BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PETITION OF PECO ENERGY COMPANY	:	
FOR APPROVAL OF ITS ACT 129 ENERGY	:	
EFFICIENCY AND CONSERVATION PLAN	:	DOCKET NO. M-2009-2093215
AND EXPEDITED APPROVAL OF ITS	:	
COMPACT FLUORESCENT LAMP	:	
PROGRAM	:	

VOLUME V OF V

ACT 129 ENERGY EFFICIENCY AND CONSERVATION PLAN

APPENDIX F-9

July 1, 2009

APPENDIX F-9.

STAKEHOLDER MEETING PRESENTATIONS

PECO

Act 129 - Key Issues

Energy Efficiency & Conservation
External Stakeholder Meeting
12/17/2008

Rich Schlesinger

Act 129 – Key Issues

- ✓ Energy Efficiency Targets
  - PECO Specific
- ✓ Demand Targets
  - PECO Specific
- ✓ Other Key Areas

Act 129 - Consumption Targets

- ✓ Reduction target of 1% by May 31, 2011
  - For PECO this is estimated to equal ~ 400,000,000 kWh*
  - We will have 15 to 19 months to achieve the goal
    - Starts no earlier than 11/1/09
    - Start could be as late as 3/1/10 depending on PUC approval
    - End date is 5/31/11
- ✓ 3% target by May 31, 2013
  - For PECO this is estimated to equal ~ 1,200,000,000 kWh*
  - We will have 24 months to achieve the incremental 2% and reach the 3% total
    - Time period is 6/1/11 to 5/31/13

* 2007 values used for demonstration purposes – Actual targets to be determined from forecast for 6/1/09 to 5/31/10 period

PECO Specifics for Consumption Targets

- ✓ PECO electric customer base is approximately 1.6M
  - 1,400,000 residential customers
  - 154,000 SC&I customers
  - 3,100 Large C&I customers
  - 1,100 Lighting customers

- ✓ To reach the 1% and 3% goals, PECO customers will have to reduce 400,000,000 kWh and 1,200,000,000 kWh respectively
- ✓ ***This is equal to the total usage of 41,000 residential customers by mid-2011 and 124,000 by mid-2013!***

PECO Specifics for Consumption Targets

- ✓ Looked at another way*:
  - 14,200 homes by 2011; 42,300 homes by 2013
    - Avg. annual usage = 9,700 kWh/yr
  - 1,542 Small C&I by 2011; 4,592 SC&I by 2013
    - Avg. annual usage = 57,500 kWh/yr
  - 30 Large C&I by 2011; 91 Large C&I by 2013
    - Avg. annual usage = 5,700,000 kWh/yr
  - 24 Municipal/street lighting by 2011; 71 by 2013
    - Avg. annual usage =170,000 kWh/yr

*Based on the current class usage and assuming a proportional reduction per class

Act 129 - Demand Targets

- ✓ 4.5% target by May 31, 2013 off of highest 100 hrs peak demand
- ✓ We will have 39 to 43 months to achieve the goal
  - Starts no earlier than 11/1/09
  - Start could be as late as 3/1/10 depending on PUC approval
  - End date is 5/31/13
- ✓ Baseline = peak demand from June 1, 2007 – May 31, 2008
- ✓ PECO supports a calculation based on the avg. of the 100 highest hrs. times the 4.5%

PECO Specifics for Demand Targets

- ✓ PECO's 2007 summer peak demand was:
  - 8,549 MW = highest hour
  - 7,534 MW = 100th highest hour
  - Average = 7,900 MW
- ✓ 4.5% target equals 355 MW based on the average
- ✓ The target would equal to 385 MW if single highest peak was used
- ✓ FYI: PECO's all-time peak = 8,932 MW from 2006
  - 2007 peak was only 4% lower than all-time peak

Act 129 – PECO Key Issues

- ✓ PECO supports the savings approach vs. the ceiling approach for the consumption goals
  - PECO supports a "deemed" savings approach for std. EE&C measures and "verified" savings for custom measures
  - Savings calculation should be cumulative in nature not annual based
- ✓ Calculation of demand targets (capability approach) and the development of temperature/humidity reduction processes
  - Desire to leverage existing demand response programs
- ✓ Measures should count for both consumption and demand where appropriate
- ✓ Load forecast – needs to be approved sooner than later
- ✓ Adopt the TRC test as found in the California Std. Practice Manual

Act 129 – PECO Key Issues

- ✓ Adopt the Pennsylvania updated AEPS Total Resource Manual
  - Need PUC to release new draft ASAP for review
- ✓ CSP bidding process / CSP approval process
  - Needs to be in place prior to EE&C plan submission
- ✓ CSP contract "template", not executed contract, to be approved prior to EE&C plan submission
  - CSP contracts should be executed after plan approval
- ✓ Cost cap is 2% of PECO's total revenue as of 12/31/06 and is an annual value

Act 129 - Key Issues

QUESTIONS

MEETING THE NEEDS OF THE CONSTANTLY CHANGING ENERGY INDUSTRY

Global Energy Partners, LLC
An Employee - Owned Company

Targeted Energy-Efficiency Services Study for PECO Energy Company

Stakeholder Meeting #1

Greg Wikler
Global Energy Partners, LLC

Harrisburg, PA
December 17, 2008

PECO

Presentation Outline

- About Global Energy Partners, LLC
- EE/DR Potential – A National and Regional Overview
- Targeted Energy Efficiency Services Study for PECO
- Methodology and Approach
- Discussion

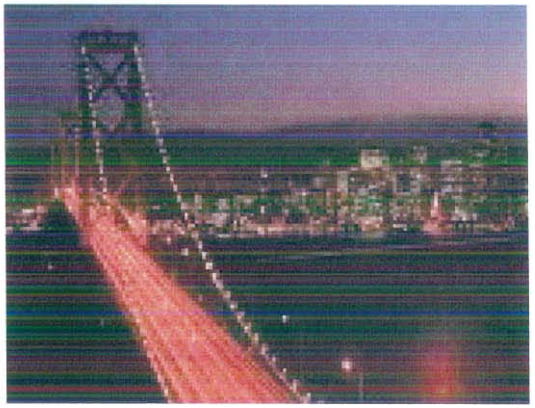
Global Energy Partners, LLC

Headquarters: Lafayette, California (San Francisco Bay Area)

Operations in CA, MO, OR, CO, NC, GA

45+ Employees

- Engineers
  - mechanical, chemical, electrical
- Economists, business administrators
- Most with advanced degrees



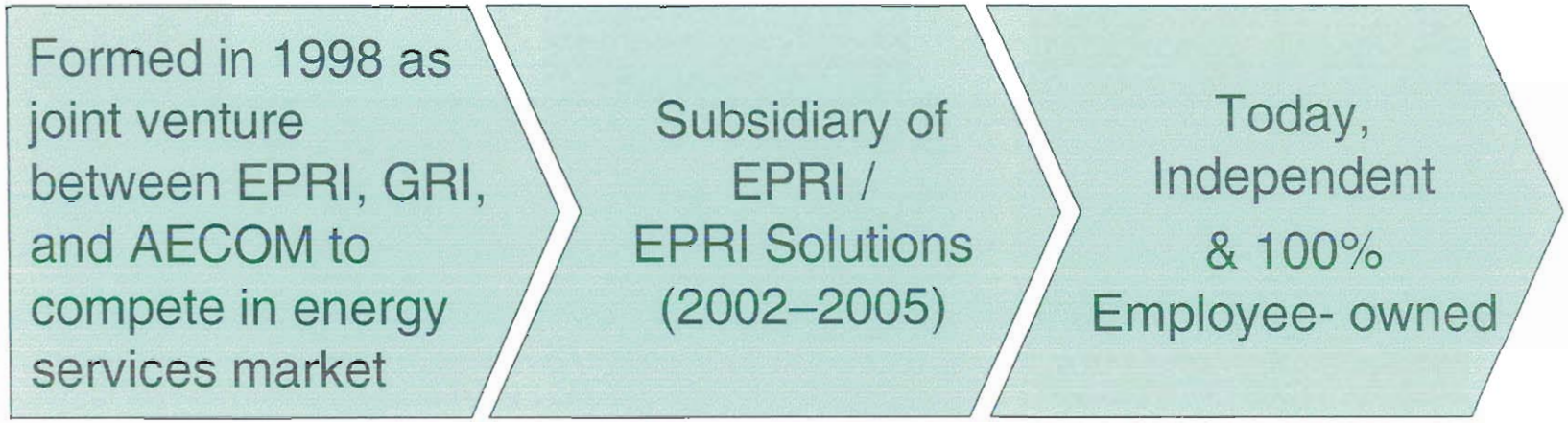
20+ Dedicated consultants

Employee-owned

Finalist in the Wall Street Journal's "Winning Workplaces - Best Small Business in North America" competition

Global Energy Partners, LLC
An Employee-Owned Company

A Brief History of Global Energy Partners



- Acquires NEOS Corp. in 2000 – (NEOS founded in 1983)
- EPRI buys out partners (2001/04). Wholly-owned subsidiary of EPRI through EPRI Solutions, Inc. (2004/05)
- Global buys-out EPRI's ownership on December 31, 2005

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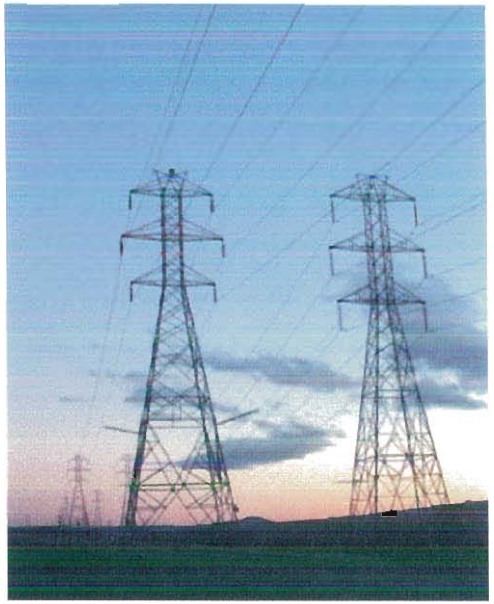
Energy Planning and Analysis Practice Overview

Over 20 years advising utilities, government agencies and regulatory bodies on demand-side and supply-side energy planning

- Energy efficiency & demand response potential assessments
- Energy efficiency and demand response program design
- Integrated resource planning (IRP)
- Utility rate cases
- Expert witness testimony for utility regulatory filings



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Energy Planning – Representative Projects

- Assessment of Energy and Capacity Savings Potential in Iowa (Alliant Energy, Aquila, MidAmerican Energy and United Cities Gas, 2002)
- Energy Efficiency Plan Development and Regulatory Support (Alliant Energy/Interstate Power & Light, 2002-2008)
- Energy Efficiency Potential Study (Great River Energy, 2003)
- Peak Load Reduction Program Market Characterization, Market Assessment and Causality Action Plan (NYSERDA, 2003-2004)
- Energy Efficiency Potential Study, IRP Program Planning and Expert Witness Testimony (Hawaiian Electric Company, 2003-2008)
- Capacity Reduction Technology Potential Study (BC Hydro, 2004-2005)
- Assessment of Energy Efficiency, Demand Response and Distributed Generation Potential on the Olympic Peninsula and Southern Oregon Coast (Bonneville Power Administration, 2004-2006)

Energy Planning – Representative Projects (cont.)

- **Demand-Side Planning Guidebook (EPRI, 2007-2008)**
- Assessment of DR Options (Bonneville Power Administration, 2008) with Brattle Group
- Demand Response Potential Assessment (Portland General Electric, 2008) with Brattle Group
- **National Energy Efficiency Potential Study (EPRI and EEI, 2007-2008) with Brattle Group**
- National Assessment of Demand Response (Federal Energy Regulatory Commission, 2008) with Brattle Group
- Energy Efficiency Potential and End-Use Allocation Study (Consolidated Edison, 2008)

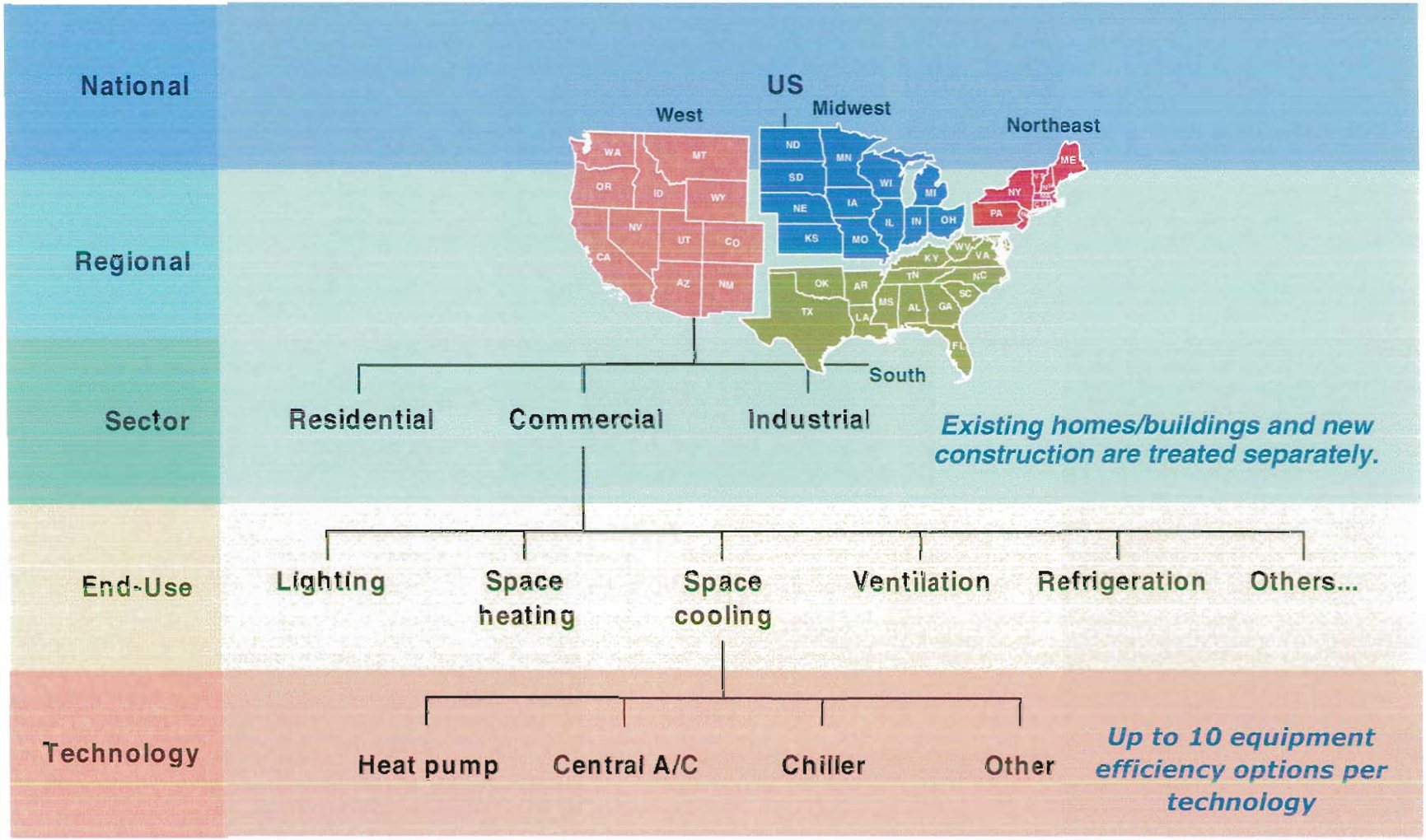
EE/DR Potential – Key Findings from Recently Completed EPRI National Study

By 2020, the electric utility industry can ***realistically*** expect to offset a substantial share of the growth in electricity sales through energy-efficiency programs.

This represents:

- 207,000 MWh
- 5% of total load in 2020
- Reduction in growth rate from 1.2% to 0.8% per year

Analysis Approach for National Potential Study



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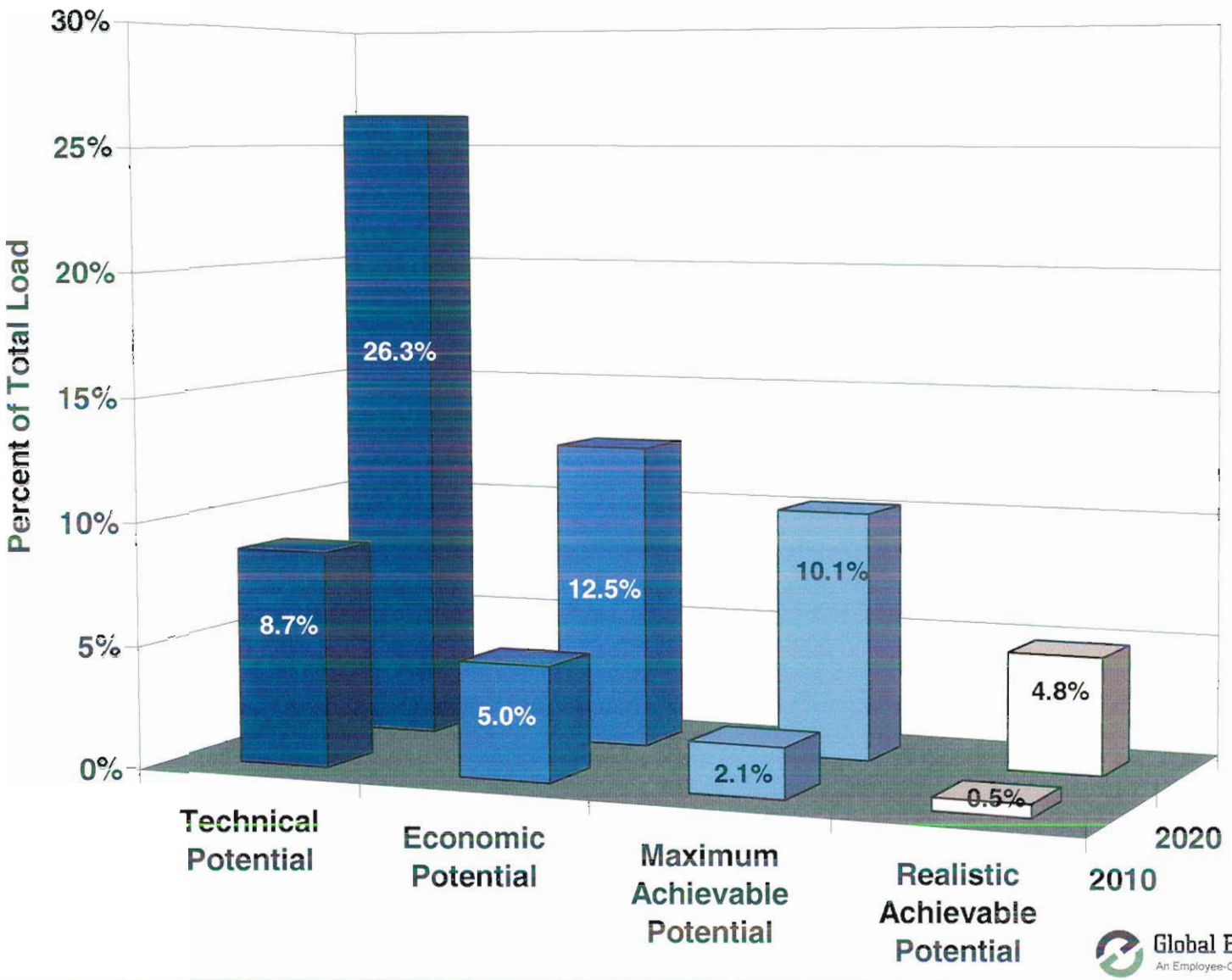
U.S. Energy Efficiency Potential Percent of Total Load (2010-2020)



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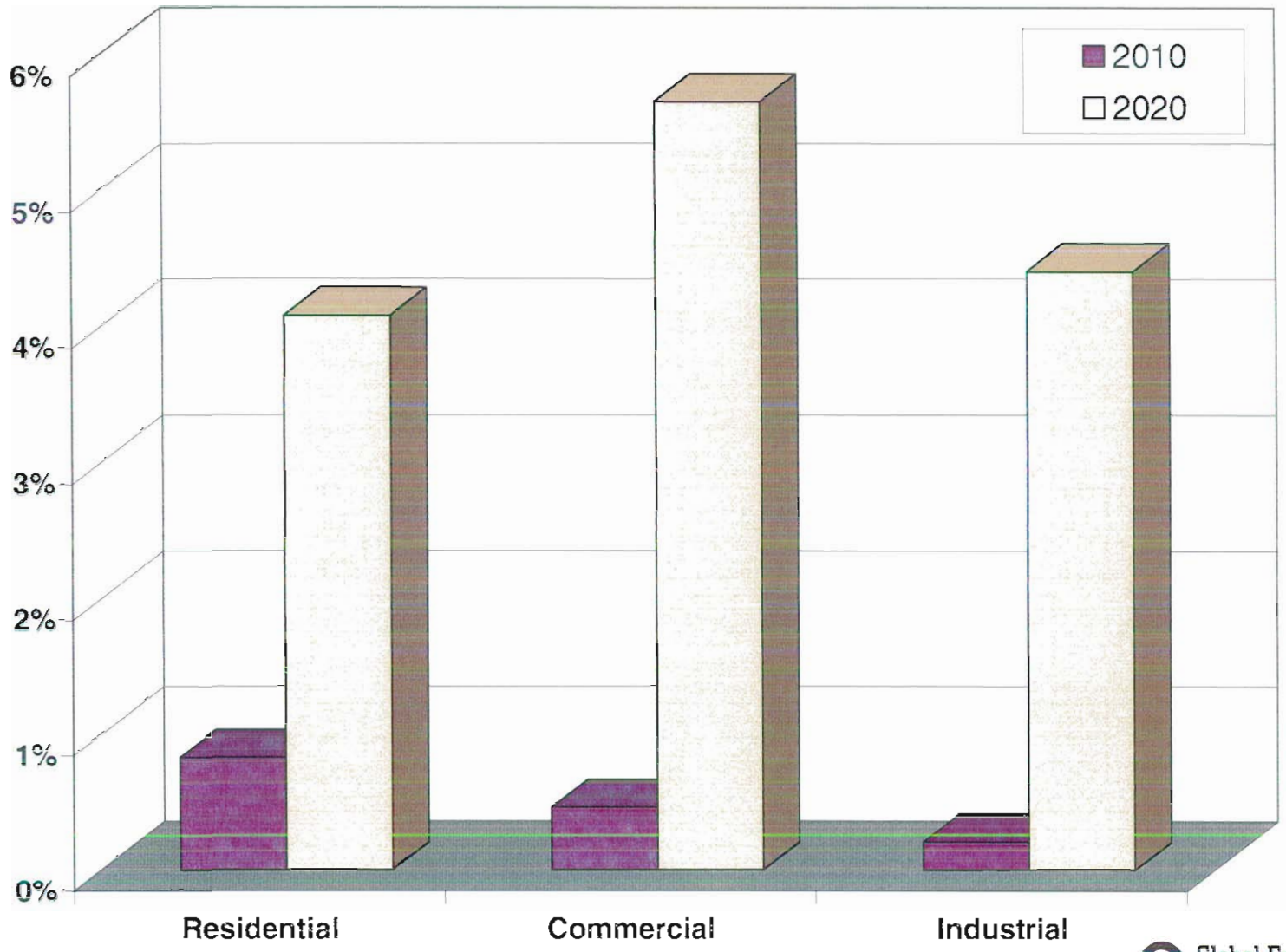
U.S. Realistic Achievable Potential by Sector (2010-2020)



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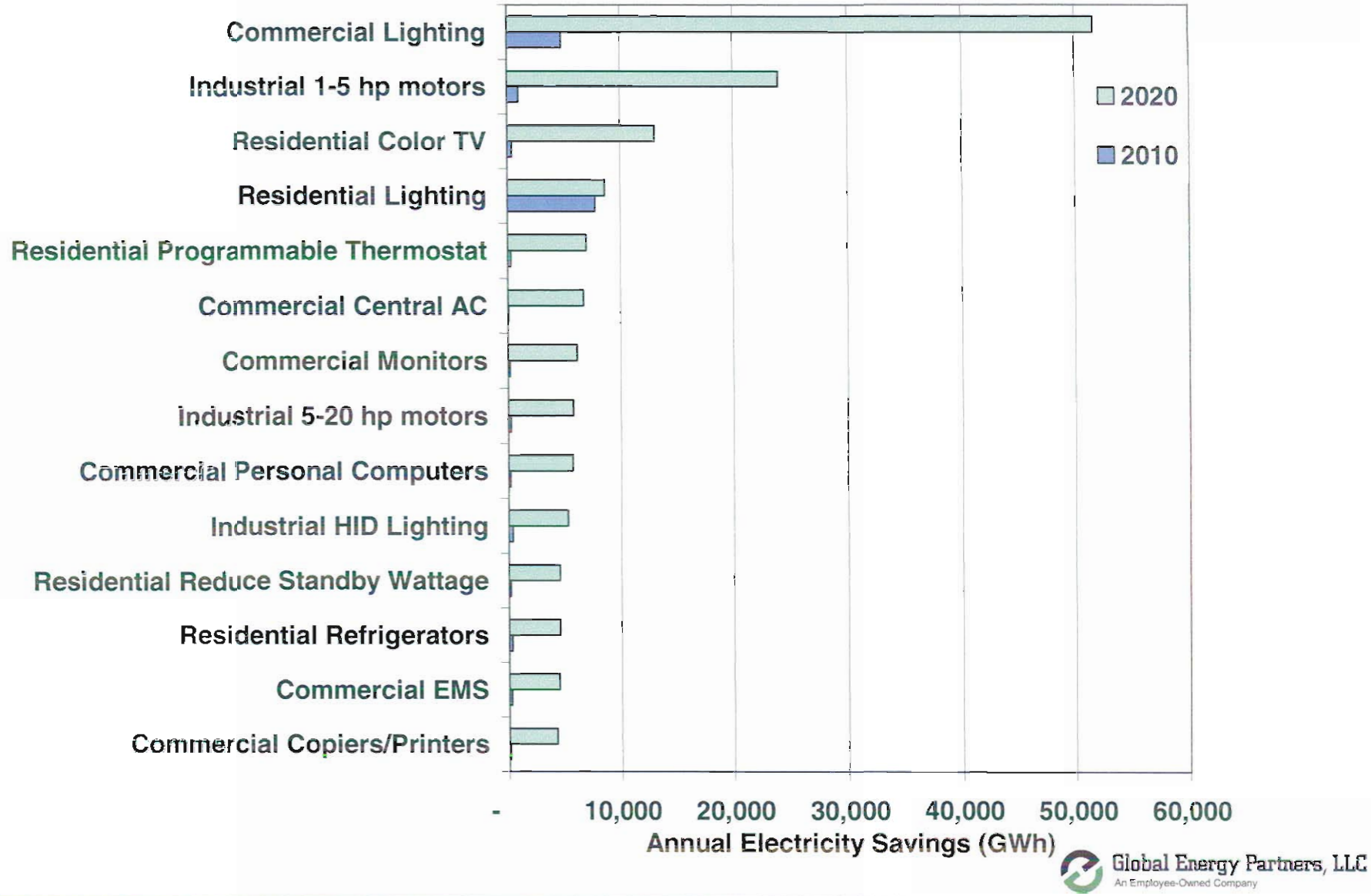
US Potential – Top Measures in Realistic Achievable Potential (2010-2020)



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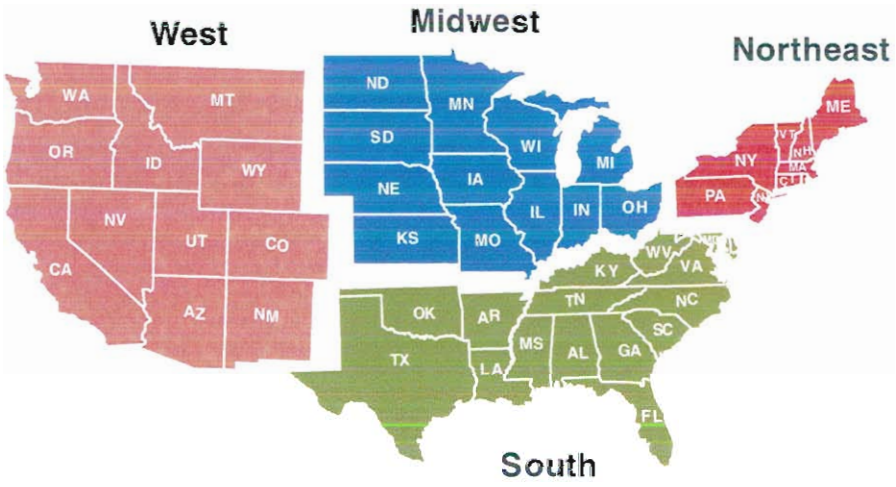
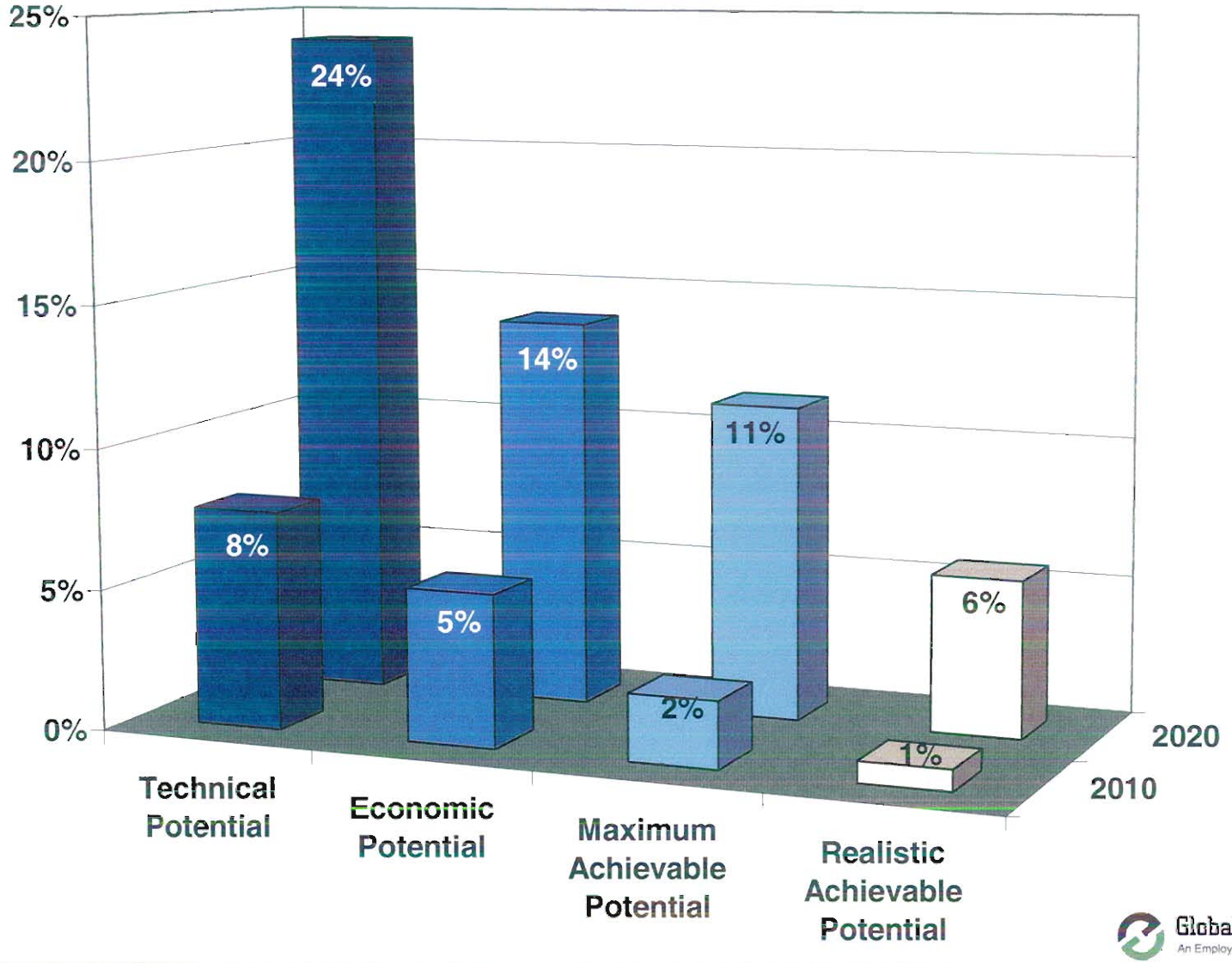
Results for the Northeast Region

By 2020, the electric utility industry can ***realistically*** expect to offset a substantial share of the growth in electricity sales through energy-efficiency programs. This represents:

- 31,000 MWh
- 6% of total load in 2020
- Reduction in growth rate from 0.7% to 0.2% per year



Northeast Energy Efficiency Potential Percent of Total Load (2010-2020)



