can get measurements on EMF levels from cell towers and schools at a national site.

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### **Public Awareness Videos on How to Reduce Exposures**

- **PSA Video on Children's Health and Wi-Fi: Original Video in** &
- **PSA Video on Pregnant Women and Wireless: Original Video in** &
- **PSA Video on Teenagers and Wireless: Original Video**
- 

### **Public Awareness Educational Brochures**

### **Scientific Presentations:**

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- 
- **Dr. Michaelidou of the National Committee gives presentation to Ioannina University:**
- **Stella Canna-Michaelidou, PhD, President of the National Committee on Environment and Children's Health of Cyprus,**

### **Cyprus Medical Association:**

In 2017 the Cyprus Medical Association signed the Nicosia Declaration and issued \_\_\_\_\_ to reduce personal exposure were issued, including that children under age 16 should only use cell phones for emergencies, to use airplane mode and turn off wireless antennas in electronics before handing devices to children, to distance the phone away from the body and use wired connections rather than wireless connections.

### **News Reports from Cyprus**

- **April 2016 - Dr. Michaelidou, President of the Cyprus National Committee, gives presentation:** \_\_\_\_\_, presenting on the issue of Electromagnetic radiation and its effects on children's health.
- **Sigma TV News Report -**
- **President of the National Committee "Environment and Child Health" with Professor Loukas Margaritis speaking in a news piece.**
- **2015 In-Cyprus News Report**
- **9/2015 News Report Cyprus Mail: '**
- 

## **Argentina**

### **2016 Proposed National Law on Electromagnetic Pollution**

- **The law proposes a regulatory framework to "radio infrastructure with radiant systems, antennas and all installations capable of generating electromagnetic radiation" in order to "ensure the protection of public health" considering "both thermal effects and biological. " In education and health facilities only wired connections to data networks and Internet access may be used.**
-

...ion requires employers to assess the levels of EMFs their employees may be exposed to, ensure  
...ce, provide information on risks and take action if necessary.  
*...ou must ensure you take workers at particular risk, such as expectant mothers and workers with active or passive  
implanted or body worn medical devices, into account when appropriate, devise and implement an action plan to  
ensure compliance with the exposure limits."*

- Safety and Health Practitioner News Article -

Note: The ASA also ruled that ads that suggested other health effects were "both misleading and likely to cause undue alarm about radiation"

## Cyprus

### 2017 Directive of the Minister of Culture and Education to Ban Wi-Fi from kindergartens, Remove Wi-Fi from Elementary Classrooms and Halt Deployment.

- 
- Wireless is recommended only to be used if needed in the administrative areas of elementary schools, not by the students. However, if the use of Wi-Fi is required, "necessary measures to protect children should be taken, and wireless access points should remain inactive when not in use for teaching purposes." Furthermore before installation of any wireless program involving teachers or students "the consent of parents should be ensured in advance" the directive reads stating that the director of the school should send a letter to the parents of children who will participate in programs involving wireless technology informing them for the reason and duration of WiFi usage.
- 

### Cyprus National Committee on Environment and Child Health

- 
- ...on reducing the risks to children from exposure to the Non Ionizing Radiation (mobile phones, Wi-Fi, tablets, etc.).
- ... is supported by the Nation of Cyprus and "has as its basic aim the prevention of illnesses, which also are related with the exposure of children in environmental dangers." The activities of the National Committee are supported by the State of Cyprus.
- The National Committee recommends, "Be Precautionary and reduce exposure to phones, Wi-Fi and other wireless devices," states the Cyprus National Committee on Environment and Child Health (ECH). Dr. Stella Michaelidou, President of the ECH, states that society should respond by taking precautions because "Documentation of other potential and more serious biological side effects are on the tip of an emerging iceberg."
- An In-Cyprus news article quoted Michaelidou as saying that "multiple and frequent exposure to this kind of radiation, which falls below the acceptable levels of thermal effects, pose a health risk to a developing embryo." Children who use their mobile phone more frequently face a higher risk at having a weaker memory, attention deficit disorder, and similar issues.
- In-Cyprus News Article -

it is not possible to say "that exposure to RF radiation, even at levels below national guidelines, is totally without potential adverse health effects" as "there is some scientific evidence which suggests that there may be biological effects and gaps in knowledge justify a precautionary approach to the use of mobile phone technologies until much more detailed and scientifically robust information on any health effects becomes available."

- which reads: "The expert group has therefore recommended that in line with a precautionary approach, the widespread use of mobile phones by children (under the age of 16) should be discouraged for non-essential calls. In the light of this recommendation the UK Chief Medical Officers strongly advise that where children and young people do use mobile phones, they should be encouraged to: • use mobile phones for essential purposes only • keep all calls short - talking for long periods prolongs exposure and should be discouraged The UK CMOs recommend that if parents want to avoid their children being subject to any possible risk that might be identified in the future, the way to do so is to exercise their choice not to let their children use mobile phones."

- with recommendations that state, "Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary."

- which reads, "Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short. If you are concerned, you can take steps to reduce your exposure such as using hands free kits or texting."

- which states: "The body and nervous system are still developing into the teenage years. Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short."

- Prior to 2015, the NHS also had additional website sections on health effects, including , which summarized the research showing cell phones had been linked to behavioral issues in children. NHS also had a which detailed research which concluded RF " is associated with adverse effects on sleep quality within certain sleep stages". For the public, the NHS had "recommendations to help lower any potential long-term risks" which included keeping calls short, keeping the phone away from the body on standby mode, only use the phone when the reception is strong and using a phone with an external antenna. These web pages were deleted from the current site.

- In 2011, the National Health Service offered specific recommendations to reduce cell phone radiation exposure to children. Precautions are still recommended, however by 2015 this original advice was no longer present on the site. **The UK National Health service changed the public advice text. Everything noted above was reworded. Now the website states:**

- - "If there are any health risks from the use of mobile phones, children might be more vulnerable because their bodies and nervous systems are still developing. Research carried out to date hasn't supported a link between mobile phone use and childhood cancers such as leukaemia. However, if you have any concerns, you can lower your child's exposure to radio waves by only allowing them to use mobile phones for essential purposes and keeping calls short."

- The newly edited section called states: "**Do scientists know everything about mobile phones and health? No, and research is continuing. Mobile phones have only been widely used for about 20 to 30 years, so it's not possible to be so certain about the safety of long-term use. More research on the effects of mobile phones on children is also needed, as they're known to be more sensitive than adults to many environmental agents, such as lead pollution and sunlight. Government advice is to be on the safe side and limit mobile phone use by children.**"

- contains recommendations that state, "Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary."

and she advised to use hands free devices (headsets, earphones) as much as possible to minimize the health issues from mobile devices.

Daily Mirror,  
Hiru News,

10/7/2018

10/6/2018

## Finland

### 2015 - Radiation and Nuclear Safety Authority (STUK) recommend reduced exposure to children

- webpage recommends:
  - Use a hands free device, don't use phones reception is poor, the phone should be kept on a table or similar location instead of in the user's pocket.
  - "STUK recommends that unnecessary exposure to radiation from mobile phones be avoided. In particular, children's unnecessary exposure should be avoided as their life-long exposure will be longer than that of those who begin using mobile phone as adults and as only scant research exists on health effects to children."
- webpage states:
  - "The level of exposure to radiation from a mobile phone held next to user's ear can approach the exposure limits. *Never before have humans been exposed to equally strong sources of radiation in their living environments.* Identifying any health impacts is highly important because practically everybody uses a mobile phone today."

### 2009 - Radiation and Nuclear Safety Authority (STUK) initially issued recommendations to reduce exposure with more explicit cautionary language.

- Information posted on the STUK website in 2009, now removed. -
- 2009 Policy position paper by STUK detailing why "It would be good to restrict children's use of mobile phones." -
- 2009 Yle Uutiset News article -

### Finland Schools

- 2012 in Ylivieska Finland bans phones and minimizes Wireless.
- 2017: Wi-fi OFF Switches Installed in the Fiskars primary school.

## Israel

### 2017: Ministry of Education banned personal use of cell phones for teaching and educational staff during teaching hours.

2018 Note\* Newspaper article states "Offer Rimon, H  
, said that soon, the ban on smart phones' use in schools will be removed." Details at . EHT  
will update.

### 2016: Ministry of Education banned cell phones during the school day.

- 
- A computer or tablet are approved for Pedagogical activities and smartphones are not approved until examination of the issue by the Ministry with published Instructions.
- CH10 News Report -

### 2016: The Mayor of Haifa calls for the removal of Wi-fi from all schools. Haifa Mayor Yona Yahav, said that "When there

**Mandatory SAR labeling on cell phones and portable devices:** According to the 2017 WHO EMF Project update by the Republic of Korea a new regulation mandates that SAR labels be affixed to devices that are used in contact with the ear of the consumer.

“The regulation for EMF rating and labelling was enforced from August 1, 2014 (MSIP Notification N o. 2015-16). The operators of radio stations should affix the labels for EMF strength rating in an appropriate place. For portable devices used in direct contact with the user’s ear, those who manufacture or import such devices should affix the labels for SAR rating, and/or display the highest SAR values appropriately.”

### **Public health recommendations to reduce exposure to cell phone radiation**

The Korea government website <http://www.rra.go.kr/emf/> has extensive information on what electromagnetic exposures are in the home and how to reduce exposure. Topics include home, school and base stations.

Some examples of statements on the guidelines for cell phones (translated by google translate) include:

“Text messaging is safer because it moves farther away from your face than voice calls.

It is safer to use alternating right and left sides of the face rather than talking on one side of the face .

When you are asleep or when you are relaxing, the farther away you are from your body, the safer you are.

If you use handsfree for mobile phone calls, you can reduce the amount of electromagnetic waves absorbed by your head by moving away from your phone”

**The Korean government webpage on children and EMF** has graphics that illustrate how to use cell phones in “safer ways” and states:

“Children and adolescents are not physically developed yet, and when you use your cell phone as a child , you are exposed to cell phone electromagnetic waves for a very long period of time and can have more impact than if you were an adult .

Electromagnetic waves generated in daily life are weak and do not affect the human body. However, if exposed for a long time, it could be harmful to the human body

“If you sleep with your mobile phone on your bedside, it may interfere with your sleep by ringtone, text message, beep, etc. , and cause sleep disorder. Especially for children, it is best to keep them as far away as possible because they can not take a good night's sleep due to text phone calls etc.

If the base station is far away, or the environment in which radio waves are received, such as basements, becomes weaker, the intensity of the electromagnetic waves of the mobile phone becomes larger and the number of antenna reception indications of the mobile phone becomes smaller.

In closed spaces such as basements, lifts, and deep mountains, the intensity of electromagnetic waves in mobile phones becomes stronger, so it is advisable to refrain from talking as much as possible .”

## **China**

**Cell Phones banned in primary and middle schools due to increasing myopia among children.**

“Primary and middle school students in Shandong province will not be allowed to use cellphones or tablets in classrooms starting from Nov 1, according to a new regulation.” Asia One “  
October 10, 2018

## **Sri Lanka**

**Recommendations to reduce exposure:** The Ministry of Health press release signed by Dr. Paba Paliwardana, Director of Health Education and Communication (dated October 5, 2018) informs people of the "serious risks" to the brain and the rest of nervous system in particular. The press release advises people not to keep mobile phones and electronic communication devices in the sleeping areas and to minimize their use.

According to by the Daily Mirror, Dr. Ayesha Lokubalasooriya of the Sri Lankan Family Health Bureau said in a press conference that, “ long term exposure to electromagnetic waves regularly could create severe health issues”

school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children.”

- The Local News Article:
- Torino News Article:

**2015: State Parliament of South Tyrol voted to reconfirm the precautionary principle: The State Government was mandated:**

- To replace existing wireless networks whenever possible with networks that emit less radiation at schools, preschools, hospitals, nursing homes, and other public facilities.
- Establish a working group whose mandate it is to assess these new technologies and their exposure levels. With regard to wireless communication technologies, mobile Internet access, and public health, the working group shall clarify which technologies emit less radiation and provide sustainable technology options and
- To start an education and awareness campaign that informs about possible health risks, especially regarding the unborn, infants, children, and adolescents and that develops guidelines for a safer use of cell phones, smartphones, and Wi-Fi.
- Previous Hearing at the Parliament of South Tyrol, 29 April 2015 -
- Discussion at the Plenary Session:
- Kompetenzinitiative News Article:
- 

**2012 Italian Supreme Court Ruling: Man’s brain tumor was caused by his cell phone use.**

- The National Institute for Workmen’s Compensation must compensate a worker with head tumor due to cell use.
- Reuters News Article -
- RT News Article -
- Daily Mail News Article -

**Lecce, Italy, "Istituto Comprensivo Alighieri- Diaz" School banned wifi: Their two resolutions decided:**

- To ban wifi in school and install a wired system for the use of internet and reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program.
- The resolution also asks the Municipality to install the antenna at a reasonable distance from school.

**The Piemonte Region Council adopted a resolution to limit EMF exposure by limiting the use of wifi in schools and be considerate to the problem of EHS people.**

- Original Resolution -

**The Italian Society for Preventive and Social Pediatrics has officially called to prohibit cell phones for children under 10 years old.**

- Giuseppe Di Mauro, president of the Italian Society of social and preventive pediatrics [Società italiana di pediatria preventiva e sociale ([www.sipps.it](http://www.sipps.it))] “We do not know all the consequences associated with cell phone use, but excessive use could lead to concentration and memory loss, increase in aggressiveness and sleep disturbances.” and he cites electromagnetic fields stating “The damage to health are increasingly evident”
- Il Tirreno Tuscany News Article -

**2016 - Turin Mayor Chiara Appendino laid out plans “to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people’s health”.**

- The Local News Report

## **Korea**

**2018: The City Council of Bologna unanimously approved an initiative to inform the public about the health risks of cell phone and wireless radiation in light of the NTP and Ramazzini Institute studies.** According to news reports the action calls for the Council to:

- Inform the public about the health risks of cell phone and wireless radiation
- Invite mayor Virginio Merola and the junta "to take action, including with the Emilia-Romagna Region, with the Ausl and the competent institutions, through appropriate communication channels, to launch a public information campaign, so that the population citizen is aware of the risks involved in using mobile phones inappropriately. "
- Proposes to the mayor "to request a commitment in this sense also to telephone companies".

Read June 26, 2018 News Report [bologna.repubblica.it](http://bologna.repubblica.it) "

**2018: The Ramazzini Institute of Bologna has developed materials to share to high school students on how to reduce exposure to cell phone radiation.** [Click here to download PDF.](#)

**2017 Decree of the Environment Minister has recommendations on reducing EMF.**

Section 2.3.5.4 of the Decree recommends reducing exposure to indoor electromagnetic pollution

- **Reduce low frequency magnetic fields:** "In order to reduce as far as possible the indoor exposure to low frequency magnetic fields (ELFs) induced by electrical panels, uprights, conductor dorsals, etc." the design of the plants must provide that meters and electric panels are outside the building and take measures to reduce levels.
- **Reduce Radio frequency radiation:** Reduce as much as possible the indoor exposure to high-frequency magnetic fields (RF) equip with alternative data transfer systems to wi-fi, eg. cable connection or Powerline communication (PLC) technology.
- This was started by a Communication by ECC , to European Parliament about: Integrated Product Policy: Develop the concept of "environmental lifecycle."

•

News on the Directive:

**Occupational Safety Database:** National of emission levels of equipment funded by Ministry of Health, regarding occupational exposure to physical agents including EMF

The site is managed and upgraded by INAIL, in cooperation with Tuscany regional authority, and local occupational safety and prevention Departments of Siena and Modena cities. The development of the web site is absolutely relevant in the frame of public information activities, specifically designed for occupational safety.

**2017: The Italian Court of Ivrea ruling recognizes causal link between cellphone use and brain tumor.**

- Italian court is the first in the world to recognize this causal link in an April 11, 2017 ruling which awarded a Telecom employee, Roberto Romeo, lifetime damages of 500 euros a month after he developed a brain tumor from fifteen years of cellphone use.
- 
- EHT
- The Guardian News Article:
- NY Daily News Article: "
- Courthouse News Service Article:

**2016: Mayor of Borgofranco d'Ivrea ordered Wi-Fi to be turned off in schools.** "Mayor Livio Tola told the town's high

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“There is no established scientific evidence that the use of mobile phones causes any health effects. However the possibility of a small risk cannot be ruled out. There are things one can do to substantially reduce exposure. Overall, the evidence suggests that the radiofrequency (RF) electromagnetic energy (EME) emissions of mobile phone handsets are not harmful to the user. However, it’s impossible to be completely sure there isn’t some risk. This is particularly true for children where there is little research evidence. One way to exercise caution is to reduce unnecessary exposure from your handset and to encourage your children to do this. This can be done easily. Remember, it doesn’t have to be for every phone call and in an emergency there are better things to worry about.”

ARPANSA still recommends that parents encourage their children to limit their exposure stating that “It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure.”

### Past Factsheets

#### Queensland Department of Education, Training and Employment - 2015

- It’s not only physical hazards you need to consider when thinking about health and safety issues at work or home — you should also think about how you use technology. When using a computer, you need to think about: ergonomics and posture, radiation, vision impacts and harmful lack of exercise (DVT).
- “Wireless devices — smart/mobile phones, tablets, slates, monitors etc — all emit low levels of electromagnetic radiation and should be used correctly. When using electronic devices, the department recommends you follow WiFi/3G/4G best practice:
  - Follow the manufacturer’s usage guideline operate from a table or bench — not on your lap
  - Use ‘hands-free’ devices to keep smart/mobile phones away from your head and body during phone calls limit the number and length of calls
  - Position the device antenna away from your body
  - Do not sit within 0.5 m of a wireless router use smart/mobile phone in areas of good reception to reduce exposure.”
  - 
  -

### ARPANSA Website

#### Other Factsheets

##### How to Reduce Exposure from Mobile Phones and Other Wireless Devices March 2015

“The scientific evidence does not establish that EHS symptoms are caused by exposure to low-level electromagnetic fields.”