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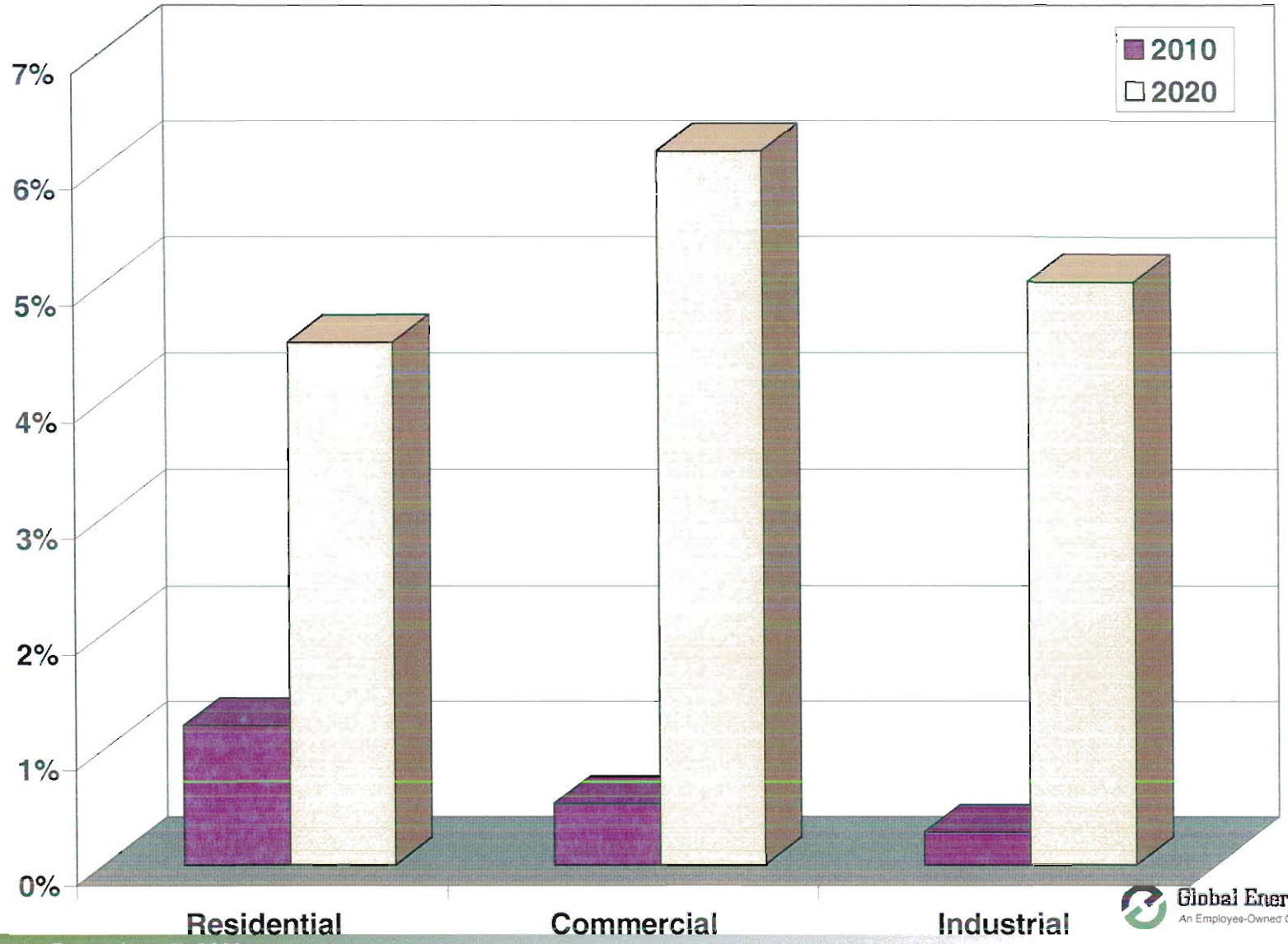
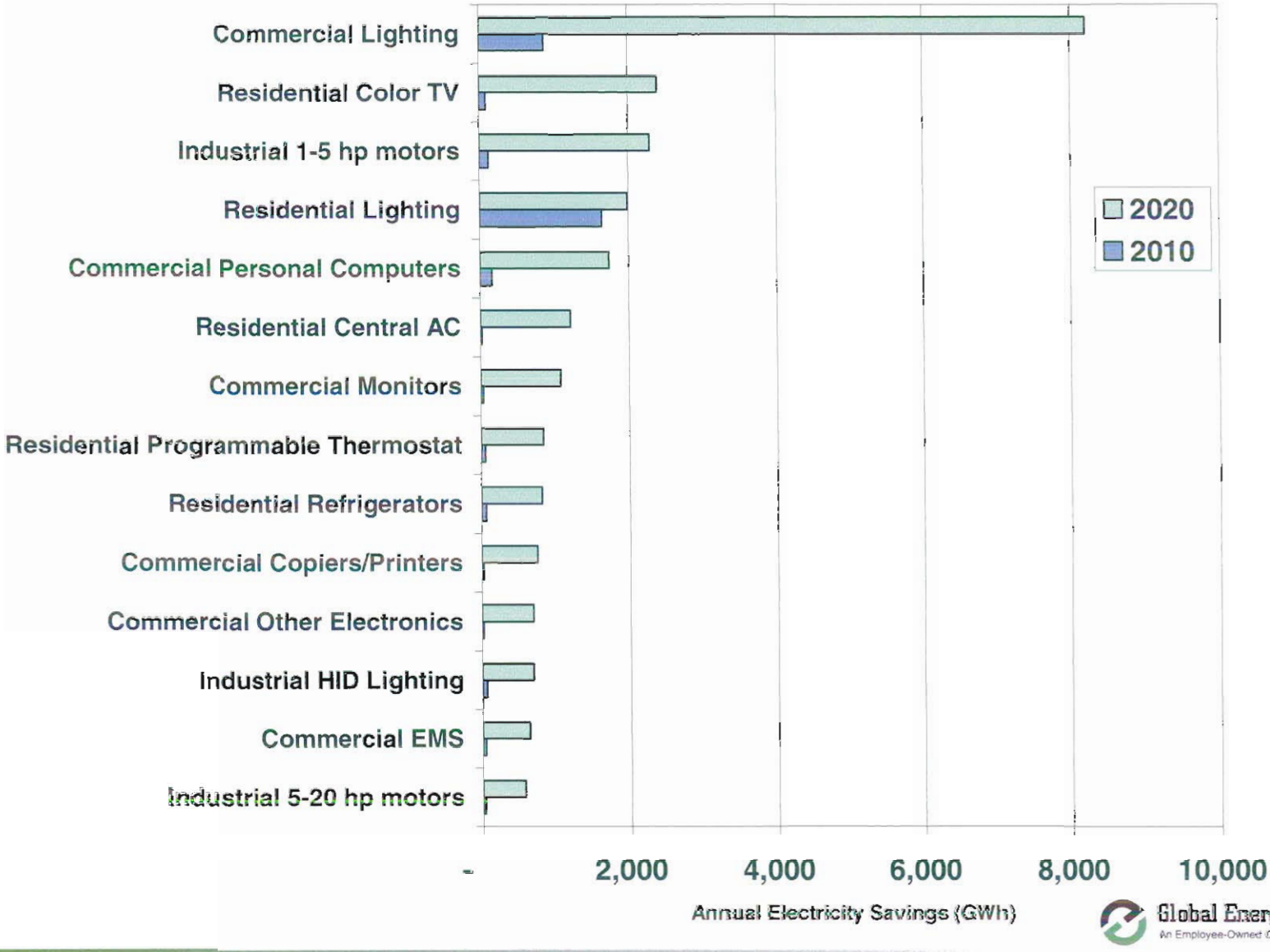
Realistic Achievable Potential by Sector Northeast Region (2010-2020)



Top Measures – Realistic Achievable Northeast Region (2010-2020)



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PECO Targeted Energy Efficiency Services Study – Task Summary

Task 1: Project Planning

Task 2: EE/DR Market Assessment Study

- Data Acquisition – Primary and Secondary
- Utilize Baseline Forecast
- Measure-Level Screening
- Technical, Economic and Achievable Potential

Task 3: EE/DR Program Design

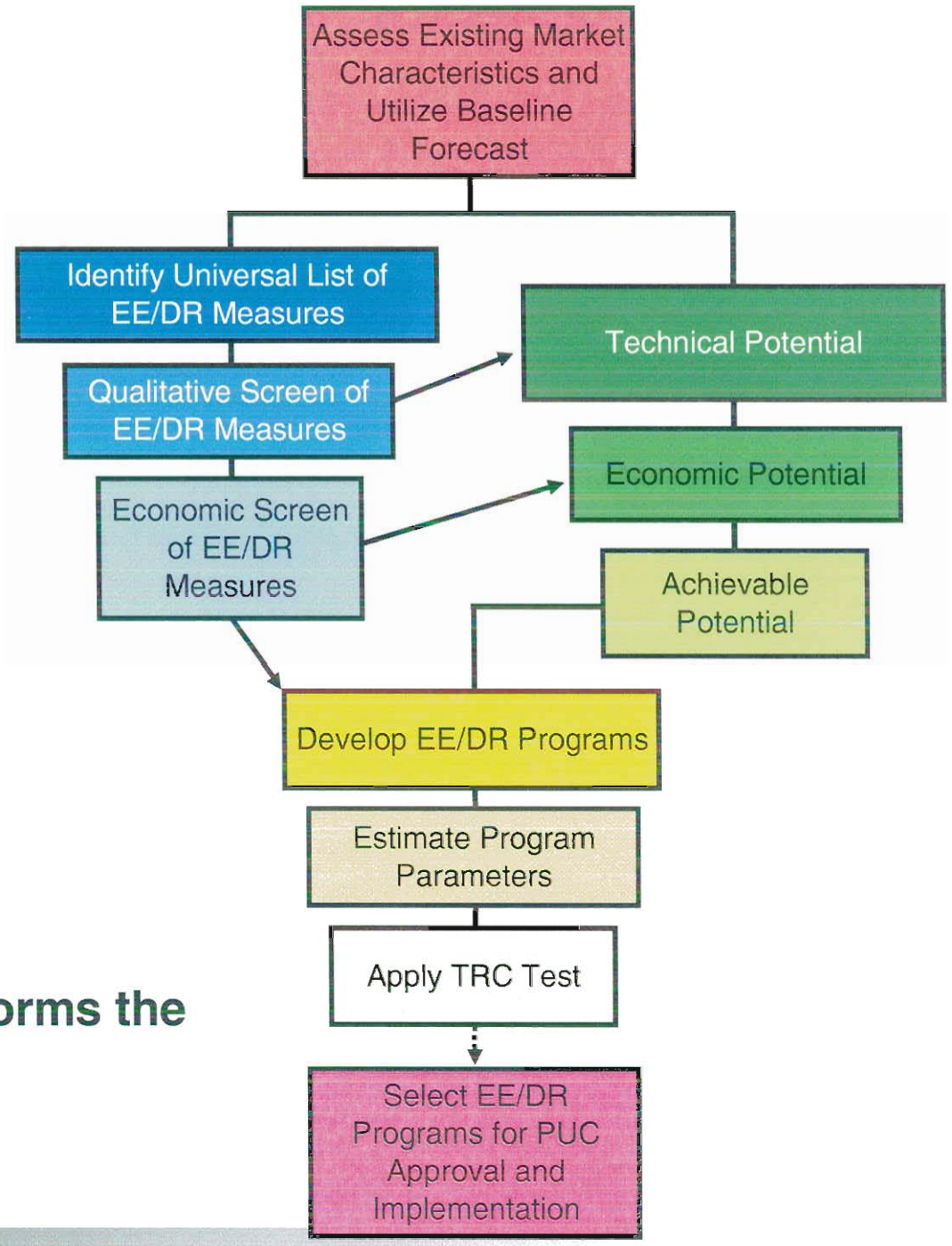
- Program Portfolio Assessment
- Cost-Effectiveness Analysis
- Program Selection

Task 4: EE/DR Program Preparation

- Evaluation, Measurement and Verification Process
- Implementation Detailing
- Regulatory Approval

Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram

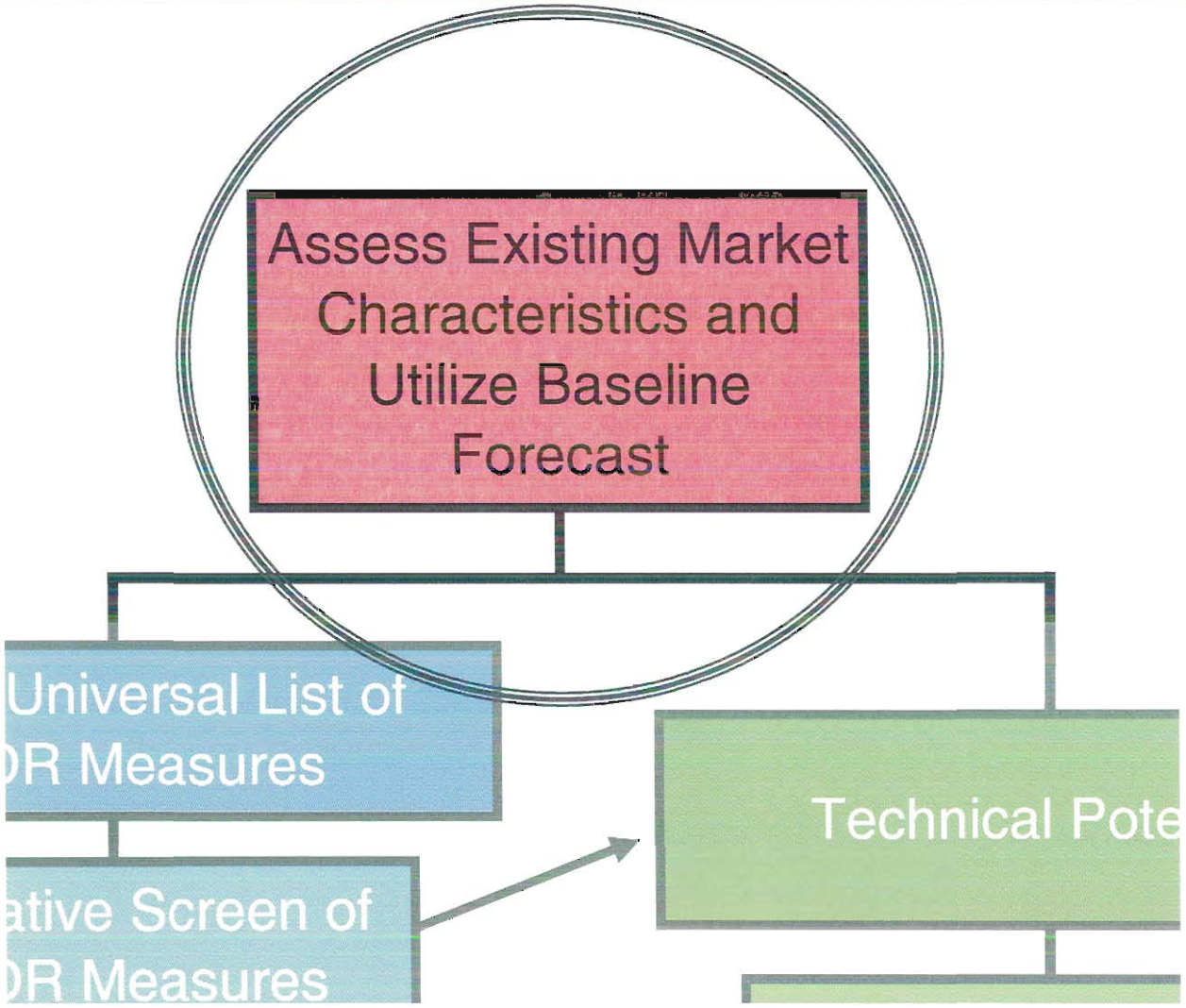


- Stakeholder input informs the process

Efficiency Targets/Goals – Regulatory Objectives

- Goals specified in Act 129
  - By 5/31/11, EDCs shall achieve a 1% savings in load relative to baseline use between 6/1/09 and 5/31/10
  - By 5/31/13, EDCs shall achieve a 3% savings in load relative to baseline use between 6/1/09 and 5/31/10
  - By 5/31/13, EDCs shall achieve a 4.5% reduction in weather adjusted peak demand during the top 100 hours of the baseline established during the time period 6/1/07 and 5/31/08

Data Acquisition and Baseline Forecast



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Existing Market Characteristics and Baseline Forecast

Step 1: Collect primary market-related data for the residential segment focused on:

- Equipment saturations and efficiencies
- Building vintage and size characteristics
- Customer counts and energy usage

Step 2: Collect comparable secondary data for the C&I segments and supplement any primary data gaps for residential with secondary data sources

Step 3: Develop prototype models that represent the building characteristics as reflected by the primary and secondary data obtained from the previous steps

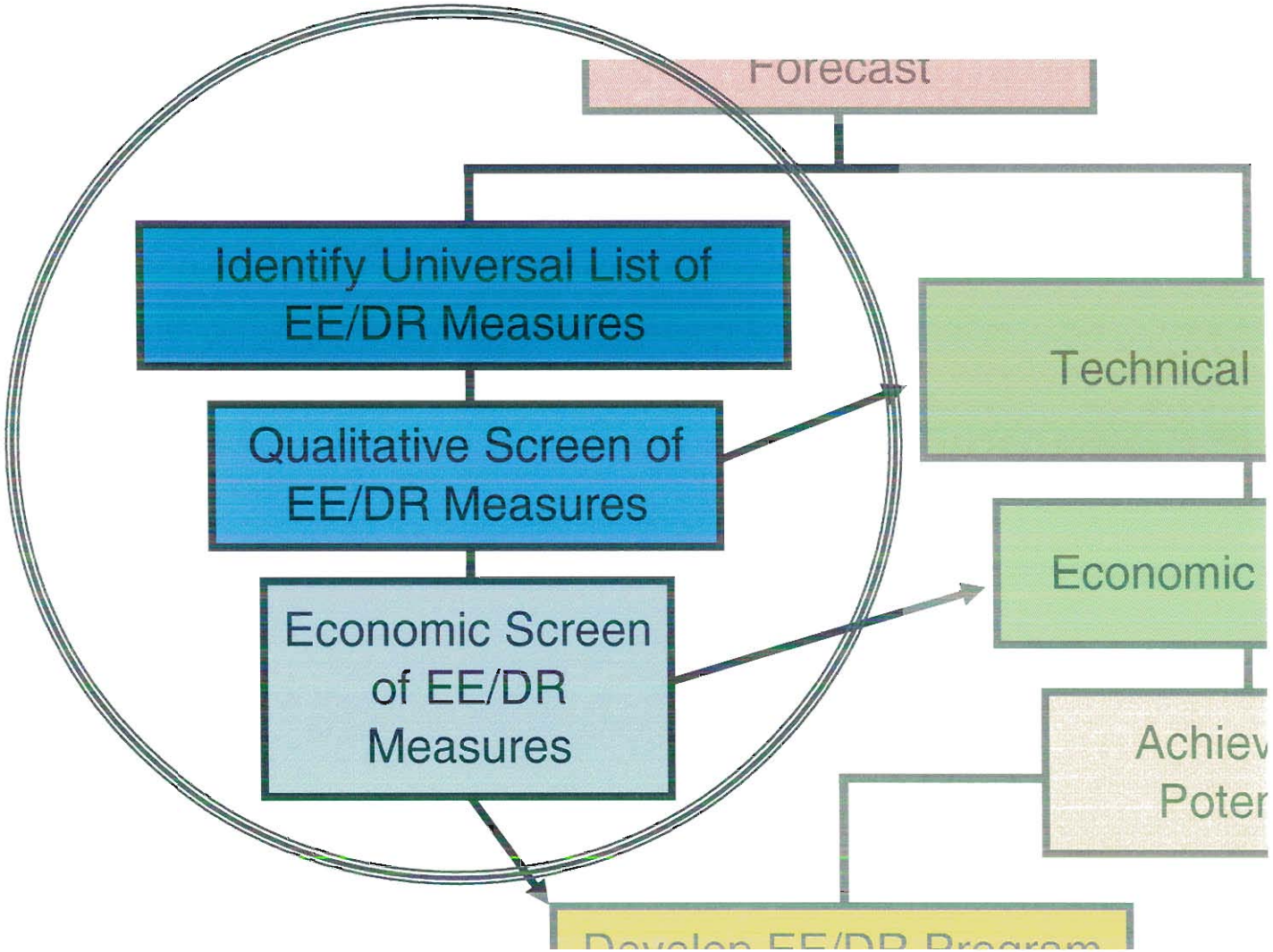
Step 4: Utilize forecast of energy use (MWh) and historical peak demand (MW) for the near and long-term planning horizon by sector and building type

Step 5: Represent energy use forecasts and peak demand loads by end-use for each sector and building type

Segmentation Approach

Market Dimension	Segmentation Design	Dimension Examples
Dimension 1	Geographic Region	5 Regions
Dimension 2	Sector	Residential, Commercial, Industrial
Dimension 3	Building Type	1-2 Residential (single-family, multi-family) 6-8 Commercial (offices, food services, etc.) 2-4 Industrial (2-digit SIC level or corresponding NAICS level, i.e., electronics, manufacturing, mineral processing, etc.)
Dimension 4	Type of Energy Use	High, Medium and Low (as appropriate for residential and commercial sectors)
Dimension 5	Vintage	Existing and new construction (as appropriate for residential and commercial sectors)
Dimension 6	End Uses	Cooling, Lighting, Water Heat, Motors, etc. (as appropriate by sector)
Dimension 7	Equipment Efficiency Levels	Old, Standard (minimum standard), Maximum Efficiency

Assessing EE/DR Measures



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Illustrative List of EE/DR Measures

Residential

- High-efficiency appliances, lighting, HVAC, water heating, and electronics
  - Includes hyper-efficient
- Thermal shell measures
- Maintenance and repair measures
- Programmable thermostats
- In-home displays
- Direct load control

Commercial

- High-efficiency HVAC, refrigeration, IT
- Economizers, EMS
- High-efficiency lighting, occupancy sensors & daylighting
- Auto-DR

Industrial

- High-efficiency motors and drives
- High-efficiency HVAC and lighting
- Process heating
- Onsite generation

Qualitative Screen – Representative Criteria

- Applicability Screen:
  - Is the measure a good match for PECO?
  - Are there verifiable and demonstrated sources to confirm the savings estimates?
  - Does the measure require fuel switching?
  - Is the measure widely adopted in the marketplace?
- Qualitative Screen:
  - Is the measure technologically mature?
  - Is there a mature and viable market for the measure?
  - Is the measure acceptable to customers?
  - Are there other benefits that give further advantage to adopting the measure?

Numerical Examples of Economic Screen

EXAMPLE 1: HEAT PUMP WATER HEATER

Single-Family House, Existing Vintage

Base Case = Standard Electric Water Heater (EF=0.83)

Efficiency Case = Heat Pump Water Heater (EF=2.0)

- Unit impact = 1,590 kWh/yr per water heater; 0.358 kW per water heater
- Lifetime = 9 years
- Measure first cost = $1,435 per water heater
- Present value of lifetime savings $2,905 per water heater
- Present value of lifecycle costs $2,211 per water heater
- B/C Ratio = 1.31
- Pass Econ Screen? = YES

EXAMPLE 2: RADIANT BARRIER

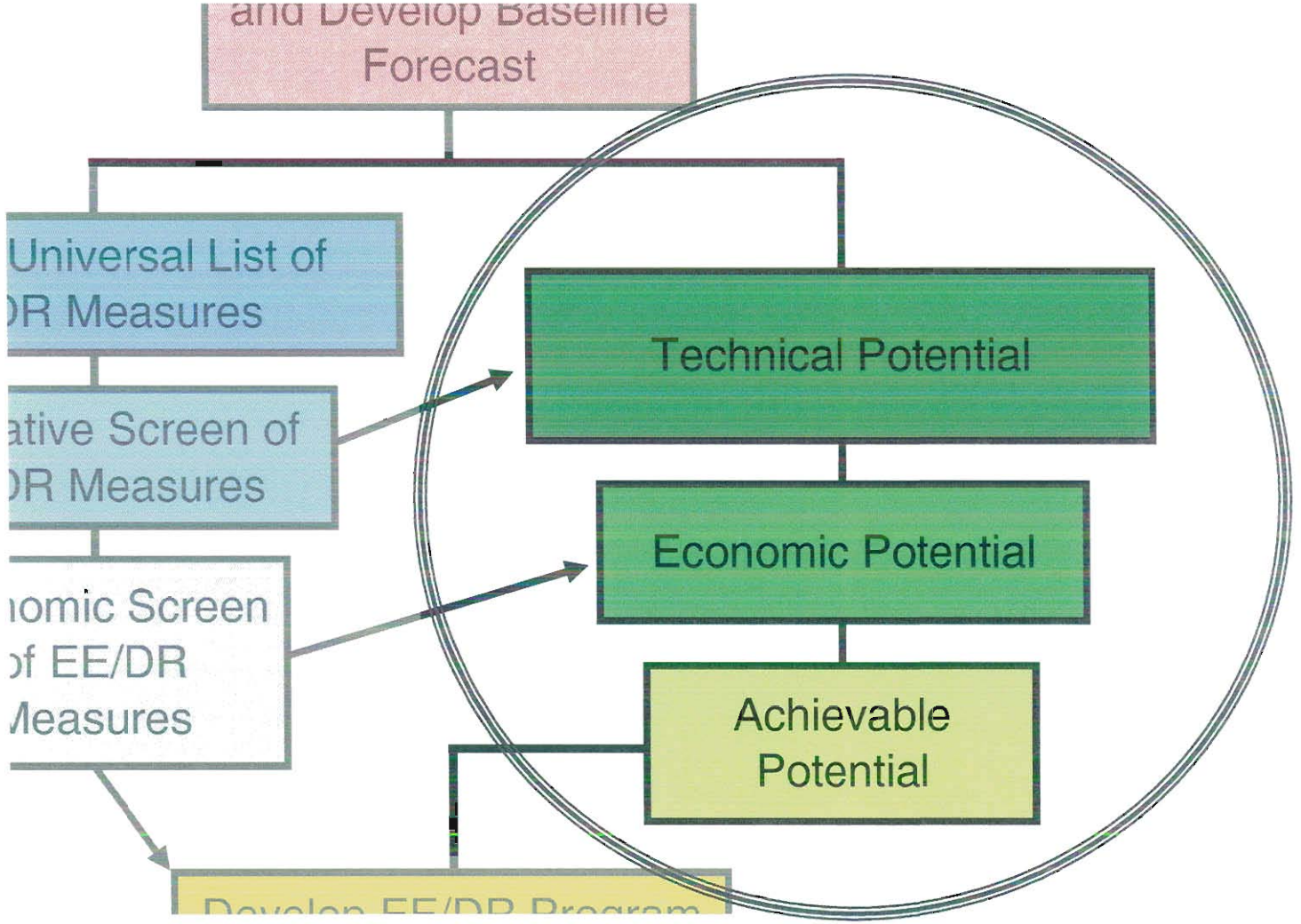
Single-Family House, Existing Vintage

Base Case = Standard Ceiling Insulation

Efficiency Case = Install Ceiling Radiant Barrier

- Unit impact = 0.0787 kWh/yr per ft2 of roof area; 0.000 kW per ft2 of roof area
- Lifetime = 50 years
- Measure first cost = $0.63 per ft2 of roof area
- Present value of lifetime savings $0.51 per ft2 of roof area
- Present value of lifecycle costs $0.63 per ft2 of roof area
- B/C Ratio = 0.81
- Pass Econ Screen? = NO

Estimating EE/DR Potential



Technical, Economic & Achievable Potential – Conceptual Overview

Technical Potential – The maximum possible savings regardless of cost and customer preference

- Two types of technical potentials – instantaneous and phase-in
- Represents the hypothetical upper-most boundary for potential energy efficiency savings
- Useful as a tool for energy efficiency program planning
- Economics are not considered in the technical potential analysis
- Program administration costs are not considered in the technical potential analysis
- Customer preference is not considered in the technical potential analysis

Economic Potential – The maximum savings for those measures that pass an economic screen but are otherwise not subject to program administration costs nor customer preferences

- The economic potential is a subset of the technical potential
- The utility's avoided costs are applied to the measure savings to determine the monetary benefits for society by avoiding the construction of new and more expensive energy resources
- Program administration costs are not considered in the economic potential analysis
- Customer preference is not considered in the economic potential analysis

Conceptual Overview (cont.)

Achievable Potential – The energy savings potential from energy efficiency programs taking into account program cost-effectiveness and real-world constraints (e.g., program administration costs and customer preferences)

- It establishes a realistic upper boundary for the energy efficiency savings that a utility could achieve through its energy efficiency programs
- Many times maximum achievable potential represents the program-level estimated savings before programs are screened for cost-effectiveness
- Achievable potential can also be represented as the realistic or likely potential recognizing that not all programs pass the cost-effectiveness screens

The Achievable Potential Formula

Baseline forecast (Represented in MWh and MW)

→ Utilize PECO load forecast, with estimates of load determined for individual market segments (residential, commercial, industrial), building types (single family, office building, etc.), and end-uses (cooling, lighting, etc.)

Multiplied by

End-Use Savings Potential (Represented as a percentage reduction of each end-use)

→ Generated through a detailed assessment of measures that are filtered through a series of screens with the final set of measures comprised of those that pass an economic screen

Multiplied by

Market Acceptance Rate (Represented as a percentage of available market that would participate in the energy efficiency or demand response program)

→ Generated through a review of energy efficiency program best practices that represent ideal circumstances and market conditions

Equals

ACHIEVABLE POTENTIAL

Achievable Potential Example

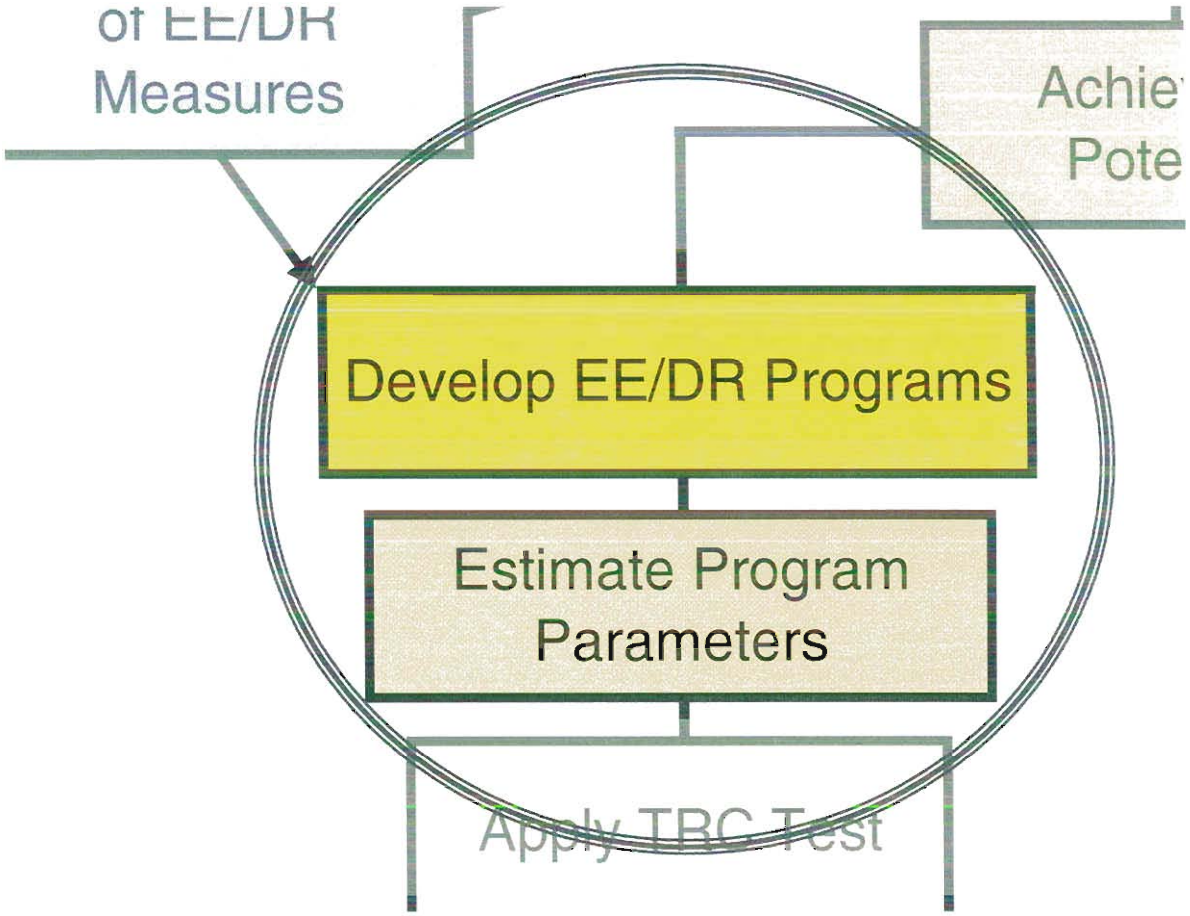
Residential Lighting Example

Row #	Data Description	Formula	Data
(1)	No. of Single Family Homes		100,000 homes
(2)	Lighting Unit Energy Consumption		1 MWh/yr
(3)	Baseline Forecast	(1) x (2)	100,000 MWh/yr
(4)	Energy savings for all applicable lighting measures		40%
(5)	Technical Potential	(3) x (4)	40,000 MWh/yr
(6)	Energy savings for all applicable lighting measures that pass an economic screen		30%
(7)	Economic Potential	(3) x (6)	30,000 MWh/yr
(8)	Market Acceptance Rate		20%
(9)	Achievable Potential	(7) x (8)	6,000 MWh/yr

Program Design – Regulatory Objectives

- Program portfolio
  - Benchmark experience will shed light on best practices
  - Harmonization with existing initiatives (regional and federal)
- Potential duplication and overlap with existing efforts should be minimized
  - Particularly related to PJM DR and EE efforts

EE/DR Program Portfolio Development



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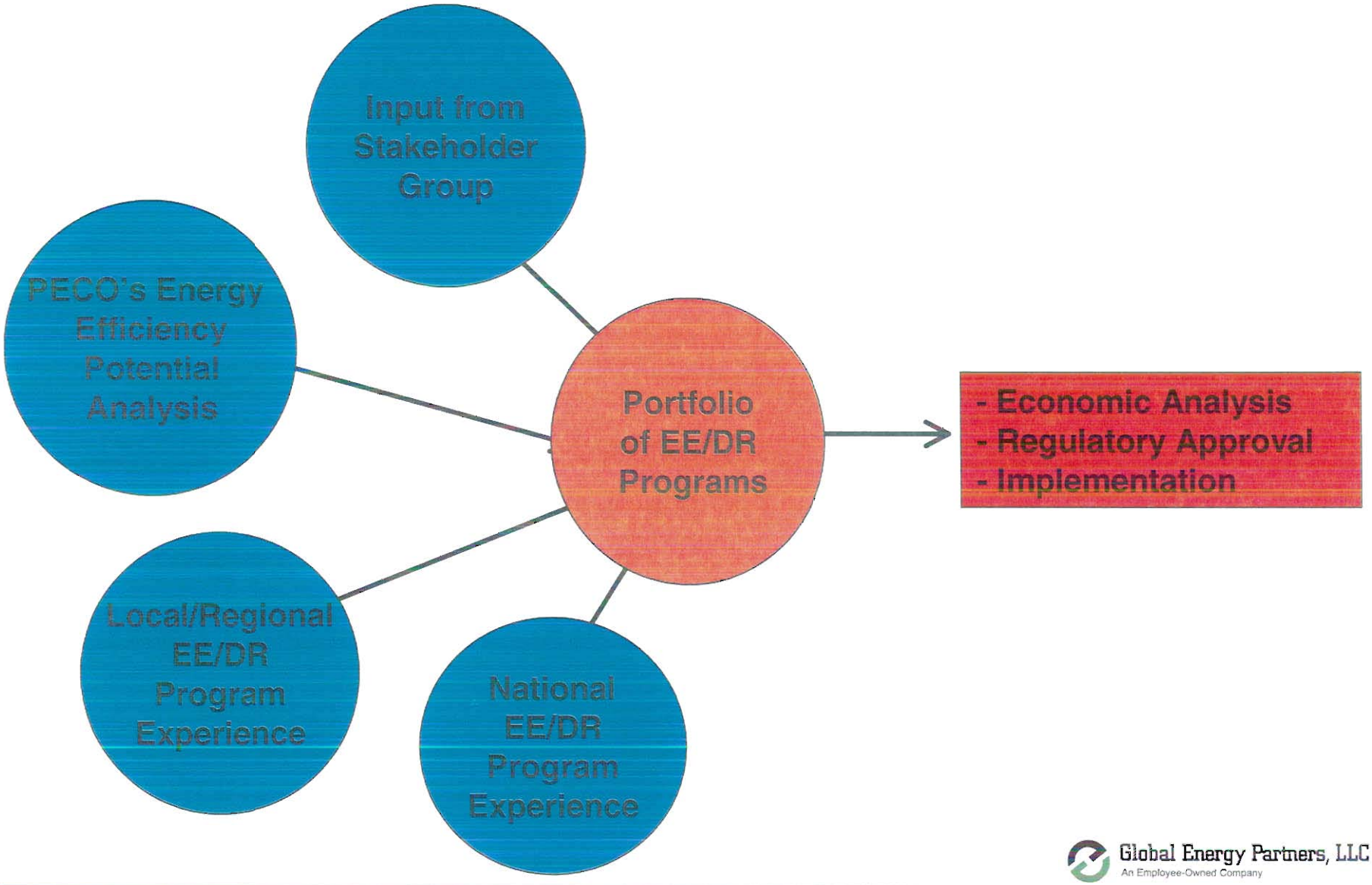
EE/DR Program Development Process



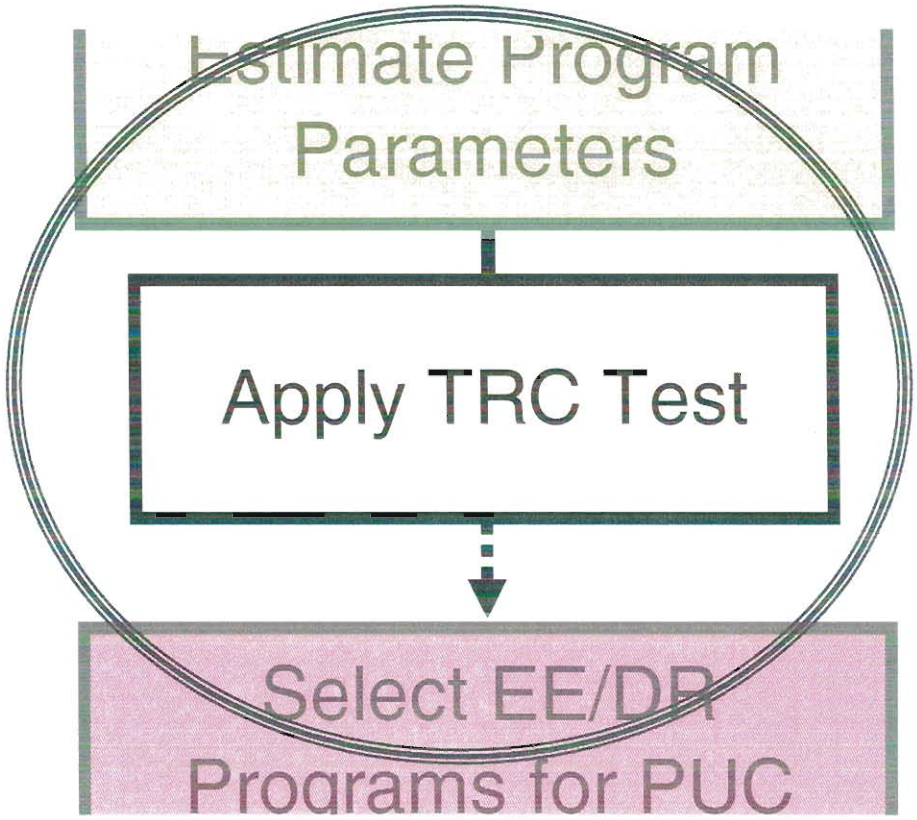
Steps in Developing Program-Level Parameters

1. Number of new participants for each year of the implementation time horizon
2. Unit-level kWh and kW savings, delineated by individual measure type
3. Lifetimes for each individual measure in the program
4. Participant incremental costs for each individual measure in the program
5. Incentive levels, as represented by the portion of the participant's incremental costs
6. Program implementation costs (labor, marketing, M&E, etc.)
7. Program administration costs

Total Resource Cost Test – Regulatory Objectives

- Act 129 (Section 2806.1(B)(1)(I)(i) [Act 129]:
  - "The electric distribution company shall demonstrate that the plan is cost-effective using a total resource cost test approved by the Commission an provides a diverse cross section of alternatives for customers of all rate classes."
- Simplification of the testing process is desirable
- Potential Adoption of *The California Standard Practice* methodological approach
- Developing avoided costs consistent with industry practice
- Addressing various external costs (e.g., environmental, social)

Applying the TRC Test



Steps in Estimating Program Cost-Effectiveness

Step 1: Obtain PECO economic data:

- Avoided capacity costs
- Avoided energy costs
- Other economic parameters including cost escalation rates and various discount rates

Step 2: Utilize the Global Energy Partners cost-effectiveness spreadsheet tools that were developed to support the program analyses in the 2006 EE Docket

Step 3: Assess the cost-effectiveness results according to the California Standard Practice Manual for the TRC test

Step 4: Make recommendations for program portfolios that should be passed to regulatory approval and implementation stages

Sample Cost-Effectiveness Output

Program	TRC Test Perspective			
	Lifetime Benefits	Lifetime Costs	Net Benefits	B/C Ratio
Residential Prescriptive Rebate	$36,677,052	$15,417,260	$21,259,792	2.38
Residential Appliance Recycling	$7,757,741	$461,216	$7,296,525	16.82
Residential Home Audits	$4,404,374	$1,037,915	$3,366,459	4.24
Residential New Construction	$6,845,593	$1,429,472	$5,416,121	4.79
Non-Residential Custom Rebates	$45,217,619	$21,407,592	$23,810,027	2.11
Non-Residential Performance Contracting	$7,297,137	$1,319,289	$5,977,848	5.53
Non-Residential Prescriptive Rebates	$13,903,937	$3,653,947	$10,249,990	3.81
Non-Residential New Construction	$5,659,693	$3,952,956	$1,706,737	1.43
Residential Load Management	$28,437,368	$2,809,544	$25,627,823	10.12
Non-Residential Load Management	$284,378,250	$94,025,638	$190,352,612	3.02
TOTAL -- ALL PROGRAMS	**$440,578,764**	**$145,514,830**	**$295,063,934**	**3.03**

Evaluation, Measurement and Verification – Regulatory Objectives

- EM&V process
  - Benchmark experience will shed light on best practices
- Deemed savings vs. customized EM&V
  - Common industry practice suggests that certain programs are most conducive to deemed savings calculations while others can only be done vis-à-vis the customized approach
- EM&V data collection issues
  - Standardization vs. EDC-specific formats

Next Steps

- Maintain collaborative
- Lead monthly seminars to review programs and results and obtain stakeholder feedback as the plan is being developed


MEETING THE NEEDS OF THE CONSTANTLY
CHANGING ENERGY INDUSTRY
Global Energy Partners, LLC
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Discussion

MEETING THE NEEDS OF THE CONSTANTLY CHANGING ENERGY INDUSTRY

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Targeted Energy-Efficiency Services Study for PECO Energy Company

Stakeholder Meeting #2: Benchmarking Overview

Greg Wikler
Global Energy Partners, LLC

Philadelphia, PA
January 22, 2009

PECO

Benchmarking Overview

Review of EE/DR study process for program design

Status of EE/DR activity nationwide

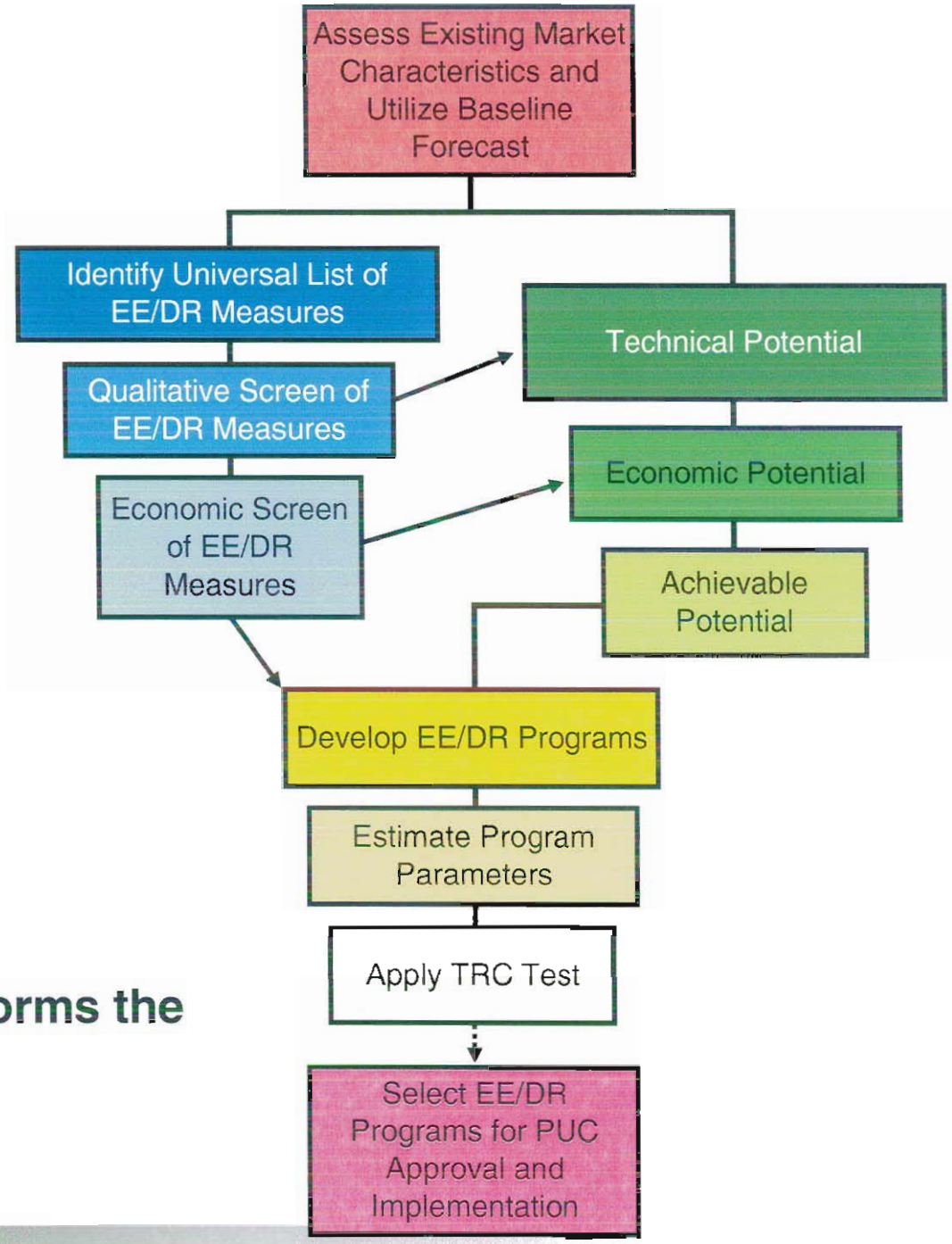
Current EE/DR practices in Northeast and Mid-Atlantic regions

Representative financing program efforts

Discussion

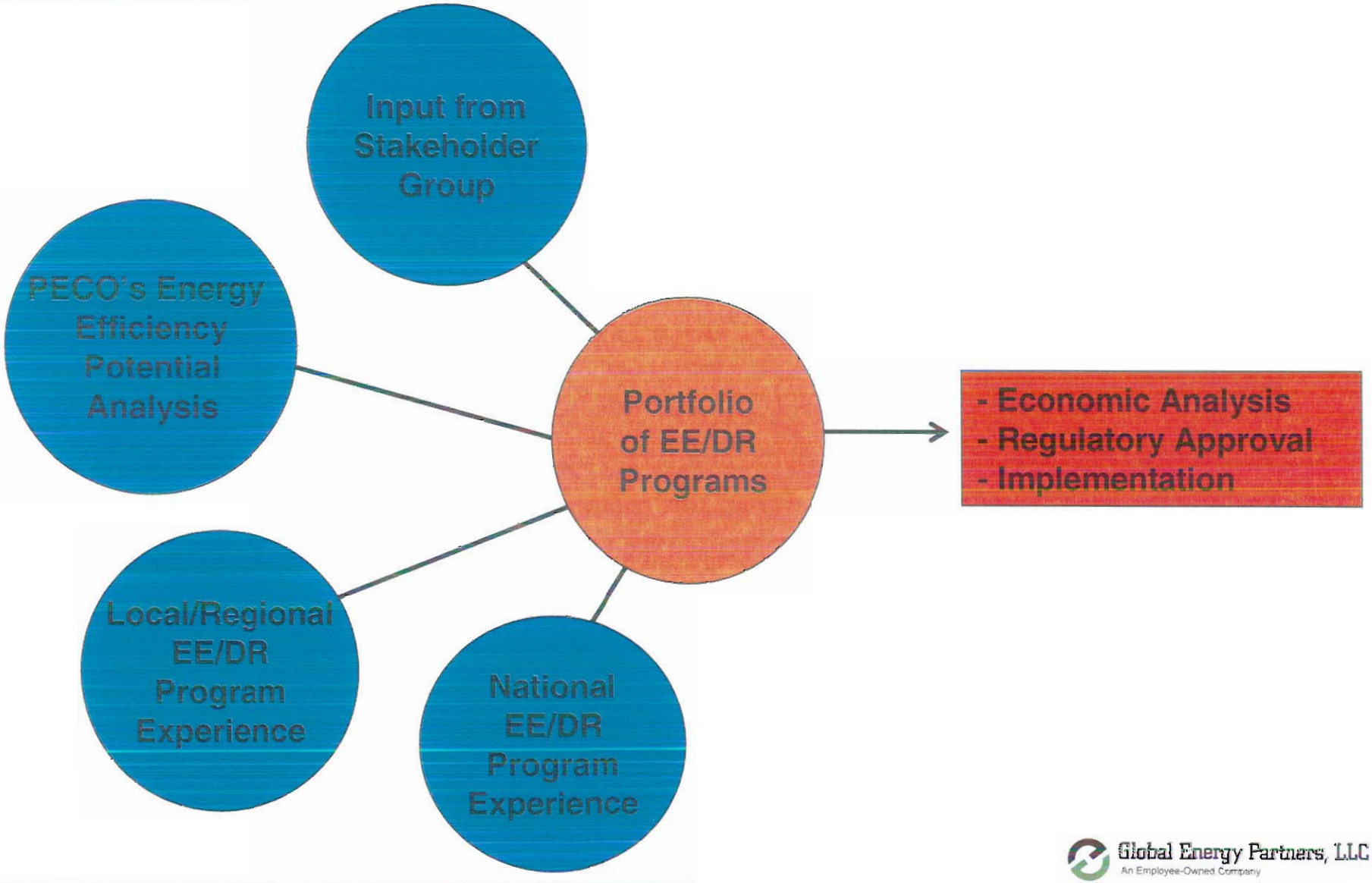
Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram



- **Stakeholder input informs the process**

EE/DR Program Development Process



Energy Efficiency Activities by State

Very Active	Modestly Active	Some Activity	Very Little Activity, If Any	
California	Florida	Arizona	Alabama	Missouri
Connecticut	Hawaii	Colorado	Alaska	Nebraska
Massachusetts	Idaho	Delaware	Arkansas	North Dakota
Minnesota	Illinois	D. C.	Georgia	Oklahoma
New Jersey	Iowa	Kentucky	Indiana	South Carolina
New York	Maine	Montana	Kansas	South Dakota
Oregon	Maryland	New Mexico	Louisiana	Tennessee
Washington	Nevada	North Carolina	Michigan	West Virginia
Wisconsin	New Hampshire	Utah	Mississippi	Wyoming
	Pennsylvania	Virginia		
	Rhode Island			
	Texas			

Source: Time Magazine Cover Story on Energy Efficiency (Michael Grunwald, 1/12/09)

Types of EE/DR Programs Offered Nationwide

Energy Efficiency

- Codes and standards
- Information-based initiatives (e.g., customer awareness, advertising)
- Technical assistance (e.g., audits, direct installs, etc.)
- Rebates for the installation of pre-specified measures
- Rebates for customized measures
- Rebates for new construction measures and practices
- Financing programs for energy efficiency
- Targeted low-income customer campaigns
- Initiatives targeting specific customer groups (e.g., government, schools, etc.)

Types of EE/DR Programs Offered Nationwide

Demand Response

- Direct control of end-use loads (e.g., A/C, water heating, etc.)
- Curtailable contracts
- Dynamic pricing programs (e.g., CPP, RTP)
- Capacity market programs (e.g., demand bidding, forward capacity, etc.)
- Technology enablement initiatives (e.g., Auto-DR)

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

Vermont

Efficiency Vermont (EVT) in operation since 1999 and supported through public benefits funds

Significant achievements – through 2005, cumulative savings have met over 5% of VT's electricity requirements

- 2006: 1% efficiency savings achieved
- 2007-2008: 3.5% efficiency savings achieved

Programs target all sectors and primarily focus on electric energy efficiency

Program lineup:

- Residential equipment rebates
- Information and home audits
- Interest rate reduction (3.5%) on loads of $15K or less for terms of 5 years or less
- Targeted initiative for multi-family dwellings and low income customers
- C&I programs targeting specific segments (colleges, industrial process, data centers, dairy farms, restaurants, schools, ski areas, small business, office, wastewater facilities)
- C&I integrated design incentives
- C&I prescriptive rebates (e.g., lighting, HVAC, agricultural, motors, multi-family apartment buildings, vending machines)

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

Maine

Efficiency Maine (division of utility commission) established to administer statewide public benefits energy efficiency program

Portfolio of energy efficiency programs available to all electric customers in the state

Statewide spending in 2007 was $13.2 million

New Hampshire

Statewide umbrella program called NHSaves is jointly developed and administered by the state's electric distribution utilities

PUC reviews and approves program plans

Performance incentives to utilities for successful implementation of their programs and meeting established performance goals

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

Massachusetts

Regulated distribution utilities administer their own programs with collaborative input and oversight from state agencies

EE program lineup:

- Business Solutions (prescriptive rebates up to 50% of cost, comprehensive rebates at 75% of cost, engineering services, design and commissioning services)
- Small Business Solutions
- New construction or renovation
- Load response program
- Other targeted programs for C&I customers (e.g., motors, compressed air, engineering services, operator training, vending machine sensor rebates)
- Residential Home Analyzer
- MassSAVE
- Energy efficiency for low income customers
- ENERGY STAR program
- Multi-family assessment program

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

Connecticut

Distribution utilities offer programs with funding through a monthly systems benefit charge on customer bills at 0.3 cents/kWh

Performance incentives to encourage and reward utilities for successfully reaching established performance targets

New state law places new requirements for energy efficiency and establishes new regulatory mechanisms such as decoupling to support achieving these goals

Utilities are now planning to achieve 1.5% savings each year

Rhode Island

One electric distribution utility (Narragansett Electric) administers and operates a portfolio of EE programs

Funding through a conservation and load adjustment factor – surcharge of 0.2 cents/kWh

Total spending on energy efficiency programs was $17.2 million in 2006

Sweeping new legislation enacted in 2006 greatly increases the role and requirements of utilities to acquire all cost-effective energy efficiency with expected implementation by 2009

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

New York

Statewide system benefits charge (SBC) supports energy efficiency and other public benefits energy programs administered by NYSERDA

NYSERDA program lineup through NY Energy $mart program lineup:

- C&I programs (energy audits, new construction, existing facilities, loans, market transformation efforts targeting lighting, motors, HVAC)
- Business partnerships with trade allies
- Bond financing
- Agricultural assistance
- Residential incentives and low-interest financing for ENERGY STAR new homes, appliances, HVAC, envelope
- EmPower New York provides cost-effective energy efficiency measures for low income homeowners and renters (e.g., lighting and refrigerator replacements)

SBC funding for energy efficiency currently at $162 million/yr with most going to NYSERDA to administer programs listed above

Several of the state's electric utilities have protested the large allocations of SBC funds going to NYSERDA claiming they should be allowed to administer at least a portion of SBC funds collected from their own customers

Representative EE/DR Practices in the Northeast and Mid-Atlantic Regions

New Jersey

New Jersey Clean Energy Program, administered by the Office of Clean Energy within the Board of Public Utilities (BPU)

Stakeholder process involving various interested parties, including distribution utilities and the NJ Clean Energy Council provide input to the BPU on program design and improvements

Legislation passed in 2007 authorizes BPU to adopt energy efficiency portfolio standards, with goals as high as 20% savings by 2020

Maryland

Recently, the legislature enacted the EmPower Maryland Energy Efficiency Act of 2008 that requires the electric utilities to create and implement energy efficiency programs

Statewide goal of reducing per-capita electricity use 15% by 2015

Five utilities have filed plans with the PSC and are awaiting approval

As a member of the Regional Greenhouse Gas Initiative, Maryland plans to use about half of its auction allotment proceeds on energy efficiency programs

Financing Programs for Energy Efficiency

State	Program Name	Funding Source
Pennsylvania	Keystone Homeowner Energy Loan Program (HELP)	AFC First Financial Corporation, a Pennsylvania lender and principally supported by the Pennsylvania Treasury Department and the Pennsylvania Housing Finance Agency
New York	NYSERDA: Energy $mart Loan Fund; Home Performance with Energy Star Loan Program	System Benefit Charge (SBC)
Vermont	Vermont Solar & Small Wind Incentive Program	Six regional revolving loan funds, in partnership with the State and Vermont Housing Finance Agency (VHFA)
Alaska, Arkansas, Georgia, Hawaii, Kentucky, Mass, New Jersey, New York, Oregon, Rhode Island, Texas, Wisconsin	Energy Finance Solutions (EFS)	Programs sponsored by a local utility, energy efficiency company, or contractor organization. An example is the service offered by the Wisconsin Energy Conservation Corp. (WECC)

Source: Database of State Incentives for Renewables & Efficiency (www.dsireusa.org).

Discussion

PECO

Act 129 Energy Efficiency and Conservation Plan

Overview of Final Implementation Order

Rich Schlesinger

External Stakeholder Meeting No. 2

January 22, 2009

Plan Approval & Effectiveness Processes

A. Plan Approval Process

1. **Consumption Forecast** – PECO must file by 2/9/09, a consumption forecast for the period 6/1/09 through 5/31/10
2. **Peak Demand** - PECO must file by 2/9/09 its hourly peak load data for the period 6/1/07 through 5/31/08
3. **CSP Contract Review Process** – PECO must file by 3/1/09, its CSP request for proposal procedures and standard form CSP contracts
4. **EE&C Plan Approval Process –** PECO to offer and engage in informal discussions with the advocates/stakeholders during the pre-filing development of the plans

B. Plan Effectiveness Evaluation Process

- ✓ The PUC will utilize the Technical Reference Manual ("TRM") as the tool to evaluate the process requirements
- ✓ PUC will initiate a process to update and expand the TRM to provide for additional EE technologies, under a separate docket
- ✓ PUC to complete the TRM update early in 2009 such that EDCs will have ample time to incorporate any TRM updates into the EE&C plan (i.e., prior to 7/1/09)
- ✓ Updates to be prospective in nature
- ✓ Will address annual reporting requirements in a subsequent order

Cost-Benefit Process & Reduction Analysis

C. Cost – Benefit Analysis Approval Process

- ✓ Adopts the TRC test from *The California Standard Practice Manual* - July 2002
- ✓ TRC test will exclude environmental and societal costs that are not already embedded in the wholesale costs of generation
- ✓ TRC test results to be expressed in both NPV and B/C
- ✓ Use PECO's post-tax weighted avg. cost of capital in calculating the TRC test NPV

D. Process to Analyze How the Program and Each Plan will Enable EDCs to Meet Reduction Requirements

1. Measuring Annual Consumption Reductions – PUC adopts the "savings approach" to reflect energy savings as opposed to absolute consumption reductions
   - ✓ Adopts use of "deemed savings" from TRM for measuring consumption savings for standard EE&C measures and verified savings for custom measures
   - ✓ Can count consumption savings from demand reduction programs
2. Measuring Peak Demand Reductions – PUC adopts the "savings approach", as opposed to a "demonstrated capability" approach for demand reduction targets
   - ✓ To determine the targeted peak demand savings, adopts the use of 4.5% of the EDC's (not RTO) avg.of the 100 highest peak hours during the summer months of June - Sept 2007
   - ✓ EDCs must curb peak demand during the 100 highest peak hours even though these times might not constitute a critical reliability or peak price situation
   - ✓ For PECO, the 100 hr avg. from the base period = 7899 MW and 4.5% = 355MW
   - ✓ Can count peak demand reductions from consumption programs

Ensuring Equitable & Additional Measures

E. Standards to Ensure that a Variety of Measures are Applied Equitably to all Customer Classes

- ✓ "Equitable" measures do not equal "pro rata" measures – thus PUC will not require a proportionate distribution of measures among customer classes
- ✓ PECO must offer at least one energy efficiency and one demand response program per customer class
- ✓ Initial mix and proportion of EE and DR programs left to the EDC
- ✓ PUC expects the EDCs to provide a reasonable mix of EE and DR programs for all customers

F. Process to Make Recommendations for Additional Measures

- ✓ EDCs and other stakeholders/advocates, may propose plan changes in conjunction with the EDC's annual report filing
- ✓ PUC and any interested party can make recommendation for plan improvement or object to the plan revision within 30 days of the annual report filing
- ✓ PUC will establish a deadline for the filing of annual reports by the EDCs, after approval of the EDCs' plans in 2009 (11/1/09)

Bidding & Approval of CSP Contracts

G. Procedures to Require Competitive Bidding & Approval of Contracts with CSPs

- ✓ EDCs are not expected to have all bids and contracts with CSPs completed by the July 1, 2009 plan filing, but expected that each plan will include at least one contract with a CSP
- ✓ A contract with a CSP cannot be finalized unless that CSP is on the CSP registry
- ✓ EDCs are encouraged to solicit bids from all potential CSPs on the condition that the CSP apply and obtain approval to be on the registry prior to final acceptance of the bid
- ✓ PUC lists the minimum requirements for reviewing and approving the proposed RFP procedures
  - ✓ Considered approved after 15 days (3/16/09) if not commented upon by PUC staff
- ✓ PUC lists the minimum requirements for reviewing and approving proposed std. Form CSP contracts prior to execution
  - ✓ Considered approved after 45 days (4/14/09) if not commented upon by PUC staff
- ✓ Equipment installers or suppliers (i.e., all entities that provide services to customers or the public) are not to be included in the CSP registry

Reduction Reqs. & CSP Participation

H. Procedures to Ensure Compliance with Consumption Reduction Requirements

- ✓ PUC intends to issue an RFP to retain an evaluation vendor(s):
  - ✓ to perform the annual and five year independent evaluation of the cost-effectiveness of each EDC plan
  - ✓ to develop the M&E protocols, standard data collection formats, and data bases for the evaluation of program benefits and results to be used across all EDC service territories
- ✓ The protocol and formats will be fully developed and approved by the PUC prior to the initiation of EDC programs and no later than November 1, 2009

I. Participation of CSPs

- ✓ See separate proceeding for establishing of CSP qualification requirements, CSP registry, CSP application form and registration fee which are to be in place by March 1, 2009

EDC Cost Recovery – Three Main Issues

J. EDC Cost Recovery

1. Determination of Allowable Costs

- ✓ Cost cap for EE&C measures is 2% of EDC's revenue from retail customers as of 12/31/06
- ✓ Cost cap is an annual amount; not an amount for the full 5 year period
- ✓ PUC defines retail customer as all customers who receive an EDC's distribution service regardless of their electric supply source
- ✓ Cost cap to be based on retail revenues from DSP customers (generation, transmission, distribution and surcharges) and from retail revenues from EGS customers that use EDC consolidated billing (generation and transmission service)

2. Allocation of Costs to Customer Classes

- ✓ Direct costs from measures for a specific customer class should be assigned solely to that class
- ✓ Costs that relate to measures that are applicable to more than one class, or that provide system-wide benefits, must be allocated using reasonable and generally acceptable cost of service principles as are commonly utilized in base rate proceedings
- ✓ Administrative costs should also be allocated using reasonable and generally acceptable cost-of-service principles

EDC Cost Recovery – Three Main Issues (cont'd)

3. Cost Recovery Tariff Mechanism –

- ✓ EDC to develop a 1307 reconcilable adjustment clause tariff mechanism and include in EE&C plan
- ✓ When the EE&C plans will benefit both shopping and non-shopping customers, the cost recovery mechanism shall be non-bypassable, and structured such that it will not affect the EDC's price-to-compare
- ✓ Cost recovery mechanism will adjusted on an annual basis
- ✓ Annual review and reconciliation to coincide with the review of the annual reports

QUESTIONS

PECO

Act 129
Stakeholder Discussion

Jim Reiley

PJM RTO vs. PE Zone Loads

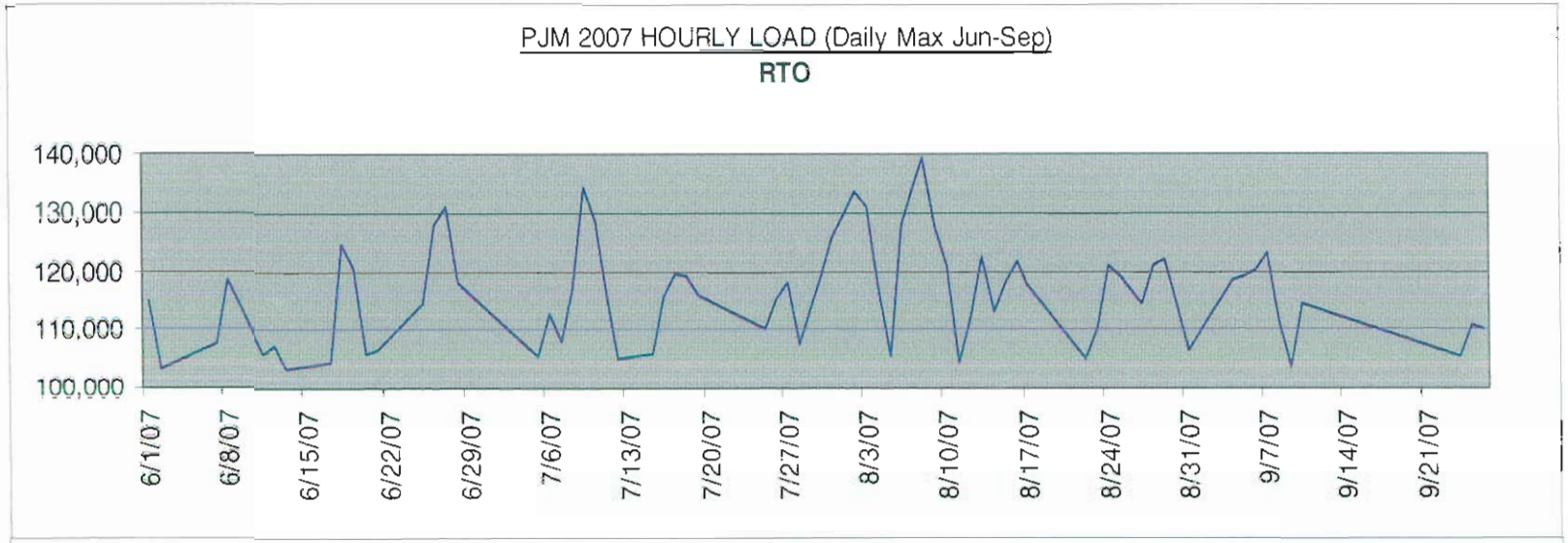
January 22, 2009

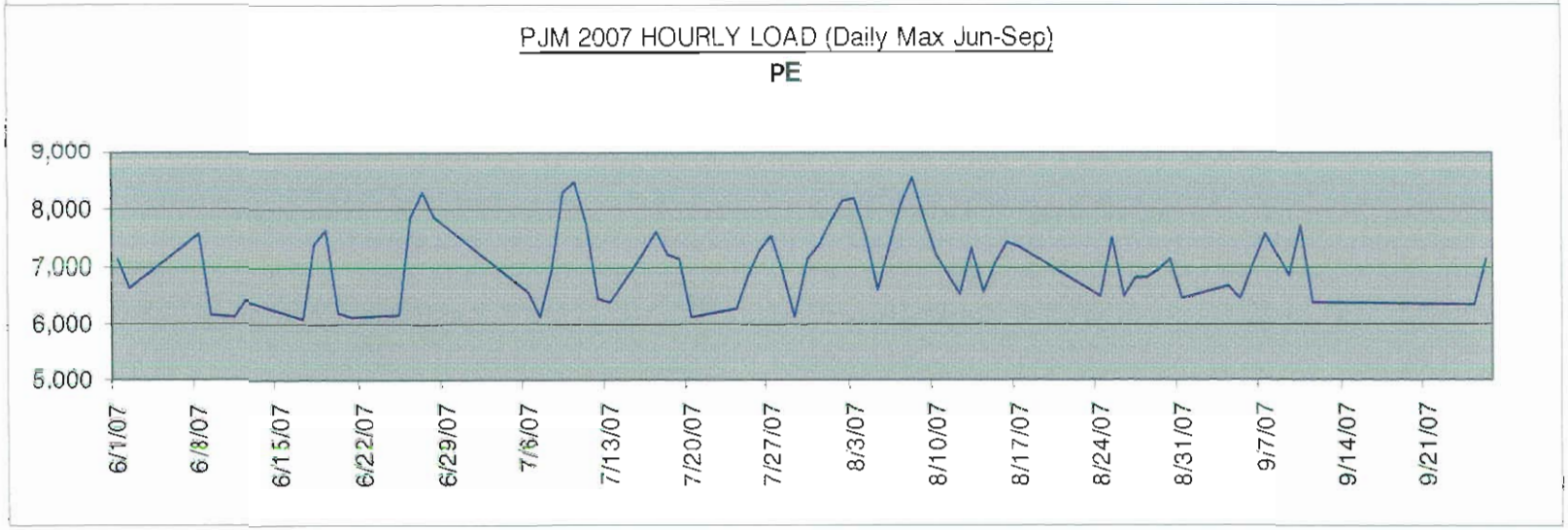
Background

- ✓ At PECO's first stakeholder meeting a request came in to evaluate the PJM RTO peak loads against the PE Zone peak loads.
- ✓ The purpose of the evaluation was to show what sort of correlation exists between the RTO and PE Zones.

PECO®

Comparison Graphs





PECO

Summary

- ✓ Observations on the top 100 hours
  - All of the top 100 hours for both the PJM RTO & PE Zone occur during the period between June 1st and September 30th
  - The top 100 hours occur on 18 different days in the PE Zone 11 of which are common to the RTO
  - 73 of the hours occur at the exact same date and time
  - The top 45 hours in the PE Zone are part of the RTO top 100
  - Utilizing an EDC zone's highest peaks will result in the selection of peak hours consistent across the RTO

PECO

PECO

Overview of Federal and State Energy Efficiency Resources

January 22, 2009

Overview of Major Resources – Federal

- ✓ Tax Credits
- ✓ Grants to States and Local Governments
- ✓ Lending Assistance

Energy Efficiency Tax Credits

✓ Tax Credits

Purpose: Broad range of tax incentives for consumers and builders to offset the upfront capital cost of installing energy efficient technologies

Eligible Uses - Consumer:

- Home improvements (windows and doors, roofing, insulation, HVAC, water heating)
- Solar Energy Systems
- Small Wind Energy Systems
- Geothermal Heat Pump Systems

Eligible Uses – Builders:

- $2,000 tax credit for new energy efficient homes that achieve 50% energy savings over 2004 International Energy Conservation Code standards
- $1.80 per square foot tax credit for commercial buildings that save at least 50% of heating and cooling energy of a building that meets ASHRAE Standard 90.1-2001

Limitations:

- All tax credits currently set to expire on December 31, 2009

For more information visit: http://www.dsireusa.org/library/includes/genericfederal.cfm?CurrentPageID=1&state=us&ee=e&re=1

Energy Efficiency Grants to States

✓ Weatherization Assistance Program

Purpose: Formula grants to states to provide direct cash assistance to low-income and other targeted populations for home energy audits and weatherization provided by local weatherization agencies

Eligible Populations:

- Individuals who are receive Supplemental Security Income (SSI) or Aid to Families with Dependent Children (AFDC) are automatically eligible
- People over age 60, families with one or more member with a disability and families with children receive preference; primary eligibility factor is income (varies by state)

Average Value of Services:

- The average value of home weatherization services is $2,500

Limitations:

- Overall funding levels vary based on year-to-year congressional appropriations ($222 million in FY '08)
- Eligible program applicants are placed on waiting lists when adequate funds are not available in any given year to meet program demand

For more information visit: http://www.eere.energy.gov/weatherization_assistance

Energy Efficiency Grants to States

✓ State Energy Programs (SEP)

Purpose: Formula grants to states to support energy efficiency projects that address their energy priorities and program funding to adopt emerging renewable energy and energy efficiency technologies

Formula based on:

- 1/3rd equal distribution to states
- 1/3rd population
- 1/3rd energy consumption

Limitations:

- Overall funding levels vary based on year-to-year congressional appropriations (no funding in FY '08, $45.4 million in FY '07)
- State Energy Program Special Projects competitive grant program has not been funded since FY '05

For more information visit: http://apps1.eere.energy.gov/wip/sep.cfm

Energy Efficiency Lending Assistance

✓ Energy Efficient Mortgages (EEM)

Purpose: Program by which borrowers through either private lenders or federal programs (FHA or Veterans' Home Loan Guarantee service) are able to borrow at levels in excess of established loan limits based on expected energy cost savings of home. Legislation (P.L. 110-289) enacted in August 2008 to simplify use of EEMs and expand program participation.