## New Zealand

2016 - : After concerns were raised about e-learning by a small group of parents from the school, the principal has put some positive procedures in place as follows:

- Children will use ipads in flight mode
- Children using laptops and Chromebooks will work on the desk top
- Parents may request that their child use an Ethernet cord to access the internet
- Children are taught about the health precautions as part of their cyber citizenship
- Digital learning in the one to one Year 5 & 6 environment is kept to less than 2 hours per school day.
- The principal has also stated there are no plans to increase the existing Wi-Fi coverage at this stage.

## Italy

# European Parliament

## 2011 The Parliamentary Assembly of the Council of Europe - Resolution 1815:

- 
- A call to European governments to “take all reasonable measures” to reduce exposure to electromagnetic fields “particularly the exposure to children and young people who seem to be most at risk from head tumours.” The Resolution calls for member states to:
- Implement “information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age.”
- “Reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation.”
- “For children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises.”

## 2009 European Parliament Resolution: Health concerns associated with electromagnetic fields

- 
- Urges the Commission to review the scientific basis and adequacy of the EMF limits as laid down in Recommendation 1999/519/EC and calls for the review to be undertaken by the Scientific Committee on Emerging and Newly Identified Health Risks
- Calls for particular consideration of biological effects when assessing the potential health impact of electromagnetic radiation, especially given that some studies have found the most harmful effects at lowest levels
- Calls for active research to address potential health problems by developing solutions that negate or reduce the pulsating and amplitude modulation of the frequencies used for transmission

# Australia

## Recommends Parents Reduce Exposure to Children

“It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting.”

The Australian Radiation Protection and Nuclear Safety Agency has issued several Factsheet on Wireless over the years and made substantial changes to these factsheets- *downgrading the concern.*

*Feb 2013*

*August 2013 How To Reduce Wireless Exposure Factsheet*

14

“How to Reduce exposure from mobile phones and other wireless devices.”

- Reduce the risk from WiFi devices by “keeping them at a distance, for example placing the wireless router away from where people spend time”, and “reducing the amount of time you use them”.
- ARPANSA recommends that parents encourage their children to limit their exposure stating that “It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure.”
- by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting.”

Current  
parents minimized

\* *Cautionary advice further minimized. Recommendations to*

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- In February 2017, the has issued a ruling that recognizes, for the first time, a permanent disability in the degree of great disability to a patient who suffers as a clinical picture residual multiple chemical sensitivity and electrosensitivity.
- During the last decades, Regional and municipal regulations were approved to reduce the legal exposure in their territories. Unfortunately, now, the last General Telecommunications Law (2014) eliminated the regional and municipal competences in that area.
- In November 2017 a court in Munich acknowledged the permanent incapacity for work, due to electromagnetic hypersensitivity and chemical sensitivity to a privately employed of a university - by the union IFFIRM international.  
Read

## Canada

1. Limit the length of cell phone calls
2. Replace cell phone calls with text, use "hands-free" devices
3. Encourage children under the age of 18 to limit their cell phone usage.

### 2015 Canadian Parliament Standing Committee on Health of the House of Commons Report: "Radio Frequency Electromagnetic Radiation and the Health of Canadians"

- 
- They made 12 recommendations including an awareness campaign on reducing exposures, improved information collecting and policy measures regarding the marketing of radiation emitting devices to children under the age of 14, "in order to ensure they are aware of the health risks and how they can be avoided."

### Toronto "Prudent Avoidance Policy for Cell Towers"

- Toronto's current PA policy was adopted by the Board of Health and City Council in 2008. The Policy was first recommended by the Medical Officer of Health and adopted by the Board of Health in 1999 as a precautionary approach.
- This policy recommended that levels of exposures to radiofrequency (RF) for the general public be kept 100 times below Health Canada's guidelines.

### 2015 National Bill C-648 was Introduced into the House Of Commons

- An Act Respecting the Prevention of Potential Health Risks From Radiofrequency Electromagnetic Radiation" would require manufacturers of all wireless devices to place specific health warning labels clearly on packaging, or face daily penalties /fines and/or imprisonment. Although the Bill did *not pass*, it made headlines.
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### Canadian Pediatric Association issued a Position Statement Recommending no Screen-based Activities for Children under Two

- Original Position Statement:
- For healthy growth and development: screen time (eg, TV, computer, electronic games) is not recommended for children under 2 years old. For children 2-4 years, screen time should be limited to <1 h/day; less is better.

### July 2008: The first policy of its kind in Canada, the Toronto Public Health Department issues Factsheet on Children and Cell Phone Use.

"Children, especially pre-adolescent children, use landlines whenever possible, keeping the use of cell phones for essential purposes only, limiting the length of cell phone calls and using headsets or hands-free options, whenever possible"

5. *Eliminate, as much as possible, the use of pesticides in the whole of the municipality. In the case when this is not possible, establish a communication protocol to contact those affected and the press regarding the places and dates of the interventions with preventive advice.*
6. Training for social workers and educators about CSS, its social, health and economic reality. Elaboration of information and education to increase the knowledge about these illnesses amongst the general population and of the city workers in particular, with the objective of diminishing the stigma that is now present regarding these illnesses.
7. Protocol for adapting working conditions of the municipal workers who have CSS with specific measures of support when having a flare up. These would be the measures: work schedule flexibility, encourage work from home through internet (teleworking), reserved parking spaces and include in the collective agreement not deduct the salary of the first 20 days of sick leave.
- 8.
9. Blog Post:

**In May 2012, the Galician Association of Biologists** to apply the precautionary principle to exposure to electromagnetic fields, specifically to protect children: Information on health EMF risks, the ban of the use of mobile phones and Wi-Fi devices in the schools and mobile phone antennas near the schools.

**In May 2016, the Guipuzcoan Association of Pharmacists** of (COFG) and the Guipuzcoan Association of Fibromyalgia and Chronic Fatigue Syndrome Bizi Bide signed of 284 pharmacies in Guipúzcoa to disseminate information and to raise awareness on Central Sensitization Syndromes (Fibromyalgia, Chronic Fatigue Syndrome, Multiple Chemical Sensitivity and Electrohypersensitivity).

#### Smartmeters

- During 2016 and 2017 motions were approved at municipal or provincial level, in Catalonia and Andalusia, against the installation of "Smart meters" ( and ): (June 2016), (June 2016), (July 2016), (September 2016), Hostalet de Pierola (September 2016), (September 2016), (September 2016), Sant Feliu de Guíxols (September 2016), (October 2016), (October 2016), Sant Adrià de Besòs (October 2016), Cerdanyola del Vallès (October 2016), Diputació de Girona (November 2016), (November 2016), (November 2016), (November 2016), (November 2016), (November 2016), Polinyà (November 2016), (December 2016), (December 2016), (December 2016), (January 2017), Molins de Rei (January 2017), Cunit (January 2017), (January 2017), Caldes de Malavella (January 2017), Prat de Llobregat (February 2017), (Granada, February 2017), (February 2017), (February 2017), (February 2017), (March 2017), (March de 2017), (March 2017)

**Since 2011, several court judgments have been approved recognizing the disability to different people affected by electrosensitivity.**

- In May 2011, a judgment of the to declare permanent incapacity (100% of his base salary) of a worker Complutense University of Madrid who suffered from chronic fatigue and environmental and electromagnetic hypersensitivity (the EHS is mentioned for the first time in Spain as cause of disability).
- In July 2016, a judgment has recognized for the first time a situation of total permanent disability for the exercise of the profession of a telecommunications engineer as result of "electrosensitivity syndrome (EHS)". For the first time in Spain, the EHS condition is considered as the main cause of disability involved. "This is the first we have achieved total disability due exclusively to this syndrome," says attorney Jaume Cortés, the Col·lectiu Ronda. Lavanguardia News Article:



**Flanders Belgium Department of the Environment Website Section on "Radiation: transmitting antennas, WiFi, mobile**

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**Belgian Federal Public Service: Health, Food Chain Safety and Environment Recommends Reducing Exposure**

- - Document describing regulation for wireless telecommunication equipment, wireless home telephones, baby monitors, wireless on the Internet, bluetooth, and comparison of SAR values
- Specific tips for Wi-Fi installations: "In order to limit the exposure, the following simple measures can be taken: Only switch on your wireless network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time."
- - "So far, it has not been proven that the radiation from mobile phones is harmful to their users. But on the foundation of current scientific knowledge, health risks relating to long-term, frequent mobile phone use cannot be ruled out. Experts – including those on the Superior Health Council – advise everyone to limit their exposure to mobile phone radiation."
- - "The use of the mobile phone by children is a special point of attention. Children may be more sensitive to radio waves. Children absorb twice as much radiation in the brain than adults do, and 10 times more in the bone marrow of the skull. In addition, due to the popularity of the mobile phone, the cumulative exposure of the current generation of children will be much higher by the time they reach their adulthood than that of the current adults."
- : This webpage contains information about complaints, the state of affairs of the scientific research and advice about what can be done in this situation.
- "Only switch on your wireless network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time."

## Spain

Several autonomous parliaments and numerous municipalities have adopted resolutions that urge the application of the precautionary principle in the field of electromagnetic pollution, e.g. by eliminating/ limiting wireless networks for children, conducting health education and public awareness campaigns, avoiding the implementation of smart meters, and claiming support measures for people affected by central sensitization syndromes.

Institutional statements of some regional parliaments of the Autonomous Communities (Basque Country and Navarre) adhering to (PACE) of 2011 to apply the precautionary principle in relation to EMF exposure.

More and more Spanish schools requests a cable internet connection, and the case of the School Solokoetxe in Bilbao has been significantly discussed in the itself in 2015 with scientific advisors provided by the parents' association.

### The

In October 2011, the in a Non-Law Motion adheres to PACE Resolution 1815 to "act accordingly .. in favor of health protection" in the field of electromagnetic waves, in particular the conducting of information and awareness campaigns "against the immoderate use of mobile phones among children".

In April 2013, a recommends that the Basque Department of Education implement measures to reduce the levels of radiofrequency emission in schools.

Environmental Health Trust

## Websites

# Belgium

**2014: Ghent Belgium bans wi-fi from pre-schools and day care. Read the Flanders Today article:**

### **2013 Federal Public Health Regulations Bans Cell Phones and Advertising Cell Phones for Young Children**

- Original Legislation:
- Phones designed for children under 7 years old are prohibited from sale.
- Total Advertising Ban on cell phones aimed at children under 14.
- Mandatory Radiation SAR levels must be available for consumers at point of sale. Warning label on phones: "Think about your health – use your mobile phone moderately, make your calls wearing an earpiece and choose a set with a lower SAR value."
- Recommendations include use of hands-free methods to keep the phone away from the body such as text messaging and not making calls when the signal is weak, such as in elevator/vehicle.
- Flanders Today News article:
- 2014 Presentation on the
  
- Belgium Governments about the new law.
- Press Release by Dr. Moskowitz:  
Lower RF Limits are Precautionary in accordance with advice of the Belgium Health Council.

### **2009 Resolution of the Belgian Parliament - "Introduction of new rules for mobile phone sales"**

: This document discusses everything from DECT home phones to baby monitors to Bluetooth to SAR.

"Considering that baby monitors can differ so greatly, it is advisable to carefully follow the instruction manual, to place the baby set at a sufficient distance from the crib (at least 1 m) and to use the 'voice activation' setting, among other things."

The Belgian Foundation Against Cancer warns that intensive use of a mobile phone can increase the risk of contracting cancer. They suggest that children younger than 12 should not use a mobile phone, and that using a mobile phone as an alarm clock is not desirable because the phone is in close proximity to the head the entire night. The Cancer Foundation also strongly advises people not to use a mobile phone in the car or a train. Read details in the  
by Alasdair and Jean Philips.

- Details the research and legislation activities of Belgium

The Government of the Brussels Capital Region Has Maps of Cellular Antennae: A map of all the locations of antennas is with the technical data of each installation.

Environmental Health Trust

**7. Avoid calling while traveling at high speeds (car, train, bus).** When moving at high speed, the phone must successively connect to different relay antennas to maintain the conversation. With each search for a relay antenna, the telephone transmits at full power, the level of emission of waves is therefore regularly higher. It is therefore recommended to avoid calling by train, for example. Telephoning while driving is also prohibited and liable to a fine. The danger comes more from the distraction created by the conversation than from the immobilization of a hand.

**8. Read the information in your cell phone manual:** You can find out about the level of exposure to the waves of your mobile phone: this is the DAS, whose display becomes mandatory at the points of sale in April 2011. The DAS (Specific Absorption Rate (SAR)) phones Mobile device quantifies the user's maximum exposure level to electromagnetic waves, for use at the ear. The French regulations require that the DAS does not exceed 2 W / kg. The devices described as "anti-waves" have not proved their effectiveness.

Go to French Government Website which hosts these

### **French National Agency on Frequencies Maintains Information On Cell Tower Radiation:**

The Agence Nationale des Fréquences holds public information on the measurements from base stations. Their website has information on their measurements of electromagnetic fields around base stations and other radio frequency emitters.

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### **Over 150 Cities in France have refused Smartmeters**

### **Additional Official Recommendations to Reduce Exposure**

**French Ministry of Solidarity and Health** website on electromagnetic waves. Prior to the 2013 and 2016 recommendations, in 2012 a (Official Recommendations to reduce exposure: Mobile phones, health and safety) was created to inform public about how to reduce exposure to cell phone radiation. In 2010

### **The City of Lyon France's Cell Phone Campaign**

### **Removal of Wifi From French Cities and Buildings**

- The Dacsupap Blog Press Release:
- The French National Library along with other libraries in Paris, and a number of universities have removed all Wi-Fi networks.
- - Herouville-Saint-Clair has removed all Wi-Fi equipment installed in municipalities.

### **French Government Resources (PDFS In French)**

### **Information Posters**

### **Environmental Health Trust**

- **Continued Evaluation of Health Effects:** The National Radiofrequency Agency will be in charge of surveillance and vigilance, evaluating potential risks and setting up scientific research, including information on health effects.
- **SAR Radiation Labeling Mandated:** The SAR of cell phones must be clearly indicated on the package.
- **Information on Reducing Exposures Mandatory:** Information on ways to reduce exposure will be detailed in the contents of the cell phone package. .
- **WIFI Hotspots will be Labeled:** Places where WIFI is provided should be clearly marked with a pictogram.
- **Advertisements Must Recommend Devices That Reduce Radiation Exposure to the Brain:** Advertising for cell phones should clearly indicate the recommendation of hand free kits for protection of the head of the user and it will be included in the package. Advertising for cell phone not accompanied by such a kit is forbidden. Companies in violation will be fined 75,000 Euros.
- **Children Must Be Provided Protections:** At the request of the buyer, equipment reducing cell phone radiation exposures to the head for children less than 14 years should be provided.
- **The Public Will Be Informed:** Within a year, a policy of information on awareness and information on a responsible and reasonable use of cell phones and other apparatus emitting radiofrequencies will be set up.
- **Electrohyper-sensitivity Report To Be Submitted:** Within a year, a report on electrohyper-sensitivity must be given to the Parliament *according to the law*.
- Le Monde.fr News Article:

#### **French Agency for Food, Environmental and Occupational Health & Safety (ANSES) 2013 recommendations for limiting exposure to radio frequencies**

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- Recommends hands free phones, SAR labeling, and “limiting the population's exposure to radiofrequencies... especially for children and intensive users, and controlling the overall exposure that results from relay antennas.”
- ANSES news article:

#### **French National Public Health Website Informs the Public About How To Reduce Exposure**

The Website hosts

which include

- 1. Protect children and youth the most.** It is recommended that parents advise their children or teenagers to use their phone only for essential calls. The use of the SMS and the use of the earpiece should also be encouraged by the parents. In addition to these specific tips, other good gestures should also be adopted.
- 2. Telephone with a headset:** By phoning with a headset (wired or bluetooth, wireless), the phone is moved away from the head. It is an effective way of reducing exposure to head waves.  
(EHT Note: Bluetooth still exposes the brain to RF so we do not recommend this.)
- 3. Prefer SMS (Texting):** By using SMS to communicate, one reduces the emission of waves of his telephone. Indeed, to send an SMS, the phone "connects" to the nearest relay antenna only the time to send the message. During a conversation, the phone connects to the nearest relay antenna and renews the connection regularly, especially on the go. The level of emission of waves is therefore more important. Also when sending an SMS, the notebook is away from the head.
- 4. Keep the phone away from electronic implants:** If you wear an electronic implant (pacemaker, insulin pump, neurostimulator ...), keep your mobile phone away from the equipped area. It can disrupt the functioning of your medical device.
- 5. Do not call in areas of poor reception:** The less the network coverage is good, the more your phone emits waves to keep the conversation going. It is therefore recommended not to call in areas where reception is not good: underground car parks, elevators, confined spaces ... Check the number of bars on your phone, it indicates the quality of coverage of the network.  
It is also generally prohibited to call in hospitals and airplanes because of the presence of radio-frequency devices. Your phone may cause interference and interfere with the operation of electronic devices.
- 6. Move the phone away just after dialing:** To limit exposure to waves at the head, you can get into the habit of not approaching the phone in your ear within seconds of dialing. Indeed, it is during these first seconds that the transmission of waves is strongest to find the nearest relay antenna. The level of wave emission then stabilizes.

"ALL wireless devices, including tablets, cordless phones, remote controlled toys, wireless toys, baby monitors and surveillance bracelets, should be subjected to the same regulatory obligations as cell phones."