Eligible purposes:

- Purchase of new construction
- Purchase of existing energy efficient home
- Refinancing to include energy efficient improvements

Limitations:

- Federal programs and private lenders limit the amount of efficiency improvements that can be financed
- Cumbersome application procedures have limited use of EEMs to approximately 30,000 nationally in an average year
- Overall volume of EEMs and federally-insured loan guarantees are limited by annual congressional appropriations

For more information visit:
http://www.hud.gov/utilities/print/print2.cfm?page=80$^@http%3A%2F%2Fwww%2Ehud%2Egov%2Foffices%2Fhsg%2Fsfh%2Feem%2Feem%5Fprog%2Ecfm&portnum=80

Energy Efficiency Lending Assistance

✓ Qualified Energy Conservation Bonds

Purpose: Legislation signed into law in October 2008 (P.L. 110-343) extends $800,000,000 tax-exempt bonding authority to states for issuance of Qualified Energy Conservation Bonds to support a broad range of conservation purposes. "Large local governments" of 100,000 population are entitled to proportional sub-allocations of funds.

Eligible purposes:

- Reduce energy consumption in publicly-owned buildings by >20 percent
- Implementing green community programs
- Qualified renewable energy research production facilities or grants
- Mass commuting facilities
- Demonstration projects including green building technologies, electricity demand response or energy efficiency education

Limitations:

- 100 percent of available project proceeds must be used for qualified conservation purposes
- All bonds must be issued by a state or local government

For more information visit: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h1424enr.txt.pdf

Energy Efficiency Proposals

- ✓ **Legislation introduced in the U.S. House of Representatives (1/15/09) includes the following Energy Efficiency-related programs**
  - $6.9 Billion for State and Local Energy Efficiency block grants
  - $6.2 Billion for Low-Income Weatherization
  - $1.5 Billion for Energy Efficiency loans and grants for institutions (schools, local governments, higher education institutions and municipal utilities)
  - $1 Billion Public Housing Capital Fund for competitive grants for Energy Efficiency
  - $300 Million for Energy Star appliance rebates
  - Increase of tax deductibility cost cap to 30% of installed costs (from 10%) for home efficiency investments (solar water heating, small wind, geothermal HP) and elimination of dollar limits
  - Increase of tax credit for energy efficiency home improvements to 30% (from 10%)
  - $10 Billion per year allowance for school construction bonds for 2009 and 2010, with energy efficiency upgrades an identified goal
  - $10 Billion Recovery Economic Development Bonds and $15 Billion Recovery Zone Facility Bonds, with energy efficiency upgrades an identified goal
  - Energy efficiency is also an allowable use for numerous other expanded programs

For more information visit:http:appropriations.house.gov/pdf/PressSummary01-15-09.pdf and http:waysandmeans.house.gov/media/pdf/110/taxsum.pdf

Energy Efficiency Proposals

Outline of Proposals to Expand Federal EE programs

- ✓ **Legislative priorities proposed by the Energy Efficiency and Economic Recovery Initiative (coalition of efficiency advocates, utilities, industry, and environmental organizations) for 2009-2010:**
  - $2.5 Billion for Home Energy Retrofits
  - $2.5 Billion for Commercial Building EE
  - $3 Billion for Public Buildings
  - $5 Billion State EE Program Matching Fund
  - $2 Billion Industrial Efficiency Program
  - $5 Billion Energy Efficiency Challenge Grants (beginning in 2010 for states that adopt efficiency compatible regulatory systems and adopt energy efficient model building codes)

Overview of Major Resources – State

✓ Existing Programs

- Weatherization Assistance Program
- State Energy Program Grants
- Pollution Prevention Assistance Program
- PHFA Purchase Improvement Loan
- PEDFA Tax Exempt Bond Program (environmental purposes eligible)

✓ Alternative Energy Investment Fund

Major efficiency and conservation-related provisions:

- $92.5 million over 8 years to offset 25% of the cost of purchasing and installing energy conservation tools and home weatherizations
- $100 million to provide loans, grants and rebates for up to 35% of the cost of installing solar energy technology
- $25 million for grants and loans to support building and renovation of Green Buildings
- $5 million to support the PHFA Energy Efficiency Loan Fund

Overview of Major Resources – State: Existing Programs

✓ Weatherization Assistance Program

Purpose: Service to increase energy efficiency of homes for target populations (60 percent of median state income) delivered through local weatherization providers. For more information visit:

http://www.newpa.com/strengthen-your-community/redeveloping-your-community/housing/weatherization/index.aspx

✓ State Energy Program Grants

Purpose: PA Energy Harvest competitive grant program for government entities and non-profit organizations to support development of innovative energy solutions. For more information visit:

http://www.depweb.state.pa.us/energy/lib/energy/docs/energyharvest/2008application/mw/7000-bk-dep3087_eh2008guidelinesmw.doc

✓ Pollution Prevention Assistance Program

Purpose: Low-interest loans of up to $100,000 to small businesses to install pollution prevention or energy efficient equipment or processes. For more information visit:

http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=31

✓ PHFA Purchase Improvement Loan

Purpose: Allows PHFA-eligible home buyers to include between $1,000 and $15,000 for energy conservation improvements on their home loans. For more information visit:

http://www.phfa.org/consumers/homebuyers/purchaseimprovementloan.aspx

✓ PEDFA Tax Exempt Bond Program (environmental purposes eligible)

Purpose: Tax-exempt bonds supporting a range of projects, including energy/environmental. For more information visit:

http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=29

Overview of Major Resources – State: Alternative Energy Investment Fund

✓ Small Business Energy Efficiency Grant Program

Purpose: Program to provide a 25% reimbursement (up to a maximum of $25,000) to enable PA small businesses to purchase a broad range of energy efficiency products. For more information visit:

http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&q=543714

✓ Residential Energy Efficiency Grant Program

Purpose: Program announcement expected in the first quarter of 2009. For more information visit:

http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&Q=543707&energindependentNav=|

✓ Pennsylvania Sunshine Program

Purpose: Provide grants, loans and rebates that cover up to 35% of the costs residential consumers and small businesses incur for installing solar energy technology. For more information visit:

http://www.depweb.state.pa.us/energindependent/lib/energindependent/documents/fs-pasunshine.pdf

✓ Pennsylvania's Energy Independence

Purpose: General information and program announcements for programs related to the Pennsylvania Energy Independence strategy. For more information visit:

http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&Q=543707&energindependentNav=|

Energy Service Companies (ESCOs)

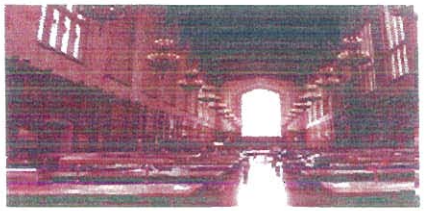
- ✓ **ESCOs typically work on a performance contracting basis (sometimes referred to as shared savings)**
- ✓ **Most ESCOs support federal government-related projects because of clearly defined and mature funding mechanisms**
- ✓ **In Pennsylvania, the PA Dept of General Services maintains a registry of 18 qualified ESCOs who are permitted to compete for energy conservation projects for any state-affiliated agency or facility**
  - Does not translate to every municipality or school district
  - Projects for non-affiliated entities are done on a "one-off" basis dependent upon financing availability
  - With the recent disruption in the financial markets, many qualified projects are on hold, pending the availability of funding. It is anticipated this problem will ease with time, but is a current challenge none the less

Firms Exist to Help Structure Financing Programs

MARKETS

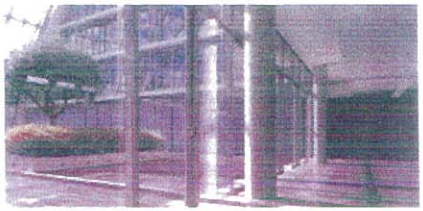
Federal

- As one of the leading financial services firms in the federal market, Hannon Armstrong has an exceptional record of financing contractors who serve the federal government. We can help with a variety of capital needs including leasing, performance contracting and service contract financing.
- Scott Foster – 410-571-7173
  sfoster@hannonarmstrong.com



State and Local

- At Hannon Armstrong, we provide state & local governments and private and public institutions such as colleges, universities and hospitals, a pathway to creative and competitive financing. We provide a financial solution that meets budgetary requirements as well as tax, accounting, regulatory and cyclical business needs.
- Gene Rogero – 706-769-6864
  grogero@hannonarmstrong.com
- Chris Youngs – 303-617-1290
  cyoungs@hannonarmstrong.com

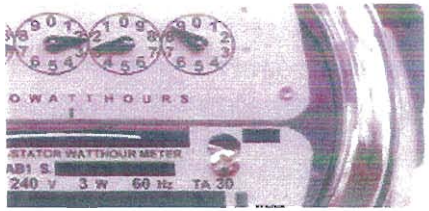


Commercial

- As commercial entities see value in outsourcing critical functions like information technology or energy management, new financial structures must be developed to support the delivery of outsourced services. Hannon Armstrong provides a broad range of commercial contract finance options to support outsourcing for commercial entities.
- John Christmas – 410-571-6164
  jchristmas@hannonarmstrong.com

Industrial

- As the industrial market moves to outsourcing, particularly for energy islands, water, wastewater and other utility-type services, Hannon Armstrong can provide the ownership and finance resources required so our clients and their service providers can develop the day-to-day operating relationship necessary for success.
- John Christmas – 410-571-6164
  jchristmas@hannonarmstrong.com



Utility

- Hannon Armstrong has a long history of working with utilities to structure and finance solutions for demand-side management programs, satisfaction of renewable and efficiency portfolio standards, and increasingly, smart-grid solutions and distributed generation.
- Claire Johnson – 410-571-6180
  cjohnson@hannonarmstrong.com

Federal Resource Index

- ✓ Energy Efficiency Tax Credits

  For more information visit: http://www.dsireusa.org/library/includes/genericfederal.cfm?CurrentPageID=1&state=us&ee=e&re=1

- ✓ Weatherization Assistance Program

  For more information visit:

- ✓ State Energy Programs (SEP)

  For more information visit:

- ✓ Energy Efficient Mortgages (EEM)

  For more information visit:

- ✓ Qualified Energy Conservation Bonds

  For more information visit:

Pennsylvania Resource Index

- ✓ Weatherization Assistance Program

  For more information visit:
  http://www.newpa.com/strengthen-your-community/redeveloping-your-community/housing/weatherization/index.aspx

- ✓ Pennsylvania Energy Harvest Grants

  For more information visit:
  http://www.depweb.state.pa.us/energy/lib/energy/docs/energyharvest/2008application/mw/7000-bk-dep3087_eh2008guidelinesmw.doc

- ✓ Pollution Prevention Assistance Program

  For more information visit:http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=31

- ✓ PHFA Purchase Improvement Loan

  For more information visit: http://www.phfa.org/consumers/homebuyers/purchaseimprovementloan.aspx

- ✓ PEDFA Tax Exempt Bond Program

  For more information visit: http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=29

- ✓ Small Business Energy Efficiency Grant Program

  For more information visit: http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&q=543714

- ✓ Residential Energy Efficiency Grant Program

  For more information visit: http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&Q=543707&energindependentNav=|

- ✓ Pennsylvania Sunshine Program

  For more information visit: http://www.depweb.state.pa.us/energindependent/lib/energindependent/documents/fs-pasunshine.pdf

- ✓ Pennsylvania's Energy Independence

  For more information visit: http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&Q=543707&energindependentNav=|

PECO

Smart Meter Update

January 22, 2009

AMR at PECO

- ✓ PECO's AMR installation project started in 1999 and was fully deployed by late-2003
- ✓ A state-of-the-art Cellnet Fixed-RF Network solution was selected.
  - All meters (Gas & Electric) are read remotely via radio.
    - All meters are transmit-only (1-way)
  - A dedicated AMR network was built by Cellnet to read the meters.
    - 99% of meters are read by the network
    - Others are drive-by and MV-90 dial-up systems
- ✓ Cellnet manages the network, performs meter maintenance and provides data to PECO.
  - All work done under a managed service contract
  - PECO pays for each meter reading delivered
- ✓ Services/Data Delivered:
  - Meters are read daily (Gas & Electric)
  - Additional services include: Demand, limited ½ Hour Interval, TOU
  - Reactive Power where required
  - On-Demand meter reading requests
  - Tamper & Outage Flags (Last-Gasp, Power-Up Messages)

Act 129 Smart Meter Requirements

- ✓ Within 9 months of effective date of the Act EDCs to file smart meter technology procurement and installation plan (i.e., 08/14/09)
- ✓ EDCs to furnish smart meters:
  - Upon customer request
  - New building construction
  - In accordance with depreciation schedule not to exceed 15 years
- ✓ Smart Meter data must be made available to 3rd parties
- ✓ Cost Recovery:
  - Base rates with deferral and carrying charges or
  - Full and current through use of a 1307 mechanism
  - Costs of the smart meter technology can be recovered less operating and capital cost savings realized

Act 129 Smart Meter Requirements

- ✓ "Smart Meter technology" means technology, including metering technology and network communications technology capable of bi-directional communication, that records electricity usage on at least an hourly basis, including related electric distribution system upgrades to enable the technology
- ✓ "Smart meter technology" shall provide customers with direct access to and use of price and consumption information
- ✓ "Smart meter technology" shall also:
  a. Directly provide customers with information on their hourly consumption;
  b. Enable time-of-use rates and real-time price programs
  c. Effectively support the automatic control of the customer's electricity consumption by one or more of the following as selected by the customer
     i. The customer
     ii. The customer's utility
     iii. A third party engaged by the customers or the customer's utility

Act 129 Smart Meter Requirements

- ✓ EDC shall submit to the PUC one or more proposed time-of-use (TOU) rates and real-time (RT) price plans
  - By 1/1/10, or at the end of the applicable rate cap period, whichever is later
  - PUC shall approve or modify the TOU rates and RT price plan within six months of submittal
- ✓ EDC shall offer the TOU and RT rates/price plan to all customers that have been provided with smart meter technology
  - Residential or commercial customers may elect to participate in TOU rates or RT pricing

AMI, Smart Meters and the Current State of the Industry

- ✓ Smart Meters are commonly thought to be a key component of the Advanced Metering Infrastructure (AMI)
- ✓ Many vendors, including Cellnet, PECO's current AMR vendor, are developing their version of AMI.
- ✓ The industry is pushing for standards to improve interoperability – which defines the means for devices and systems to communicate with each other.
- ✓ Common AMI features include:
  - Smart Meters with
    - Internal memory to support interval data
    - 2-way communications, that are remotely configurable
    - Provisions to supply price signals and usage data to either an in-home device or a home automation network

MEETING THE NEEDS OF THE CONSTANTLY CHANGING ENERGY INDUSTRY

Global Energy Partners, LLC
An Employee - Owned Company

Targeted Energy-Efficiency Services Study for PECO Energy Company

Stakeholder Meeting #3: Program Development

Ingrid Rohmund, Greg Wikler
Global Energy Partners, LLC

Ahmad Faruqui, The Brattle Group

Harrisburg, PA
February 18, 2009

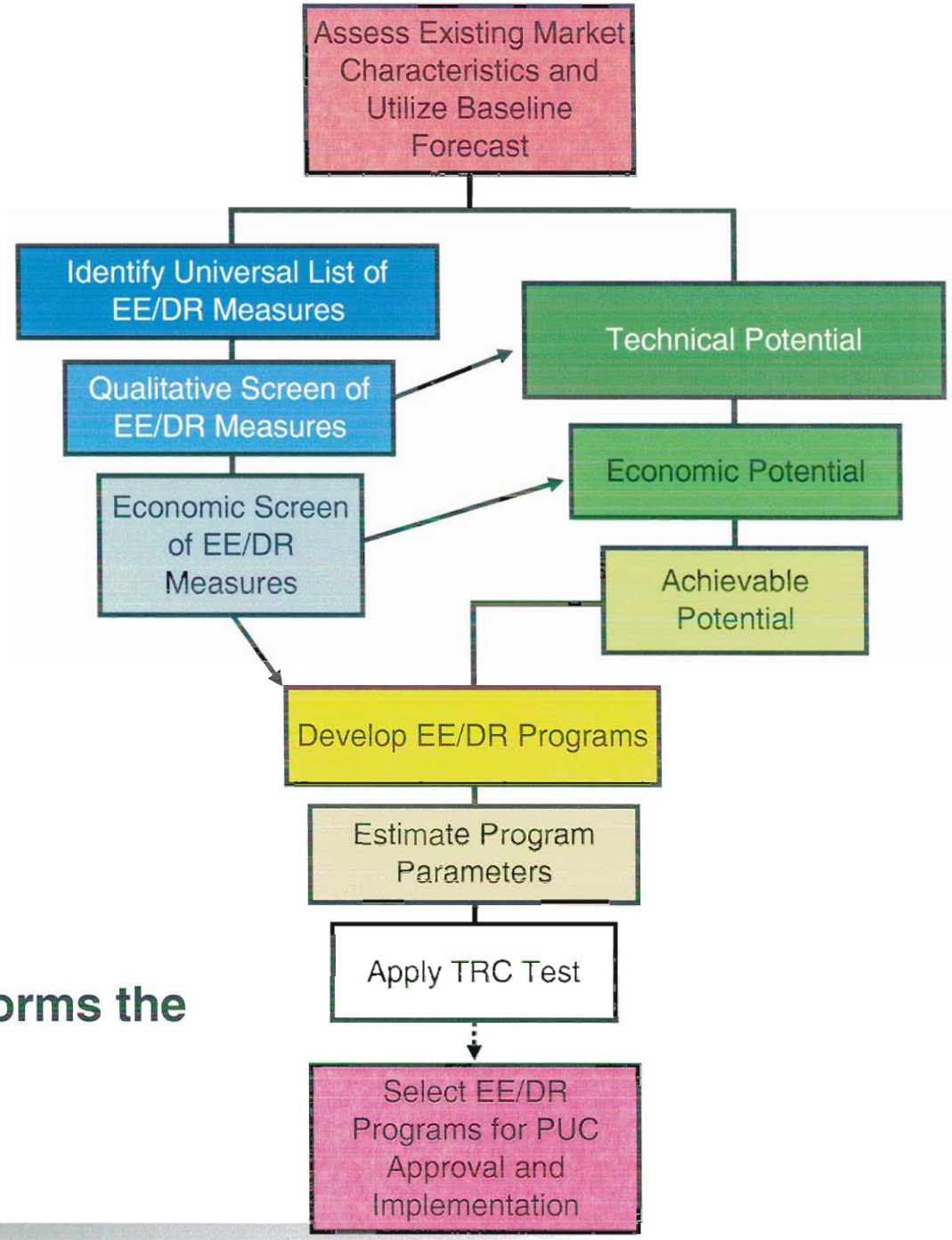
PECO

Presentation Outline

- Introductions
- Review of study progress
- Presentation of strawman programs and concepts
- Discussion

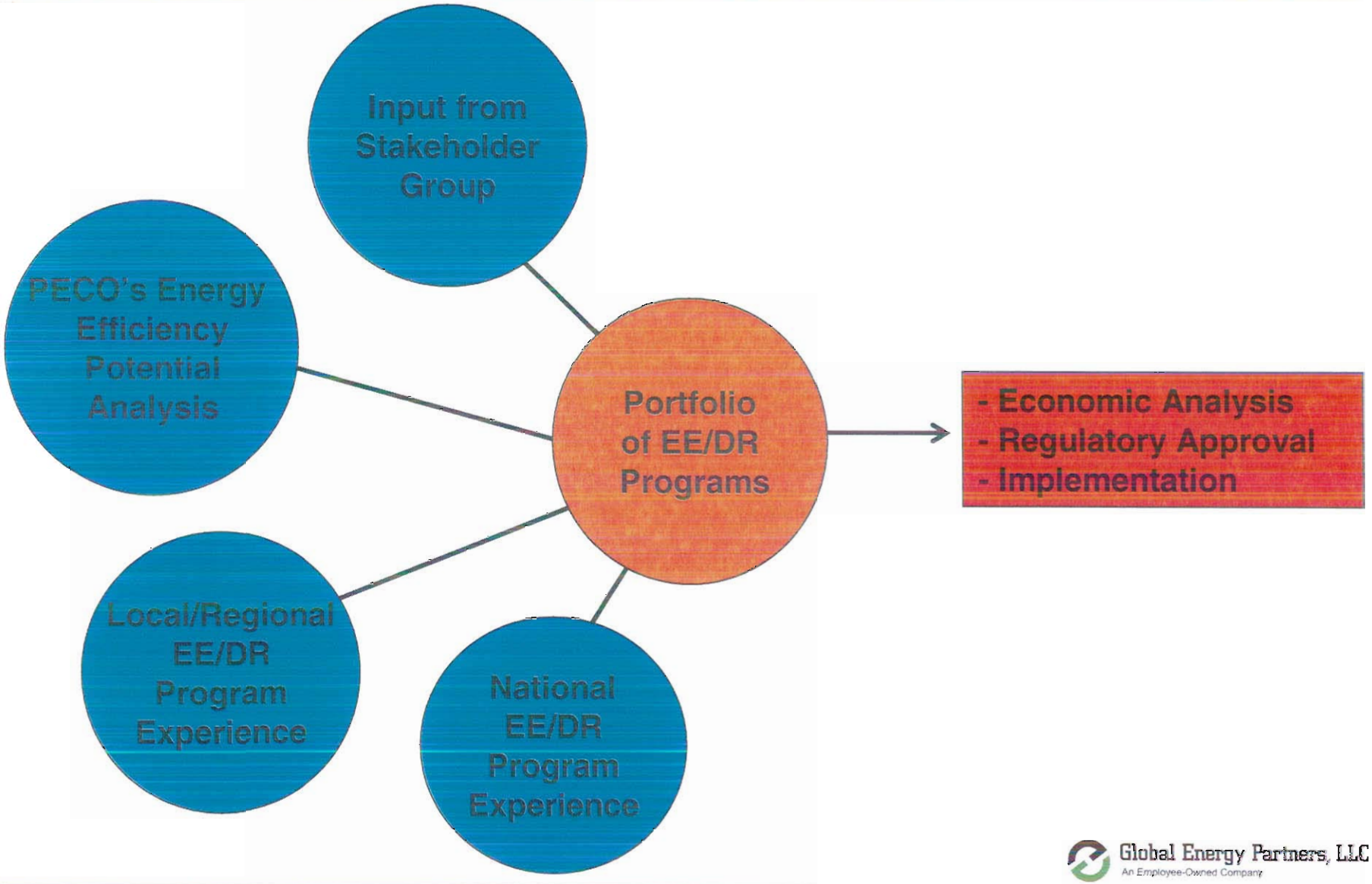
Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram



- Stakeholder input informs the process

EE/DR Program Development Process



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Strawman Program Approach

- Listing of generic programs comes from best industry practices
- Specific programs and approaches will be tailored based on Act 129 requirements and PECO-specific customer characteristics
- The strawman programs are meant to frame the discussion with PECO Stakeholders and are not intended to be the end-all programs
- Once a set of preliminary programs is developed, the analytical process begins
  - Analysis of energy and peak demand savings
  - Estimation of potential
  - Market acceptance analysis
  - TRC tests

Strawman Energy Efficiency Programs

- Address all sectors and in compliance with Act 129
- Programs designed to produce the bulk of kWh savings in all sectors
- Will include measures proven to deliver savings
- Will use delivery mechanisms effective for each customer sector
- Designed to evolve as market awareness and acceptance improves

Overview of Strawman EE Programs

Residential

1. Low-income improvements
2. Home energy audits
3. Home energy incentives
4. New construction
5. Appliance pickup
6. Renewables

Business

1. Commercial prescriptive rebates
2. Commercial custom incentives
3. C&I new construction
4. Government/public building energy savings

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Low-Income Improvements

- Direct-install and education program to improve the living environment and reduce electricity use among low-income residents
- Focus on water heating, lighting, and building shell
- Will build on PECO's LIURP activities
- Deliver with help from community action groups

Example: Multifamily Assistance Program—City of Portland, Oregon

Residential Home Energy Audits

- Purpose:
  - Promote awareness of energy savings opportunities and EE, Renewables, and DR programs
  - Provide entry point for participation in other programs
- Several delivery options:
  - On-site audits
  - Web-based, on-line audits
  - Whole-building assessments
- May also produce countable kWh savings

Example: RCS Audit program—Massachusetts Electric

Home Energy Incentives

- Comprehensive range of energy efficiency measures for all major end uses and building shell, including: lighting, water heating, cooling, and appliances
- Provides cash rebates for installation of high-efficiency measures, including home insulation
- Features Energy Star products
- Early focus on CFL installations
  - Possible give-aways to "reward" audit participation and encourage other measure adoption
  - Proven to deliver large savings when widely adopted
  - Use to create models for influencing stocking practices and upstream incentives

Example: Residential Efficiency Products Program—Efficiency Vermont

Residential New Construction

- Goal is to influence and accelerate improvement of energy efficiency in "standard" design practices
- Forward-looking and proven to have permanent effects on the housing market
- Provides financial incentives to builders and owners to incorporate more energy efficient design, construction, and operation of homes
- May include both prescriptive measures and whole-building approach

Example: Energy Star Homes Program—Efficiency Vermont

Residential Appliance Pickup

- Goal is to remove spare and inefficient refrigerators, freezers, and room air conditioners from operation while accelerating purchase of new more efficient units
- Provides pickup service and sometimes a small payment to customer
- Includes environmental disposal/recycling of components; can help meet Act 129 CSP inclusion

Example: Refrigerator Recycling program—Southern California Edison

Residential Renewables

- Educate homeowners about financial incentives (including tax breaks) and facilitate access to technical expertise for installation of solar PV and hot water systems
- Build on experience with PECO's Solar Hot Water Heater Pilot program
- Contributes directly to peak load reduction goal
- Excellent Stimulus opportunity

Example: California Solar Initiative—California Energy Commission with California utilities

Commercial/Industrial Prescriptive Rebates

- Full range of energy efficiency measures for all major end uses, including lighting and HVAC, office equipment, controls
- Features Energy Star products
- Directed mainly to smaller businesses
- Provides cash rebates for installation of high-efficiency and energy-saving measures
- Consider low-interest loans and rebates to equipment dealers

Examples: Small Business Energy Advantage—Northeast Utilities
Small Comm. Prescriptive Lighting Incentive Program—SMUD

Commercial/Industrial Custom Incentives

- Designed to accommodate efficiency improvements more complex or more costly than prescriptive ones
- All businesses eligible; likely attract larger ones
- Consider various financing options, including cash incentives, performance contracting, low-interest loans
- Can help meet Act 129 CSP inclusion through contracting and/or verification

Examples: Energy Initiative—National Grid
Energy Opportunities—United Illuminating

Commercial/Industrial New Construction

- Goal is to reduce electric demand and energy use by influencing building design practices in building/facility construction and major renovations
- Provides design assistance to architects/engineers (A&E), proven to have permanent effects on design practices
- Includes custom financial incentives to builders and owners
- Plan staggered or slow ramp-up during down economy

Examples: Design2000plus—Massachusetts Electric
New Construction Program—NSTAR Gas & Electric

Government/Public Building Energy Savings

- Umbrella program to reduce electric demand and energy use in public facilities, including local/state/federal buildings, schools, and streets
- Includes broad range of measures for each type of building, from equipment and shell improvements to traffic signals
- Provides education and incentives to improve design, construction, maintenance, and operational practices
- Will provide 10% of all kWh savings, per Act 129 requirement
- Excellent Stimulus opportunities

Examples: Northeast Collaborative for High Performance Schools
Energy Efficiency in State Government—Virginia Energy Plan

Strawman Demand Response Programs

- Address all sectors and in compliance with Act 129
- Designed to produce the bulk of top 100 hours peak load reductions in all sectors
- Will include strategies proven to achieve reductions: direct control, response incentives, and tariffs
- This is the future; fits well with deregulation plans

Overview of Strawman DR Programs

Residential

Direct load control

Critical peak pricing

Real time pricing

Peak time rebate

Business

C&I direct load control/curtailable

C&I permanent load shifting

Critical peak pricing

Real time pricing

Conservation voltage reduction pilot

Residential Direct Load Control

- Electronic communication equipment enables reduced central AC compressor and/or electric hot water heater element operation for short periods of time
- Utility controlled with customer override capability
- Utility calls events during high summer demand
- Participants receive monthly incentives for allowing control
- Trend toward adaptive algorithm and/or programmable communicating thermostats

Example: BGE's program in Maryland with 200,000 plus customers

Residential Critical Peak Pricing (CPP)

- Designed to lower peak demand during critical peak periods through significantly higher prices
  - Participants receive an off-peak discount to ensure revenue neutrality
- Rates are dispatched on short notice, for limited days/year, using "trigger" criteria, such as temperature
- Customer controls response and this can be enhanced through enabling technology
- Critical peak price is based on capital and operating cost of peaking capacity

Example: PG&E's CPP program in Bakersfield, California with 10,000 customers

Residential Real-Time Pricing (RTP)

- Participants pay electricity price that varies hourly, linked to changes in the day-of (real time) or day-ahead cost of power
  - Nighttime prices can be very low
- Utility sends price signal to participants so they know real-time price
  - Price forecast is usually provided in day-ahead
- Customer controls response and can be provided enabling technology
- Participants receive bill savings through usage reductions if they cut or shift load during high-priced periods; additional incentive may also be offered for signing up

Example: Commonwealth Edison and Ameren Illinois Utilities have more than 10,000 customers on such rates

Residential Peak-Time Rebates (PTR)

- Payments to participants who reduce electricity use during critical peak days
- Utility dispatches same as for Critical Peak Pricing (CPP)
- Customer controls response which can be boosted with enabling technology
- Participant receives rebate only if reduces load; no penalty for failure to curtail
- There are challenges with defining the "baseline"

Example: Has been piloted in Anaheim, California, Ottawa, Canada and Baltimore, Maryland

C&I Direct Load Control/Curtailable

- Electronic communication enables full or partial shutdown of facility equipment on highest demand days
- Utility controlled with customer override capability
- Proven technology currently used with high effectiveness
- Most attractive if offer incremental commitment options; e.g., 2-hr blocks, total 100 hours
- Most cost-effective for participants with >200 kW demand

Example: Utility sends signal to a Lowe's store that has several packaged AC units; store responds by staggering cycling of the units and slight dimming of lights.
Result = 150 kW reduction

C&I Critical Peak Pricing (CPP)

- CPP tariff designed to induce peak demand reduction via significant price increase during critical peak periods
- Program operates same as for Residential CPP
  - Utility calls event
  - Customer controls response
  - Participants receive lower than normal off-peak prices
  - Critical peak price is set using empirical data to ensure achievement of sufficient peak load reduction
  - Less expensive to operate than direct load control
- Public facilities/institutions eligible to participate

Example: Critical Peak Pricing Program—PG&E

C&I Real-Time Pricing (RTP)

- Participants pay electricity price that varies hourly, linked to changes in the day-of (real time) or day-ahead cost of power
- Program operates same as for Residential RTP
  - Utility sends price signal to participants so they know real-time price
  - Customer controls response
  - Participants receive bill savings through usage reductions if they cut or shift load during high-priced periods
- Consistent with PECO move toward all large customers on full market pricing

Conservation Voltage Reduction Pilot

- Designed to lower service voltage levels for all customers within applicable distribution feeders
- Includes voltage regulation devices at customer sites to safeguard equipment
- Pilot will test feasibility and cost-effectiveness on selected feeders

Example: Snohomish PUD Voltage Reduction, since 2006

C&I Permanent Load Shifting (PLS)

- Designed to encourage customers to move electricity usage from peak period to another on and ongoing (permanent) basis
- Technologies can include "clean" energy, e.g., solar PV, and storage systems, e.g., ice storage for cooling
- Installed systems can be connected to utility to enable activation during system peak periods; customers can also utilize equipment at any time
- Participants receive capital cost incentives and may receive additional payments for peak period reductions

Example: Southern California Edison PLS Pilot

Next Steps

- Refine program features
- Screen programs for local market potential, market acceptance, and cost-effectiveness (TRC)
- Begin screening of specific energy efficiency measures for inclusion in programs

MEETING THE NEEDS OF THE CONSTANTLY CHANGING ENERGY INDUSTRY

Global Energy Partners, LLC
An Employee - Owned Company

Targeted Energy-Efficiency Services Study for PECO Energy Company

Stakeholder Meeting #4: EE&C Plan Update

Greg Wikler
Global Energy Partners, LLC

Philadelphia, PA
March 19, 2009

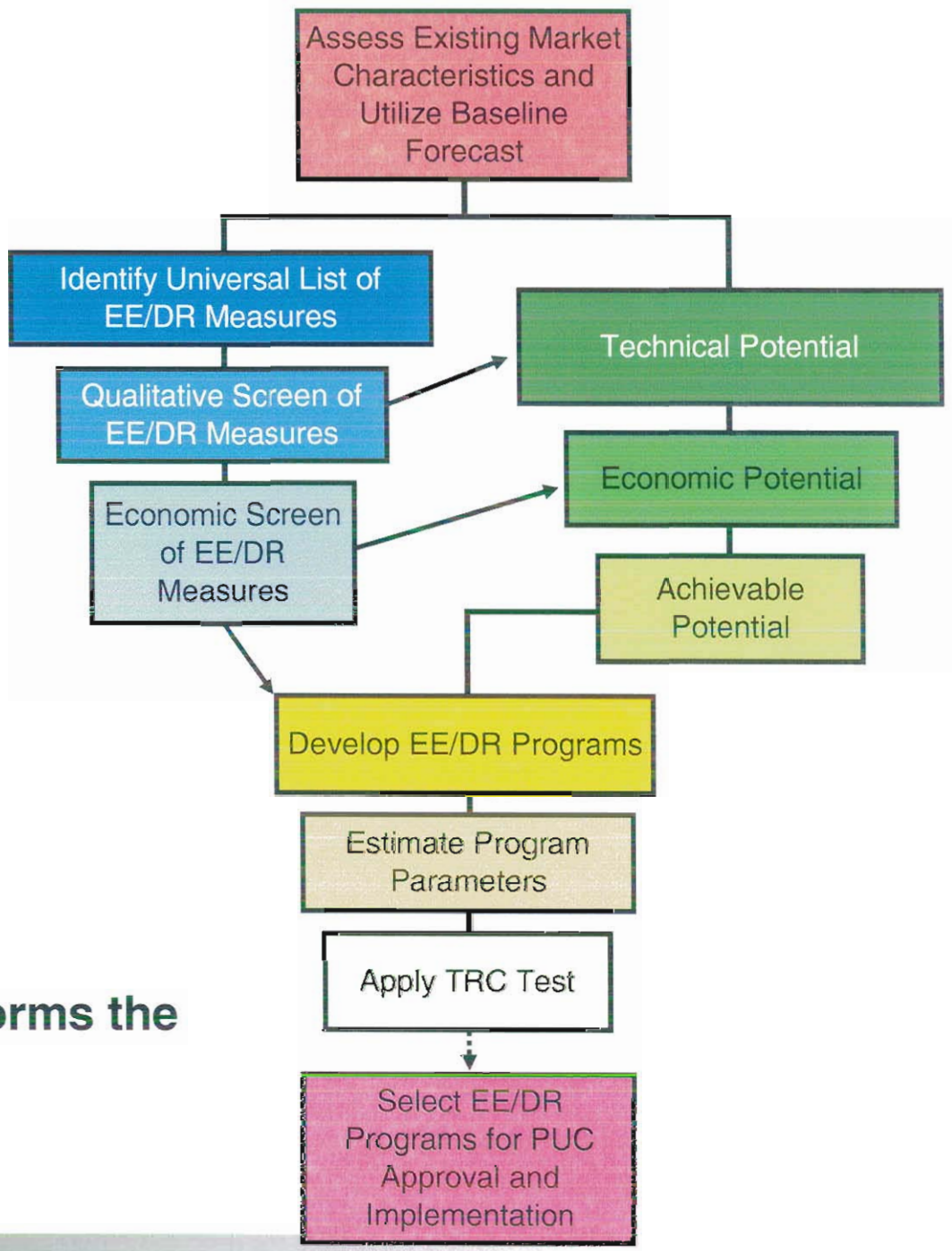
PECO

Presentation Outline

- Introductions
- Review of EE&C plan progress
  - EE/DR measure analysis
  - Program development
- Channel strategies best practices
- Customer education best practices
- Discussion

Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram



- Stakeholder input informs the process

Steps in Conducting the Qualitative Screen of EE/DR Measures

Step 1: Develop universal list of measures

- List is built from years of experience
- Included additional measures recommended by Stakeholder participants (e.g., white roofs, solar w/h)

Step 2: Conduct qualitative screen to determine which measures are most feasible for consumers and businesses in PECO service territory

Step 3: Estimate Technical Potential

- Savings represented from all measures passing the qualitative screen multiplied by Baseline forecast

Step 4: For measures passing the qualitative screen, conduct detailed measure-level assessment to determine savings and cost

- Run BEST models for each individual measure at various efficiency levels
- Assess measure costs drawing upon actual market prices

Universal List of EE and DR Measures

Sector	Total Number of Measures in Universal List		
	Energy Efficiency Measures	Demand Response Measures	Total
Residential	118	6	124
Commercial	122	13	135
Industrial	87	10	97
Total	**327**	**29**	**356**

- Supply-side measures eliminated from universal list of measures
- Next step is the qualitative screen
- Measures passing qualitative screen represented in economic screening analysis

The Qualitative Screen: Measure Screening Criteria

- (In)Applicability Criteria
  - Is the measure already widely implemented by building code?
  - Is the measure a bad match to the local conditions?
  - Are there verifiable and demonstrated sources to confirm the savings estimates?
- Qualitative Criteria
  - Is the measure technologically mature?
  - Is there a mature and viable market for the measure?
  - Is the measure acceptable to customers?
  - Are there other benefits that give further advantage to adopting the measure?

Preliminary Results of the Qualitative Screen

Sector	Total Number of Measures Passing Qualitative Screen					
	Energy Efficiency Measures		Demand Response Measures		Total Measures	
	Number Passing	% of Total	Number Passing	% of Total	Number Passing	% of Total
Residential	95	81%	6	100%	101	81%
Commercial	104	85%	13	100%	117	87%
Industrial	69	79%	10	100%	79	81%
Total	**268**	**82%**	**29**	**100%**	**297**	**83%**

- Overall, 83% of measures initially looked at pass through the qualitative screen and are taken to the next step of economic screen
- Measures passing economic screen represented in Achievable Potential estimates

Steps in Conducting the Economic Screen of Remaining EE/DR Measures

Step 1: Obtain PECO avoided energy and capacity costs

Step 2: Conduct economic screen that compares the first cost of each measure plus an administrative cost to deliver the measure relative to the lifetime benefits associated with the measure (lifetime energy savings x avoided costs)

Step 3: Bundle measures that pass the economic screen to determine the sector-specific and end-use specific savings potential

Step 4: Estimate Economic Potential

- Percent savings from Step 3 multiplied by Baseline forecast

Numerical Example of Economic Screen

COMPACT FLUORESCENT LAMP

Single Family Home, Existing Vintage

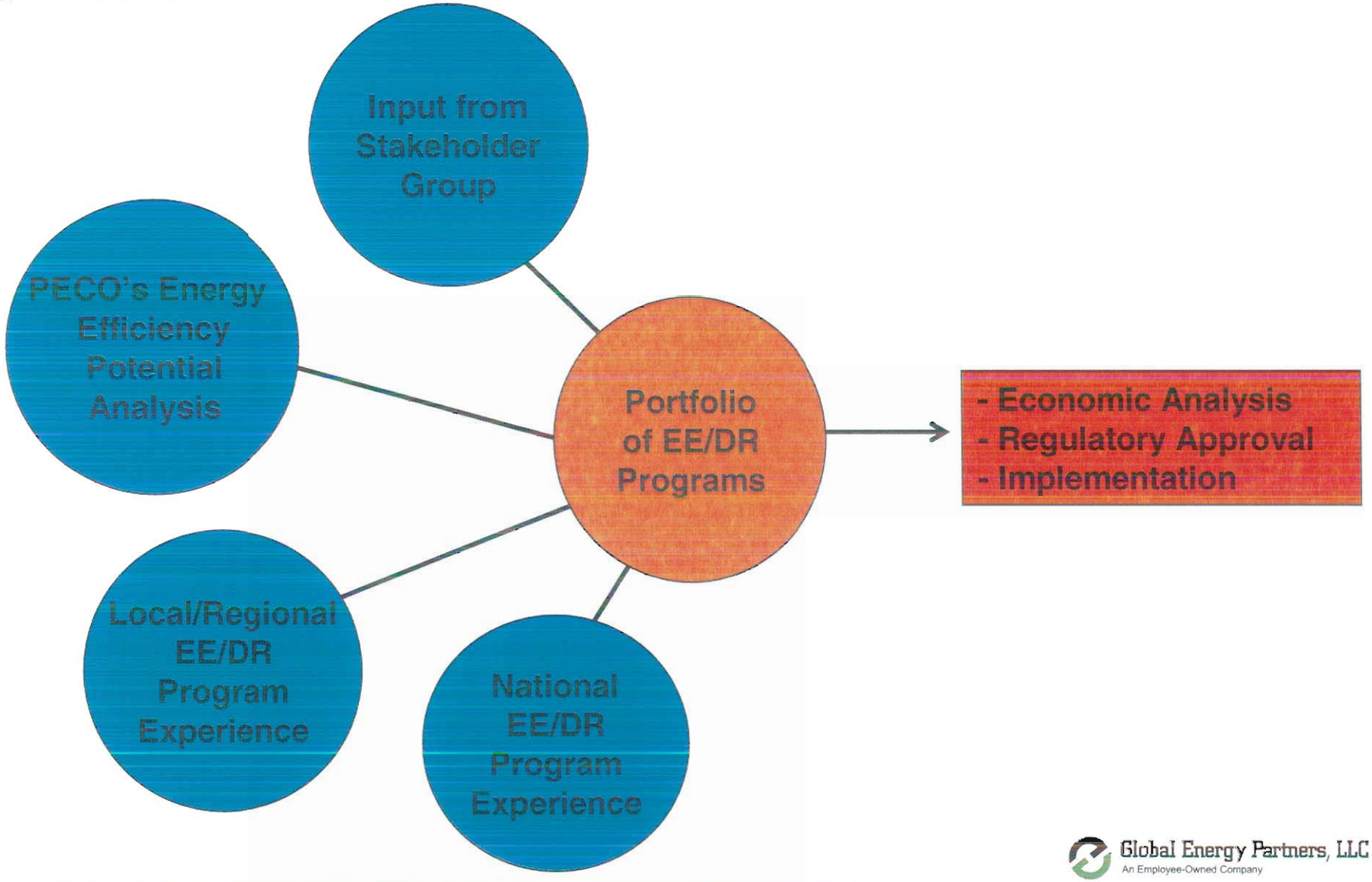
Base Case = 75 watt incandescent lamp

Efficiency Case = 23 watt CFL

Economic Screen Analysis:

- Unit Impact = 83 kWh/year; 0.01 kW peak demand
- Lifetime = 5 years
- Measure First Cost = $5.00
- Administrative Cost Adder = $0.75
- Present Value of Lifetime Savings = $53.02
- Present Value of Lifecycle Costs = $13.75
- B/C Ratio = 3.86
- Pass Economic Screen? = YES

EE/DR Program Development Process



Steps in Program Development

Step 1: Develop strawman programs based on "best practices"

Step 2: Review & revise programs for relevance to PECO customers and regulatory/market conditions

Step 3: Populate programs with specific cost-effective measures

Step 4: Assess cost-effectiveness of programs

- Use information on aggregate impact, measure set costs and incentives, PECO avoided costs

Step 5: Review features & refine final designs for plan

Overview of EE Programs

Residential Strawman Programs

1. CFL initiative
2. Low-income energy improvements
3. Whole home help
4. Home energy incentives
5. New construction
6. Appliance pickup
7. Renewables

Commercial/Industrial Strawman Programs

1. Prescriptive rebates
2. Whole Building Help
3. Custom incentives
4. New construction
5. Renewables
6. Government/public facility energy savings

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Overview of DR Programs

Residential Strawman Programs

1. Direct load control
2. Critical peak pricing
3. Real-time pricing
4. Peak-time rebates

Commercial/Industrial Strawman Programs

1. Direct load control/curtailable
2. Critical peak pricing
3. Real-time pricing
4. Permanent load shifting/ distributed resources

System-wide Program

1. Conservation voltage reduction

Channel Strategies – Best Practices

Successful programs use the strength of market relationships from various channels in all parts of program delivery.

	Manufacturers	Retailers	Contractors	A & E Designer	Trade Assns	Community grps	Gov't. agencies	News media	Energy profiles	Utility field staff	Utility bill inserts/email	CSPs
Product supply	◆	◆	◆	◆								
Prog./Prod. distribution	◆	◆				◆				◆		◆
Program promotion	◆	◆	◆		◆	◆	◆	◆		◆	◆	◆
Education	◆	◆			◆			◆	◆	◆	◆	◆

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Channel Strategies – Best Practices (cont.)

Most Effective Roles of Various Channels

- Trade Allies--partner with utility to design, supply and install EE measures; deliver program message and incentives to consumers
- Trade Associations--facilitate education of nonresidential and residential consumers
- Community Groups--provide workforce for events, education, and distribution/installation; raise profile of promo events
- News Media—provide promotion via paid advertising, education via reporting on energy issues & programs available
- Government Agencies--cost-share and champion public facility programs, coordinate low-income programs
- Utility Staff--range from administration only (turnkey outsource) to hands-on delivery (recruitment to incentives processing); always set and track goals
- CSPs--operate turnkey programs or individual components, provide education

Existing Channels - PECO

Communication

- Bill Insert
- Bill Message
- Customer Newsletters
- Direct Mail
- E-mail
- Envelope Message
- Website
- News Release
- On-Hold Telephone Message
- Paid Media
- Media Engagement

Customer Outreach

- Community Events
- County Affairs Managers
- ESO Account Managers
- Trade Shows
- Low-Income
  - Community Based Organizations
  - LIURP

Existing Channels – PECO Gas Rebate Program

- **Trade Allies**
  - Contractors
  - Electrical Association of Philadelphia
  - Air Conditioning Contractors of America (ACCA)
  - PA Association of Plumbing, Heating, Cooling Contractors
  - Gas Equipment Guild
- **Manufacturers and Distributor Network**
  - Lennox Industries, Trane, Carrier, Bryant, Payne, York International, American Standard, Crown, Burnham, Rheem/Ruud, Weil-McLean, Bradford-White
- **Supply Houses**
  - Riley Sales, Ferguson, L&R Associates, R.E. Michel, Weinstein Supply/Hajoca, U.S. Supply

Other Channels - PECO

Associations

- Association of Energy Engineers (AEE)
- Association of Pennsylvania Municipal Management
- Building Owners and Managers Association (BOMA)
- Delaware Valley Green Building Council (DVGBC)
- Delaware Valley Regional Planning Commission (DVRPC)
- Greater Philadelphia Chamber of Commerce
- Home Builders Association
- Pennsylvania State Association of Township Supervisors
- Smart Energy Initiative (SEI)

Next Steps - PECO

Develop/Enhance Relationships

- Architect and Engineering Firms
- Commercial and Industrial Developers
- Commercial and Industrial Equipment Manufacturers
- Retailers
- ESCOs/CSPs
- Training Contractors
- Trade Associations

Customer Education – Best Practices

General EE vs. Program-Specific Education

- Almost all utilities use bill inserts *regularly* to raise awareness and understanding of energy efficiency benefits and *periodically* promote a single program/measure
- Almost all utilities combine some amount of general EE information with specific program information
  - e.g., Did you know that cutting your electricity use by just x% reduces carbon emissions by… And right now you can save $x on the purchase of a new ENERGY STAR® refrigerator…

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Customer Education – Best Practices (cont.)

All successful programs have a strong educational component.

- Audits used extensively to educate residential and business customers (window of opportunity)
- Education and outreach directed to specific target markets is mostly conducted in person
  - Low-income customers-- part of in-home audits, general assistance, community outreach meetings
  - A&E contractors-- seminars for new construction design
- Community campaigns and contests increasingly used to raise awareness of schools, neighborhood businesses, etc.
- Engaging trade/industry associations and news media to run topical series in publications/meetings/shows effectively raises EE IQ and sparks inquiries about programs

Education and Awareness - PECO

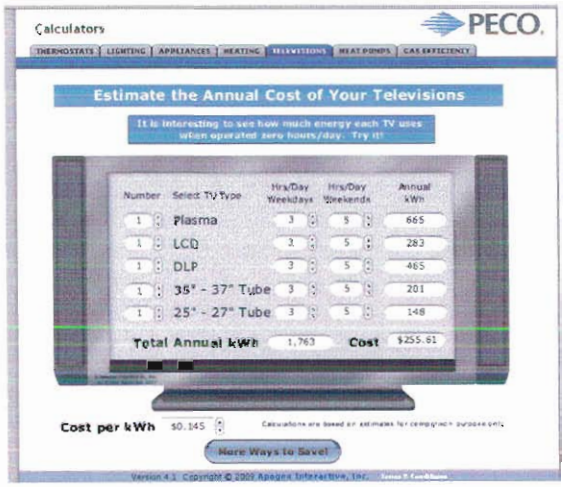
✓PECO will use a three prong approach to communicate to customers:

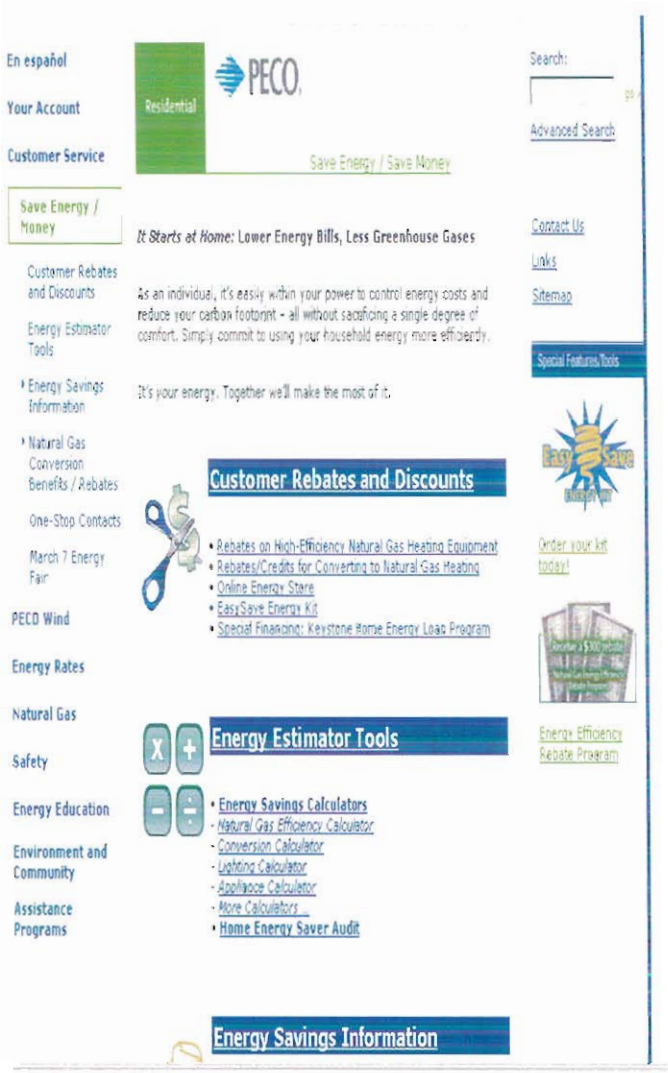
- ✓ **Awareness** - general awareness about energy efficiency and PECO's programs
- ✓ **Education** - educate customers on how small actions can have a big impact on reducing their energy usage
- ✓ **Programmatic** - specific details pertaining to each program with the benefits and instructions on how they can participate

✓PECO will utilize the launch of its programs as a springboard for education and awareness

Education and Awareness - PECO

- ✓PECO currently uses the following tools to educate customers:
- ✓Bill Inserts
- ✓Customer Newsletters
- ✓Energy Calculators
- ✓Energy Tips
- ✓Grassroots Outreach





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Next Steps

- Integrate Stakeholder feedback
- Finalize economic screen
- Package passing measures into strawman programs and assess representative savings and costs
- Conduct TRC screen of programs

PECO
Act 129 Smart Meter

3/19/09

Act 129 Smart Meter - Agenda

- ✓ Welcome
- ✓ Purpose
- ✓ Introductions
- ✓ Smart Meter/AMI
- ✓ PECO AMI Consultant
- ✓ Thank You/Next Meetings

PECO®

PECO – Smart Meter Governance Structure

PECO Executive Steering Committee

Smart Meter Project Teams

Act 129 Smart Meter Project Mgt

Lead
Ellen Cavanaugh
PM
Dave Glenwright

Technology & Business Solutions
Executive Sponsors

Leads

Members

IT Infrastructure

Executive Sponsor

Lead

Members

Regulatory Strategy

Executive Sponsor

Lead

Members

Supply Strategy

Executive Sponsor

Lead

Members

Stakeholder Outreach

Executive Sponsor

Leads

Members

Finance

Executive Sponsor

Lead

Members

Energy Efficiency*

Executive Sponsor

Lead

Members

Low Income Customer Strategy*
Executive Sponsor

Lead

Members

* Existing/Onging Team

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Act 129 Smart Meter Requirements

- ✓ Within 9 months of effective date of the Act EDCs to file smart meter technology procurement and installation plan (i.e., 08/14/09)
- ✓ EDCs to furnish smart meters:
  - Upon customer request
  - New building construction
  - In accordance with depreciation schedule not to exceed 15 years
- ✓ Smart Meter data must be made available to 3rd parties
  - Note: Data exchange rules not specified in Act
- ✓ Cost Recovery:
  - Base rates with deferral and carrying charges or
  - Full and current through use of a 1307 mechanism
  - Costs of the smart meter technology can be recovered less operating and capital cost savings realized

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Act 129 Smart Meter Requirements

- ✓ "Smart Meter technology" means technology, including metering technology and network communications technology capable of bi-directional communication, that records electricity usage on at least an hourly basis, including related electric distribution system upgrades to enable the technology
- ✓ "Smart meter technology" shall provide customers with direct access to and use of price and consumption information
- ✓ "Smart meter technology" shall also:
  a. Directly provide customers with information on their hourly consumption;
  b. Enable time-of-use rates and real-time price programs
  c. Effectively support the automatic control of the customer's electricity consumption by one or more of the following as selected by the customer
     i. The customer
     ii. The customer's utility
     iii. A third party engaged by the customer or the customer's utility

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Act 129 Smart Meter Requirements

- ✓ EDC shall submit to the PUC one or more proposed time-of-use (TOU) rates and real-time (RT) price plans
  - By 1/1/10, or at the end of the applicable rate cap period, whichever is later
  - PUC shall approve or modify the TOU rates and RT price plan within six months of submittal
- ✓ EDC shall offer the TOU and RT rates/price plan to all customers that have been provided with smart meter technology
  - Residential or commercial customers may elect to participate in TOU rates or RT pricing

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Smart Meter – As Part of the Smart Grid

Smart Grid

- Is the overall system that integrates various automated technologies and network intelligence programs
- It spans the power grid from the generating station to the customer's home
- The key component is the communications network, often know as the backhaul network
- The Smart Grid enables: Advanced Metering Infrastructure (AMI), Distribution Automation, and other advanced programs, such as Plug-in Electric Vehicles, Distributed Generation and Local Storage.

Smart Meters & AMI

- A subset of Smart Grid
- Key components include: AMI Head-End Controller, Meter Data Management System (MDMS), AMI Communication Network and Smart Meters
- It is focused on energy usage measurement, data collection and data storage
- It enables 2-way communications between utility and customer, advanced rates such as TOU and RTP, Demand Response & Energy Efficiency Programs

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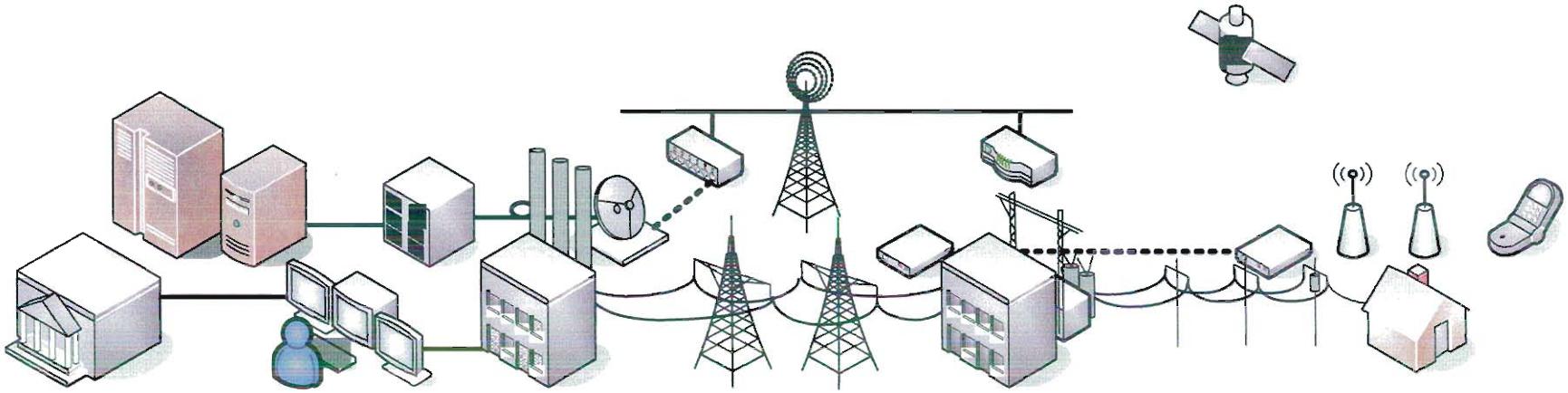
Smart Grid Applications



Control Center → Generation → Transmission → Distribution → Meter → In-Home

Advanced Metering Infrastructure

Demand Response and Dynamic Pricing

Distributed Generation and Alternate Energy Sources

Self-Healing Wide-Area Protection and Islanding

Asset Management and On-Line Equipment Monitoring

Real-time Simulation and Contingency Analysis

Participation in Energy Markets

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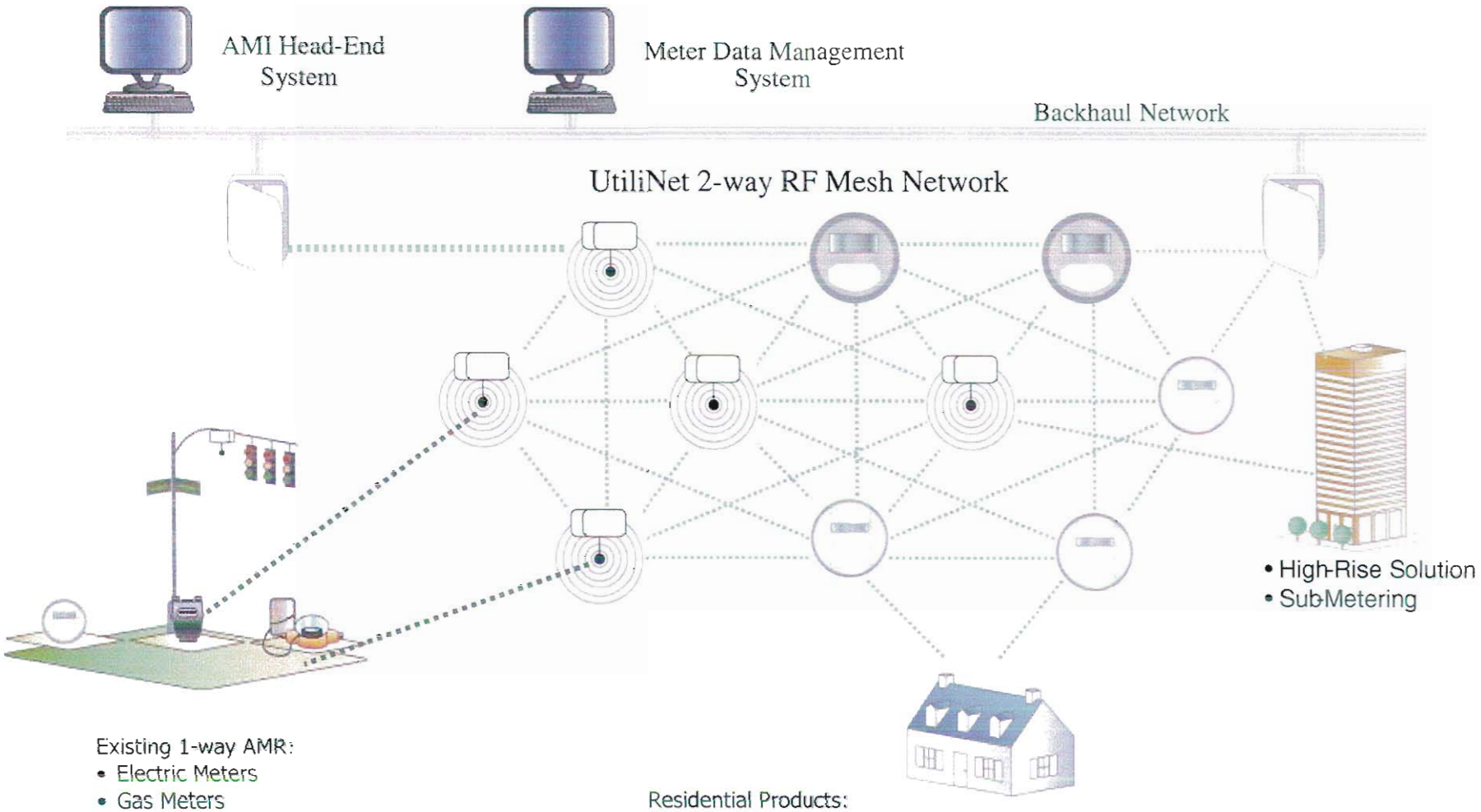
Based on EPRI Intelligrid Materials

Sample AMI Network



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Current System & Act 129 Requirements

✓ Bi-directional Communications

- Not available with current Network; meters are transmit only

✓ Hourly Interval Data

- Limited availability. Up to 1000 interval data accounts per Controller
- Cellnet contract only requires delivery of 98% of intervals
- Meters do not have internal memory; data can be lost to interference

✓ Provide Direct Access to Data/Enable TOU & Real Time Pricing

- Current system doesn't support real time; usage data can be provided via a web-page ~36 hours after the read-day
- There are no commercially available in-home displays or in-home network products (HAN) for the Cellnet AMR system

✓ Support automatic control of customer's consumption

- Not currently supported via the Cellnet AMR System; third party hardware and internet or broadband could deliver options

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PECO's AMI Pilot

- ✓ Purpose: To pilot the Landis+Gyr Gridstream radio mesh network in a real-world / field environment
  - Demonstrate system functionality including:
    - AMI / Meter Reading
      - Bi-directional 2-way Smart Meters
        - Core meter functions – meter reading, outage management, tamper reporting
        - Interval Data Capabilities
        - In-Home Communications
      - Existing 1-way meters
    - Distribution Automation
      - Reclosers Communications, for existing devices without communications
      - Unit Substation Monitoring, for existing sites that do not have SCADA
- ✓ Evaluate:
  - Gridstream Network and 2-way meter performance and features
  - Demonstrate backward compatibility with existing 1-way meters
  - Data Integration requirements
- ✓ Validate: New reliability features, EE & DR programs

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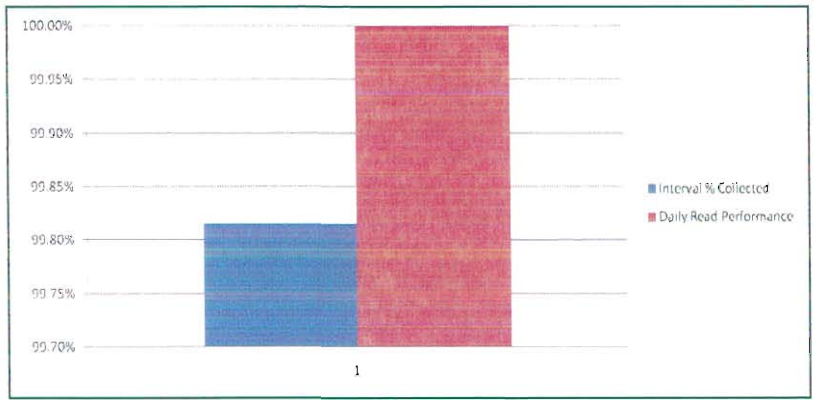
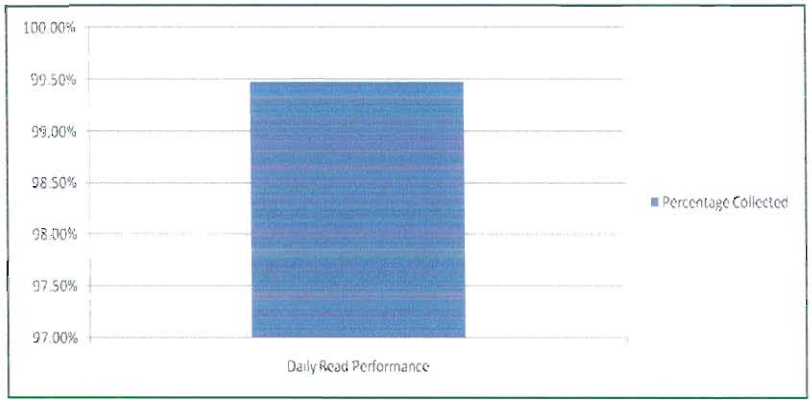
AMI Pilot Project Results

- ✓ Smart Meters (Bi-directional/2-way)
  - Daily AMI meter reading performance has been demonstrated to be 100% (Meters have memory and multiple polls are used)
  - Interval read performance exceeds 99.8%
- ✓ Existing Cellnet Meters (1-way)
  - Daily read performance is consistent with the revenue system
  - When the billing daily read window is applied, monthly billing performance is typically 99.4%



Smart Meters (2-Way)



Existing Meters (1-Way)

- ✓ Distribution Automation
  - Reliability of SCADA polling communication stats (time outs/failures) exceeding expectations
  - Functioning at a better performance level than telephone lines

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PECO's AMI Consultant

- ✓ PECO has secured the services of Enspiria Solutions, Inc. to assist with the evaluation of Smart Meter technology
- ✓ Enspiria is a 50+ person consulting and system integration firm with over 20 years of hands-on experience in utility business and operations
  - Experience in planning, architecting, and implementing information & automation technologies
  - Assisted 10 utilities in the last 12 months in planning AMI, MDMS, and Smart Grid decisions
  - Assisted in business case development, technology assessment, RFP development/evaluation, and contracting procurement support
  - Direct experience with Cellnet/L&G technology
  - Active involvement in Smart Grid industry groups

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Act 129 Smart Meter - Next Meetings

- ✓ Next Smart Meter session - as part of April 22nd EE&C meeting
  - Review Implementation Order Comments/Key Issues
  - Update on Smart Meter Project Status
  - Other Smart Meter topics that would be helpful to you
    - What do you want to see/know?