: ANSES recommends to "reconsider the regulatory exposure limits" to ensure "sufficiently large safety margins" to the health of young children:

- All wireless devices, including tablets, cordless phones, remote controlled toys, wireless toys, baby monitors and surveillance bracelets, should be subjected to the same regulatory obligations as cell phones.
- Compliance with regulatory exposure limits should be insured for the ways that devices are customarily used, such as positioned in contact with the body.
- Exposure limits for radiofrequency electromagnetic fields should be tightened to ensure sufficiently large safety margins to protect the health and safety of the general population, particularly the health and safety of children.
- Reliance on the specific absorption rate (SAR) to set human exposure limits should be re-evaluated and replaced through the development of an indicator to assess real exposures for mobile phone users that applies to various conditions: signal type, good or bad reception, mode of use (call, data loading, etc.), location device is used on the body.
- ANSES reiterated its recommendation, as previously stated, to reduce exposure to children: minimize use and prefer a hands-free kit. The new report has made across the country.
- ANSES Article:  
(translate into English)  
(French)

#### 2016 National Decree No. 2016-1074 on the protection of workers against the risks arising from electromagnetic fields

- It is forbidden to place workers under age 18 in posts where EMF is apt to exceed limit values
- each employer has to evaluate EMF risks.
- When exposure exceeding limit values is detected or when an undesirable or unexpected health effect from exposure to EMF is reported, the worker will benefit from a medical visit.
- The employer must provide information and training to his employees regarding the characteristics of EMF emissions, the direct and indirect biophysical effects that could result from exposure to EMF, etc.
- The employer must adapt as much as possible the post in order to limit exposure to EMF.
- Specific precautions will be taken regarding pregnant women.
- Next Impact News Article:
- Inter France News Article:
- **WiFi Banned in Nursery Schools:** WIFI and Wireless devices will be banned in "the spaces dedicated to home, to rest and activities of children under 3 years".
- **WiFi on "OFF" as Default to Minimize Exposures in Schools:** In elementary schools, WIFI routers should be turned off when not in use.
- **Schools Will be Informed:** The school board should be informed when new tech equipment is being installed.
- **Cell Tower Emission Compliance Will Be Verified:** A decree will define the limits of emission of equipments for electronic communications or transmission to which the public is exposed. These values can be verified by accredited organizations and results will be made accessible to the public through a National Radiofrequency Agency.
- **Citizens Will Have Access to Environmental/Cell Tower Radiation Measurements** Near homes: Every resident may get access to the results of measurements for their living space.
- **Cell Antennae Maps For the Country:** A description and map of the places with atypical (higher than the limits) places will be conducted at regular intervals with follow up of the actions being taken to limit the exposure. A map of all antennas will be produced for each town.

**INTERNATIONAL POLICY BRIEFING**  
**Governments, Health Authorities and Schools**  
**Enacting Policy to Reduce Radiofrequency Radiation Exposures**

We recommend using keywords to search within this document. Please go to source documents by clicking on the blue underlined hyperlink.

Please email [info@environmentalhealthtrust.org](mailto:info@environmentalhealthtrust.org) for comments/updates as we do our best to ensure accuracy but the policy landscape is always changing. This is a living document. The last update was made 7/2018.

## France

**2017: Cell Phones are fully banned - in hallways, lunchroom and playgrounds- in schools through 14-15 years old (elementary and middle).**

- Mobile phones will be fully banned announced the Minister of National Education Jean-Michel Blanquer according to [this press release](#). The measure was confirmed by the Minister of Education. While France previously banned cell phones in classrooms, this policy includes all locations in the school and is considered a “full ban”.

**2017: The Ministry of Ecological and Solidarity Transition: “mobile phone and health” 2017 campaign on 6 Behaviors to reduce exposure to radiofrequency radiation.**

### ***Since 2010 French Law has Regulations on Cell Phones***

- Retailers must display SAR Radiation levels for different phone models, the specific absorption rate SAR shall be clearly indicated in French.
- All phones must be sold with a headset and mention should also be made of the recommendation to use the accessory to limit the exposure of the head to radio transmissions during communications.
- [Article 11](#): Cell phone advertising aimed at children younger than 14 is banned. In nursery schools, elementary schools and colleges, the use of a mobile telephone during a teaching activity and in the places provided by the rules of procedure, by a pupil is prohibited.
- Cell phones made for children under 6 are banned “to limit exposure to children”.
- EWG Blog Post:
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**2016 Report Cell For Reducing Exposure: French Agency for Food, Environmental and Occupational Health & Safety (ANSES)** “Radiofrequency Exposure and the Health of Children” recommends regulatory changes to ensure “sufficiently large safety margins” to protect the health of young children stating:

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the use of the precautionary principle that is premature, it is the Commission's claim that it has done the required risk analysis and risk assessment. This is the bizarre world that we live in.

The European Commission has done nothing to protect European citizens from the very serious health hazards and the U.S. FDA, EPA and National Cancer Institute have done nothing to protect U.S. citizens. The U.S. FCC has been worse than that, acting in wanton disregard for our health.

Let me close, as follows. There have been certain points in our history where people have stood up to strong destructive forces against what often appeared to be insurmountable odds. Those people are THE most honored people in our history. The people who failed to do so are among the most despised people in our history. I am not at all sure we will have historians to record us 100 years from now or even 30 years from now, given the direction in which we are heading. But if we do, rest assured that these are the standards by which we will all be judged.

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adults. Therefore, they may be a special risk for impacts of 5G, because of great increases in the regeneration of the electrical fields. Here one can think of all kinds of possibilities. Let me suggest two. We may have a gigantic (sorry about using that word again) epidemic of spontaneous abortion due the teratogenic effects. Another possibility is that instead of autism being one birth in 38, however horrendous that is, it could be one out of two, or even a majority of births. I don't know that these will happen, but these are the kinds of risks we are taking and there are many others one can think of. Putting in tens of millions of 5G antennae without a single biological test of safety has got to be about the stupidest idea anyone has had in the history of the world.

This brings us back to the earlier point. The only way to do 5G safety testing is to do genuine 5G biological safety testing. I have published on how this can be done relatively easily at relatively low cost and have, as you saw in the Chapter 6, told the FCC how this can be done. Those tests must be done by organizations completely independent of industry and that leaves out both ICNIRP and SCENIHR and a lot of other organizations.

Now we will get into the precautionary principle which is specially relevant to the EU but may have lessons for all of us.

Dr. Vincitūnas' last full paragraph reads as follows: "The recourse to the EU's precautionary principle to stop distribution of 5G products appears too drastic a measure. We need first to see how this technology will be applied and how the scientific evidence will evolve. Please be assured that the Commission will keep abreast of the scientific evidence in view of safeguarding the health of European citizens at the highest level possible and in line with its mandate."

Article 191 defines the **Precautionary Principle** as follows:

**"According to the European Commission the precautionary principle may be invoked when a phenomenon, product or process may have a dangerous effect, identified by a scientific and objective evaluation, if this evaluation does not allow the risk to be determined with sufficient certainty.**

Recourse to the principle belongs in the general framework of **risk analysis** (which, besides risk evaluation, includes risk management and risk communication), and more particularly in the context of **risk management** which corresponds to the decision-making phase.

The Commission stresses that the precautionary principle may only be invoked in the event of a potential risk and that it can never justify arbitrary decisions.

The precautionary principle may only be invoked when the **three preliminary conditions** are met:

identification of potentially adverse effects;  
evaluation of the scientific data available;  
the extent of scientific uncertainty."

The question now is what about 5G? We have with 5G strong suspicions of similar or much more severe risk of effects documented elsewhere in this document. We have no biological safety testing of genuine 5G radiation. Therefore, we have no risk analysis or risk management because we have no risk assessment whatsoever on 5G. So here we have Dr. Vincitūnas arguing that the request for precautionary principle application is premature. But it is not the request for

made from that, much more suspect. In any case, these surface effects of 5G will have especially strong impact on organisms with much higher surface to volume ratios. Consequently, I predict that many organisms will be much more impacted than we will. This includes insects and other arthropods, birds and small mammals and amphibia. It includes plants including even large trees, because trees have leaves and reproductive organs that are highly exposed. I predict there will be major ecological disasters as a consequence of 5G. This will include vast conflagrations because EMF exposures make plants much more flammable.

But let's get back to humans. The industry has also made claims that more conventional microwave frequency EMFs are limited in effect to the outer 1 cm of the body. We know that is not true, however because of the effects deep in the human brain, on the heart and on hormone systems. Perhaps the most important two studies demonstrating effects deep within the body are the studies of Professor Hässig and his colleagues in Switzerland on cataract formation in newborn calves [137,138]. These two studies clearly show that when pregnant cows are grazing near mobile phone base stations (also called cell phone towers), the calves are born with very greatly increased incidences of cataracts. It follows from these findings that even though the developing fetuses are very deep in the body of the mother and should be highly protected from the EMF exposures, they are not so protected. And because the EMF safety guidelines in Switzerland are 100 times more stringent than are the safety guidelines in most of the rest of Europe, in the U.S., Canada and most of the rest of the world, the more general safety guidelines allow greatly excessive exposures and penetration of effects. The claims of industry that microwave frequency EMFs only act in the outer centimeter of the body are clearly false.

How then can both conventional microwave frequency EMFs and 5G radiation act deeply within the body? You may correctly observe that the electrical effects of the EMFs activate the voltage sensor and that the direct electrical forces are rapidly attenuated in the body. So how can we get deep effects? I think the answer is that the magnetic parts of the EMFs have been known for decades to penetrate much more deeply than do the electrical parts. The magnetic fields put forces on mobile electrically charged groups dissolved in the aqueous phases of the body and small individual movements of the charged groups can regenerate electric fields that are essentially identical to the electric fields of the original EMFs, carrying the same frequency and same pulsation pattern, although with lower intensity. An example of this is given in the Lu and Ueno [139] study. Because the voltage sensor is so stunningly sensitive to electrical forces and part of the reason for that is the very high level of amplification of the electrical field across the plasma membrane, we have an almost perfect way in which to produce EMF effects deeply within our bodies.

I am very concerned that 5G may produce effects like those we already see produced from lower frequency EMFs but are much more severe. I am also concerned that we will also see responses that are qualitatively different. Let me give you three possible examples of the latter type and one quantitative example. Each of the four types of blindness, have downstream effects of VGCC activation as causal factors: cataracts, detached retinas, glaucoma and macular degeneration. The aqueous and vitreous humors in the eye may be an ideal environment for the regeneration of the electrical fields within the eye. We may, therefore have a gigantic epidemic of each of the four types of blindness. Another concern focuses on kidney dysfunction, which was shown in Chapter 5 to be impacted by EMFs. The kidneys have much fluid, both blood and also what will become urine, which may allow efficient the regeneration of electrical fields. Such regeneration may be expected to impact both the glomerular filtration and also the reabsorption, both essential to kidney function. Does this mean that 5G will produce very large increases in kidney failure? The only way to find out is to do biological safety testing of genuine 5G radiation. Let me give you a third example. Fetuses and very young babies have much more water in their bodies than do

continuous wave) EMFs. A second is that the EMFs act by putting forces on the voltage sensor of the VGCCs, opening these calcium channels and allowing excessive calcium ions to flow into the cell. The voltage sensor is extraordinarily sensitive to those electrical forces, such that the safety guidelines are allowing us to be exposed to EMFs that are something like 7.2 million times too high.

The reason that the industry has decided to go to the extremely high frequencies of 5G is that with such extremely high frequencies, it is possible to carry much more information via much more pulsation than it is possible to carry with lower frequencies even in the microwave range. We can be assured, therefore, that 5G will involve vastly more pulsation than do EMFs that we are currently exposed to. It follows from that, that any biological safety test of 5G must use the very rapid pulsations including whatever very short term spikes may be present, that are to be present in genuine 5G. There is an additional process that is planned to be used in 5G: phased arrays ([https://en.wikipedia.org/wiki/Phased\\_array](https://en.wikipedia.org/wiki/Phased_array)). Here multiple antenna elements act together to produce highly pulsed fields which are designed for 5G, to produce increased penetration. 5G will entail particularly powerful pulsations to be used, which may, therefore, be particularly hazardous.

The only data we have, to my knowledge, on millimeter wave frequencies of 5G used *non-pulsed EMFs in the millimeter frequency range of 5G, not genuine 5G*. Such millimeter waves have been shown to produce a number of downstream effects of VGCC activation. One millimeter wave study showed that it activated both the VGCCs and also the voltage-gated potassium channels, suggesting that it worked via the voltage sensor, as do other EMFs [136]. Any such data tells us almost nothing about how biologically active genuine very highly pulsed 5G will be. I take it that from their statements, that both Mr. Ryan and Dr. Vincitnas are ready to put out 10s of millions of 5G antennae to afflict every single person in the EU with 5G radiation without even a single biological test of safety of genuine 5G. In the U.S., the FCC has taken a much worse position. The FCC is not only willing to allow such completely untested exposures but has also been aggressively pushing to promote installation of 5G antennae, such that antennae are already being installed in parts of the U.S. In a world where shocking behavior has become less and less shocking, I consider EU and U.S. views and actions to be shocking. The U.S. situation is mass insanity. I would have hoped that the Europeans, who think of themselves as being much more thoughtful than Americans, would have been genuinely more thoughtful.

Why does 5G need such high numbers of antennae? It is because the 5G radiation is much more absorbed as it enters various materials. The approach is to use many more antennae with one found every few houses, such that 5G can sufficiently penetrate local walls. Such absorption usually involves the interaction with electrically charged groups, such that such high absorption is likely to involve placing forces on electrically charged groups. Because such forces are the way in which EMFs activate the VGCCs, it seems highly likely, therefore, that 5G radiation will be particularly active in VGCC activation.

In summary, then, 5G is predicted to be particularly dangerous for each of four different reasons: 1. The extraordinarily high numbers of antennae that are planned. 2. The very high energy outputs which will be used to ensure penetration. 3. The extraordinarily high pulsation levels. 4. The apparent high level interactions of the 5G frequency on charged groups presumably including the voltage sensor charged groups.

Now what the telecommunications industry argues is that 5G radiation will be mostly absorbed in the outer 1 or 2 mm of the body, such that they claim that we don't have to worry about the effects. There is some truth to that, but there are also some caveats that make any conclusions

"One of the greatest challenges facing any public health agency is that of risk communication. ... The FDA's job is to minimize risks through education, regulation, and enforcement. To be credible in all these tasks, the agency must communicate frequently and clearly about risks and benefits—and about what organizations and individuals can do to minimize risk. When, like the FDA, Americans must make choices about medication, devices, foods, or nutrition in the absence of perfect information, the FDA cannot delay in providing reasonable guidance —guidance that informs rather than causes unnecessary anxiety. For these communications to have credibility, the public must trust the agency to base its decisions on science."

These were and are laudable goals. As far as I can tell, with regard to EMF effects, the FDA has failed to base either its communications or its decisions on science.

### Summary of Chapter 6

In the areas discussed in Chapter 6 what used to be the primacy of U.S. science has completely disintegrated. It has disintegrated because of the cessation of U.S. government funding for either experimental studies or epidemiological studies. It has disintegrated due to attacks on U.S. and International scientists, attacks that started in the U.S. with the attacks on Dr. Henry Lai. It has disintegrated because of aggressive industry propaganda, propaganda that has no connection with the real science. It has disintegrated because of the outright corruption of the committee to set standards for radio-frequency exposures and the FCC and the possible and *de facto* corruption of the FDA. The telecommunications industry has been aware of much of the problems with their approach since the 1999 letter to them from George Carlo. The FCC has been aware of much more of the science since my presentation to them in September 2016. The FDA has been aware of contrary findings since 1993. Each of them has, if anything, doubled down on their fictions since those respective times.

Many of these things are going on internationally; however the U.S. has often been leading the world in these processes. All of the actions we have seen to corrupt the science and public understanding of the science have the effect of making it vastly more difficult for individuals impacted by the EMFs to protect themselves from further harm. We have many effects that are cumulative and become irreversible as they become more severe, effects that impact at a minimum, tens of millions of Americans and hundreds of millions of people elsewhere in the world. *Industrial and regulatory organizations make it difficult or impossible for people to have scientifically valid information also make it difficult or impossible for people to protect themselves from the accumulation of these effects, leading to severe irreversible effects. Each of the organizations involved, both U.S. and international that collaborate in this process, have important responsibility for the consequences.* I think damage goes way beyond tens and hundreds of millions of people, because I think we are looking at cumulative severe impact on our brain function, on our reproductive function and on our DNA, and that these, in turn will lead to the crash of every single technologically advanced country on earth, barring a major change in course. That will happen fairly quickly, in my opinion, even without 5G but 5G will greatly speed up the process and perhaps even add new egregious effects

### Chapter 7: The Great Risks of 5G: What We Know and What We Don't Know

We have already discussed two issues that are essential to understanding 5G. One is that pulsed EMFs are, in most cases, much more biologically active than are non-pulsed (often called

The FDA may have had a long history of playing fast and loose with the truth. For example, Microwave News article published in 2003, provides this account of what occurred at the FDA in 1993 [134]:

**1993 FDA Memo Data "Strongly Suggest" Microwaves Can Promote Cancer.**

In the spring of 1993 at the height of the public concern over cell phone brain tumor risks, the Food and Drug Administration (FDA) biologists concluded [134] that the available data "strongly suggest" that microwaves can "accelerate the development of cancer." This assessment is from an internal agency memo recently obtained by Microwave News under the Freedom of Information Act.

"Of approximately eight chronic animal experiments known to us, five resulted in increased numbers of malignancies, accelerated progression of tumors, or both" wrote Drs. Mays Swicord and Larry Cress of FDA's Center for Devices and Radiological Health (CDRH) in Rockville, MD. They also pointed to other evidence from laboratory (in vitro) studies which supported cancer risk.

Yet in its public statements at that time, the agency played down these findings [134]. For instance in a Talk Paper issued in early February, the FDA stated that there was "limited evidence that suggests that lower levels (of microwaves) might cause adverse effects."

"A few studies suggest that (microwave) levels (from cellular phones) can accelerate the development of cancer in laboratory animals," the FDA added [134], "but there is much uncertainty among scientists about whether these results apply to the use of cellular phones."

I have three comments. Firstly, if you look at the 35 citations in the list on cancer causation in Chapter 1, you will see that there are 8 citations (#s 2-7 & 15 & 19) which provide similar evidence of stimulation of tumor promotion, four of which (#s 3-6) were published around 1993, the time of the FDA memo and public statement described above. Therefore, there was a substantial literature including peer-reviewed primary literature and review articles which produced similar conclusions to those of the FDA internal memo. The importance of the memo is that the FDA knew about these findings and opted to cover them up.

Secondly if you compare the rhetoric in the 1993 memo with the first quote from the current FDA web site quoted in this section, you will see some striking similarities. They both first refer to "a few studies" which are not identified, followed by raising uncertainties and then finally raising doubt as to whether these findings apply to cell phone radiation. The pattern of the FDA rhetoric has not changed much in 25 years.

If one includes the middle statement also quoted from the FDA web site, we have three FDA statements each of which downplays any biological effects and each of which are strongly rebutted by extensive peer-reviewed independent scientific literature. I'm not sure we can say the FDA has been corrupted by the industry, but what we can say is that it has been functioning as if it has been corrupted for 25 years.

In mid-2009 Margaret A. Hamburg, the new commissioner of the FDA, and Joshua M. Sharfstein, her principal deputy commissioner, published a commentary article in the New England Journal of Medicine [135] which included the following:

Very high levels of electromagnetic energy, such as is found in X-rays and gamma rays, can ionize biological tissues. Ionization is a process where electrons are stripped away from their normal locations in atoms and molecules. It can permanently damage biological tissues including DNA, the genetic material.

The energy levels associated with radio frequency energy, including both radio waves and microwaves, are not great enough to cause ionization of atoms and molecules. Therefore, RF energy is a type of non-ionizing radiation. Other types of non-ionizing radiation include visible light, infrared radiation (heat), and other forms of electromagnetic radiation with relatively low frequencies.

While RF energy does not ionize particles, large amounts can increase body temperatures and cause tissue damage. Two areas of the body, the eyes and the testes, are particularly vulnerable to RF heating because there is relatively little blood flow in them to carry away excess heat.

The three paragraphs from the FDA statement are word for word identical to the first three paragraphs of the Samsung statement. The last paragraph in the Samsung statement was deleted from the FDA statement. It is clear from this that either the FDA statement is derived from the earlier industry statement rather than the other way around or both are derived from a previous statement similar to the Samsung statement.

These types of statements have given rise to shorter statements that are all something like the following:

Non-ionizing radiation consists of photons that do not have enough energy to break chemical bonds including the chemical bonds of DNA.

All of these statements are technically correct. They are also highly misleading. They are often falsely interpreted as meaning that there cannot be any effects of non-ionizing, non-thermal EMF exposures *including indirect effects*. There are many possible indirect effects that may occur, given the complexity of biology. But our situation goes way beyond that, because we know that most of the effects are produced via VGCC activation which produces, as downstream effects, the free radical breakdown products of peroxynitrite (Fig. 1, Chapter 2). Those free radical breakdown products attack DNA, proteins and other biological constituents in ways that are very similar to the ways in which ionizing radiation attack these same molecules. Ionizing radiation was shown by Arthur Compton, who won the Nobel prize in physics in 1927, for showing that ionizing radiation produces large numbers of free radicals through what has become known as Compton scattering, with those free radicals being responsible for most of the biological effects of ionizing radiation. So the often repeated industry claim that ionizing radiation is dangerous but non-ionizing radiation is not, is wrong – both of them produce similar effects mediated through free radical generation. However the dangers of non-ionizing radiation may eclipse the dangers of ionizing radiation under some conditions because of something that is discussed early in Chapter 5, at the end of the Speit/Schwarz discussion. There are three processes which occur in the sequence by which EMF activation leads to peroxynitrite breakdown product radicals, each of which have high levels of amplification (each discussed on p. 29 in Chapter 5). Thus potentially and I believe actually microwave frequency EMFs can produce under suitable conditions, much more efficient free radical production than occurs from a similar energy level of ionizing radiation.

frequency-radiation-cancer/ (Accessed Sept. 9, 2017)

support the view that cell phones do cause cancer

The effects of specifically cell phone radiation that have been found in these reviews (Table 5) include: lowered male reproductive function, lowered female reproductive function, increased cellular DNA damage, neurological/neuropsychiatric effects, increased stress protein synthesis, increased intracellular calcium, apoptosis, lowered melatonin, oxidative stress, cancer (10 reviews) and specifically increased ipsilateral cancer (3 reviews). So there are 11 different cell phone effects where there is substantial enough evidence to warrant publication in one or more review articles. Each of these effects has been shown to occur in response to other microwave frequency EMFs and therefore should be considered to be caused by EMFs more broadly.

The summary of Table 4, Chapter 5, the genuine cell phone primary literature studies that fell into the 2009-2013 time frame, started as follows: "If you look through the studies described in Table 4, you will see multiple studies in oxidative stress/free radical damage, on changes in tissue structure (sometimes called remodeling), on cellular DNA damage, on male fertility (and also one on female fertility), on behavioral changes and on neurological changes. There is also one study on insulin/type 2 diabetes (hormonal effect). It follows from this that five of the effects that were extensively documented in large numbers of reviews (Chapter 1) are further demonstrated to be produced by cell phone radiation in these studies. In addition the tissue remodeling and proteomic changes discussed in Chapter 3 are also further demonstrated here."

It can be seen from Tables 4 & 5 and the preceding two paragraphs, that there is a vast amount of literature on repeatedly found effects of cell phone radiation, effects which make a mockery of the *completely undocumented and non-specific* FDA claims to the contrary.

Let's look at another part of the FDA statement which also shows similarities to statements made elsewhere [131]:

The biological effects of radiofrequency energy should not be confused with the effects from other types of electromagnetic energy.

Very high levels of electromagnetic energy, such as is found in X-rays and gamma rays can ionize biological tissues. Ionization is a process where electrons are stripped away from their normal locations in atoms and molecules. It can permanently damage biological tissues including DNA, the genetic material.

The energy levels associated with radiofrequency energy, including both radio waves and microwaves, are not great enough to cause the ionization of atoms and molecules. Therefore, RF energy is a type of non-ionizing radiation. Other types of non-ionizing radiation include visible light, infrared radiation (heat) and other forms of electromagnetic radiation with relatively low frequencies.

This is almost identical to another Samsung statement and also to an FCC statement that I have not copied. Here is the Samsung statement [133]:

The biological effects of RF energy should not be confused with the effects from other types of electromagnetic energy.

radiation on oxidative stress and reproductive signaling pathways in females and males. <i>J Membr Biol</i> 246:869-875.	
Yakymenko I, Sidorik E. 2010 Risks of carcinogenesis from electromagnetic radiation and mobile telephony devices. <i>Exp Oncol</i> 32:729-736.	Cancer, cellular DNA damage, apoptosis; higher cancer incidence on ipsilateral side of the head, not contralateral
Zhang J, Sumich A, Wang GY. 2017 Acute effects of radiofrequency electromagnetic field emitted by mobile phone on brain function. <i>Bioelectromagnetics</i> 38:329-338. doi: 10.1002/bem.22052.	Neurological dysfunction
Kundi M, Mild K, Hardell L, Mattsson M. 2004 Mobile telephones and cancer – a review of the epidemiological evidence. <i>J Toxicol Env Health, Part B</i> 7:351-384.	Cancer – epidemiological review
Hardell L, Carlberg M, Soderqvist F, Hansson Mild K. 2008 Meta-analysis of long-term mobile phone use and the association with brain tumors. <i>Int J Oncol</i> 32:1097-1103.	Cancer – meta-analysis on long-term cell phone use and brain tumors
Hardell L, Carlberg M. 2013 Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones. <i>Rev Environ Health</i> 28:97-106. doi: 10.1515/reveh-2013-0006.	Mobile and cordless phone radiation caused brain cancer based on the Hill criteria for causation (most important criteria for causation in epidemiology)
Hardell L, Carlberg M, Hansson Mild K. 2013 Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. <i>Pathophysiology</i> 2013;20(2):85-110.	Mobile and cordless phone exposures associated with increased risk of glioma and acoustic neuroma; higher cancer increase on ipsilateral side of the head
Davis DL, Kesari S, Soskolne CL, Miller AB, Stein Y. 2013 Swedish review strengthens grounds for concluding that radiation from cellular and cordless phones is a probable human carcinogen. <i>Pathophysiology</i> 20:123-129.	Cell phone and cordless phone radiation are a probable carcinogens; cancer increase on ipsilateral side of the head, not contralateral side
Morgan LL, Miller AB, Sasco A, Davis DL. 2015 Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (2A). <i>Int J Oncol</i> 46(5): 1865-1871.	Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen
Bielsa-Fernández P, Rodríguez-Martín B. 2017 [Association between radiation from mobile phones and tumour risk in adults]. <i>Gac Sanit.</i> 2017 Apr 12. pii: S0213-9111(17)30083-3. doi: 10.1016/j.gaceta.2016.10.014.	Association between mobile phone risk and tumor risk
Prasad M, Kathuria P, Nair P, Kumar A, Prasad K. 2017 Mobile phone use and risk of brain tumours: a systematic review of association between study quality, source of funding, and research outcomes. <i>Neurol Sci.</i> 2017 Feb 17. doi: 10.1007/s10072-017-2850-8.	The association between mobile phone use and brain cancer is higher in independently funded studies than in industry funded studies
Miller A. 2017 References on cell phone radiation and cancer. <a href="https://ehtrust.org/references-cell-phone-radio-">https://ehtrust.org/references-cell-phone-radio-</a>	This is a bibliography of studies on cell phone radiation and cancer – most

According to current data, the FDA believes that the weight of scientific evidence does not show an association between exposure to radiofrequency from cell phones and adverse health outcomes. Still, there is a consensus that additional research is warranted to address gaps in knowledge, such as the effects of cell phone use over the long-term and on pediatric populations.

There was a similar statement made by the FCC, in previous section, and also similar statement was made by Samsung, one of world's largest producers of cell phones which reads as follows [132]:

Over the past 15 years, scientists have conducted hundreds of studies looking at the biological effects of radio frequency energy emitted by cell phones. While some researchers have reported biological changes associated with RF energy, these studies have failed to be replicated. The majority of studies published have failed to show an association between exposure to radio frequency from a cell phone and health problems.

Neither the FDA statement nor the Samsung statement give us any idea what possible effects are being considered here, what literature was used for such a consideration. These statements are completely undocumented and therefore must be viewed as being unscientific. In Chapter 1, 79 reviews were given that each showed the existence of one or more effects. Eight different effects were each documented in from 12 to 35 reviews. Such reviews must be extensively documented or one cannot get them published. Any one of those reviews provides, therefore, a much stronger argument for presence of one or more effects than do the FDA, FCC and Samsung statements put together arguing for the opposite. One thing that is strange about the FDA statement is that they are talking specifically about cell phones even though they are tasked with regulating safety on all such microwave/radiofrequency devices. What I have done below is to put together the 16 reviews which are completely or largely focused on cell phone radiation effects so that we can see what specific effects have been found to be caused by cell phone radiation. I will summarize those effects below.

**Table 5: Reviews on Cell Phone Effects and the Effects Found in Each**

<b>Review on Cell Phone Effects</b>	<b>Effects Found</b>
La Vignera S, Condorelli RA, Vicari E, D'Agata R, Calogero AE. 2012 Effects of the exposure to mobile phones on male reproduction: a review of the literature. <i>J Androl</i> 33:350-356.	Multiple effects on male reproduction
Makker K, Varghese A, Desai NR, Mouradi R, Agarwal A. 2009 Cell phones: modern man's nemesis? <i>Reprod Biomed Online</i> 18:148-157.	Cellular DNA damage, neurological/neuropsychiatric effects, apoptosis
Yakymenko IL, Sidorik EP, Tsybulin AS. 1999 [Metabolic changes in cells under electromagnetic radiation of mobile communication systems]. <i>Ukr Biokhim Zh</i> (1999), 2011 Mar-Apr:20-28.	Apoptosis, increased oxidative stress, increased intracellular calcium
K Sri N. 2015 Mobile phone radiation: physiological & pathophysiological considerations. <i>Indian J Physiol Pharmacol</i> 59:125-135.	Male infertility, cellular DNA damage, lowered melatonin, increased stress protein expression
Nazırođlu M, Yüksel M, Köse SA, Özkaya MO. 2013 Recent reports of Wi-Fi and mobile phone-induced	Oxidative stress, male and female reproductive signaling dysfunction

Industry Association (CTIA), [129] Dated October 20, 1999. This would involve a Cooperative Research and Development Agreement (CRADA). Later in their Letter of Intent, it states under Initial Research Under the CRADA [129]: “The first study to be conducted would follow up on the findings of studies previously conducted by WTR but not yet published using the micronucleus assay, a test which detects structural effects on genetic material. Research data in the literature from RF exposure studies using the micronucleus assay are conflicting, and warrant follow-up study.” You will see here that the FDA is accepting the industry claim that these studies are conflicting even though, having been done under different circumstances, they are not.

The basic approach of the CRADA was that the industry would fund any research to be done and decide what research should be done by whom and how and what information would be published subsequently.

*You may recall that Dr. George Carlo wrote a very important letter to the heads of the telecommunications companies, described earlier. That letter was dated two weeks before the date of the letter or intent. Carlo’s letter stated: “I am especially concerned about what appear to be actions by a segment of the industry to conscript the FCC, the FDA and WHO... .” Carlo who had been up to that point, an industry insider, and apparently had reason to think that the FDA had been corrupted, or what he called conscripted by parts of the telecommunications industry two weeks before the letter of intent was written. I don’t think this is definitive evidence that the FDA has been corrupted, and it can even be argued that it is not evidence at all. But it does suggest, however, that we need to look further into this issue.*

Let’s go on to the results of this CRADA [130]. The FDA reports the following findings from the CRADA: “FDA’s cooperative research and development agreement (CRADA) with the Cellular Communication & Internet Association (CTIA) has resulted in research projects focused on two topics - mechanistic studies related to genotoxicity and exposure assessment studies. All studies funded through the CRADA have been completed, and no association was found between exposure to radiofrequency (RF) radiation from cell phones and adverse health effects.” I have been unable to get copies of these studies and therefore cannot comment on them.

The CRADA also lead to a National Academy of Sciences (NAS) workshop on EMFs that lead, in turn, to a 2008 NAS report. That 2008 NAS report can be accessed from [130]. It is a useful report, in my view, albeit one that leaves out much of what was already known in 2008. It does *not* say that there are no clear non-thermal effects and specifically calls for study of the neurological effects, suggesting that “that neural networks are a sensitive biological target.” It also calls for much research on biophysical or biochemical molecular mechanism(s) that may lead to the non-thermal effects. It also calls for much more study on cancer. There has been a large amount of progress in each of these three areas since 2008, including of course the identification of VGCC activation as the most important but not necessarily the only biophysical mechanism. The problem with regard to the FDA is that as far as one can tell, the FDA has paid no attention to either the 2008 report or to the subsequent progress we have had in these several areas.

Let’s shift our attention to what the FDA currently says about the impacts of these EMFs? On their web site [131], the FDA states the following:

**Is there a connection between certain health problems and exposure to radiofrequency fields via cell phone use?**

The results of most studies conducted to date indicate that there is not. In addition, attempts to replicate and confirm the few studies that did show a connection have failed.

The actions produced by such VGCC activation go mainly through the excessive intracellular calcium levels produced by such activation. Excessive calcium acts via three main pathways to produce effects in the body. Therapeutic effects are produced through the nitric oxide signaling pathway whereas many pathophysiological effects are produced by the peroxynitrite/oxidative stress pathway. Excessive calcium signaling also produces pathophysiological effects. Numerous effects produced following non-thermal EMF exposures can be produced by these pathways including oxidative stress, cellular DNA damage, cancer, widespread neuropsychiatric effects, breakdown of the blood brain barrier, lowered male and female fertility and various endocrine (that is hormonal) changes.

It has long been known that pulsed EMFs are usually much more biologically active than are non-pulsed (or continuous wave) EMFs and this difference appears to be consistent with the VGCC mechanism. Because all wireless communication devices communicate via pulsations, such devices may be of special concern.

Three concerns were expressed with regard to 5G: 1. The stronger absorption of the very high frequencies involved require the setting up of vast numbers of antennae, making it essentially impossible to avoid damaging exposures. 2. The stronger absorption suggests that these EMFs may be particularly active in activating the VGCC voltage sensor. 3. The very high level and complexity of pulsations also may make for much more biological damage via VGCC activation.

There was substantial discussion of the need for biological safety testing. That discussion focused on the using cells in culture that have high densities and different types of VGCCs. Responses can be monitored by either monitoring intracellular calcium levels or by measuring nitric oxide production using a nitric oxide electrode.

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We had what would be considered in diplomatic circles a good and productive meeting, but since that time the FCC has doubled down on their positions, pushed much further on 5G, leading us to the mega-crisis situation which we are faced with now. Instead of actually testing 5G radiation biologically for safety, using the methods that were discussed in that meeting, the FCC has instead opted to put out tens of millions of 5G antennae without any biological safety testing of genuine 5G radiation. That is the insanity that we are in.

#### What About the FDA?

The Food and Drug Administration (FDA) was given the power to regulate devices that emit microwave frequency EMFs. This was not an unreasonable decision, given that the FDA was already regulating the safety of medical devices, where one can argue that there are similar challenges involved. The FDA was given this responsibility without any additional funding. So obviously, it was and is distinctly limited in what it can do.