Thank You

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MEETING THE NEEDS OF THE CONSTANTLY CHANGING ENERGY INDUSTRY

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Targeted Energy-Efficiency Services Study for PECO Energy Company

Stakeholder Meeting #5: EE&C Plan Update

Greg Wikler
Global Energy Partners, LLC

Harrisburg, PA
April 22, 2009

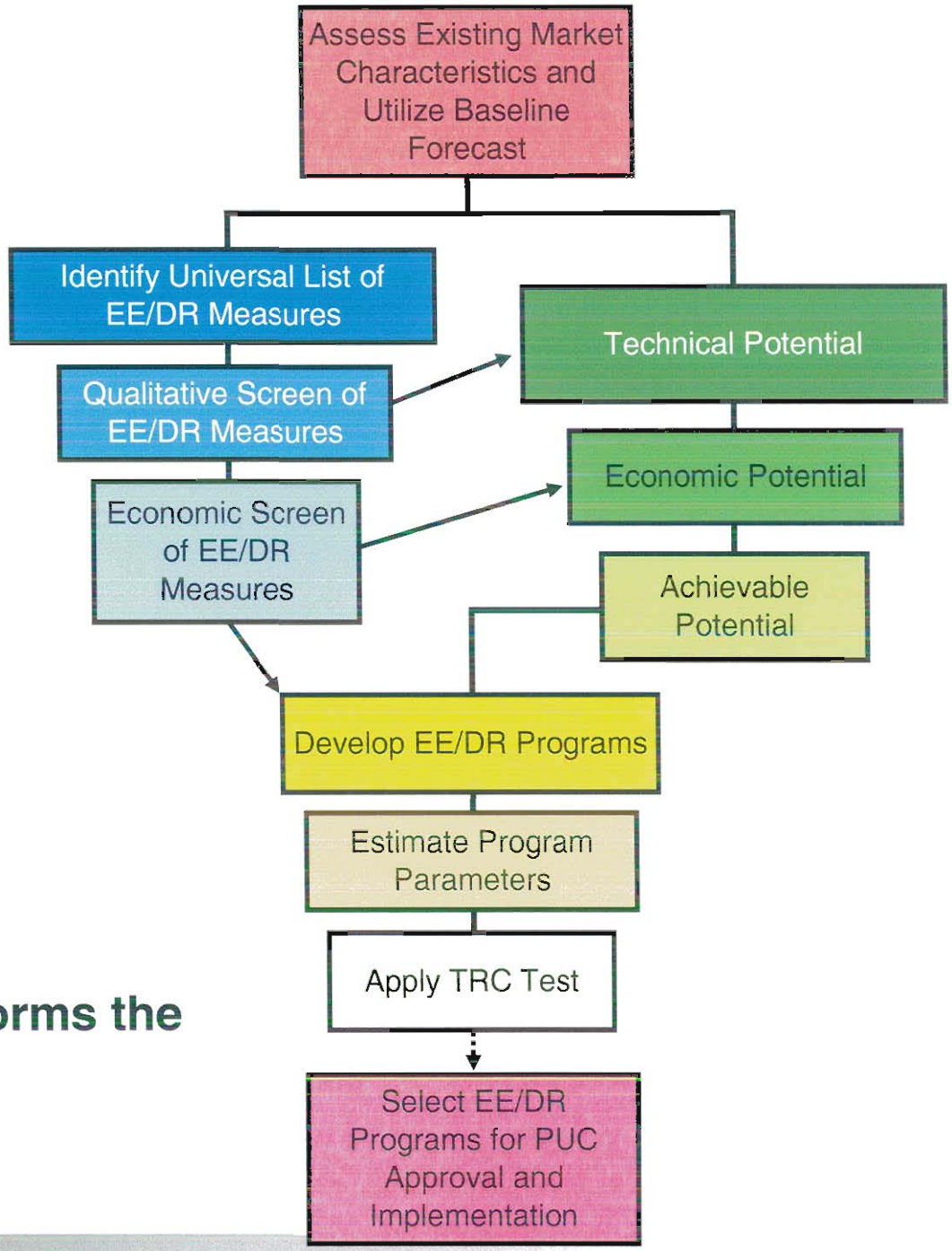
PECO

Presentation Outline

- Introductions
- Review of study progress
- Market research results
  - Saturation survey
  - Focus group study
- Energy efficiency programs
- Demand reduction programs
- Discussion

Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram



- **Stakeholder input informs the process**

Market Research Results

Residential Saturation Survey

Residential Saturation Survey Methodology

- Saturation survey sent out using e-Rewards panel
  - Soft launch on February 27
  - Full launch on March 3
  - e-Rewards handled recruiting and incentives
- Low-income customers (less than $25K) were oversampled
- Screening criteria:
  - Age: Adults greater than 18 years old
  - PECO customer
  - Customer pays their own utility bill
  - Not employed by a market research firm or an electric or gas utility

Residential Saturation Survey Results

- Received 1,481 complete, usable responses
  - Total was 1,504 responses but removed 23 for straight-lining and "speeders"
  - Average response time was 12 minutes, not including outliers (people who left the survey and came back to complete it)
- Responses were segmented into low-income and all other residential
- Weighted low-income more to reflect share of population

	Population	Sample	Weight
Residential	1,162,449	1,377	844
Low income	250,000	104	2,404
Total	1,412,449	1,481	

Respondent Demographics - Income

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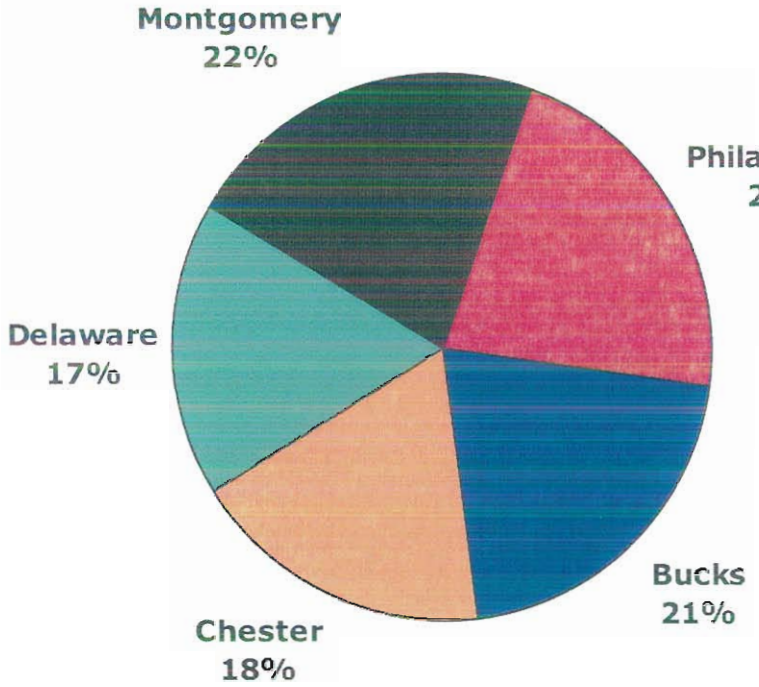
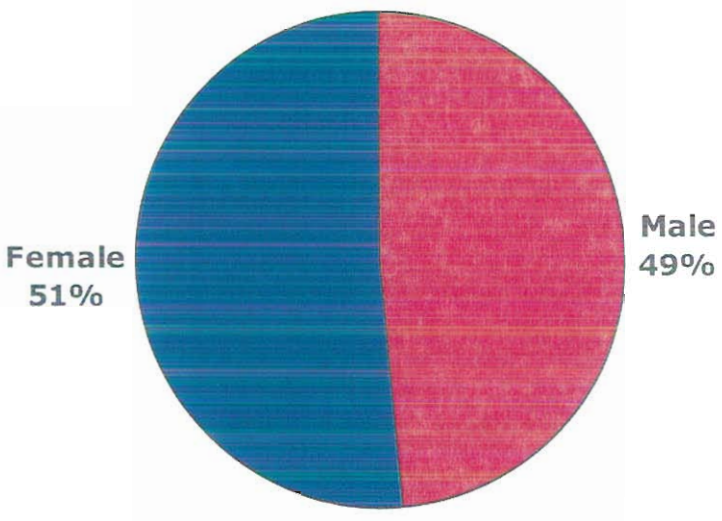
Survey Results – County and gender

- Respondents were evenly distributed by county
- Slightly more women responded to the survey





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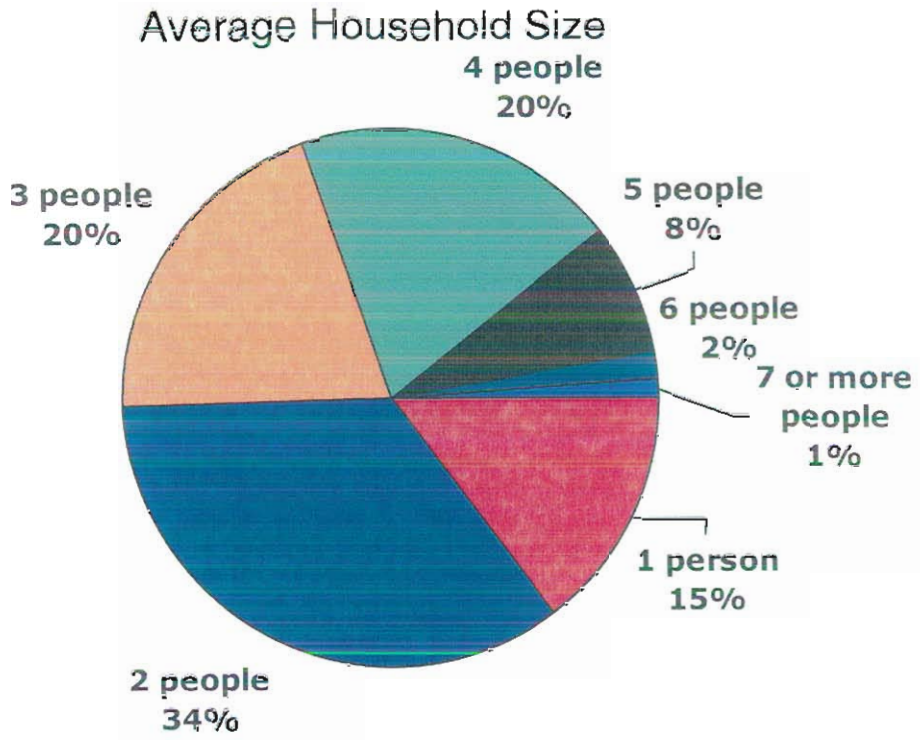
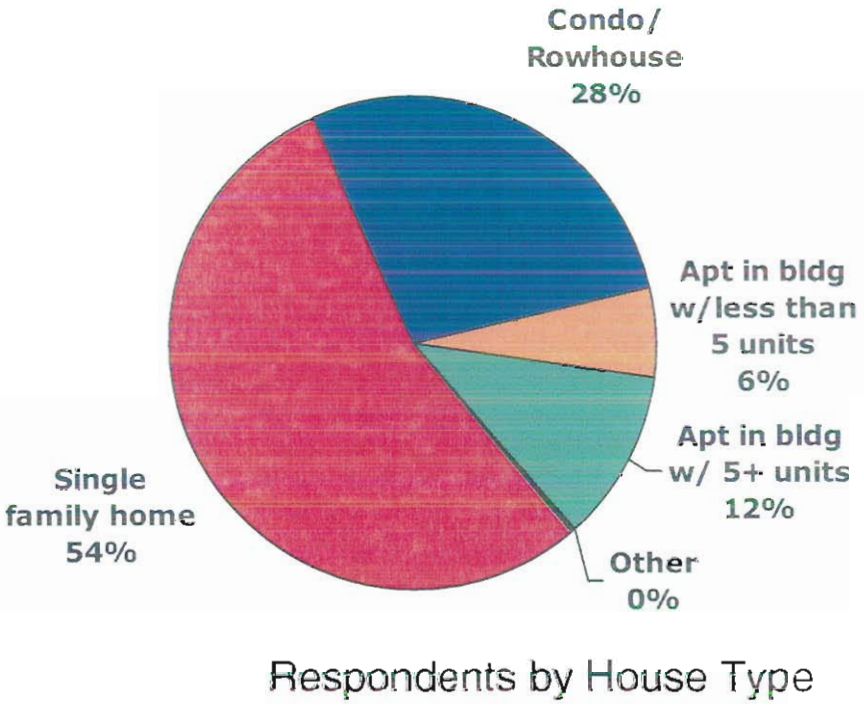
Survey Results – Size of household and housing type

- The average household size is 2.8
- Just over half of respondents live in a single-family home





Respondents by House Type

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Survey Data → Market Profiles

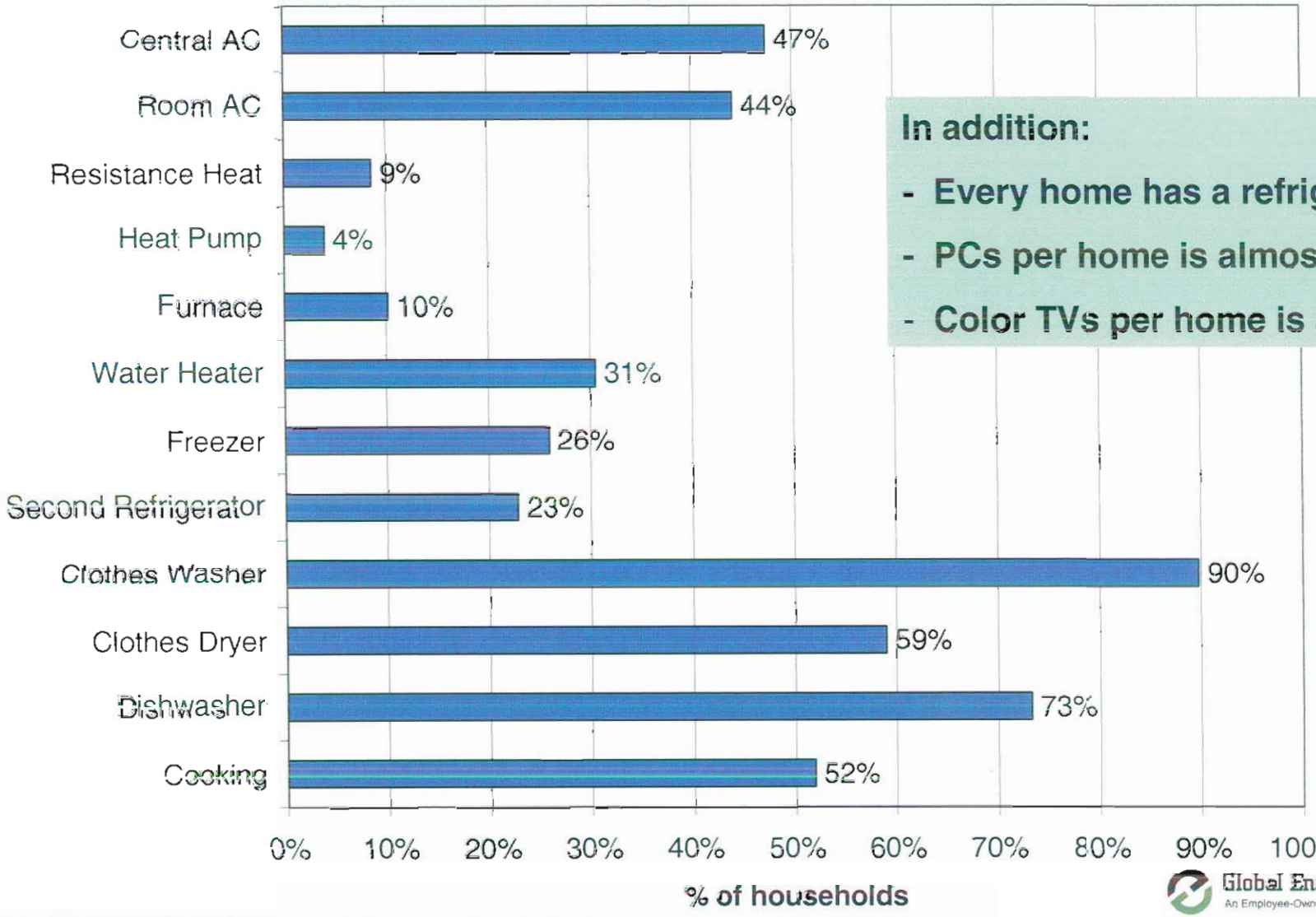
Market profiles characterize current electricity use by end use and technology

Elements include:

- Appliance/equipment saturations
- Fuel shares – fraction that is electric
- Whole-house intensity
- Unit energy consumption (UEC) – developed using BEST engineering analysis and Northeast region data from EPRI National Potential Study

Separate profiles for existing homes and new construction

Saturations of Electric Equipment – Residential sector average



In addition:

- **Every home has a refrigerator**
- **PCs per home is almost 2**
- **Color TVs per home is almost 3**

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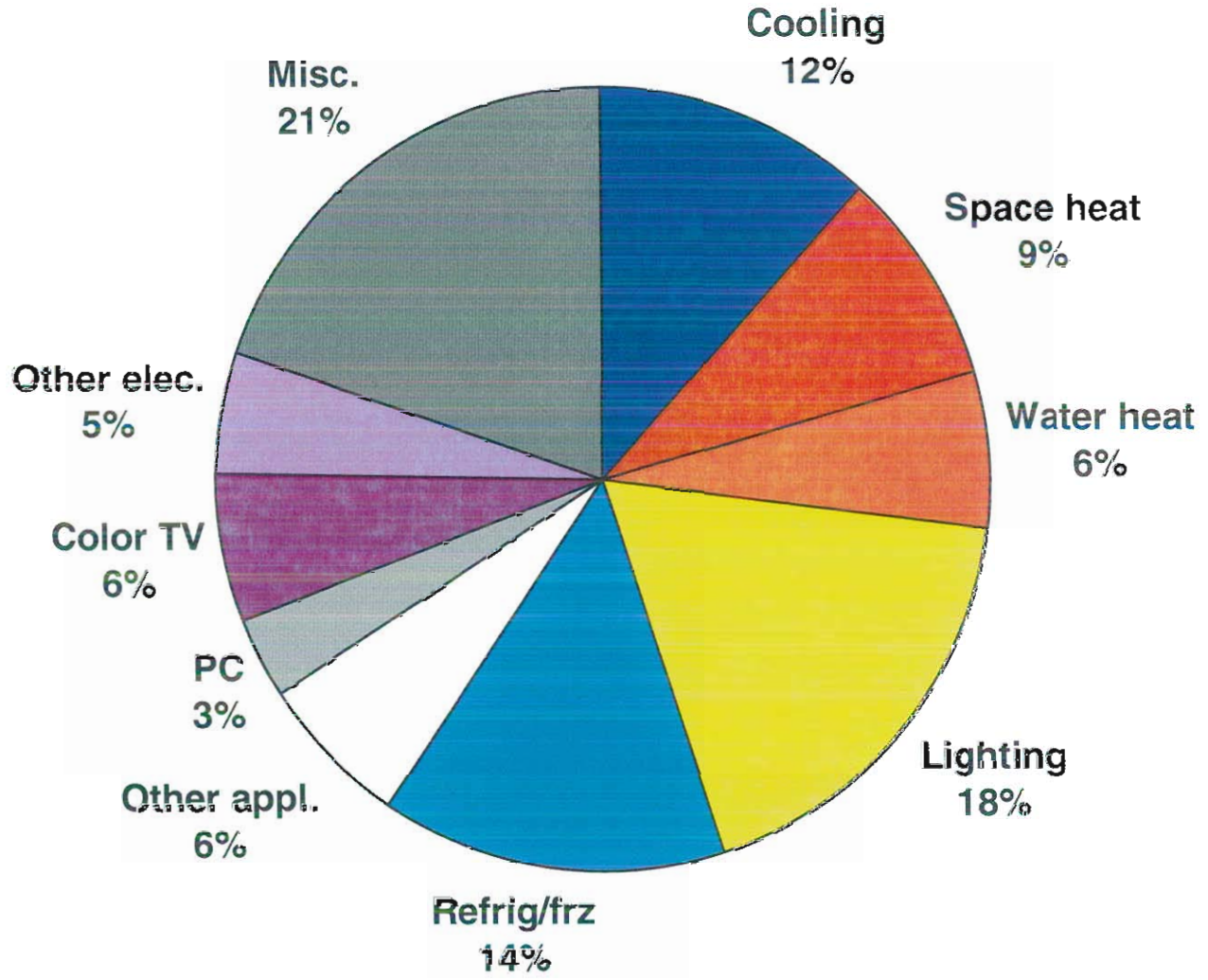
Preliminary electricity use by end use
Residential sector total



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Other Survey Results Used for Potentials Analysis

Appliance / equipment details

- Vintage data are proxy for efficiency levels
- Equipment densities – number of units
- Current saturation of EE equipment
- Current saturation of EE measures

Building information

- Home size
- Current saturation of EE measures

Behavioral information

- Home occupancy patterns
- Hours of appliance/equipment operation

Market Research Results

Focus Group Study

Focus Group Study Objectives

- PECO seeks to understand how new energy efficiency and demand response programs might affect total use of – and peak demand for – electricity.
  - PECO is considering a range of programs for both residential and commercial customers, as well as programs targeted specifically at low-income residential customers.
  - Key points of interest:
    - The likelihood that customers will adopt each program.
    - Concerns or attitudinal biases that might prevent customers from adopting each program.
    - Additional information required for customers to make a decision.

Focus Group Study Methodology

- Data collection consisted of 12 focus groups conducted from March 23 to March 26.
- Each group focused on one of the four customer types described below.

Residential

General residential customers (4 groups)

- HH income ≥ $25,000
- Half of group has central A/C
- No more than three renters
- No more than three multi-family dwellings
- Summer electric bill: max. of four with bill under $50, max. of two with bill under $25

Low income residential customers (2 groups)

- HH income < $25,000
- Half of group has A/C
- No more than seven renters
- No more than seven multi-family dwellings
- Summer electric bill: max. of six with bill under $50, max. of three with bill under $25

Business

Small/medium business customers (2 groups)

- Employee headcount from 1-25
- At least 25% must own facility
- Half of group has central A/C cooling at least 2/3 of facility
- Electricity bill: at least half over $250, at least three under $250
- Mix of building types

Large business customers (4 groups)

- Employee headcount > 25
- At least 75% must own facility
- 3/4 of group has central A/C cooling at least 2/3 of facility
- Electricity bill: at least half over $1,500, at least 3 from $250 to $1,500, none > $250
- Mix of building types

	General residential	Low income residential	Small/med business	Large business	Total
Philadelphia	--	2	2	2	6
Bala Cynwyd	4	--	--	2	6

Focus Group Results: Customer responses to tested programs

	General residential	Low-income residential
CFL bulb discounts	●	●
In-home energy audits	○	◑
Online energy audits	◕	◕
Home energy incentives	◕	●
Appliance pickup	◕	●
EE new home building	◑	◕
Solar power	◑	◑
Energy improvements for low-income customers	--	●
Direct load control	○	○
Critical peak time pricing	◑	○
Real-time pricing	○	○
Peak use rebates	●	●

	Large business	Small / med business
EE rebates for specific equipment	●	◕
Custom EE rebate programs	◕	◕
New energy efficient construction	◕	◕
EE program for gov't, public facilities and NPOs	◑	◑
Direct load control	○	◑
Curtailable load control	○	◑
Peak time pricing	○	◑
Real-time pricing	○	◑
Electricity use shifting	◑	○
Temporary voltage reduction	○	○

○ Few/none would adopt ◑ Some would adopt ◕ Many would adopt ● Most would adopt

Top EE programs

Top DR programs

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Focus Group Summary: Overview of customer response to tested programs

- All four audiences are more receptive to EE programs than to DR programs.
  - The highest-rated programs are all EE programs.
  - Having said that, there are a few DR programs that receive a positive response. This is particularly true among residential customers.
- Saving money is the key driver for both EE and DR programs.
  - Though almost all residential customers say that environmental concerns are important to them, there is consensus that cutting electric bills is a higher priority.
  - Business customers' primary focus is the bottom line and controlling costs; they are less likely to mention environmental issues as a factor in decision making.
- As suggested by the universal focus on cost cutting, the current economic climate appears to be affecting customer decisions on energy related issues.
  - Most customers indicate that, while they have not been dramatically affected by the current recession personally, they are taking a more conservative approach to both capital expenditures and taking a closer look at ongoing operating costs.
  - The implications for energy-related decisions are that customers are likely to prefer to extend the life of old appliances or equipment, and to avoid other capital expenses as long as possible. If there are low/no cost ways to reduce operating costs, these would be viewed positively.

Overview of Energy Efficiency Programs

Residential Programs

1. CFL initiative
2. Low-income energy improvements
3. Whole home performance
4. Home energy incentives
5. New construction
6. Appliance pickup

Commercial/Industrial Programs

7. Equipment incentives
8. New construction
9. Government/public facility energy savings

Cross-Sector Program

10. Renewable Resources

1. CFL Initiative

- Kick off program for all PECO activities for next 4 years
- Distribute 200,000 bulbs (60-watt equivalent) in first month of program launch
- Work with big box, chain, and local retailers to offer in-store discounts on ENERGY STAR® bulbs (standard and specialty CFLs)
- PECO has issued an RFP for implementation of this program; potential bidders will help inform about appropriate incentive levels
- Preliminary program parameters:
  - Will sell >3.5 million discounted bulbs by PY2012[1], in addition to no-cost distributions
  - Projected energy savings of 211 million kWh in PY2012
  - Estimated $22.3 million spend during 4-year period
  - Preliminary TRC of 5.61

[1]Program Year 2012 (PY2012) runs from June 1, 2012 to May 31, 2013.

1. CFL Initiative (cont'd)

Representative rebate levels **(for illustrative purposes):**

Measure	**$ per lamp**
Standard CFLs (giveaway)	$4.00
Standard CFLs (discount)	$2.00
Specialty CFLs (discount)	$5.50

2. Low-Income Energy Improvements

- Direct-install and education program to improve the living environment and reduce electricity use among low-income residents
  - Focus on lighting, weatherization, heating, appliances
- Program will be structured in three modes:
  a. Build on PECO's existing LIURP activities and infrastructure
     - Facilitate LIURP's planned expansion to double LIURP participation levels through expanded funding of existing program
     - Provide existing LIURP program participants additional CFL bulbs (6 additional bulbs to go with the 4 distributed under current program)

  b. Leverage anticipated municipal and natural gas program provider programs to expand reach to 55,000 additional households through CFL distributions

  c. Direct install or drop-ship 4-packs of CFLs to 200,000 households
- Preliminary program parameters:
  - 80,000 participants beyond current LIURP projected by PY2012
  - Projected energy savings of 90 million kWh in PY2012
  - Estimated $30.4 million spend during 4-year period
  - Preliminary TRC of 2.67

3. Whole Home Performance

- Use Home Performance with ENERGY STAR approach to recommend and encourage action on comprehensive list of energy efficiency improvements
- Audits and basic installations of CFLs and low-cost measures by trained contractors
- Customer pays for audit (estimated cost ~$300); reimbursed if install recommended measures
- Preliminary program parameters:
  - 3,500 participants projected by PY2012
  - Projected energy savings of 9.3 million kWh in PY2012 from measures installed during audit alone
  - Estimated $5.6 million spend during 4-year period
  - Preliminary TRC of 2.37

4. Home Energy Incentives

- Encourage and enable installation of comprehensive range of prescriptive energy efficiency measures in existing homes, including:
  - All major end uses: lighting, water heating, cooling, heating, and appliances
  - Building shell: home insulation, white roof
- Provide cash rebates for installation of qualifying measures
- Features ENERGY STAR products
- Preliminary program parameters:
  - Over 70,000 participants projected by PY2012
  - Projected energy savings of 127 million kWh in PY2012
  - Estimated $30 million spend during 4-year period
  - Preliminary TRC of 3.09

4. Home Energy Incentives (cont'd)

Representative rebate levels **(for illustrative purposes):**

Measure	$ per Unit	Units
Attic / roof insulation	$150	per home
ENERGY STAR windows	$75	per window
ENERGY STAR room AC	$25	per RAC
ENERGY STAR dehumidifier	$10	per humidifier
ENERGY STAR central AC	$100	per home
ENERGY STAR air-source heat pump	$250	per home
ENERGY STAR refrigerator	$50	per home
ENERGY STAR freezer	$50	per home
ENERGY STAR clothes washer	$75	per home
ENERGY STAR dishwasher	$25	per home
ENERGY STAR lighting fixtures	$10	per fixture
ENERGY STAR heat pump water heater	$250	per home
High-efficiency electric water heater	$25	per home
LED lamps	$15	per lamp
Programmable thermostat	$50	per home
High-efficiency gas furnace (fuel switching from BB)	$1,000	per home
High-efficiency gas furnace (fuel switching from HP)	$550	per home
High-efficiency gas water heater (fuel switching)	$250	per home
Whole-house fan	$90	per fan
White roof	$50	per home
Ground-source heat pump	$650	per home

5. Residential New Construction

- Increase and accelerate energy efficiency in "standard" design practices for new single-family and small multifamily housing to achieve ENERGY STAR home standards
- Financial incentives to builders who incorporate energy efficient design, construction, and operation of homes--uses a "whole home" approach
- Incorporate substantial education component for builders
- Good opportunity for statewide partnership
- Launch program in PY2010
- Preliminary program parameters:
  - Over 1,000 participants projected by PY2012
  - Projected energy savings of 500,000 kWh in PY2012
  - Estimated $1.2 million spend during 4-year period
  - Preliminary TRC of 0.57

6. Residential Appliance Pickup

- Goal is to remove spare inefficient refrigerators, freezers, and room air conditioners from operation
  - Remove second units from operation
  - Eliminate retention of replaced units
  - Room A/C units picked up when refrigerator/freezer also picked up
- For verified working units, provides pickup service, customer incentives, and environmentally safe disposal of units
- Turnkey service providers are well-established
- Preliminary program parameters:
  - Over 90,000 participants projected by PY2012
  - Projected energy savings of 91 million kWh in PY2012
  - Estimated $14.7 million spend during 4-year period
  - Preliminary TRC of 7.75

7. Commercial/Industrial Equipment Incentives

- Financial incentives (rebates) on retrofits that incorporate energy efficiency measures for all major end uses in both small business and general commercial/industrial facilities
- Measures and incentive structures that suit needs of different facilities in the target market
  - Small businesses & master-metered multifamily: emphasize simplicity of prescriptive measures, e.g., smaller packaged AC units
  - General C/I: emphasize flexibility with combination of custom and prescriptive measure incentives
- Offer referrals of audit providers to assist with identification of appropriate and cost-effective retrofit opportunities
- Allow split incentives to equipment dealers/trade allies and customers
- Preliminary program parameters:
  - Over 40,000 participants projected by PY2012
  - Projected energy savings of 228 million kWh in PY2012
  - Estimated $44 million spend during 4-year period
  - Preliminary TRC of 3.10

7. Commercial/Industrial Equipment Incentives

Representative rebate levels **(for illustrative purposes):**

Measures for Small Business Customers (< 100 kW)	$ per Installation
SB - ENERGY STAR room AC	$13
SB - Small packaged and split system AC	$89
SB - Small air-source heat pump	$213
SB - High-efficiency cooling - packaged units	$122
SB - High-efficiency air-source HP	$365
SB - Ground-source heat pump	$3,095
SB - HVAC tune-up	$663
SB - CFL bulbs	$1
SB - CFL fixtures	$25
SB - High-efficiency lighting - T-8	$21
SB - High-efficiency lighting - T-5	$30
SB - High-efficiency lighting - HID	$15
SB - LED exit signs	$26
SB - Occupancy sensors	$15
SB - Cool roofs	$263
SB - Premium-efficiency motors	$6

7. Commercial/Industrial Equipment Incentives

Representative rebate levels **(for illustrative purposes):**

Measures for Larger C&I Customers (> 100 kW)	$ per Installation
GC&I - High-efficiency cooling - packaged units	$365
GC&I - High-efficiency air-source HP	$1,094
GC&I - Ground-source heat pump	$9,285
GC&I - HVAC tune-up	$1,988
GC&I - CFL bulbs	$1
GC&I - CFL fixtures	$25
GC&I - High-efficiency lighting - T-8	$21
GC&I - High-efficiency lighting - T-5	$30
GC&I - High-efficiency lighting - HID	$15
GC&I - LED exit signs	$26
GC&I - Occupancy sensors	$15
GC&I - Cool roofs	$525
GC&I - Premium-efficiency motors	$21
GC&I - Energy management control system	$3,875
GC&I - Lighting control system	$1,375
Custom measures	$25,000

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8. Commercial/Industrial New Construction

- Provide financial incentives to incorporate more energy-efficient building design and construction practices in new facilities and major renovations
- Provides education, design assistance, and financial incentives to architects/engineers (A&E) to help flesh out qualified projects
- Custom measures to address all types of new facilities, including small business, master-metered multifamily, and all other commercial and industrial facilities
- Launch program in PY2011
- Preliminary program parameters:
  - Approximately 200 participants projected by PY2012
  - Projected energy savings of 22 million kWh in PY2012
  - Estimated $8 million spend during 4-year period
  - Preliminary TRC of 3.24

9. Government/Public Facility Energy Savings

- Financial incentives to reduce electric demand and energy use in public facilities, including local/state/federal buildings, schools, hospitals, and street lighting
- Includes broad range of measures for each type of building
  - Street light replacement with HID, HPS, or new technology fixtures
  - Traffic signal replacement with LED lamps
  - Prescriptive and custom measures, akin to general C/I Incentives
  - Audit referral and reimbursement (up to $20,000 cost) for installation of recommended measures within one year of audit
- Designed to address special purchasing protocols and schedules of public agencies
- Preliminary program parameters:
  - Nearly 110,000 participants by PY2012
  - Projected energy savings of 190 million kWh in PY2012
  - Estimated $55 million spend during 4-year period
  - Preliminary TRC of 3.37

10. Renewable Resources

- Educate homeowners and businesses about financial incentives (including stimulus opportunities and tax credits)
- Facilitate access to technical expertise for installation of solar PV and hot water systems
- Target residential and commercial market segments
- Offer incentives through a custom rebate format that channels in solar contractors and turnkey providers for performance-based contracting mechanisms
- PECO plans to coordinate extensively with existing entities that are already providing such services (either through stimulus dollars or other tax-based incentives

Overview of Demand Reduction Programs

Residential Demand Response Programs

1. Direct load control
2. Super peak TOU

Commercial/Industrial Demand Response Programs

3. Direct load control
4. Super peak TOU
5. DR aggregator contracts

Other Demand Reduction Programs

6. Distributed energy resources
7. Permanent load reduction
8. Conservation voltage reduction

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An Employee-Owned Company

1. Residential Direct Load Control

- Electronic communication equipment enables reduced central AC compressor and/or electric hot water heater element operation for limited periods of time
- PECO calls events to ensure contributions to the 100 hours peak demand reduction
- Plan is to tap existing off-peak water heating customers
- Participants receive monthly incentives for allowing control
- Preliminary program parameters:
  - 70,000 central A/C and 45,000 water heating participants projected by PY2012
  - Projected demand reduction of over 83 megawatts by PY2012
  - Estimated $50 million spend during 4-year period
  - Preliminary TRC of 1.38

2. Residential Super Peak TOU

- Time-of-use tariff designed to lower peak demand during a narrow band of peak hours (e.g., weekdays 2-6PM June-Sept) designed to coincide with PECO's 100 peak hours
- Customer experiences higher prices during the "super peak" periods
- Customer controls response and this can be enhanced through enabling technology
- A portion of these customers will also adopt DLC
- Enablement accommodated through low-cost programming changes to existing PECO metering system
- Preliminary program parameters:
  - 95,000 participants projected by PY2012
  - Projected demand reduction of 47 megawatts by PY2012
  - Estimated $10 million spend during 4-year period
  - Preliminary TRC of 3.14

3. C&I Direct Load Control

- Programmable Communicating Thermostats (PCTs) are installed for small C&I customers (demands less than 100 kW)
  - PCTs have a pager-based signaling capability that enables automated adjustments to setpoint temperatures by 2-4 degrees to accommodate significant load reductions
  - PCTs are a proven technology currently used with high effectiveness
- PECO calls events to ensure contribution to the 100 hours peak demand reduction
- Participants receive monthly incentive to allow PECO to control their units
- Preliminary program parameters:
  - 10,000 small C&I participants projected by PY2012
  - Projected demand reduction of 22 megawatts by PY2012
  - Estimated $11 million spend during 4-year period
  - Preliminary TRC of 1.43