What the FDA did was to issue a Letter of Intent for Proposed Collaboration in Mobile Phone Research between the Food and Drug Administration and the Cellular Telecommunications

Let's go on to the cancer claim at the bottom of the copied section. The FCC states that "A number of reports have appeared in the scientific literature describing the observation of a range of biological effects resulting from exposure to low levels of RF energy. However, in most cases, further experimental research has been unable to reproduce these effects. Furthermore, since much of the research is not done on whole bodies (in vivo), there has been no determination that such effects constitute a human health hazard." You will note here that there are no specifics, nor were there any specifics on the section discussed in the previous paragraph. What we have here are completely undocumented FCC claims, with no specifics whatsoever and claims that are clearly contradicted by each of the 35 reviews on cancer causation by EMF exposure. They are also clearly contradicted by the 21 reviews on cellular DNA damage following EMF exposures, something that the FCC says nothing about. It has been known for decades, that the process of carcinogenesis (cancer causation) usually starts with one or more mutations in the cellular DNA, mutations that can be caused by each of the three types of cellular DNA damage known to be caused by EMF exposure.

The sort of pattern seen here, where we have gross generalizations followed by no or completely inadequate documentation goes on with the industry propaganda [119,120] as discussed earlier, as well as in the Speit/Schwarz discussion from early in Chapter 5. What you see in each of those cases is everything falls apart when you look carefully at the facts. The situation with the FCC statements is very similar. There can be little doubt that the FCC is acting as a propaganda organization here, as strongly suggested by the George Carlo letter [125,126] and the FCC as a captured agency [127] document.

Three questions: Does the FCC know that these statements that it has made are not factual? Does it know how non-thermal EMF effects actually are produced? Does it know that its safety guidelines do not protect our health? That answer to all three of these questions is yes. How do I know? I know because I did a PowerPoint presentation to the FCC in September 2016 which presented findings in each of these important areas. My account of that presentation, written two days after it occurred, follows:

Professor Emeritus Martin L. Pall presented Powerpoint presentation on the main mechanism of action of non-thermal microwave frequency EMFs to the FCC

I met with Julius Knapp, Chief of OET, Martin Doczkat, Branch Chief, OET/Technical Analysis Branch, and Ed Mantiply Engineer OET/Associate Chief at the Federal Communications Commission on September 21, 2016 to present a Powerpoint presentation and answer questions. The presentation showed that non-thermal microwave and lower frequency EMFs act via voltage-gated calcium channel (VGCC) activation. The most important findings demonstrating this mechanism are that various effects produced by such non-thermal exposures can be blocked or greatly lowered by calcium channel blockers, drugs that are highly specific for blocking VGCCs. The reason why such low intensity non-thermal exposures activate the VGCCs is because the voltage sensor of the VGCCs is exquisitely sensitive to the electrical forces produced by these EMFs. The forces on the voltage sensor are calculated to be about 7.2 million times higher than are the forces on singly charged chemical groups in the aqueous phases of the cell. This very high level sensitivity also predicts that the safety guidelines allow us to be exposed to EMF intensities that are approximately 7.2 million times too high.

At relatively low levels of exposure to RF radiation, i.e., levels lower than those that would produce significant heating, the evidence for production of harmful biological effects is ambiguous and unproven. Such effects, if they exist, have been referred to as "non-thermal" effects. A number of reports have appeared in the scientific literature describing the observation of a range of biological effects resulting from exposure to low levels of RF energy. However, in most cases, further experimental research has been unable to reproduce these effects. Furthermore, since much of the research is not done on whole bodies (in vivo), there has been no determination that such effects constitute a human health hazard. It is generally agreed that further research is needed to determine the generality of such effects and their possible relevance, if any, to human health. In the meantime, standards-setting organizations and government agencies continue to monitor the latest experimental findings to confirm their validity and determine whether changes in safety limits are needed to protect human health. (Back to Index)

#### **CAN PEOPLE BE EXPOSED TO LEVELS OF RADIOFREQUENCY RADIATION THAT COULD BE HARMFUL?**

Studies have shown that environmental levels of RF energy routinely encountered by the general public are typically far below levels necessary to produce significant heating and increased body temperature. However, there may be situations, particularly in workplace environments near high-powered RF sources, where the recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or mitigation actions may be necessary to ensure the safe use of RF energy. (Back to Index)

#### **CAN RADIOFREQUENCY RADIATION CAUSE CANCER?**

Some studies have also examined the possibility of a link between RF exposure and cancer. Results to date have been inconclusive. While some experimental data have suggested a possible link between exposure and tumor formation in animals exposed under certain specific conditions, the results have not been independently replicated. Many other studies have failed to find evidence for a link to cancer or any related condition. The Food and Drug Administration has further information on this topic with respect to RF exposure from mobile phones at the following Web site: FDA Radiation-Emitting Products Page . (Back to Index)

Let's look at the first paragraph. In the third and fourth sentence, they state that there have been non-thermal effects reported but then say that "in most cases they have not been reproduced." Is that true? No. The 79 reviews listed in Chapter 1 have each found repeated studies documenting one or more of the EMF effects. You can't get a review published without multiple studies. And the fact that so many of these effects have been repeatedly reviewed, over many years shows that similar patterns of evidence have been found over long periods of time. *The FCC provides not one iota of evidence on its claims, despite the fact that such a claim of inability to reproduce findings absolutely requires extensive documentation to be scientifically valid. This difference in documentation, means that any one of those 79 reviews listed in Chapter 1 is vastly more scientific in showing the falsity of the FCC statement than is the FCC statement itself, which is completely undocumented.*

Section 332(c)(7)(B)(iv) of the Act remarkably, and that adverb seems inescapably best here, wrests zoning authority from local governments. Specifically, they cannot cite health concerns about the effects of tower radiation to deny tower licenses so long as the towers comply with FCC regulations.

### **Congress Silences Public**

Section 322(c)(7)(B)(iv) of the Communications Act Provides:

No State or local government or instrumentality thereof may regulate the placement, construction of personal wireless service facilities on the basis of environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

In preempting local zoning authority – along with the public's right to guard its own safety and health, Congress unleashed an orgy of infrastructure build-out. Emboldened by the government green light and the vast consumer appetite for wireless technology, industry has had a free hand in installing more than 300,000 sites. Church steeples, schoolyards, school rooftops, even trees can house these facilities.

What, then are the consequences of all of this? The 17 studies that have been done on people living near cell phone towers show that many people within 300 meters (about 1000 feet) of a cell phone tower are afflicted by six of the health effects found in those many reviews listed in Chapter 1. Two of those effects have not been looked at. According to this literature, people living within 300 meters of cell phone towers suffer from widespread neuropsychiatric effects, cellular DNA damage, cancer, oxidative stress, elevated apoptosis (cell death), and hormonal effects. They also suffer from cardiac effects like those discussed in Chapter 3 and from hypertension and also anemia. The two extremely well documented EMF health effects that have not been looked at are the reproductive effects and the high levels of intracellular calcium. That does not tell us these are not also caused in people living near cell phone towers, just that no one has looked. Roughly 30% of the people in this country live within 300 meters of a cell phone tower so the impact on health is major. But few know about this and the media and our government, including especially the FCC and FDA are keeping it all a deep dark secret. Not a single one of these 17 studies have been done in the U.S. Consequently, when the U.S. has ensured that we are irradiated by well over 300,000 of these cell phone towers, it has done absolutely nothing to determine what the consequences of exposure are. Of course we are impacted not only by cell phone towers near where we live but also near where we work or go to school and to some extent, when we are driving around town. These high levels of exposure are not necessary. Switzerland has safety guidelines that are 100 times more stringent than ours, Russia has safety guidelines that are 1000 times more stringent than ours. The health effects we see now will no doubt rise much further in the future without any increasing exposure, because many of these effects are cumulative, eventually becoming irreversible.

I would encourage you to look at the whole FCC as a captured agency document [127] – it can be downloaded at no cost from the internet [127]. It is very interesting and adds considerably to my short comments here regarding corruption.

So what does the FCC have to say about EMF effects on its web site [128]? I have copied some relevant sections as follows:

Carlo was, at that time the soon to be retiring head of the WTR, which was the CTIA/telecommunications industry research arm. In the letters to the heads of the telecommunications industry companies, Carlo discusses the types of evidence arguing that cell phones do apparently cause cancer and that they do cause DNA damage to our cellular DNA. The DNA damage, suggested that the apparent cancer causation was real. Carlo continues the letter as follows [125]:

"Today, I sit here extremely frustrated and concerned that appropriate steps have not been taken by the wireless industry to protect consumers during this time of uncertainty about safety." Continuing further down, Carlo adds:

"Alarming, indications are that some segments of the industry have ignored the scientific findings suggesting potential health effects, have repeatedly and falsely claimed that wireless phones are safe for all consumers including children, and have created an illusion of responsible follow up by calling for and supporting more research. The most important measures of consumer protection are missing: complete and honest factual information to allow informed judgment by consumers about assumption of risk; the direct tracking and monitoring of what happens to consumers who use wireless phones; and, the monitoring of changes in the technology that could impact health.

I am especially concerned about what appear to be actions by a segment of the industry to conscript the FCC, the FDA and WHO with them in following a non-effectual course that will likely result in a regulatory and consumer backlash."

This is an important letter for several reasons. After October 7, 1999 the heads of the telecommunications companies or, for that matter anyone else at those companies, could no longer legitimately claim that they did not know there were serious health concerns with cell phones, with targeting cell phones to young children, or with increasing allowable cell phone exposure radiation. The last of these was done a few years later, as you have already seen.

The concerns Carlo expresses about the FCC (Federal Communications Commission) and the FDA (U.S. Food and Drug Administration) are particularly important in the U.S., because both the FCC and the FDA had already been given important regulatory roles when the Carlo letter was written. The FCC had been given the power of regulating the location of cell phone towers by the 1996 telecommunications act, which also *prohibited, as I understand it, any state or local government from protecting their people's health by regulating cell phone tower positioning*. In other words, the 1996 telecommunications act *de facto* stated that the U.S. Federal government valued telecommunication industry profits over every single health impact of microwave frequency radiation, *no matter how serious* it is, to the American people. There have been several subsequent pieces of legislation that have made the situation still worse. The FDA had been given the power to regulate radiation emissions from cell phones and other devices that emit microwave/radiofrequency radiation, with cell phone regulation apparently being shared with the FCC.

#### What Can We Say About the FCC?

There was a very informative document about the FCC published by the Safra Institute for Ethics at Harvard University [127] entitled "Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates." One of the sections in that document shows why both the FCC role and the telecommunications industry role were so important with regard to the 1996 telecommunications act:

erythrocytes have a lifespan of only about 30 days; because of the inherent instability of micronuclei in replicating cells, such micronuclei in erythrocytes may possibly be generated over at most a 30 day period. It is misleading to describe this as a two year study when only the last 30 days are relevant to generating the marker being studied. 4. In rats and humans, erythrocytes containing micronuclei are selectively removed from circulation very quickly (see p. 459 of Ziemann et al [124]). While Ziemann et al claim that mice do not have a similar mechanism for selective rapid removal, the only citation that they provide is a study published by Chaubey et al (1993) showing that this was apparently true with Swiss mice; Ziemann et al [124] chose to use B6C3F1/CrIBR mice, a different inbred mouse strain which may well behave quite differently from Swiss mice. It follows from this that we have no idea whether the strain studied is similar to Swiss mice with regard to selective removal of erythrocytes containing micronuclei.

5. Ziemann et al [124] show that male and female mice behave quite differently with regard to levels of micronuclei (Tables I and III in [124]); however in their experimental study (Figure 2), males and females were combined in doing the statistics. What that inevitably does is to produce greater variations in micronuclei levels within different animal groups, making it substantially more difficult to detect any statistical significance among different animal groups in the study. It also means that it is important to use similar ratios of males and females in the experimental groups and we have no idea whether this was done or not. 6. In section A of Figure 2, there were only 8 animals in each group studied. In section B of Figure 2, there are only 5 to 9 animals in each animal group studied. These tiny numbers mean that there is only extremely low statistical power to detect any effects of EMF exposure and therefore these tiny studies make it almost impossible to say anything at all about the results. 7. The Ziemann et al study [124] provide none of their raw data; consequently we are in a situation where we have no way of judging whether their statistical analysis was done properly. We also have no way to use any such data as part of a meta-analysis of multiple studies, which may have much more power than do any single study (particularly such a tiny one). Consequently, the lack of statistical significance they report, cannot be properly assessed by the reader. 8. When one does a study looking at the possible effects of some variables, in this case a couple of simulated cell phone radiation studies, the most you can say about an apparent negative result is that "we did not see any statistically significant effects." When you have tiny studies such a described under 7 above, then the lack of statistical significance tells you almost nothing. But even with a very large study such as with thousands of mice including hundreds in each experimental group, all you can say is that "we did not see any statistically significant effects." 9. What do Ziemann et al conclude? They state in their title that there is an "Absence of genotoxic potential of 902 MHz (GSM) and 1747 (DCS) wireless communication signals." Did they study these EMFs in all organisms and all cell types? No of course not. Did they study all possible pulsation patterns of these two frequency EMFs? No of course not. Did they study all types of genotoxicity found following low-intensity EMF exposures? No, just one, micronuclei in erythrocytes in an inbred strain of mice. This title alone should tell any competent scientist that the paper is deeply flawed, completely apart from the preceding 8 flaws, with each of the 8 adding substantially to the flaws in this paper.

#### George Carlo Letter

Dr. George Carlo is an interesting and controversial figure who has both a law degree (JD) and a PhD in, I believe, epidemiology. He had worked in the telecommunications industry for years as head of the SAG and then WTR research arms. Dr. Carlo wrote an important letter to the heads of the telecommunications companies on October 7, 1999. The letter he sent to the head of AT&T is available on the internet [125]. In his book [126] Carlo lists all of the people sent the letter and also provides the text of the letter.

### Have There Been Individual Research Studies Designed to Fail and Therefore Corrupt the Scientific Literature?

The first example, that I am aware of, where false science has been produced to supposedly show that an important EMF observation was unreproducible also came from the U.S. It was described in Dr. Davis' book [77]. Dr. Allen H. Frey (pronounced Fry) published a paper in 1975 in Annals of the New York Academy of Science showing that low intensity pulsed EMF exposures produced a breakdown of the blood-brain barrier, the barrier in the blood vessels in the brain and the brain tissue that protects the brain from toxic chemicals and also infectious agents. The methodology that he used was to inject the fluorescent dye fluorescein into the blood (IV) and then use its fluorescence to detect whether and to what extent it penetrates into the brain tissue from the blood. A subsequent paper was published in 1978 [123], using similar methodology *except* that the fluorescein instead of being injected into the blood, was injected by intraperitoneal (IP) injection. When a compound is injected IP, it enters the blood only slowly over a substantial period of time, so that when one does a short term experiment looking at penetration through the blood-brain barrier, essentially nothing is seen. This was a transparent attempt to claim that the studies of Dr. Frey had been repeated with negative results, but the Frey studies had not been replicated.

I am aware of many papers that were flawed like the seven studies of simulated Wi-Fi, discussed near the end of Chapter 5 that were each touted by Foster and Moulder [110]. Let me remind you of what the flaws were in those seven studies. Firstly, each of them used EMFs that were the correct frequency for Wi-Fi but differed in pulsation from genuine Wi-Fi. Each of these studies used a reverberation exposure chamber which is predicted to decrease effects by both decreasing the polarization of the EMFs and increasing the destructive interference of the EMFs. They also used tiny numbers of animals for each study group, such that any statistics would have very low power. Finally, Foster and Moulder claimed each of them showed "no effect" when one can only at best claim there was no statistically significant evidence of an effect. Given the tiny numbers, the lack of statistical significance is of very little importance. I find that this pattern has been followed in a substantial number of additional studies.

What I want to discuss here is a paper that had each of those four properties but had several additional flaws, as well. I am aware of three legal proceedings in the U.S., where the industry side of that case touted the paper to be discussed, as being a particularly strong one. This paper by Ziemann et al [124] is entitled "Absence of genotoxic potential of 902 MHz (GSM) and 1747 MHz (DCS) wireless communication signals: In vivo two-year bioassay in B6C3F1 mice. In other words, the title claims that the 902 MHz frequency, studied and the 1747 MHz frequency also studied in the paper cannot cause DNA damage or other types of genotoxicity."

On p. 456 of Ziemann et al [124], the authors make clear that they are studying the effects of simulated cell phone radiation, not actual cell phone radiation. You will recall that Panagopoulos et al [110] found that almost all studies of genuine cell phone radiation found effects whereas less than half of simulated cell phone studies showed effects. This raises an important question about why Ziemann et al [124] opted to study simulated cell phone radiation. Much of the funding of the Ziemann et al paper (see pp. 462-463) came from industry sources. Funding source is not a flaw but it is a reason to look at the paper particularly closely. 2. The Ziemann et al [124] study used a stainless steel exposure chamber similar to the reverberation chambers discussed in Chapter 5 of this document. The chamber is predicted, to produce lower effects because of lowered polarization and increased destructive interference 3. The study is described as being a two year study of radiation effects. However the cells examined for micronuclei (their marker for genotoxicity (cellular DNA damage)), were mouse erythrocytes (red blood cells), and such

Berezow and Bloom Op-Ed Document: Recommendation to Limit Maryland School Wi-Fi Is Based on “Junk Science”

Berezow and Bloom, [120] start their 2017 op-ed with the claim that “The CEHPAC, an agency within Maryland’s Department of Health and Mental Hygiene, has recommended that schools reduce or eliminate students’ exposure to Wi-Fi because it believes wireless signals might cause cancer. *This is pure, unadulterated junk science. At least three separate, major areas of scientific knowledge can unambiguously confirm that wireless radiation is completely safe* (italics added).”

They continue with the physics [120], stating that “CEHPAC fails to realize that all radiation is not created equal. The energy of nuclear radiation, X-rays and UV light is high enough to damage our bodies and cause cancer. But other forms of radiation are energetically weak by comparison. They cannot cause cancer.” This argument has validity with regard to individual photons, as I stated in my first paper on the activation of VGCCs by EMFs [4], but it is completely bogus with regard to EMFs as a whole. It has been known for 70 years that a person walking in front of a high powered radar machine will rapidly die, but Berezow and Bloom claim that cannot happen because the fields are “energetically weak.” Furthermore, as discussed in Chapter 2 and elsewhere [5,11], the voltage sensor that controls the opening of the VGCCs is extraordinarily sensitive to electrical forces of EMFs, with the forces on the voltage sensor being approximately 7.2 million times greater than the forces on singly charged groups in the aqueous parts of our cells and tissues. It can be seen, therefore, that Berezow and Bloom [120] while claiming to be experts, are profoundly ignorant of the relevant physics.

Berezow and Bloom [120] state that “According to the NIH’s National Cancer Institute [121], well performed studies that included over one million people showed no connection between cell phone use and cancer.” There is no such statement in the NCI 2016 [121] document – I suggest the reader look it up – it differs substantially from the op-ed characterization of it. The NCI 2016 [121] document, states that “there is currently no consistent evidence that non-ionizing radiation increases cancer risk” (sole supporting citation in NCI 2016 [121] was SCENIHR 2015 [73]). It has been shown above in Chapter 5, that SCENIHR 2015 is not a credible source of information on this and as shown, in Chapter 1, there are 35 different reviews that each provide strong evidence that EMFs do cause cancer. So claiming, that EMF causation of cancer is, in Berezow & Bloom’s words, “pure, unadulterated junk science” is nonsense. What is amazing here is that the U.S. NTP study, published by Wyde et al [122], clearly shows that cell phones do cause cancer but it was completely left out of the Berezow & Bloom statement.

Let’s go to their third “major area of scientific knowledge” – Berezow and Bloom [120] state that “the only known health effects from Wi-Fi are due to psychosomatics.” That is, “people who believe that something will make them sick will report feeling ill, even if nothing is happening externally.” Some of the Wi-Fi studies (Table 1 in [11]) are cell culture studies, some are animal model studies where EMF exposures are compared with sham exposures. While there may be a very weak argument regarding some but not other human studies when they are not done blinded, there is no argument that effects in any of the other studies are caused by “psychosomatics.” Berezow and Bloom do not look at any of the 23 studies of Wi-Fi reviewed in [11], each of which showed effects and it is clear that most of them cannot possibly be due to psychosomatics. What is surprising here, is that the trillion dollar set of telecommunication industries, having been working on their propaganda for over a quarter of a century, is unable to produce a more convincing argument.

may have been sufficient to encourage the telecommunications industry to follow a similar, although, in my opinion, much more aggressive pathway.

One question that can be asked is whether there are any major international political figures who appear to have a good understanding of the EMF/health issue? When I was asked that question, I was able to come up with only one person. That person is President Vladimir Putin of Russia. This inference comes from an interview of Dr. Dietrich Klinghardt, who practices in Seattle, by Dr. Joseph Mercola, that occurred in December 2017, an interview that was entirely focused on EMF health effects [117]. In that context Dr. Klinghardt states that a lecture that Putin gave to the Russian assembly said, "We do not need to go to war with America. America is committing collective suicide by the way they are using electricity. We just have to wait until they are all in the psychiatric hospital." When I saw that, I asked myself whether it is plausible that Vladimir Putin has a deep understanding of the neuropsychiatric effects of the EMFs? And then I thought, of course, Vladimir Putin was the head of the KGB when the latter studies reviewed by Dr. Karl Hecht [28] were being done in the Soviet Union. The most important effects that were shown to be produced by the EMFs, in those studies, were the neuropsychiatric effects. Furthermore, the Putin statement apparently shows not only a substantial understanding of those effects but also the fact that they are cumulative and become irreversible, as shown in those studies [28] and in other studies discussed in Chapter 4. One thing that I would add is that President Putin apparently practices what he preaches. He avoids smart phones [118].

It is my opinion, that the CIA and other international intelligence agencies should examine these issues very carefully to assess whether they see the kinds of threats that I see. Those agencies are very good at obtaining information from various sources and determining probable threats to national and international security. It should not be difficult to come to an assessment, especially because some of us have done much of the work that needs to be done. The threat here is self-inflicted, it is not caused by any foreign power or set of powers. But it is the most serious national or international security threat that we have faced, in my opinion, with the exception of nuclear annihilation.

#### Propaganda:

In the initial days of the controversy regarding cell phones, in 1993, the industry developed a huge public relations effort in the face of lawsuits and adverse press reports impacting the industry. Paul Staiano, President of Motorola General Systems stated in a 1993 ABC 20/20 interview [119] that, "Forty years of research and more than ten thousand studies have proved that cellular phones are safe." So I asked how many studies of cell phone safety or lack thereof had been published by the end of 1993. The way I did that was to search in the PubMed database under (cell phones or cellular phones or mobile phones). I found about 11,000 hits, roughly 99% of them having nothing to do with health safety, and then looked at the few studies that had been published before the end of 1993. The only study I found that had any connection with health or safety, was one on driving safety while using a cellular phone, giving equivocal results with regard to driving safety. So there, were apparently no studies done on cell phone safety at that time. Furthermore, even if there had been any studies, they could not possibly show that "cellular phones are safe." At most they might show that there was no statistically significant evidence of an effect but that only shows that you have not proven an effect, not that you have proven the opposite. It can be seen, therefore, that this propaganda statement is complete nonsense. Furthermore, we know that the Panagopoulos et al [100] review, showed that 46 out of 48 genuine cell phone studies that they reviewed showed effects. So the facts are exactly opposite of the industry propaganda on this. If this was the beginning of propaganda in the U.S. let's look at something much more recent.

Gandhi reports that four different peer reviews of Chou's critique of my work indicated that Chou's critique of my work was 'scientific junk.' Only when the editor of the journal balked did the industry finally relent. Despite this success in beating back one attempt to discredit Gandhi's work, the effort to increase allowable amounts of radio frequency radiation was won on a major front. As the new chief of the standard-setting committee, Chou masterminded changes in the standards, and the committee, which now included a large majority of industry experts, issued new recommendations, ignoring Gandhi's analysis showing that these would effectively double exposures.

(I want to comment on this. I've published three papers on the physics of EMF action [4,5,11]. In each of them, I have taken the industry arguments about the physics seriously. Even though it was clear that the industry arguments were wrong, because of the clear existence of so many effects that occur at non-thermal levels of exposure, the industry arguments claiming that there could only be thermal effects were substantive and therefore, had to be considered. What I find, in the previous six paragraph, is that the industry itself is ready to throw out its own arguments, when they conflict with their ability to make massive profits. The issues here are very simple. Anyone with the most elementary understanding of the geometry of the head and a high school knowledge of physics, will know that a person with a smaller head and thinner skull will be exposed to higher brain levels of radiation from cell phones.)

What is obvious about this is that the industry does not care about health impacts, as long as they can maintain some deniability. What is also obvious is that the telecommunications industry can act to systematically corrupt an organization that, in effect, regulates the telecommunications industry. That in turn means that other organizations that, in effect, regulate the industry must be scrutinized for possible corruption. Those include ICNIRP, SCENIHR, WHO, the FCC and the FDA.

#### When Have Somewhat Similar Things Happened in Other Situations in the U.S.?

Is this approach to obfuscating the science unusual? Not really, but it appears to be much more extreme than usual, with the telecommunications industry and EMF effects. I suggest looking at the book on "Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health" by Dr. David Michaels. I've cited a book review of that book here [116]. The review starts out with the statement that "Creating doubt – at least enough to derail government regulation – is an art form long practiced and highly perfected by some sectors of private industry. In the book, Professor David Michaels vividly demonstrates how each such industry channels some of its profit to 'product defense firms' and 'self interested scientists' who conduct research designed to cast doubt on the science that supports regulation." (I will add that it also casts doubt on the science that may support lawsuits, as well.) "As a result of the doubt created, regulation is long-delayed and thousands of people (or perhaps millions) suffer and die unnecessarily." The industries that are covered in the book include tobacco, lead, asbestos, Merck (the maker of Vioxx), global warming, chromium, beryllium, artificial butter flavoring (diacetyl, the cause of often fatal popcorn lung). I think you will see parallels with what went on with SCENIHR (Chapter 5) and with the telecommunications industry actions (this chapter). Part of the problem with these precedents, is that nobody went to prison, despite the many deaths and injuries that were perpetrated and in most of these cases, the industries involved ended up making more money than they lost in the subsequent lawsuits. The precedent has been set that you can get away with almost anything if you are big enough and powerful enough and rich enough. That

Prof. Gandhi became concerned about the fact that both the head size and skull thickness of SAM was greater than that of most men and essentially all women and children and consequently began modeling a typical woman and typical 10 year old child, When he did that he found that the cell phone EMF exposures to the brain were much too high, even based on their own standards, standards that were and are only based on heating. The timing of these events was from 1975 through 1996. I will be quoting on what occurred subsequently. I have received permission from Dr. Devra Davis to make these quotes from pages 81 through 88 of her book Disconnect [77]. I will use a different font for those quotes so that you can see them easily.

Based on the new work he had produced, Gandhi called for a revision of the safety standards that regulated cell phones. The industry was stunned. For years, Gandhi had been one of those on whom they had counted. If Gandhi's work went uncontested, it would mean that children, women and men with smaller heads could not safely use some electronic devices or that these devices would have to be redesigned to emit less radio frequency radiation. *The industry's first response was to cut off all of Gandhi's funding.*

Going to p. 86 from [77]:

Gandhi explained that something has gone very wrong with standard setting in the United States in the past few years.

*"Starting in the late 1980s, I chaired the committee to set standards for radio-frequency exposures before all cell phones ever existed. About a decade ago, C.K. Chou, then at the City of Hope Hospital, replaced me. Within two years, Chou had moved. He became a senior executive with Motorola—a clear conflict of interest. The committee that advises as to cell phone standards is supposed to be independent and had never before been led by someone from the very industry it advises. Under Chou's leadership, the committee relaxed standards for cell phones as of 2005. Having spent my entire life developing models of the brain, I know how things work. I also know that what we have done here is to ratchet up exposures, without actually telling people we have done so. Today's standards for cell phones have more than doubled the amount of radio-frequency radiation allowed into the brain."*

The next quote starts at 2002, before the more than doubling of those radiation standards (pp. 87-88 from [77]).

By 2002 the gloves were off and the industry made it clear to Gandhi that they would take him on directly. Gandhi remembers being told by an industry colleague who was once a student and friend, "If you insist on publishing these papers saying that children get more exposed than adults and saying our test procedure is not valid, you can expect that we will not fund you."

Gandhi replied, "I am a university professor. I don't need your money."

Next industry tried to place an article by Chou critiquing Gandhi's models in the journal of which Gandhi had been editor and chief and in which he had published dozens of articles, and asked that either his (that is Gandhi's) article criticizing the grounds for setting standards be removed, or that they be allowed to publish Chou's rejoinder.

Then they talk about Media Strategy where Motorola stays in the background with SAG and CTIA in front.”

Three important things happened to Dr. Henry Lai at about this time [114,115]. In November 1994, before the War-Gaming memo had been written, a representative of the industry called the NIH claiming that money had been misspent from the Henry Lai grant for the DNA studies. Dr. Lai faxed the NIH an explanation which was accepted. However, the cutoff of new NIEHS funding appears to have occurred at this time, such that the industry pressure is likely to have been important. Furthermore [114] “The industry made a full-court press to discredit the DNA break study. A consistent and coordinated message was put out to marginalize Lai and Singh. For instance, in November 1994 (note: this was also before the War-Gaming memo was written), Q. Balzano, then a senior Motorola executive, wrote to us (Microwave News) that “Even if it is validated, the effects it purports to show may be inconsequential.” (My comment is that DNA breaks produced at intensity levels well below safety guidelines are *not* inconsequential. If they were, the industry would not be worrying so much about them). Ron Nessen, the CTIA’s top spokesman told a Florida newspaper that “It’s not very relevant.” He also tried to cast doubt on the comet assay pioneered by Singh to measure DNA breaks. It “may not be scientifically valid.” Quite a number of months later, the head of the WTR (successor organization to SAG) wrote a 6 page letter to the President of the University of Washington to try to get him to fire both Lai and Singh [114, 115]. Neither was fired, but this is what you face when you get results that the telecommunications industry does not like.

(My comments: The basic findings of the Lai and Singh studies have been replicated more than two dozen times, at this writing. There have also been many replicates of the findings of increased micronucleus formation and oxidized bases in the DNA following non-thermal EMF exposures. All of that replication and the 21 reviews that were listed in Chapter 1 each showing non-thermal cellular DNA damage have still not gotten the telecommunications industry to admit that these DNA effects are occurring. The industry apparently does not care about the replication but cares, rather, about having talking points. Furthermore, when the industry was trying to get Dr. Lai’s research funding cut off or later was trying to get both Lai and Singh fired, they were trying to *prevent* replication rather than encouraging it).

So Dr. Henry Lai was the first major scientist who came under vicious attack from the telecommunications industry and their allies, but he was certainly not the last. There are many such scientists including Prof. Adlkofer in Germany and Prof. Rüdinger in Austria. I know of nine others who have been attacked in the U.S. or in Europe. But here is a situation where the U.S. instead of leading world science in the right direction has been leading it into corruption. There are others.

I want to talk about another especially important case of such an attack on a U.S. scientist, that of Professor Om Gandhi. Gandhi is a professor at the University of Utah who, for many years was doing modeling of cell phone EMF exposures on the brains of humans. He was modeling such exposures for a substantial period of time based on the head of what was called standard anthropomorphic man (SAM). SAM was modeled from a 6 foot 2 inch, 200 pound man, a man in the upper 10% of men for head size and estimated skull thickness. He was doing such cell phone modeling for the telecommunications industry and received an important honor for this research. Because the safety guidelines are based only on thermal effects, the modeling was aimed at determining heating of the human brain by cell phone radiation.

Dr. Henry Lai from the University of Washington and a collaborator, NP Singh were using the alkaline comet assay, discussed earlier in this document to measure single stranded breaks in cellular DNA. They found a substantial elevation of the levels following low level EMF exposure in late 1994. Before that finding had even been published, they found that they were targets of a severe attack from the telecommunications industry. A key document providing evidence of this was what was called the "War-Gaming" memo [113], where an executive named Norm Sandler, head of the Corporate Communications Department of Motorola (at that time the largest cell phone company) sent the memo to Michael Kehs of a public relations campaign in Washington DC (dated Dec. 13, 1994), describing their planned response to these at that time, unpublished findings. The memo stated that "While this work raises some interesting questions about possible biological effects, it is our understanding that there are too many uncertainties—related to the methodology employed, the findings that have been reported and the science that underlies them—to draw any conclusions about its significance at this time. Without additional work in this field, there is absolutely no basis to determine whether the researchers found what they report finding—or that the results have anything at all to do with DNA damage or health risks, especially at the frequencies and power levels of power levels of wireless communication devices.

In discussing the frequency differentiation issue, we should be able to say that Lai-Singh and Sarkar were not conducted at cellular (that is cell phone) frequencies."

(My comments are as follows: It is true that Lai/Singh used a different frequency from that used by cell phones. So the industry was correct about that. But the findings also show that the industry claims that there cannot be any non-thermal effects are wrong, and that may be more important. Singh had a reputation of being a genuine international expert on comet assays, so I doubt that methodology was a problem. If this had nothing to do with DNA damage or health risks, Motorola would not be worrying about these findings. There were at that time (1994) previously published studies of EMF effects on cellular DNA including the concurrent Sarkar findings and including findings of chromosome breaks and rearrangements reported in [30]).

Further down, the memo: "I think we have sufficiently war-gamed the Lai-Singh issue, assuming that SAG (Scientific Advisory Group, a group linked to the telecom industry) and the CTIA (the umbrella telecom lobbying, publicity and legal organization) have done their homework. We want to run this by George Carlo and fill him in on contacts we have made."

Under Excerpts from Confidential Working Draft #3. Question and Response:

Q. How can Motorola downplay the significance of the Lai study when one of your own expert consultants is on record telling Microwave News that the results—if replicated—could throw previous notions of RF safety into question?

R. It is not a question of downplaying the significance of the Lai study. In his comments to Microwave News, Dr. Sheppard raised the key question: Can it be replicated and interpreted? We will wait and see."

(My comments: Replication needed to be done, so that was a valid point. The interpretation was and is clear – it is that EMF exposures produce large increases in the numbers of single strand breaks in the cellular DNA.)

"Action Planned: In addition to response materials prepared by SAG (see attached copies) we will work with SAG to identify appropriate experts to comment in general on the science of DNA research, in addition to any experts SAG may be able to recommend to publicly comment on one or both of these particular studies.

Societies Choose to Fail or Succeed.” In it he documents how each society that “chose to fail,” chose paths that had some short term gains but also had much more severe longer-term consequences. This is exactly what we have been doing with the EMFs, except that the consequences are much more severe than the collapse of one society – here all of the advanced technology societies on earth are at great risk.

### **Chapter 6: The U.S. Early Role in Recognizing Non-Thermal EMF Effects and How This Was Abandoned Starting in 1986: U.S. Failure to Research Health Impacts of Cell Phone Towers, Cell Phones, Wi-Fi, Smart Meters and Now 5G. What Is the Current Position of U.S. Government Agencies?**

We in the U.S. often take great pride in our scientific research. That is, of course, especially true of U.S. scientists, of which I am one. We have far more Nobel laureates than any other country so we think of ourselves as being the #1 science country in the world. But we have had, over the past 20 years, almost no scientific primary literature studies, either laboratory studies or epidemiological studies, on non-thermal microwave frequency EMF effects. We had much more such research in this area 35 years ago,

In terms of non-thermal effects of microwave frequency (sometimes called radiofrequency) EMFs, the U.S. government published documents acknowledging the existence of large numbers of such non-thermal effects. This included the 1971 U.S. Office of Naval Medical Research Institute Report [30] and the 1981 report from the National Aeronautics and Space Administration (NASA) [26]. The most recent such report acknowledging widespread non-thermal EMF effects was the NCRP report [112] published in 1986. It follows that for the past 32 years, the U.S. government has been in denial on what *had been* repeatedly recognized by our government and is of great importance to protecting our health. 1986 turns out to be a key year because in that year, the U.S. Environmental Protection Agency (EPA) shut down its in house research program studying non-thermal EMF effects. In 1986, the U.S. Office of Naval Research, which had been funding grants in this area, stopped funding any new grants – the already funded grants were funded to the end of the grant period but no new grants were funded past 1986. A few years later, I think it was in late 1994, a similar shutdown of grants went into effect at the NIEHS, the part of the National Institutes of Health (NIH) which supports environmental health research. In 1999, the last U.S. agency that had been funding some research in this area, The Department of Energy also shut down what little research it had been funding.