4. C&I Super Peak TOU

- Time-of-use tariff designed to lower peak demand during a narrow band of peak hours (e.g., weekdays 2-6PM June-Sept) designed to coincide with PECO's 100 peak hours
  - Customer experiences higher prices during the "super peak" periods
  - Customer controls response and this can be enhanced through enabling technology
- Program eligible to small (< 100 kW) and medium (100-500 kW) C&I customers
- A portion of these customers will also adopt DLC
- Enablement accommodated through low-cost programming changes to existing PECO metering system
- Preliminary program parameters:
  - 20,000 participants projected by PY2012
  - Projected demand reduction of 57 megawatts by PY2012
  - Estimated $6 million spend during 4-year period
  - Preliminary TRC of 8.43

5. DR Aggregator Contracts

- Performance contracts established with one or more Curtailment Service Provider companies who will in turn recruit customers in DR events called by PECO
- DR events based on 100 hour peak demand threshold
- Contractors expected to tap their existing clients participating in PJM market-based programs
- Incentives to be made available for aggregators and their customers
- Preliminary program parameters:
  - Projected demand reduction of 150 megawatts by PY2012
  - Estimated $21 million spend during 4-year period
  - Preliminary TRC of 1.06

6. Distributed Energy Resources

- Designed to work with PECO customers who have existing backup generation resources which would be deployed during peak periods
  - Incentives would be provided to enable upgrades to existing systems to ensure compliance with regional, state and federal emission standards
  - Systems would be dispatched by PECO during the 100-hour critical peak period each year
- Enablement incentive to be available for equipment upgrades and/or replacements
- Preliminary program parameters:
  - Projected demand reduction of 50 megawatts by PY2012
  - Estimated $21 million spend during 4-year period
  - Preliminary TRC of 1.12

7. Permanent Load Shifting

- Designed to encourage customers to move electricity usage from peak period to another, on an ongoing (permanent) basis
- Technologies would focus on energy storage options such as ice storage for cooling
- Installed systems can be connected to PECO to enable activation during system peak periods; customers can also utilize equipment at any time
- Enablement incentive to be available for equipment upgrades and/or replacements
- Preliminary program parameters:
  - Projected demand reduction of 10 megawatts by 2012
  - Estimated $3 million spend during 4-year period
  - Preliminary TRC of 1.0

8. Conservation Voltage Reduction

- Designed to lower service voltage levels for all customers within applicable distribution feeders
- Program includes significant distribution system upgrades to accommodate variations during peak periods
- Includes voltage regulation monitors to ensure that voltage does not drop below regulatory requirements
- Preliminary program parameters:
  - Projected demand reduction of 11 megawatts by PY2012
  - Estimated $4 million spend during 4-year period
  - Preliminary TRC of 32.04

Additional Measures/Options to be Considered

- Emerging technology experiments:
  - LED streetlighting
  - Solar water heating
  - Room A/C direct load control
- Enhanced DR options once AMI is fully in place:
  - Programmable communicating thermostats (PCT) for residential customers
  - Critical peak pricing
  - Real-time pricing
  - Peak-time rebates

Additional Steps to Ensure Effective Implementation

- Education and awareness
  - PECO will develop a broad program that is intended to go beyond just delivery of savings
  - Outreach via seminars, public events, and training
  - Bill inserts and special mailings
  - Communication through various media outlets (television, radio, internet)
- Website enhancement
  - Improved links to existing energy efficiency resources
  - Do-it-yourself online energy audits

Next Steps

- Integrate Stakeholder feedback
- Finalize program features
- Complete EE/DR potential study
- Prepare for filing

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Act 129 – Energy Efficiency & Conservation Plan Cost Recovery Options

4/22/09

Prepared by
Rich Schlesinger

PECO EE&C Plan Budget

- ✓ EE&C orders define a EE&C "Program Year" (PY) as running from June 1 through May 31 each year
- ✓ Report Years are also defined as June 1 through May 31 of each year
- ✓ There are 4 program years
  1. 6/1/09 through 5/31/10
  2. 6/1/10 through 5/31/11
  3. 6/1/11 through 5/31/12
  4. 6/1/12 through 5/31/13

- ✓ Total PECO EE&C Plan Budget is based on 2% of 2006 annual retail revenues/year for four Program Years
- ✓ Thus PECO's 4 year budget total is: ~$85M x 4 years = $340M
- ✓ Annual spend however, should not be limited to these amounts
- ✓ **PECO supports a flexible spend model such that fewer dollars can be spent in the early years of the program and more in later years to support program initiation, build-out, and customer acceptance**

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PECO EE&C Recovery Mechanism

- ✓ Recovery of Plan costs will be per a 1307 mechanism which would start after plan approval – approximately Dec. 1, 2009 and end May 31, 2013 (42 months)
- ✓ Depending on the recovery mechanism used, large fluctuations in the EE&C 1307 charge could occur
- ✓ PECO is considering several cost recovery options to minimize this issue
- ✓ In all cases, separate recovery mechanisms will be used for each class (residential, commercial, industrial) to minimize any cross-subsidization

Option 1: Annual True-Up ("Traditional 1307")

- Annual true-up of actual expenses to collections and projected sales
- Would be based on actual periods: PY 1 would cover 7 mo., PY 2-4 would be 12 mo.
- Could result in large fluctuations in annual charge

Option 2: Levelized Charge with Annual True-Up

- Calculate a levelized charge based on $85M/yr and projected sales over 42 mo.
- Annual true-up of sales only to ensure collection of ~$85M/yr - "delinks spend from collections"
- Aims to keep fluctuations in annual charge smaller

Option 3: Levelized Charge w/ 2013 True-Up

- Calculate a levelized charge based the entire Program Budget ($340M) over 42 mo.
- Single end-of-plan true-up (5/31/13) of actual expenses to actual collections- "delinks spend from collections"
- Option to adjust charge earlier if large over/under recovery expected
- No change in annual charge over program life

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✓ Questions and Comments

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Summary of PECO Comments to PAPUC's Smart Meter Draft Implementation Order Issued 3/31/09

4/22/09

Prepared by
Rich Schlesinger

PECO's Comments - Goals/Key Principles

✓ **PECO believes that the goals of the rulemaking should be:**

1. To enable EDCs to meet today's meter functionality requirements set forth in the Act
2. To provide EDCs with the flexibility to meet tomorrow's consumer energy & technology needs

✓ **PECO's comments are based on several key principles:**

1. *Act 129's smart meter requirements should be the polestar for the PUC's smart meter procurement and installation rules*
2. *Smart meter protocols and standards should be developed collaboratively with the industry*
3. *In implementing smart meter technology, the PUC and EDCs should be mindful of network security and management risks*
4. *As Staff has correctly recognized, a fully functional smart meter involves more than just the meter hardware attached to the customer's premises*
5. *Appropriate incentives will be critical to accelerating smart meter deployment ahead of the Act's required deployment period*
6. The costs incurred as part of smart meter plans should be "reasonable and prudent"

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A. Plan Approval Process

- ✓ PECO has requested for the addition of language regarding the plan approval process:

"If no comments are filed on the EDC's smart meter plan, or if no parties oppose the plan at the conclusion of the technical conference, the EDC (and, if applicable, the parties) may request certification of the record to the Commission pursuant to 52 Pa. Code § 5.531(a) for a decision on the EDC's smart meter plan."

- ✓ This language anticipates that many issues will primarily be technology issues as opposed to legal issue – therefore these issues are hoped to be resolved by settlement early in the plan proceeding

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B. Smart Meter Deployment

1. Network Development and Installation Grace Period

✓ *PECO recommends that the 18-month grace period be tied to the PUC's approval of an EDC's negotiated contracts with smart meter equipment vendors, which will follow the PUC's approval of the EDC's plan*

✓ Takes into account that:

- RFIs and RFPs must be issued
- Vendors and equipment must be evaluated and selected
- Delivery schedules will need to be agreed upon
- Contracts will need to be negotiated, signed, and approved by the Commission
- EDCs may need to conduct factory acceptance testing to ensure that a larger deployment will be successful

2. Interval Meters

✓ PECO notes that the Act does not require the installation of interval meters

✓ PECO cautions that there are costs and security issues that must be considered with respect to this proposal

✓ PECO's current AMR system is to a large degree capable of providing customers interval data with the addition of certain information collection by PECO's vendor – without requiring installation of an interval meter

✓ However, PECO still incurs costs to supply interval data or meters to customers during the grace period

✓ *The Draft Order should make it clear that the customer will be required to pay the associated interval data/meter costs*

PECO

B. Smart Meter Deployment cont'd

3. Interval Meters - Data Access

- ✓ PECO does not oppose providing interval ***data*** to third parties
- ✓ However, the Act does not require that EDCs provide customers with interval meters, thus it also does not require that EDCs provide direct access to ***interval meters*** to 3rd parties
- ✓ PECO has a concern that such access could negatively impact the security and reliability of its current meters and meter network
- ✓ *The Draft Order should not require EDCs to give access to 3rd parties to their interval meters*

4. System-Wide Deployment

- ✓ PECO and many other EDCs have upgraded their meters and meter systems over the years and continue to do so
- ✓ Much of this equipment is either new or has not been fully depreciated
- ✓ Many EDCs may be in the middle of contract terms with respect to current meter equipment that may impact their ability to meet and accelerate the Act's goals
- ✓ *The PUC will need to provide incentives to EDCs such as recovery of accelerated depreciation of assets and cost recovery for the early conclusion of current projects to promote more rapid deployment of smart meters*

PECO

C. Smart Meter Capabilities

- ✓ Two of the Draft Order's proposed additional smart meter "capabilities" are neither practical nor cost effective:

1. *The proposal that smart meters must have the "…ability to provide 15-minute or shorter interval data to customers, EGSs, third-parties and the RTO" should be removed from the Draft Order*

- ✓ Collecting 15-minute or shorter data for all customers is not practical or useful for the vast majority of residential and small commercial customers
- ✓ Mandating the collection of this data for these customers may result in significantly increased data management costs with no commensurate benefit.
- ✓ Moreover, the Act requires that EDCs provide customers with information on their hourly usage
- ✓ If the PUC believes it is necessary to establish minimum interval standards at this time, it should adopt an hourly interval data standard for residential and small commercial customers and a 15-minute interval data standard for large commercial and industrial customers

2. *PECO believes that the same-day provision of consumption information by EDCs should not be a Commission-mandated requirement. Instead, provisioning of this data should be provided as available through individual technical solutions offered by the meter vendor community and selected by the EDC*

- ✓ The Draft Order proposes to require that hourly reads be delivered to customers "at least once per day." While all major smart metering solutions ***collect*** information from the meter on at least a daily basis, collection of the data from the meter is only the first step in the data process. The data must then be aggregated in the smart meter collection system head-end for transmission to the MDMS, where it is preprocessed and then validated, edited and estimated.
- ✓ Currently, this type of information cannot be provided on a same-day basis

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D. Access to Smart Meters and Data

Access to Smart Meters

- ✓ As currently drafted, this section of the Draft Order appears to envision virtually unrestricted access by third parties to EDC smart meters
- ✓ PECO believes that such an interpretation of the Act would cause a result that "is absurd, impossible of execution or unreasonable."
- ✓ *PECO recommends that a technical working group be established by the Commission to define and address smart meter access, security and reliability issues*

Data

- ✓ With regard to the Draft Order's proposal that the Commission's EDEWG address "formats for electronic data communications with customers and third-parties" PECO agrees with this recommendation
- ✓ The Draft Order should also direct EDEWG to monitor NIST's development of smart meter protocols and standards.
- ✓ *The Draft Order should also direct EDEWG to work closely with the smart meter access and security technical working group to ensure that both groups develop consistent and workable solutions for PUC consideration*

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E. EDC Cost Recovery

Cost Recovery Mechanism

- ✓ The Draft Order states that "[a]n EDC may recover smart meter technology costs through (1) base rates, including a deferral for future base rate recovery of current basis with a carrying charge as determined by the Commission; **or** (2) on a full and current basis through a reconcilable automatic adjustment clause under section 1307."
- ✓ PECO does not read this language as being mutually exclusive, and that an EDC should be allowed to use either a 1307 recovery mechanism and/or a base rate case for recovery of smart meter cost
- ✓ *PECO recommends that the Draft Order should make it clear these recovery mechanisms are not exclusive*

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Additional Questions – PECO Responses

- ✓ Standards and protocols - PECO believes that these are best left to the marketplace and nationally recognized standards boards
- ✓ Customer information access - PECO's believes there are 2 primary communication modes that can be leveraged
  - First is the use of the smart meter as an access point to the consumer to enable the consumer to receive consumption information from the meter
  - Second is the use of the Internet, or similar broadband communication mediums to provide a richer source of information than that available through the meter
  - PECO believes that these two methods are complementary and should both be leveraged in a way that provides the customer, 3rd parties and PECO with flexibility to meet the needs of the customer ***and*** permit PECO to operate the smart meter network in a secure and robust fashion

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Additional Questions – PECO Responses

- ✓ Data from the meter to the consumer - PECO's position is that the data to be provided from the meter to a Home Area Network ("HAN") device should be limited to the raw consumption information generated by and directly available from the meter
- ✓ This raw energy consumption data will not be processed nor will it be of billing quality and should be used for informational purposes only
- ✓ Beyond this default mode, PECO will support advanced rates and demand management programs by actively supporting devices for the provision of control signals for management of energy usage and the receipt of energy data for those PECO customers that are on advanced rate and energy management programs
- ✓ Role of the EDC in managing the HAN network - PECO's position is that it is appropriate for the EDC to be responsible for the provision of energy usage data from the meter for the customer's HAN
- ✓ However, EDCs should not be responsible for the reception of the data or messages from the meter by HAN devices nor for the on-going operation of the HAN
- ✓ EDCs are not in the position to provide in-home communications and networking services to consumers beyond data from the meter; this is best left to other parties in the marketplace

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Commentors – as of 4/21/09

1. Allegheny Power
2. Duquesne Light Company
3. FirstEnergy Companies
4. PECO Energy Company
5. PPL Electric Utilities
6. Energy Association of PA

7. Office of Consumer Advocate
8. Industrial Energy Consumers of PA
9. Citizen Power

10. Elster Integrated Solutions
11. Sensus Metering Systems
12. Tendril Networks
13. Trilliant Inc.

14. Constellation NewEnergy

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Key Issues from Other Commentors

✓ Discussion of Key Issues

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Act 129
Energy Efficiency and Conservation Plan

Stakeholder Meeting No. 6

May 20, 2009

Topics

- ✓ Overall Plan Summary
- ✓ Energy Efficiency Spend and Programs
- ✓ Demand Reduction Spend and Programs

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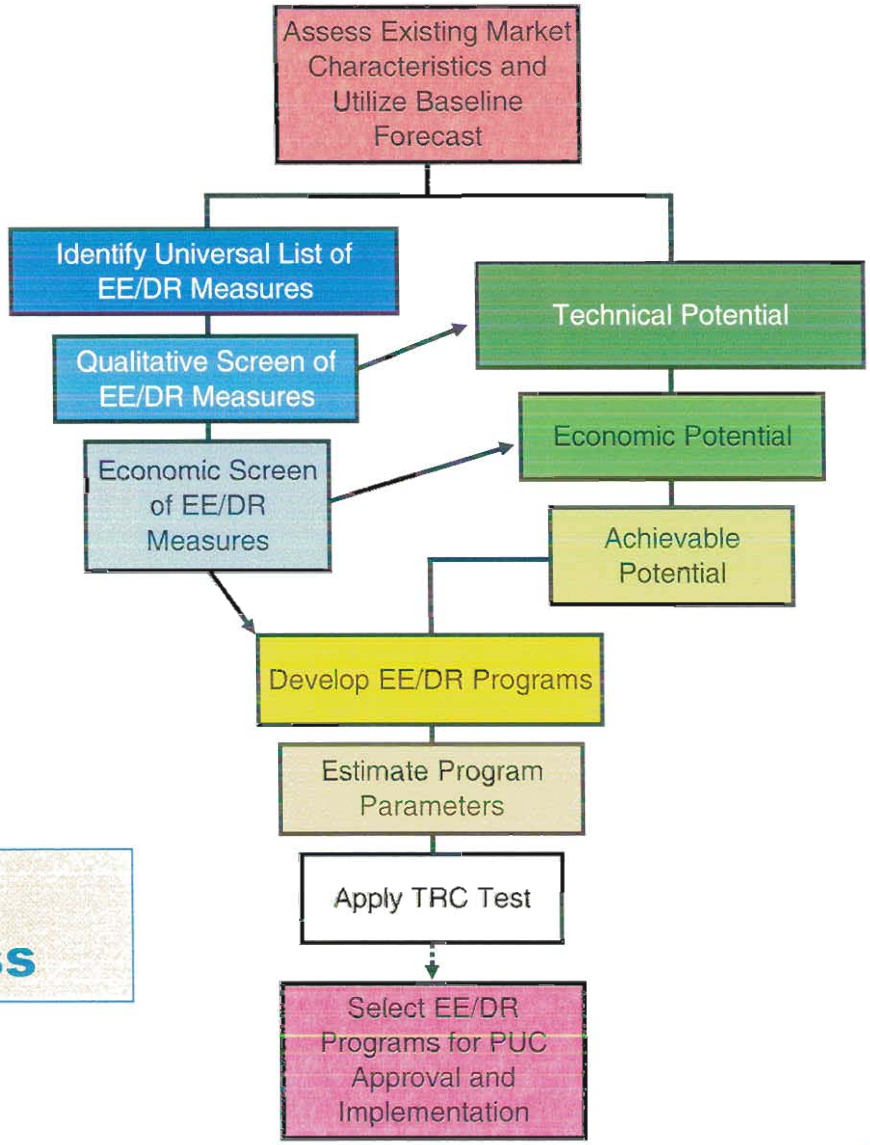
Approach to Program Development



Stakeholder Input Informs the Process

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Overall Plan Summary

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Plan Summary

- ✓ Under the current Plan, the allowable spending of $340M is not sufficient to meet both energy efficiency and demand reductions
  - Exceed statutory limits by 6% - $358M vs. $340M
  - Cost differential will be validated through RFP process and finalized TRM
- ✓ PECO can meet the Energy Efficiency targets:
  - Exceed 2011 goal by 40% - 550K kWh vs. 394K kWh
  - Slightly exceed 2013 goal by 8% - 1.28B kWh vs.1.18B kWh
  - Levelized cost to execute the programs will be $0.055 per kWh (Industry benchmark is $0.03-$0.05 per kWh) (Source: National Action Plan for Energy Efficiency, July 2006)
- ✓ Plan delivers significantly greater MWs under contract in order to meet the 4.5% reduction off of the 100 peak hours
  - Contract 552 MW vs. 355 MW target
  - Levelized cost of Demand Reduction is $50/kW-year compared to avoided capacity cost of $65.78 in 2010

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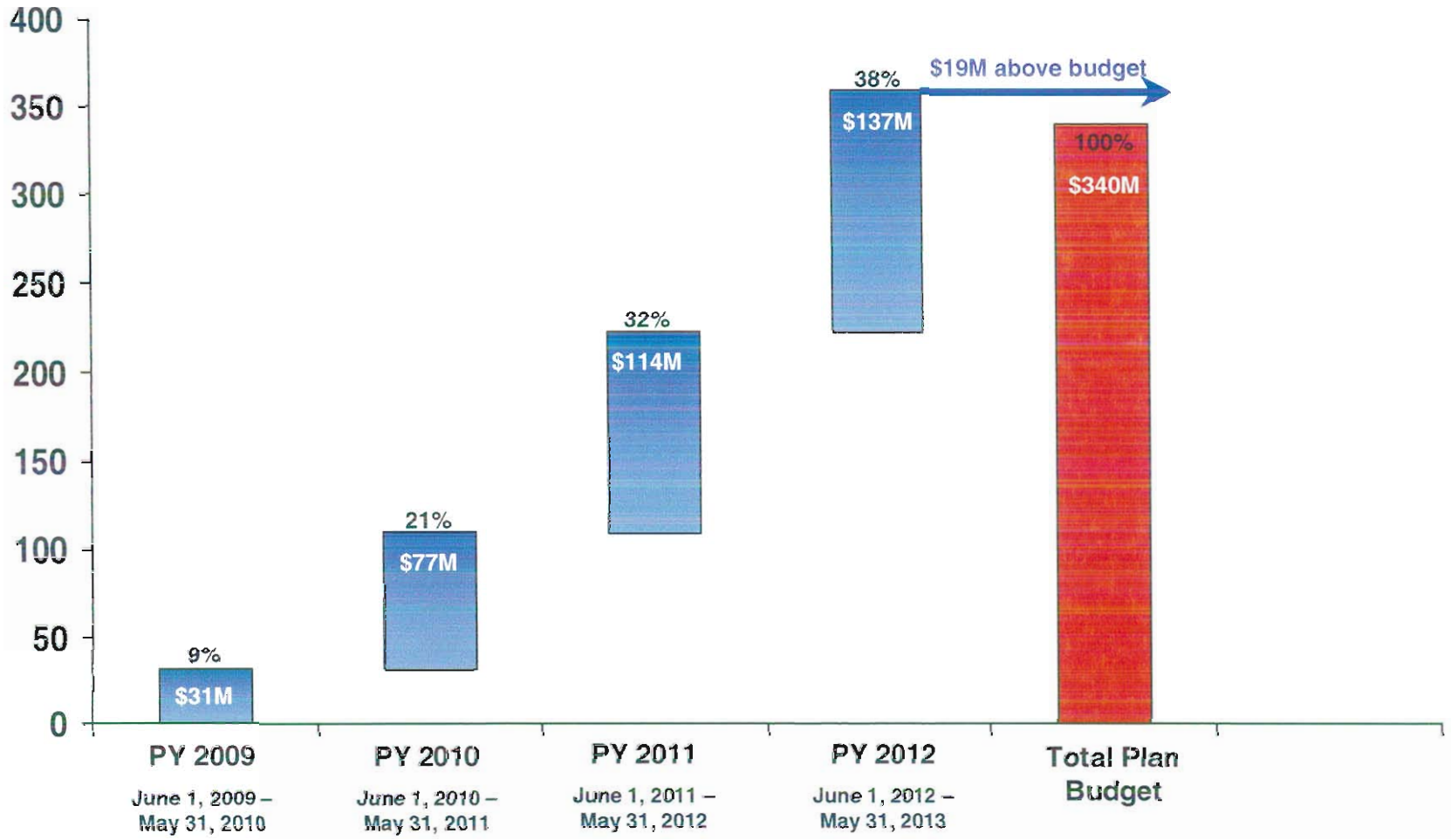
Total Plan Budget Spend by Program Year

EE and DR proposed programs will exceed four-year total budget spend by $19M



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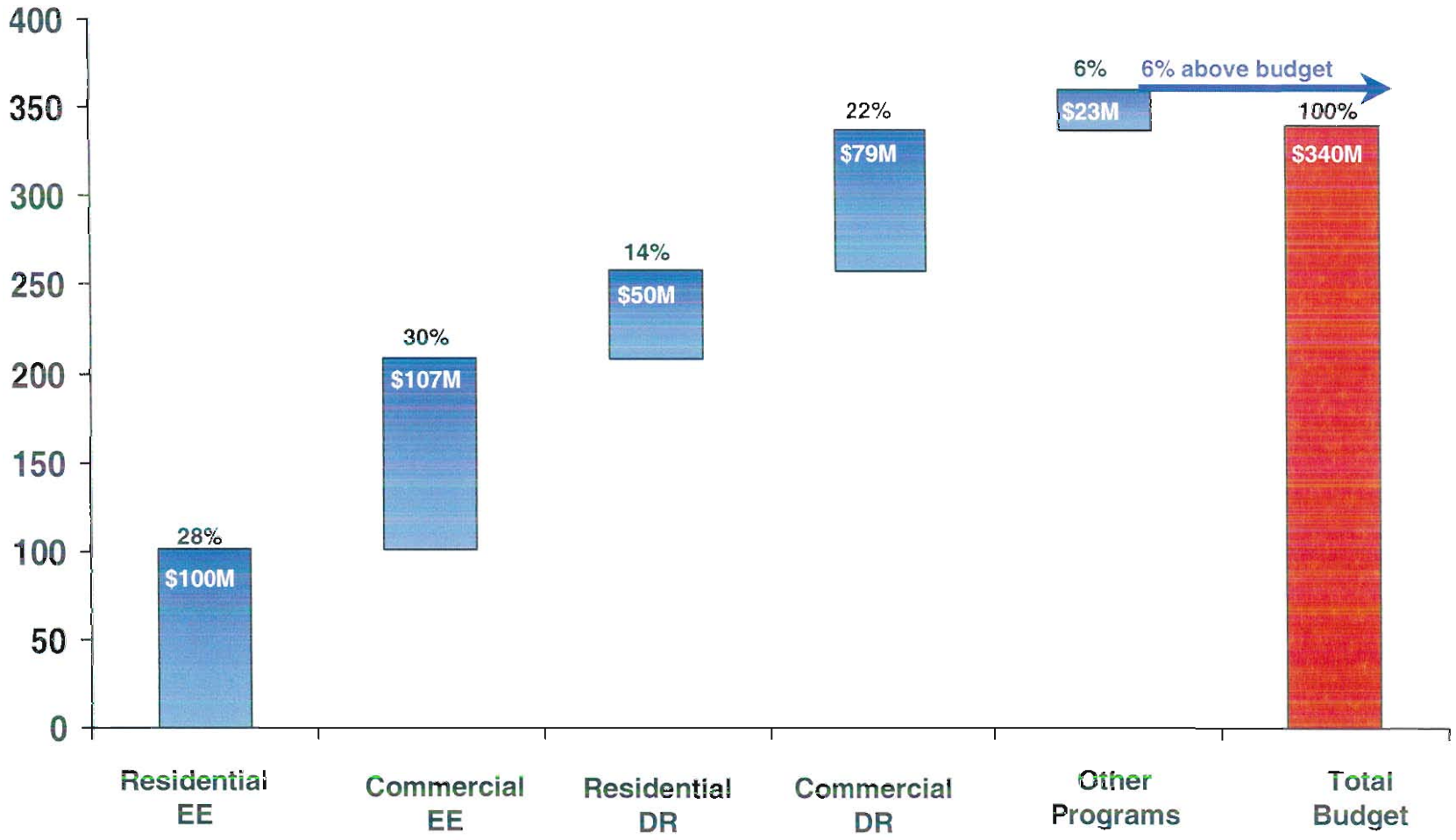
Total Plan Budget Spend by Segment

EE and DR proposed programs will exceed four-year total budget spend by $19M



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Energy Efficiency Program Details

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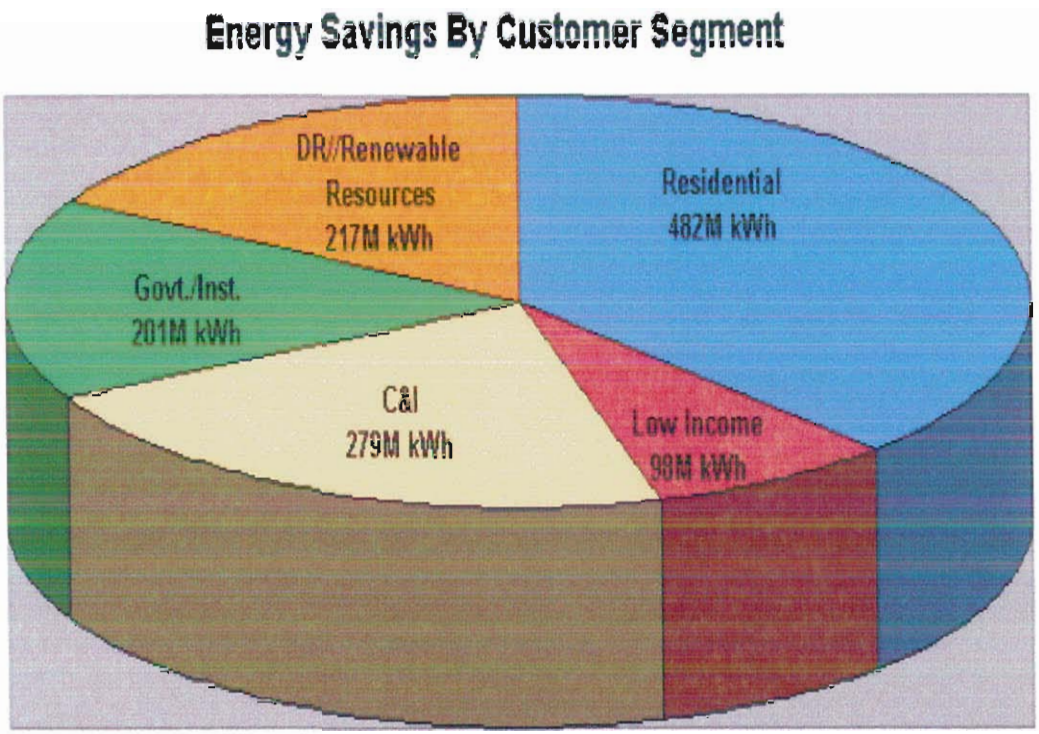
Projected EE Savings by Segment and Budget

Proposed plan provides savings across all customer segments. Residential programs will deliver the largest kWh savings over the four program years.



Program	Savings[1] (kWh)	Budget[2] ($M)
✓ Residential	✓ 482M kWh/ (41%)	✓ $72 (21%)
✓ Low Income	✓ 98M kWh/ (8%)	✓ $28 (8%)
✓ C&I	✓ 279M kWh/ (24%)	✓ $62 (18%)
✓ Govt./Inst.	✓ 201M kWh/ (17%)	✓ $45 (13%)
✓ DR Programs	✓ 217M kWh/ (18%)	✓ N/A[3]

(1) Projected Energy Savings of Total Reduction Goal of 1.182M kWh
(2) Program Cost of Total EE&C Budget of $340M
(3) Demand Reduction budget costs are calculated in DR program summary

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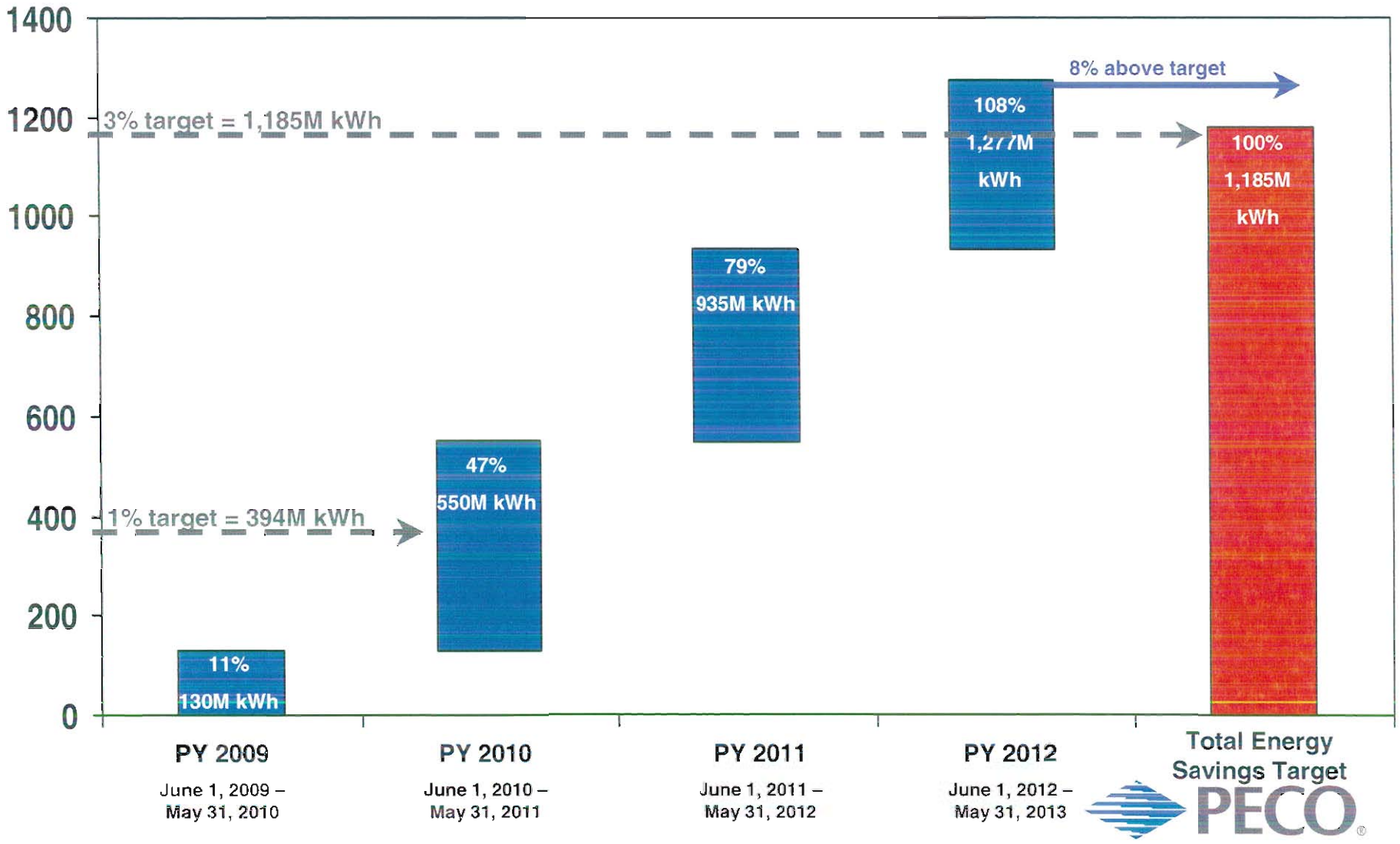
Projected EE Savings by Program Year

The proposed programs will result in a reduction of 1.28B kWh over the four program years



Proposed Energy Efficiency Programs

Proposed programs are expected to deliver savings across all customer segments throughout the four program years.

	EE Program	Energy Savings (kWh)[1]	Budget ($M)[2]
Residential EE:	✓ CFL Initiative	✓ 298M/ (25%)	✓ $24.1/ (7%)
	✓ Home Equipment Incentives	✓ 123M/ (10%)	✓ $32.2/ (9%)
	✓ Appliance Pick-up	✓ 54M/ (5%)	✓ $9.6/ (3%)
	✓ Low-Income Energy Efficiency	✓ 98M/ (8%)	✓ $28.3/ (8%)
	✓ Whole Home Performance	✓ 6M/ (.5%)	✓ $4.1/ (1%)
	✓ New Construction	✓ 1M/ (0%)	✓ $2.3/ (1%)
	Residential EE programs represent 49% of total energy savings goal of 1.2B kWh and 30% of total budget of $340M.		
C&I EE:	✓ Equipment Process Incentives	✓ 251M/ (21%)	✓ $57.0/ (17%)
	✓ Governmental/Institutional /Non Profit Programs	✓ 201M/ (17%)	✓ $44.7/ (13%)
	✓ New Construction	✓ 28M/ (2%)	✓ $4.6/ (1%)
	Commercial EE programs represent 40% of total energy savings goal of 1.2B kWh and 31% of total budget of $340M.		
Other :	✓ kWh savings from Demand Reduction Programs	✓ 210M/ (18%)	✓ DR Programs [3]
	✓ Renewable Resources	✓ 7M/ (1%)	✓ $18.6/ (6%)
	Other EE programs represent 19% of total energy savings goal of 1.2B kWh and 6% of total budget of $340M.		