The consequences of those shutdowns is that of the 17 studies on people living near cell phone towers, not a single study has been done in the U.S. Of the 23 studies of effects of genuine Wi-Fi EMFs, each of them showing effects [11], not a single study was done in the U.S. Of the over 50 studies on genuine cell phone radiation effects, only single one was done in the U.S, the NTP cell phone cancer study required by the Congress. So we have a situation where the U.S. government is encouraging EMF exposures and, in many cases, making it impossible to avoid EMF exposures while doing nothing or almost nothing to ensure our safety. There are a tiny number of studies that somehow sneak through, such as the Aldad et al study (#12 in Table 4) discussed in the preceding chapter, which was funded through the Child and Human Development Institute of the NIH, but these are few and far between.

How did these shutdowns happen? I don't know about 1986 but have some useful information from 1994/1995.

### **Attacks by the Telecommunications Industry on Two U.S. Scientists**

### Summary of Flaws in SCENIHR 2015

The first set of flaws, is that SCENIHR is perfectly willing to make statements which they know or should have known are false. The most egregious example of this is the Speit/Schwarz controversy described at the beginning of this chapter where there are seven clear falsehoods *created by SCENIHR*, each of which greatly strengthens the telecommunications industry propaganda positions. There are many others, described in this chapter that are substantive, but less egregious than the Speit/Schwarz falsehoods.

There is a vast literature, both in the review literature and in the primary literature studies, that disagrees strongly with the SCENIHR positions and is completely ignored by SCENIHR. In a few cases, such studies are cited and very briefly discussed by SCENIHR but then they have no impact on the assessments that SCENIHR makes in the SCENIHR 2015 document [73]. In most cases, they are neither cited nor discussed. The situation here is similar to an organization that has two sets of books, the fake books that are used in public and then a genuine set of books that includes all of the data that are too inconvenient to be included in the fake set of books.

The finally, we have three additional considerations which interact with each other to produce the completely bogus logic used by SCENIHR and by other organizations that have taken positions similar those taken by SCENIHR. One of those considerations comes from our knowledge that pulsation pattern, cell type, polarization and frequency can all influence biological effects and that there are exposure windows that produce much larger effects than are seen with either lower or higher intensities. Our knowledge of these factors mean that it is possible for the telecommunications industry to foster any number of studies where it is unlikely that statistically significant evidence of effects will be seen. I have presented examples where this may have been done. One of the most bizarre things about the SCENIHR 2015 document [73] is that there is a sentence on p. 101 where they state "In some of these cases, the effect seemed to be dependent on the cell type investigated and by the electromagnetic parameters applied (frequency, modulation)." Modulation and pulsation are the same thing. They know about these three factors and therefore, they know that these factors may explain differences in results obtained by different studies. But they still falsely assume that such differences imply inconsistencies in results and falsely assume that it makes sense to simply count apparent positive and apparent negative studies as a way of assessing whether there are effects or not.

SCENIHR has often falsely stated that these studies show no effects as opposed to lack of statistical significance of any effects. SCENIHR 2015 document has 125 places where such bogus claims of "no effect" are found. They repeatedly claim the literature is inconsistent but studies done under different conditions are *not* inconsistent because they are more likely to be due to genuine biological heterogeneity of responses. The false logic described here is used, in turn, to support another highly pervasive false logic. I've documented where SCENIHR has simply counted numbers of studies showing so many findings of effects and some other number of findings of "no effect." But these numbers are meaningless, when the studies are done under different conditions and where the "no effect" numbers can easily be inflated by studies designed to produce such results. They are also, of course, meaningless, when large numbers of studies that show effects are eliminated by SCENIHR by the simple process of pretending they don't exist. You can see from this, that the entire logical framework behind the SCENIHR 2015 [73] document is completely bogus.

Lastly, before going on to the situation in the U.S. and with 5G, there is one other thing I want to state here. In 2005, Dr. Jared Diamond published a book [111] entitled "Collapse: How

The important roles of pulsation, window effects, frequency, cell type and polarization in determining biological activity of EMFs were discussed in Chapter 1, where it was noted that SCENIHR fails to pay attention to any of these roles. That failure shows up in many places in the document. In Tables 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 of SCENIHR 2015 [73], the discussion of each table centers on how many studies found apparent effects and how many did not. But these numbers are irrelevant to the issue of whether there are effects or not. In fact one can argue that the industry, knowing about the roles of each of these factors, could fund any number of studies designed to give apparent negative results just by manipulating these factors to minimize responses and by only studying tiny numbers of individuals to produce low statistical power. This approach closely describes the approach used in seven studies of what were claimed to be genuine Wi-Fi studies that were described by Foster and Moulder [110] in Table 4 of their paper. Those seven studies were shown [11] to all have used an EMF that was not genuine Wi-Fi, despite claims to the contrary. They each used one of two types of reverberation exposure chamber for their rodent exposures, with each type of chamber greatly lowering the polarization of the EMFs [11] and also generating some level of destructive interference from variable path lengths produced by the reverberations. Each of these changes from genuine Wi-Fi is predicted to lower effects. Foster and Moulder [110] concluded that there was no effect in any of these studies. However tiny numbers of rodents were studied, between 3 and 15 in each class, such that these studies have very low statistical power to conclude anything substantive.

It is not possible to conclude no effect even with large studies. At most one can claim that there is no statistically significant evidence of an effect. With tiny numbers, a claim of no effect is complete nonsense. This problem with “no effect” claims is documented in a section of Rothman et al., *Modern Epidemiology*, 3rd Edition, a highly respected source of information, cited over 19,000 times according to the Google Scholar database. It states (p. 151, bottom) that: “A common misinterpretation of significance tests is that there no difference between two observed groups because the null test is not statistically significant, in that P is greater than the cutoff for declaring statistical significance (again, usually 0.05). This interpretation confuses a descriptive issue (whether two observed groups differ) with an inference about the superpopulation. The significance test refers only to the superpopulation, not the observed groups. To say that the difference is not statistically significant means only that one cannot reject the null hypothesis that the superpopulation groups are the same; it does not imply that the two groups are the same.” All such claims of “no effect” are, therefore flawed. When they are made regarding very small studies with very low statistical power, they are particularly deeply flawed.

Were these seven studies designed to fail? I don't think we can say for certain but they certainly *look* as if they may have been. They also raise the serious question about whether the industry may be corrupting the science, by using their knowledge of the roles of pulsation, window effects, frequency, cell type and polarization.

The SCENIHR 2015 document has 127 places in the 221 pages of text where the term “no effect” was found (these can be easily found by searching the document using “no effect” for the search terms (that also picks up “no effects” statements. The first two of these 127 places are used properly, to describe the null hypothesis. *Each of the other 125 should not be there*, with each of those 125 overstating the case and therefore, improperly supporting the industry propaganda case.

In any case, the only way to show that there are inconsistencies or conflicts in the EMF literature is to carefully repeat studies finding such effects, not to flood the literature with studies done under other conditions. The logic used throughout SCENIHR 2015 [73] of just counting numbers of studies is deeply flawed.

elderly subjects but not for the young ones. This might point to a GSM-EMF related inter-hemispheric synchronization of alpha rhythms as a function of physiological aging.” Another related study (#by the same research group was also cited and discussed SCENIHR 2015 [73] as follows: “Vecchio et al. (2012a) used the same study design to investigate an exposure effect in patients with epilepsy. Data from 10 patients were compared to results from 15 age- matched controls from previous studies. Patients showed a statistically significant higher inter-hemispheric coherence of temporal and frontal alpha-rhythms under exposure as compared to control subjects. According to the authors, these results might indicate a GSM exposure effect on inter-hemispheric synchronization of the dominant (alpha) EEG rhythms in epileptic patients.”

What do I have to say about the two Vecchio studies? They are both based on an earlier 2007 study which showed that increased EEG coherence between the two hemispheres of the brain was produced by genuine cell phone EMF exposure. What the 2010 study (#5 in Table 4) shows is that the EMF-induced increased coherence is much higher in older adults than it is in younger adults. What the 2012 study (#10 in Table 4) shows is that the EMF-induced coherence seen in people with epilepsy is also much higher than in people without epilepsy. These three studies then provide large amounts of evidence for a neurological effect of cell phone radiation that is influenced by two variables, age and epilepsy. These findings should be looked at the context of the 23 reviews, listed in Chapter 1, each showing that EMFs produce both neurological and/or neuropsychiatric impacts on the brain. Here we have still another neurological effect, one that is influenced by age and epileptic condition. There are, then three important findings in these studies. One is that while we have had quite lot of evidence showing that children are more sensitive to EMF effects than adults, this is the first clear finding, to my knowledge, that suggests that older people may be more sensitive to a neurological effect. The linkage to epilepsy should not be surprising as some EHS people are reported to have seizures triggered by very low intensity EMF exposures. Finally, the communication between the two hemispheres of the brain has been known for over half a century to be through what is called the corpus callosum, a structure deeply buried in the middle of the brain, linking the two hemispheres. These effects increasing the coherence between the two hemispheres are probably produced, therefore, through the impact of the EMFs on the corpus callosum. That implies, in turn, that the EMFs act much more deeply in the brain than the industry claims is possible.

The problem with SCENIHR is that it lives in a totally fictional universe where none of those EMF effect reviews exist or at least none of them have any relevance to the SCENIHR world. Neither of the two Vecchio et al studies, discussed in the previous two paragraphs, are used by SCENIHR [73] to make any conclusions about EMF effects or lack thereof – they are only cited in the quote that I gave you. We know that because because the citations are by author’s last name and are, therefore easily searchable. Similarly, the Aldad et al (#12) study discussed two paragraphs further up, was also never cited except in the quotation given. So none of these three papers are used to assess any effects of EMFs or lack of effects. The same thing is true of the two reviews from Table 3 that were cited and discussed in [73]. They also were only cited in the quoted section and are never used to assess EMF effects or the mechanism of EMF action. As previously noted, there are several statements in SCENIHR 2015 [73] regarding lack of any available mechanism to explain claimed EMF effects, something that is directly contradicted by one of those cited and discussed reviews [4]. The consequence of all of that is that we have two very large and very consequential bodies of literature, the reviews on EMF effects and the literature on genuine cell phone radiation effects, which are entirely missing from any SCENIHR 2015 [73] conclusion.

Is There Another Systematic Effort by Industry to Corrupt the Literature that Has Been Followed to Some Extent by SCENIHR?

excitatory postsynaptic currents, allowing the authors to conclude “that these behavioral changes were due to altered neuronal developmental programming.” SCENIHR states the following about this study: “Neurodevelopment from a functional point of view was studied by Aldad et al. (2012) who exposed mice in utero and investigated them as adults for certain behavioural traits and electrophysiological characteristics. Exposure is poorly described but is reported to be to a muted telephone (900-1800 MHz) during the entire gestation period. After blinded investigations, the authors concluded that exposed animals displayed hyperactivity, memory deficiencies, decreased anxiety, and impaired glutamatergic transmission. Although the study employs relevant biological end-points, it cannot be used for any conclusions regarding pre-natal mobile phone exposure and functional development of the brain.” SCENIHR fails to tell us why they claim the exposures were poorly described nor do they provide any reasoning on why “it cannot be used for any conclusions regarding pre-natal mobile phone exposure and development of the brain.” It is hard to see how such results could be found unless there are substantial effects of pre-natal exposure. Because the study used genuine cell phone radiation, the effects seen are disturbing. It would be reasonable for SCENIHR to call for more studies of this type to see if they can be replicated. Having said that there have been five subsequent studies that I found where pre-natal mouse exposure to non-thermal EMFs produced substantial and somewhat similar adult neurological effects and or behavioral effects [102-106]. These five included exposures to Wi-Fi and to DECT (cordless phone) EMFs. These studies provide, then, strong evidence that prenatal exposures to EMFs can in animals, produce ADHD-like effects even into adulthood. They also show that during the late prenatal period, the developing brain is particularly sensitive to the effects of microwave frequency EMFs and raise the issue of how long after birth such sensitivity is also seen. It is common for SCENIHR and other industry friendly organizations to treat experimental studies as if they had the weaknesses of epidemiological studies. They don't because they can and do in these cases, directly demonstrate causation. In epidemiology, causation can be inferred but not directly demonstrated. What about epidemiological evidence with regard to EMF causation of ADHD? There are two such studies that each provide evidence for an association between prenatal cell phone exposures and development of ADHD [107,108]. SCENIHR knew about both of these, since it discusses one of them which is, in turn, based on the earlier one. Why then did SCENIHR not make the connection of those two studies with at Aldad study (#12 in Table 4)? That is of course an important failure, given that the Aldad study greatly strengthens the argument for EMF causation of ADHD.

Given the current situation where there are a total of 6 studies showing that pre-natal EMF exposures, including cell phone, Wi-Fi and cordless phone EMFs can cause ADHD-like effects in mice and two human epidemiological studies suggesting a similar mechanism in humans and the parallel between the huge increase in ADHD in humans and the huge increase in microwave frequency EMF exposures, is there any other type of evidence that supports a causal role for EMFs? It turns out there is. EMFs act primarily via VGCC activation (Chapter 20. Genetic polymorphism studies show that elevated VGCC activity has a role in causing ADHD [109], acting to a substantial extent prenatally. This is the way real science works. It is not the way that SCENIHR works.

The Vecchio et al 2010 paper (#5, Table 4) was discussed in SCENIHR 2015 as follows: “A study by Vecchio et al. (2010) analysed age-dependent EMF effects on alpha activity in waking EEGs in 16 older (47-84 years) and 15 younger subjects (20-37 years). Participants were exposed to a GSM signal (902.40 MHz, modulation frequencies: 8.33 and 217 Hz) for 45 min with a maximum SAR of 0.5 W/kg emitted by a commercially available mobile phone which was set using a test card in a double-blind cross-over paradigm. EEG was recorded for 5 min prior to and following exposure at 19 electrodes. The authors found an increased inter-hemispheric coherence of frontal alpha EEG activity after GSM exposure which was statistically significant for the

following EMF exposures. What is particularly important in this study is that high levels of two different antioxidants, vitamin C and vitamin E, were each shown to produce substantial protection of the testis structure from the EMF effects while partially normalizing the oxidative stress elevation. What this clearly shows is that the oxidative stress causes the testis tissue disruption. So we don't just have evidence for two effects, testis disruption and oxidative stress but we have strong evidence that one causes the other. It is exactly these connections that are essential for the progression of the science!

# 13 is another study not discussed by SCENIHR which is particularly important. It looks at cell phone radiation DNA damage produced in a mouse spermatocyte-derived cell line. What it finds is that DNA damage is particularly high when the cell phone is in the dialed or dialing mode, as opposed to a listen mode. They also state that the radiation levels in the three modes correspond, at least roughly, to the DNA damage effects seen. They also show that pretreatment with melatonin (which is known to have antioxidant effects) greatly lowers the DNA damage produced by the cell phone EMF exposures. This is similar to the study discussed immediately above because it again shows that one effect, DNA damage is produced by another effect, namely oxidative stress/free radical elevation. You will recall that as discussed in Chapter 2, cellular DNA damage following EMF exposure is produced by the attacks by on the DNA by peroxy nitrite derived free radicals. This study provides confirmation for that mechanism.

#14 is another study not discussed by SCENIHR which is also particularly important. It looks at the impact of cell phone radiation on kidney structure of rats, using six different measures of kidney structure. There were two groups of rats that were exposed to cell phone radiation which were both compared with each other and with normal unexposed control rats. The two exposed groups differed from each other in one group the kidney structure was assessed immediately following the 20 day exposure period. The second exposure group was also exposed for 20 days but was given 20 days subsequently with no exposure to see if the kidney structure spontaneously recovered. There was no recovery seen in the second group, showing that the kidney damage was effectively irreversible. In Chapter 3, several tissue remodeling type effects produced by EMF exposure appeared to be irreversible. Study #14 may add an additional such effect to that list.

#15 is another study not discussed by SCENIHR which is also particularly important. In this study control (unexposed) rats were compared with rats exposed to cell phone radiation for: less than 15 minutes per day, 15 to 30 minutes per day, 31 to 45 minutes per day or 45 to 60 minutes per day. Rats exposed to over 15 minutes per day of cell phone radiation showed type 2 diabetes onset-like effects, with higher fasting glucose levels and higher serum insulin levels. This appears to be, therefore a study showing important hormone dysfunction. It should be noted that the same research group has found similar changes in people living near cell phone towers [101]. Consequently, this is still another situation where findings in experimental animal studies appear to be directly applicable to humans.

Of the papers that were discussed, it is my opinion that the Aldad et al paper (#12, Table 4) is perhaps the most important. The paper starts out discussing the very large increase in ADHD that we have had in recent years, an increase which suggests that one or more environmental changes must be involved. This paper is from a distinguished laboratory, Hugh Taylor's laboratory at Yale, and was published in one of the highly respected Nature journals and the paper, at this writing has been cited 89 times, showing a high level of scientific interest in it. The paper showed that prenatal exposure of pregnant mice to cell phone radiation produced three highly statistically significant changes in the adult mice. These were a decrease in measured memory function, increase in hyperactivity and increase in anxiety. They also showed that there was a dose dependent decrease in an important neurological parameter, the frequency of miniature

<p>17. Luo Q, Jiang Y, Jin M, Xu J, Huang HF. 2013 Proteomic analysis on the alteration of protein expression in the early-stage placental villous tissue of electromagnetic fields associated with cell phone exposure. <i>Reprod Sci</i> 20:1055-1061. doi: 10.1177/1933719112473660.</p>	<p>To explore the possible adverse effects and search for cell phone electromagnetic field (EMF)-responsive proteins in human early reproduction, a proteomics approach was employed to investigate the changes in protein expression profile induced by cell phone EMF in human chorionic tissues of early pregnancy in vivo. <b>METHODS:</b> Volunteer women about 50 days pregnant were exposed to EMF at the average absorption rate of 1.6 to 8.8 W/kg for 1 hour with the irradiation device placed 10 cm away from the umbilicus at the midline of the abdomen. The changes in protein profile were examined using 2-dimensional electrophoresis (2-DE). <b>RESULTS:</b> Up to 15 spots have yielded significant change at least 2- to 2.5-folds up or down compared to sham-exposed group. Twelve proteins were identified-procollagen-proline, eukaryotic translation elongation factor 1 delta, chain D crystal structure of human vitamin D-binding protein, thioredoxin-like 3, capping protein, isocitrate dehydrogenase 3 alpha, calumenin, Catechol-O-methyltransferase protein, proteinase inhibitor 6 (PI-6; SerpinB6) protein, 3,2-trans-enoyl-CoA isomerase protein, chain B human erythrocyte 2,3-bisphosphoglycerate mutase, and nucleoprotein. <b>CONCLUSION:</b> Cell phone EMF might alter the protein profile of chorionic tissue of early pregnancy, during the most sensitive stage of the embryos. The exposure to EMF may cause adverse effects on cell proliferation and development of nervous system in early embryos. Furthermore, 2-DE coupled with mass spectrometry is a promising approach to elucidate the effects and search for new biomarkers for environmental toxic effects.</p>	<p>Listed under literature identified but not cited. SCENIHR knew about this paper but decided not to discuss it.</p>
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If you look through the studies described in Table 4, you will see multiple studies in oxidative stress/free radical damage, on changes in tissue structure (sometimes called remodeling), on cellular DNA damage, on male fertility (and also one on female fertility), on behavioral changes and on neurological changes. There is also one study on insulin/type 2 diabetes (hormonal effect). It follows from this that five of the effects that were extensively documented in large numbers of reviews (Chapter 1) are further demonstrated, as being caused by cell phone radiation, in these studies. In addition the tissue remodeling and proteomic changes discussed in Chapter 3 are also further demonstrated here. One question that needs to be raised with regard to SCENIHR is why so many clearly important primary literature studies of cell phone radiation (perhaps the most important source of human microwave irradiation) are not discussed in SCENIHR 2015. I will discuss certain particular articles that I think are particularly important for *particular reasons*. Subsequently, I will discuss the three articles that SCENIHR does discuss.

One of the more interesting studies not discussed by SCENIHR, is #11 in Table 4. This was published by a woman scientist in Saudi Arabia. What it shows is that 15, 30 or 60 minutes per day of cell phone radiation disrupts the structure of the rat testis and also produces high levels of oxidative stress as shown by measuring 5 different markers of oxidative stress. Such studies have been done for several decades, with oxidative stress having been shown in many different organs

<p>phones on fasting blood glucose. <i>Int J Occup Med Environ Health</i> 26:235-241. doi: 10.2478/s13382-013-0107-1.</p>	<p>phones on fasting blood glucose in Wistar Albino rats. <b>MATERIALS AND METHODS:</b> 40 Male Albino rats (Wistar Strain) were divided into 5 equally numerous groups. Group A served as the control one, group B received mobile phone radiation for less than 15 min/day, group C: 15-30 min/day, group D: 31-45 min/day, and group E: 46-60 min/day for a total period of 3 months. Fasting blood glucose was determined by using Spectrophotometer and serum insulin by Enzyme-linked Immunosorbent Assay (ELISA). The Homeostatic Model (HOMA-B) was applied for the assessment of <math>\beta</math>-cell function and (HOMA-IR) for resistance to insulin. <b>RESULTS:</b> Wister Albino rats exposed to mobile phone radiation for longer than 15 min a day for a total period of 3 months had significantly higher fasting blood glucose (<math>p &lt; 0.015</math>) and serum insulin (<math>p &lt; 0.01</math>) compared to the control group. HOMA-IR for insulin resistance was significantly increased (<math>p &lt; 0.003</math>) in the groups that were exposed for 15-30 and 46-60 min/day compared to the control rats. <b>CONCLUSION:</b>The results of the present study show an association between long-term exposure to activated mobile phones and increase in fasting blood glucose and serum insulin in Albino rats.</p>	
<p>16. Tsybulin O, Sidorik E, Brieieva O, Buchynska L, Kyrylenko S, Henshel D, Yakymenko I. 2013 GSM 900 MHz cellular phone radiation can either stimulate or depress early embryogenesis in Japanese quails depending on the duration of exposure. <i>Int J Radiat Biol</i> 89:756-763. doi: 10.3109/09553002.2013.791408.</p>	<p>Our study was designed to assess the effects of low intensity radiation of a GSM (Global System for Mobile communication) 900 MHz cellular phone on early embryogenesis in dependence on the duration of exposure. <b>MATERIALS AND METHODS:</b> Embryos of Japanese Quails were exposed in ovo to GSM 900 MHz cellular phone radiation during initial 38 h of brooding or alternatively during 158 h (120 h before brooding plus initial 38 h of brooding) discontinuously with 48 sec ON (average power density 0.25 <math>\mu\text{W}/\text{cm}^2</math>), specific absorption rate 3 <math>\mu\text{W}/\text{kg}</math>) followed by 12 sec OFF intervals. A number of differentiated somites were assessed microscopically. Possible DNA damage evoked by irradiation was assessed by an alkaline comet assay. <b>RESULTS:</b> Exposure to radiation from a GSM 900 MHz cellular phone led to a significantly altered number of differentiated somites. In embryos irradiated during 38 h the number of differentiated somites increased (<math>p &lt; 0.001</math>), while in embryos irradiated during 158 h this number decreased (<math>p &lt; 0.05</math>). The lower duration of exposure led to a significant (<math>p &lt; 0.001</math>) decrease in a level of DNA strand breaks in cells of 38-h embryos, while the higher duration of exposure resulted in a significant (<math>p &lt; 0.001</math>) increase in DNA damage as compared to the control. <b>CONCLUSION:</b> Effects of GSM 900 MHz cellular phone radiation on early embryogenesis can be either stimulating or deleterious depending on the duration of exposure.</p>	<p>Listed under literature identified but not cited. SCENIHR knew about this paper but decided not to discuss it.</p>

<p>DNA damage in a mouse spermatocyte-derived cell line: a protective role of melatonin. <i>Int J Radiat Biol.</i> 2013. 89: 993-1001. doi: 10.3109/09553002.2013.811309.</p>	<p>were significantly higher increases in the dialed and dialing modes than in the listen mode. Interestingly, these results were consistent with the radiation intensities of these modes. However, the DNA damage effects of MPR in the dialing mode were efficiently attenuated by melatonin pretreatment.</p> <p>CONCLUSIONS: These results regarding mode-dependent DNA damage have important implications for the safety of inappropriate mobile phone use by males of reproductive age and also suggest a simple preventive measure: Keeping mobile phones as far away from our body as possible, not only during conversations but during 'dialed' and 'dialing' operation modes. Since the 'dialed' mode is actually part of the standby mode, mobile phones should be kept at a safe distance from our body even during standby operation. Furthermore, the protective role of melatonin suggests that it may be a promising pharmacological candidate for preventing mobile phone use-related reproductive impairments.</p>	
<p>14. Koca O, Gökçe AM, Öztürk MI, Ercan F, Yurdakul N, Karaman MI. 2013 Effects of intensive cell phone (Philips Genic 900) use on the rat kidney tissue. <i>Urol J.</i> 2013 Spring;10:886-891.</p>	<p>To investigate effects of electromagnetic radiation (EMR) emitted by cell phones on the rat kidney tissue.</p> <p>MATERIALS AND METHODS: Twenty-one male Albino rats were divided into 3 groups, each comprising 7 rats. Group 1 was exposed to a cell phone in speech mode for 8 hours/day for 20 days and their kidneys were removed. Group 2 was exposed to EMR for 20 days and then their kidneys were removed after an interval of 20 days. Cell phone used in the present study was Philips Genie 900, which has the highest specific absorption rate on the market. RESULTS: Light microscopic examination of the kidney tissues obtained from the first group of rats revealed glomerular damage, dilatation of Bowman's capsule, formation of large spaces between the tubules, tubular damage, perivascular edema, and inflammatory cell infiltration. The mean severity score was <math>4.64 \pm 1.7</math> in group 1, <math>4.50 \pm 0.8</math> in group 2, and 0 in group 3. While there was no significant difference between group 1 and group 2 (<math>P &gt; .05</math>), the mean severity scores of groups 1 and 2 were significantly higher than that of the control group (<math>P = .001</math> for each).</p> <p>CONCLUSION: Considering the damage in rat kidney tissue caused by EMR-emitting cell phones, high-risk individuals should take protective measures.</p>	<p>Not cited and not discussed by SCENIHR.</p>
<p>15. Meo SA, Al Rubeaan K. 2013 Effects of exposure to electromagnetic field radiation (EMFR) generated by activated mobile</p>	<p>Extensive use of mobile phones has been accompanied by a common public debate about possible adverse effects on human health. No study has been published so far to establish any association between the fastest growing innovation of mobile phone and fasting blood glucose. The aim was to determine the effects of exposure to electromagnetic field radiation generated by mobile</p>	<p>Not cited and not discussed by SCENIHR.</p>

<p>telephone and the protective effects of the antioxidants vitamins C and E. Clinics 67:785-792</p>	<p>radiation on the testes.  <b>MATERIALS AND METHODS:</b> The treatment groups were exposed to an electromagnetic field, electromagnetic field plus vitamin C (40 mg/kg/day) or electromagnetic field plus vitamin E (2.7 mg/kg/day). All groups were exposed to the same electromagnetic frequency for 15, 30, and 60 min daily for two weeks. <b>RESULTS:</b> There was a significant increase in the diameter of the seminiferous tubules with a disorganized seminiferous tubule sperm cycle interruption in the electromagnetism-exposed group. The serum and testicular tissue conjugated diene, lipid hydroperoxide, and catalase activities increased 3-fold, whereas the total serum and testicular tissue glutathione and glutathione peroxidase levels decreased 3-5 fold in the electromagnetism-exposed animals.  <b>CONCLUSION:</b> Our results indicate that the adverse effect of the generated electromagnetic frequency had a negative impact on testicular architecture and enzymatic activity. This finding also indicated the possible role of vitamins C and E in mitigating the oxidative stress imposed on the testes and restoring normality to the testes.</p>	<p>SCENIHR knew about this paper but decided not to discuss it.</p>
<p>12. Aldad TS, Gan G, Gao X-B, Taylor HS. 2012 Fetal radiofrequency radiation from 800-1900 MH-rated cellular telephone affects neurodevelopment and behavior in mice. Scientific Rep 2, article 312.</p>	<p>Neurobehavioral disorders are increasingly prevalent in children, however their etiology is not well understood. An association between prenatal cellular telephone use and hyperactivity in children has been postulated, yet the direct effects of radiofrequency radiation exposure on neurodevelopment remain unknown. Here we used a mouse model to demonstrate that in-utero radiofrequency exposure from cellular telephones does affect adult behavior. Mice exposed in-utero were hyperactive and had impaired memory as determined using the object recognition, light/dark box and step-down assays. Whole cell patch clamp recordings of miniature excitatory postsynaptic currents (mEPSCs) revealed that these behavioral changes were due to altered neuronal developmental programming. Exposed mice had dose-responsive impaired glutamatergic synaptic transmission onto layer V pyramidal neurons of the prefrontal cortex. We present the first experimental evidence of neuropathology due to in-utero cellular telephone radiation. Further experiments are needed in humans or non-human primates to determine the risk of exposure during pregnancy.</p>	<p>Was cited and discussed, see text.</p>
<p>13. Liu C, Gao P, Xu SC, Wang Y, Chen CH, He MD, Yu ZP, Zhang L, Zhou Z. 2013 Mobile phone radiation induces mode-dependent</p>	<p>A mouse spermatocyte-derived GC-2 cell line was exposed to a commercial mobile phone handset once every 20 min in standby, listen, dialed or dialing modes for 24 h. DNA damage was determined using an alkaline comet assay. <b>RESULTS:</b> The levels of DNA damage were significantly increased following exposure to MPR in the listen, dialed and dialing modes. Moreover, there</p>	<p>Not cited and not discussed by SCENIHR.</p>

	<p>test also showed that significantly more damages resulted after 30 min than after 15 min of phone use.</p> <p>CONCLUSIONS: A short-term exposure (15 and 30 min) to RFR (900-MHz) from a mobile phone caused a significant increase in DNA single-strand breaks in human hair root cells located around the ear which is used for the phone calls.</p>	
<p>10. Vecchio F, Tombini M, Buffo P, Assenza G, Pellegrino G, Benvenega A, Babiloni C, Rossini PM. 2012 Mobile phone emission increases inter-hemispheric functional coupling of electroencephalographic <math>\alpha</math> rhythms in epileptic patients. <i>Int J Psychophysiol</i> 84:164-171. doi: 10.1016/j.ijpsycho.2012.02.002.</p>	<p>It has been reported that GSM electromagnetic fields (GSM-EMFs) of mobile phones modulate - after a prolonged exposure - inter-hemispheric synchronization of temporal and frontal resting electroencephalographic (EEG) rhythms in normal young and elderly subjects (Vecchio et al., 2007, 2010). Here we tested the hypothesis that this can be even more evident in epileptic patients, who typically suffer from abnormal mechanisms governing synchronization of rhythmic firing of cortical neurons. Eyes-closed resting EEG data were recorded in ten patients affected by focal epilepsy in real and sham exposure conditions. These data were compared with those obtained from 15 age-matched normal subjects of the previous reference studies. The GSM device was turned on (45 min) in the "GSM" condition and was turned off (45 min) in the other condition ("sham"). The mobile phone was always positioned on the left side in both patients and control subjects. Spectral coherence evaluated the inter-hemispheric synchronization of EEG rhythms at the following frequency bands: delta (about 2-4 Hz), theta (about 4-6 Hz), alpha1 (about 6-8 Hz), alpha2 (about 8-10 Hz), and alpha3 (about 10-12 Hz). The effects on the patients were investigated comparing the inter-hemispheric EEG coherence in the epileptic patients with the control group of subjects evaluated in the previous reference studies. Compared with the control subjects, epileptic patients showed a statistically significant higher inter-hemispheric coherence of temporal and frontal alpha rhythms (about 8-12 Hz) in the GSM than "Sham" condition. These results suggest that GSM-EMFs of mobile phone may affect inter-hemispheric synchronization of the dominant (alpha) EEG rhythms in epileptic patients. If confirmed by future studies on a larger group of epilepsy patients, the modulation of the inter-hemispheric alpha coherence due to the GSM-EMFs could have clinical implications and be related to changes in cognitive-motor function.</p>	<p>Was cited and discussed – see text.</p>
<p>11. Al-Damegh MA. 2012 Rat testicular impairment induced by electromagnetic radiation from a conventional cellular</p>	<p>OBJECTIVE: The aim of this study was to investigate the possible effects of electromagnetic radiation from conventional cellular phone use on the oxidant and antioxidant status in rat blood and testicular tissue and determine the possible protective role of vitamins C and E in preventing the detrimental effects of electromagnetic</p>	<p>Listed under literature identified but not cited.</p>

217.	active mobile phone handsets have a dramatic impact on the behavior of the bees, namely by inducing the worker piping signal. In natural conditions, worker piping either announces the swarming process of the bee colony or is a signal of a disturbed bee colony.	
8. Cammaerts MC, Debeir O, Cammaerts R. 2011. Changes in <i>Paramecium caudatum</i> (protozoa) near a switched-on GSM telephone. <i>Electromagn Biol Med</i> . 2011 Mar;30(1):57-66. doi: 10.3109/15368378.2011.566778.	The protozoan <i>Paramecium caudatum</i> was examined under normal conditions versus aside a switched-on GSM telephone (900 MHz; 2 Watts). Exposed individuals moved more slowly and more sinuously than usual. Their physiology was affected: they became broader, their cytopharynx appeared broader, their pulse vesicles had difficulty in expelling their content outside the cell, their cilia less efficiently moved, and trichocysts became more visible. All these effects might result from some bad functioning or damage of the cellular membrane. The first target of communication electromagnetic waves might thus be the cellular membrane.	Listed under literature identified but not cited. SCENIHR knew about this paper but decided not to discuss it.
9. Çam ST, Seyhan N. 2012 Single-strand DNA breaks in human hair root cells exposed to mobile phone radiation. <i>Int J Radiat Biol</i> 88:420-424. doi: 10.3109/09553002.2012.666005.	To analyze the short-term effects of radiofrequency radiation (RFR) exposure on genomic deoxyribonucleic acid (DNA) of human hair root cells. <b>SUBJECTS AND METHODS:</b> Hair samples were collected from eight healthy human subjects immediately before and after using a 900-MHz GSM (Global System for Mobile Communications) mobile phone for 15 and 30 min. Single-strand DNA breaks of hair root cells from the samples were determined using the 'comet assay'. <b>RESULTS:</b> The data showed that talking on a mobile phone for 15 or 30 min significantly increased ( $p < 0.05$ ) single-strand DNA breaks in cells of hair roots close to the phone. Comparing the 15-min and 30-min data using the paired t-	Not cited and not discussed by SCENIHR.

**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

**VIA E-MAIL & FIRST CLASS MAIL**

Cheryl Higgins  
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**RECEIVED**

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PA PUBLIC UTILITY COMMISSION  
SECRETARY'S BUREAU

Date: July 3, 2019



Devin T. Ryan