(1) Projected Energy Savings of Total Reduction Goal of 1.18M kWh
(2) Program Cost of Total EE&C Budget of $340M
(3) Demand Reduction budget costs are calculated in DR program summary

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Demand Reduction Program Details

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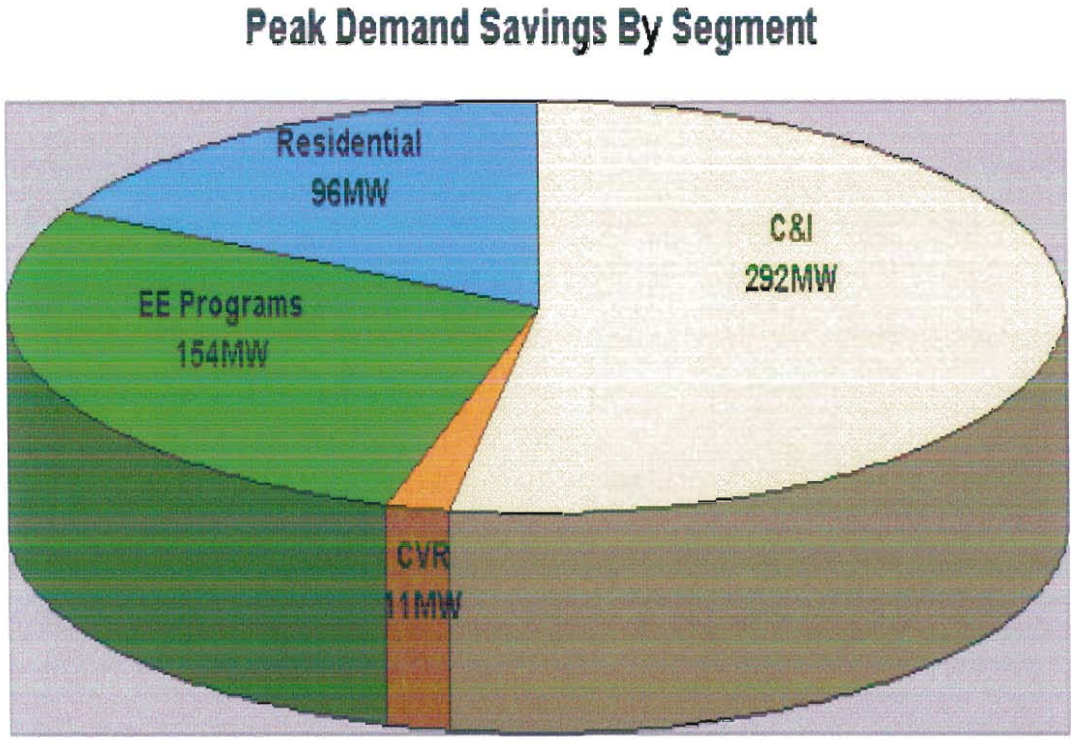
Projected DR Savings by Segment and Budget

Proposed plan provides reductions across all customer segments. C&I programs will deliver the largest MW reductions.



Program	Savings [1] (MW)	Budget [2] ($M)
✓ C&I	✓ 292/ (82%)	✓ $79/ (23%)
✓ Residential	✓ 96/ (27%)	✓ $50/ (15%)
✓ CVR	✓ 11/ (3%)	✓ $4/ (1%)
✓ EE Programs	✓ 154/ (43%)	✓ N/A [3]

(1) Projected Energy Savings of Total Reduction Goal of 355MW
(2) Program Cost of Total EE&C Budget of $340M
(3) Energy Efficiency budget costs are calculated in EE program summary

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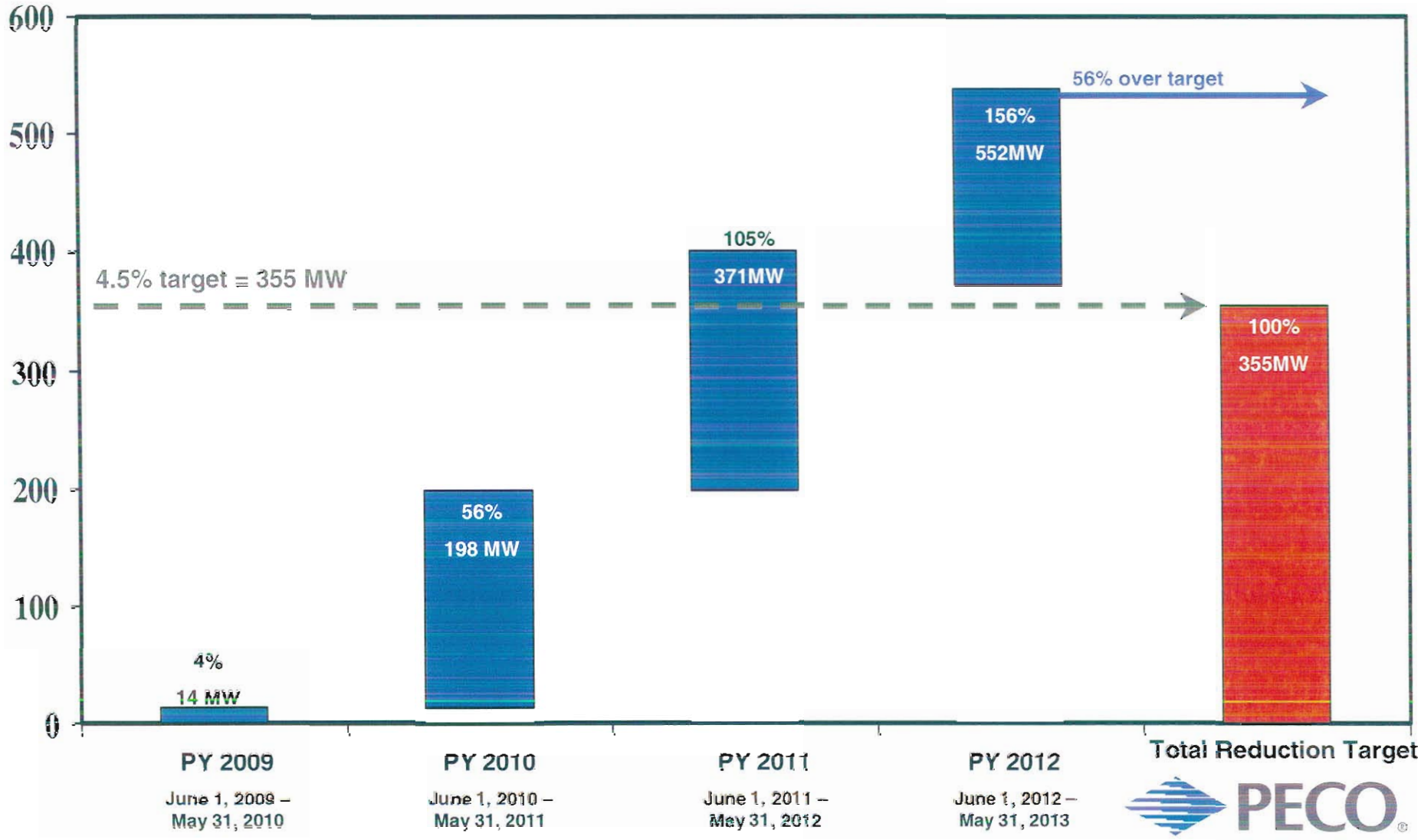
Projected DR Savings by Program Year

Demand Reduction programs are intentionally oversubscribed by 197MW in order to deliver the reduction target of 355MW



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Proposed Demand Reduction Programs

The recommended mix of programs are based on industry benchmarking, stakeholder input and TRC results

	DR Program	Demand Savings (MW) [1]	Budget ($M)[2]
Residential DR:	✓ Direct Load Control ✓ Super Peak TOU	✓ 67.5/ (19%) ✓ 28.1/ (8%)	✓ $41.3/ (12%) ✓ $8.7/ (3%)

Residential DR programs represent 27% of total peak demand goal of 355MW and 15% of total budget of $340M.

C&I DR:	✓ DR Aggregator Contracts ✓ Direct Load Control ✓ Super Peak TOU ✓ Distributed Energy Resources ✓ Permanent Load Reduction	✓ 150.0/ (42%) ✓ 16.1/ (5%) ✓ 31.1/ (9%) ✓ 75.0/ (21%) ✓ 19.6/ (6%)	✓ $20.4/ (6%) ✓ $13.2/ (9%) ✓ $10.0/ (3%) ✓ $24.7/ (7%) ✓ $10.5/ (3%)

Commercial DR programs represent 82% of total peak demand goal of 355MW and 23% of total budget of $340M.

Other :	✓ Conservation Voltage Reduction ✓ Energy Efficiency Programs	✓ 11.3/ (3%) ✓ 153.5/ (43%)	✓ $4.4/ (1%) ✓ EE Programs [3]

Other programs represent 46% of total peak demand goal of 355MW and 1% of total budget of $340M.

(1) Projected Demand Reduction Savings Goal of 355MW
(2) Program Cost of Total EE&C Budget of $340M
(3) Energy Efficiency budget costs are calculated in EE program summary

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Next Steps

- ✓ Continue to refine the Plan
- ✓ Develop petition with testimony for a July 1, 2009 filing
- ✓ Prioritize issuance of subsequent RFPs and award CSP contracts
- ✓ Prepare for launch of CFL Program in November 2009

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Appendix

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Act 129 Proposed Program Summary

Program	Energy Savings (MWh)				Peak Demand Savings (MW)				Budget (Million $)		Total Participants (Cumulative by Year	TRC Analysis			
	PY 2009	PY 2010	PY 2011	PY 2012	PY 2009	PY 2010	PY 2011	PY 2012	4-Year Total	Average Annual		Benefits (Million $)	Costs (Million $)	Net Benefits (Million $)	B/C Ratio
Energy Efficiency Programs															
1. CFL Initiative	67,204	158,336	256,786	297,659	3.2	7.6	12.3	14.3	$24.1	$6.0	1,856,250	$205	$41	$164	5.05
2. Residential Low-Income Energy	8,891	28,595	61,815	97,809	0.5	1.6	3.4	5.6	$28.3	$7.1	222,517	$66	$26	$40	2.56
3. Residential Whole Home Performance	0	885	2,656	6,198	0.0	0.0	0.1	0.1	$4.1	$1.0	2,100	$6	$4	$2	1.42
4. Residential Home Energy Incentives	9,794	44,194	83,662	123,308	0.5	2.1	3.9	5.7	$32.2	$8.0	177,351	$143	$80	$63	1.79
5. Residential New Construction	0	213	640	1,066	0.0	0.0	0.1	0.1	$2.3	$0.6	93	$1	$2	-$1	0.52
6. Residential Appliance Pickup	5,394	21,575	37,756	53,937	1.6	6.4	11.1	15.9	$9.6	$2.4	55,500	$50	$7	$44	7.51
7. Commercial/Industrial Equipment Incentives	16,444	78,170	165,018	251,122	4.2	19.3	40.9	62.4	$57.4	$14.3	72,455	$202	$128	$75	1.58
8. Commercial/Industrial New Construction	0	0	9,653	27,579	0.0	0.0	1.2	3.3	$4.6	$1.1	100	$21	$8	$14	2.72
9. Government/Public Facility Energy Savings	22,210	70,914	136,339	201,381	4.1	13.6	25.5	37.3	$44.7	$11.2	275	$174	$100	$74	1.73
10. Renewable Resources	0	1,069	3,207	6,758	0.0	1.4	4.1	8.8	$18.6	$4.6	1,850	$11	$39	-$29	0.27
Subtotal Energy Efficiency Programs	***129,937***	***403,952***	***757,532***	***1,066,816***	***14.0***	***51.9***	***102.6***	***153.5***	***$225.8***	***$56.4***	***2,388,490***	***$879.4***	***$434.9***	***$444.5***	***2.02***
Demand Reduction Programs															
1. Residential Direct Load Control	0	2,886	4,263	5,639	0.0	34.4	51.0	67.5	$41.3	$10.3	115,000	$43	$39	$3	1.09
2. Residential Super Peak TOU	0	401	1,458	2,809	0.0	4.0	14.6	28.1	$8.7	$2.2	52,500	$17	$10	$7	1.72
3. Commercial/Industrial Direct Load Control	0	644	1,208	1,611	0.0	6.4	12.1	16.1	$13.2	$3.3	10,000	$10	$9	$1	1.13
4. Commercial/Industrial Super Peak TOU	0	453	1,440	3,113	0.0	4.5	14.4	31.1	$9.9	$2.5	10,000	$18	$10	$8	1.85
5. DR Aggregator Contracts	0	5,000	10,000	15,000	0.0	50.0	100.0	150.0	$20.4	$5.1	NA	$89	$87	$2	1.02
6. Distributed Energy Resources	0	23,400	40,950	58,500	0.0	30.0	52.5	75.0	$24.7	$6.2	NA	$85	$75	$11	1.15
7. Permanent Load Reduction	0	3,356	8,389	13,423	0.0	5.3	12.4	19.6	$10.5	$2.6	NA	$20	$33	-$13	0.61
8. Conservation Voltage Reduction	0	110,000	110,000	110,000	0.0	11.3	11.3	11.3	$4.4	$1.1	NA	$124	$5	$119	27.28
Subtotal Demand Reduction Programs	***0***	***146,140***	***177,709***	***210,095***	***0.0***	***146.0***	***268.3***	***398.7***	***$133.1***	***$33.3***	***187,500***	***$407.0***	***$267.7***	***$139.3***	***1.52***
Grand Total -- All Programs	***129,937***	***550,091***	***935,240***	***1,276,911***	***14.0***	***198.0***	***370.9***	***552.2***	***$358.9***	***$89.7***	***2,575,990***	***$1,286.3***	***$702.6***	***$583.8***	***1.83***
PECO Goals		*393,850*		*1,181,550*		*175.0*		*355.0*	*$340*	*$85*					
Percent of Goal		*140%*		*108%*		*113%*		*156%*	*106%*	*106%*					

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PECO Energy Efficiency and Demand Reduction Plan – Updates to Plan

June 11, 2009

Prepared by

Greg Wikler, Global Energy Partners

Overview

- ✓ Process review
- ✓ Plan summary
- ✓ Energy efficiency program update
- ✓ Demand reduction program update

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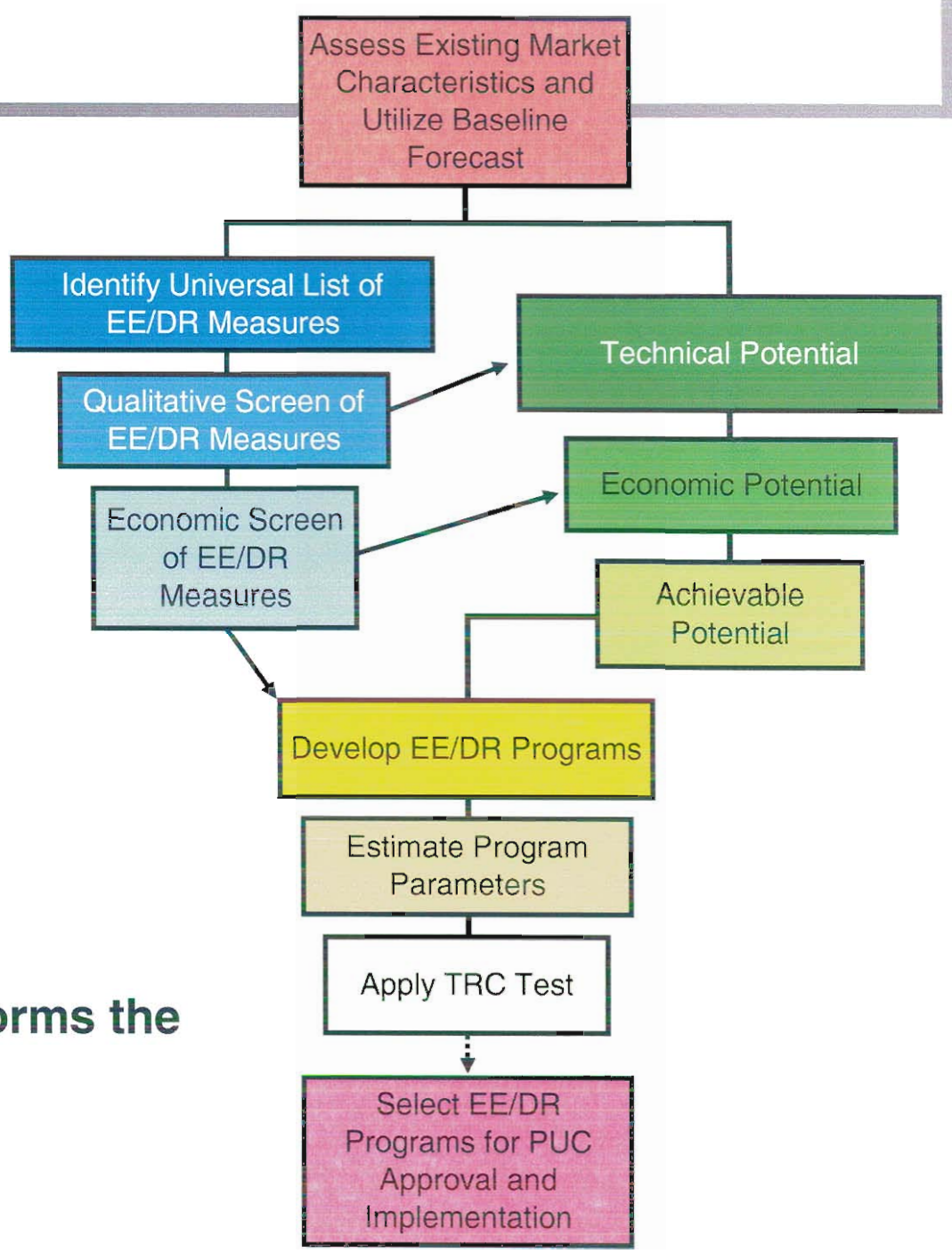
Targeted Energy Efficiency Services Study for PECO

Process Flow Diagram



- Stakeholder input informs the process

Plan Summary

- ✓ Under the current draft Plan, the allowable spending of $342M is not sufficient to meet both energy efficiency and demand reductions
  - Exceed statutory limits by 3% - $351M vs. $340M
  - Cost differential will be adjusted through further iterations
- ✓ PECO expects to meet the Energy Efficiency targets:
  - Exceed 2011 goal by 42% - 558K kWh vs. 394K kWh
  - Slightly exceed 2013 goal by 6% - 1.25B kWh vs.1.18B kWh
  - Levelized cost to execute the programs will be $0.045 per kWh (Industry benchmark is $0.03-$0.05 per kWh) (Source: National Action Plan for Energy Efficiency, July 2006)
- ✓ Plan delivers significantly greater MWs under contract in order to meet the 4.5% reduction off of the 100 peak hours
  - Contract 527 MW vs. 355 MW
  - Levelized cost of Demand Reduction is $50/kW-year

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Plan Summary (continued)

- ✓ The Plan is very cost effective
  - EE programs yield $922 million in lifetime benefits and $419 million in lifetime costs for a TRC of 2.22
  - DR program yield $448 million in lifetime benefits and $273 million in lifetime costs for a TRC of 1.64
  - The Plan yields $1.4 billion in lifetime benefits and $692 million in lifetime costs for a TRC of 1.98

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Proposed Energy Efficiency Programs

CFL Initiative

- ✓ Key program to meet 2011 goal
- ✓ In-Store Discounts and Give-Away on ENERGY STAR® bulbs – 5M Bulbs
- ✓ Largest/immediate Savings
- ✓ Flagship launch of PECO's EE Programs
- ✓ Recycling Program

Low-Income Energy Efficiency

Three components:

- ✓ "LIURP Like" - Double the number of LIURP participants by 9,000
- ✓ Increase number of installed CFL by 6 for the existing 9,000 LIURP participants
- ✓ Partner with Utilities and Existing Weatherization Programs to install up to 6 CFLs (assumes 150,000 homes over plan period)

Res. Whole Home Performance

- ✓ Customer pays $300 for audit
- ✓ CSP will install low-cost measures that will generate up to $300 annual savings
- ✓ Customer can take advantage of rebates and discounts for installation of measures

Res. Home Energy Incentives

- ✓ Provide cash rebates for qualifying EE measures in existing homes
- ✓ Rebates include lighting, water heating, cooling, heating, appliances, home insulation, white roofs
- ✓ Features ENERGY STAR products

Res. New Construction

- ✓ Financial incentives to builders who incorporate EE design, construction and operation of homes
- ✓ Work with Residential Builders

Res. Appliance Pickup

- ✓ Remove spare refrigerators, freezers and room air conditioners from operation
- ✓ Provide pickup service, customer incentives and safe and proper disposal

C&I New Construction

- ✓ Financial incentives to incorporate more EE building design and construction practices in new facilities and major renovations
- ✓ Work with Architects, Engineers, Design Firms and Commercial Developers

C&I Equipment Incentives

- ✓ Financial incentives on retrofits that incorporate EE measures for all major end uses in small business and general C&I facilities
- ✓ Incentives for Custom and Prescriptive Measures

Govt./Institutional/Non-Profits

- ✓ Financial incentives on retrofits that incorporate EE measures for all major end uses for local, state, federal buildings, schools, hospitals and other non-profit organizations
- ✓ Includes specific measures such as LED traffic lights

Renewable Resources

- ✓ Financial incentives through rebates for solar PV and hot water systems through contractors and turn key providers
- ✓ Educate homeowners and businesses about financial incentives (including Stimulus and tax credits)
- ✓ Facilitate access to technical expertise for installation of solar PV and hot water systems

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Key Changes to EE Programs Since 5/20

- ✓ Eliminated line loss credit from counted savings (but not from TRC analysis)
- ✓ Adjusted participation assumptions for selected programs
- ✓ Finalized TRM savings
  - Central AC, air-source heat pump, duct sealing, and ground source heat pump – energy savings increased due to higher full load hours of operation
  - Energy Star clothes washer and dishwasher – impacts changed due to new formulas provided in TRM
  - Energy Star CFL bulbs and fixtures – impacts decreased due to lower hours of daily use
  - CFL – factored in future effects of EISA
  - Energy Star windows – impacts changed due to new formulas provided in TRM
  - Refrigerator retirement – impacts changed due to new formula provided in TRM
  - C&I and Gov:
  - LED traffic signals – impacts changed due to new savings figures provided in TRM
  - Packaged AC and air-source heat pump, and ground source heat pump – energy savings increased due to higher full load hours of operation
- ✓ Aligned rebate levels with other EDCs
  - Central AC and heat pump – broke out into multiple efficiency increments and increased incentive levels
  - Packaged AC and heat pump – broke out into multiple efficiency increments but kept incentive levels at 33% of incremental costs
  - Reduced incentive for the pin-based CFL to $30 per fixture
  - Reduced incentive for the LED exit sign to $15 per sign
  - Reduced incentive for the T-8 lamps (regular & U-tube) to $14 per fixture
  - Reduced incentive for variable speed drives to $75/hp

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Proposed Energy Efficiency Programs

Proposed programs are expected to deliver savings across all customer segments throughout the four program years.

	EE Program	Energy Savings (Million kWh)	Budget ($M)
Residential EE:	✓ CFL Initiative	✓ 225 / (vs. 298)	✓ $19.8 / (vs. $24.1)
	✓ Home Equipment Incentives	✓ 124 / (vs. 123)	✓ $35.5 / (vs. $32.2)
	✓ Appliance Pick-up	✓ 75 / (vs. 83))	✓ $9.7 / (vs. $9.6)
	✓ Low-Income Energy Efficiency	✓ 80 / (vs. 100)	✓ $27.5 / (vs. $28.3)
	✓ Whole Home Performance	✓ 6 / (vs. 6)	✓ $3.9 / (vs. $4.1)
	✓ New Construction	✓ 1 / (vs. 1)	✓ $3.1 / (vs. $2.3)

Residential EE programs represent 43% of total energy savings goal of 1.2B kWh and 29% of total budget of $342M.

C&I EE:	✓ Equipment Process Incentives	✓ 273M/ (vs. 251)	✓ $62.3/ (vs. $57)
	✓ Governmental/Institutional /Non Profit Programs	✓ 217M/ (vs. 201)	✓ $45.7/ (vs. $44.7)
	✓ New Construction	✓ 25M/ (vs. 28)	✓ $4.8/ (vs. $4.6)

Commercial EE programs represent 44% of total energy savings goal of 1.2B kWh and 33% of total budget of $342M.

Other :	✓ kWh savings from Demand Reduction Programs	✓ 224 / (vs. 210)	✓ See DR program budgets
	✓ Renewable Resources	✓ 1 / (vs. 7)	✓ $5 (vs. $18.6)

Other EE programs represent 19% of total energy savings goal of 1.2B kWh and 1% of total budget of $342M.

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Proposed Demand Reduction Programs

Res. Direct Load Control

- ✓ Central air conditioners and/or electric hot water heaters are cycled via a paging network (external switches installed on customer equipment)
- ✓ PECO calls events to ensure alignment with highest 100 peak hours for demand reduction
- ✓ Participants receive monthly incentives for allowing control

Res. Super Peak TOU

- ✓ Time-of-use tariff designed to lower demand during a narrow band of peak hours (aligned with system peak hours)
- ✓ Customer charged significantly higher prices during the "super peak" periods, lower rates in shoulder and off peak
- ✓ Customer controls response, but some will also participate in RDLC providing some enablement to reduce load
- ✓ Can be implemented with minor IT enhancement and through the existing Cellnet AMR system

C&I Direct Load Control

- ✓ Similar to RDLC, but instead of switches, Programmable Communicating Thermostats (PCTs) are installed to raise temperature set points during called curtailment events
- ✓ PECO calls events during highest 100 peak hrs. to achieve demand reduction
- ✓ Participants receive monthly incentives

C&I Super Peak TOU

- ✓ Time-of-use tariff designed to lower demand during a narrow band of peak hours (aligned with system peak hours)
- ✓ Customer charged significantly higher prices during the "super peak" periods, lower rates in shoulder and off peak
- ✓ Customer controls response, but some will also participate in DLC providing some enablement to reduce load
- ✓ Can be implemented with minor IT enhancement and through the existing Cellnet AMR system

DR Aggregator Contracts

- ✓ Performance contracts established with one or more Curtailment Service Providers who will in turn recruit customers to deliver demand reductions as called by PECO over the highest 100 hour peak demand periods

Distributed Energy Resources

- ✓ Financial incentives provided to existing backup generation owners in exchange for PECO taking over dispatch of the units as a DR resource
- ✓ Systems would be dispatched by PECO as necessary to ensure load drop over the highest 100 peak hours

Permanent Load Reduction

- ✓ Incent projects and technologies designed to permanently shift electricity usage from peak to off peak time period permanently
- ✓ Examples of technologies targeted would be thermal energy storage which make ice for cooling off peak, fuel switching (from electric to gas cooling), etc.

Conservation Voltage Reduction

- ✓ Designed to lower service voltage levels for all customers within applicable distribution feeders
- ✓ Minor distribution system upgrades to accommodate CVR

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Key Changes to DR Programs Since 5/20

- ✓ Eliminated line loss credit from counted savings (but not from TRC analysis)
- ✓ Adjusted participation assumptions for selected programs

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Proposed Demand Reduction Programs

The recommended mix of programs are based on industry benchmarking, stakeholder input and TRC results

	DR Program	Demand Savings (MW)	Budget ($M)
Residential DR:	✓ Direct Load Control ✓ Super Peak TOU	✓ 60.5 / (vs. 67.5) ✓ 25.5 / (vs. 28.1)	✓ $41.4 / (vs. $41) ✓ $8.7 / (vs. $9)

Residential DR programs represent 24% of total peak demand goal of 355MW and 15% of total budget of $342M.

C&I DR:	✓ DR Aggregator Contracts ✓ Direct Load Control ✓ Super Peak TOU ✓ Distributed Energy Resources ✓ Permanent Load Reduction	✓ 150.0 / (vs. 150) ✓ 14.6 / (vs. 16.1) ✓ 28.2 / (vs. 31.1) ✓ 75.0 / (vs. 75.0) ✓ 14.7 / (vs. 19.6)	✓ $22.6 / (vs. $20) ✓ $13.1 / (vs. $13) ✓ $10.1 / (vs. $10) ✓ $26.9 / (vs. $25) ✓ $6.1 / (vs. $11))

Commercial DR programs represent 80% of total peak demand goal of 355MW and 23% of total budget of $342M.

Other :	✓ Conservation Voltage Reduction ✓ Energy Efficiency Programs	✓ 11.3 / (vs. 11) ✓ 146.7 / (vs. 154)	✓ $4.5 / (vs. $4.4) ✓ See EE program budgets

Other programs represent 45% of total peak demand goal of 355MW and 1% of total budget of $342M.

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Act 129 – Energy Efficiency & Conservation Plan Cost Recovery

June 11, 2009

Prepared by
Rich Schlesinger

Overview

- ✓ Final 2% Annual Retail Revenue Calculation
- ✓ Cost Recovery Mechanism
- ✓ Recovery Charge
- ✓ Plan Flexibility
- ✓ True Up Process
- ✓ Total Resource Cost Test (TRC)

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2% Annual Retail Revenue Calculation

- Total revenues as of 12/31/06 = $4,371,215,020 *
- Adjustment G&T Shopping customers = $92,390,366
- Wholesale revenue adjustment = ($189,747,111)
- Total Retail Revenue = $4,273,858,275
- Allowed Spend 2% of Rev. = $85,477,166
- **Four Year Total Spend = $341,908,662**

✓ Plan is based on a flexible spend model such that fewer dollars can be spent in the early years of the program and more in later years to support program initiation, build-out, and customer acceptance

* Source 2006 Annual Electric Report to the Commission

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PECO EE&C Recovery Mechanism

- ✓ Cost Recovery Mechanism
  - Two General Classes
  - Residential (R, RH, CAP)
    - Program Spend = $149M
  - Commercial/Industrial (C/I) - (GS, PD, HT,EP,TL, SL)
    - Includes Gov't/Institutional (G/I)
    - Program Spend = $193M
  - Levelized charges based on 41 months (1/1/10 thru 5/31/13)
    - Using 1/1/10 start to coincide with annual/qtr rate adjustments
    - Charges follow billing routes
    - Charges will continue past 5/31/13 due to over/under collections
  - Treatment of CAP customers
    - For 2010 need to apply charge based on current CAP rate design
    - For 2011 - 2013 charges will be based on new discounted CAP rates
  - Treatment of Gov't/Institutional customers
    - G/I will be surcharged as part of C/I class since they are "embedded"
    - However, G/I customers will be tracked separately for M&V purposes

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Recovery Charge

- ✓ Unit Rates
  - Residential = 0.33 to 0.35 cents/kWh
    - CAP (2010) = 0.02 to 0.35 cents/kWh
    - Residential (500kWh) = $1.54/ month or 1.9%
  - Commercial/Industrial = 0.22 to 0.24 cents/kWh

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Plan Flexibility

- ✓ PECO also supports additional plan flexibility
- ✓ **Intra**-class flexibility
  - discuss changes with stakeholders
  - adjust spend with no change in EE&C charge
  - true-up spend to collection at end of plan true-up
- ✓ **Inter**-class (<$20M)
  - discuss changes with stakeholders
  - adjust spend with no change in EE&C charge
  - true-up spend to collection at end of plan true-up
- ✓ **Inter**-class (>$20M)
  - discuss with stakeholders and develop plan
    - Decision point: modify EE&C rate or not
  - submit plan to PUC for approval

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Plan True Up Process

- ✓ End of Plan True Up (5/31/13)
  - Revised charges will reflect:
    - Over/Under collection from first Plan
      - With no interest adjustment
    - Any inter-class adjustment
    - Second Plan spend – as determined in 2013

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Comments to Draft TRC

- ✓ PECO's Comments to Draft TRC
  - Level at Which to Measure TRC
    - Plan B/C >= 1.0
  - Avoided Cost of Supplying Electricity
    - Avoided Energy Supply Costs – noted flaws and suggested an improved methodology
    - Depending on date of final order and final method adopted by PUC, uncertain as to inclusion in the EE&C plan filed on 7/1
  - Savings Claims From Other Programs and Act 129 Programs
    - Entire savings should be claimed by the EDC for evaluation purposes
  - Net-to-Gross (NTG) Adjustments to Savings
    - NTG for plan are set to 1; results of future studies will be incorporated into future EE&C plans
  - Limited Use of TRC Results
    - Results should be utilized solely for ranking/prioritizing potential EE&C measures and not used as evidence of an EDC's prudence or cost of service
  - Incentive Payments from Outside Sources
    - These are a benefit and should be included to the extent that the EDC is aware of these incentives
- ✓ Comments of Others

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✓ Questions and Comments

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TRM Highlights

June 11, 2009

Prepared by
Jim Reiley

TRM Highlights

- ✓ PUC Issued the final TRM on May 28th
- ✓ Dual Purpose: Act 129 & AEPS
  - Highlighted areas & definitions
- ✓ Individual Measure Changes
- ✓ Baseline Estimates for Burnout vs. Early Retirement
- ✓ Documented Savings for Standard Measures
- ✓ Future TRM Updates

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Individual Measure Changes

- ✓ ENERGY STAR® Savings vs. Sales Weighted Average
- ✓ Compact Fluorescent Lighting
  - Hours per day reduced from 3.4 to 3.0 – ENERGY STAR
  - The Energy Independence and Security Act of 2007 (EISA) ordered a phase out of certain incandescent bulbs beginning in Jan. 2012
  - Beginning in plan year 2012, accounting for a 5 month depletion lag following effective date of EISA standard, EDC's must calculate annual energy savings to account for the phase out over the life of the measure
- ✓ LED Traffic Signals
- ✓ Large Scale Data Analysis
  - Outside the scope of the TRM – EM&V technique

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Individual Measure Changes

- ✓ Natural Gas Fuel Switching
  - Additional time is needed to sort this out so it is not included in the TRM
  - The Commission will convene a working group to address
- ✓ General Comments
  - A strict interpretation of prescriptive measures was adopted – "custom measures are outside the scope of the TRM"
  - The commission expects a significant portion of the savings to come from custom programs – note: the EM&V protocols are yet to be determined

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Baseline Estimates - Burnout vs. Early Retirement

- ✓ Baseline for early retirement of appliances and equipment consists of two parts: 1) the estimated energy use for existing in-place equipment over the remainder of the useful life, 2) the estimated energy use for standard new equipment
  - Example: if an appliance is replaced and has 3 years of useful life remaining, the energy savings will be the difference between the energy use of the existing equipment and new high efficiency equipment for the first 3 years and the difference between standard new equipment and new high efficiency equipment for the last 12 years (TRC calculations)
- ✓ If a measure has a life exceeding 15 years it can be counted toward the energy savings goals beyond 15 years but not for TRC purposes

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Documented Savings for Standard Measures

- ✓ If an EDC has documented savings for standard measures that are unique to a specific application, they can be used but will be subject to Commission review and approval

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Future TRM Updates

- ✓ Timeline for annual updates
  - Draft TRM issued each June 1st
  - Comment period until final revision is issued December 31st
  - New TRM effective June 1st

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✓ Questions and Comments

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Plan Impact of Energy Efficiency on Demand Reduction

June 11, 2009

Prepared by

Paul Miles

The PUC's Act 129 Final Order Provides the Framework for EE & DR Accounting

- ✓ PECO's July 1 filing is our "Plan" and is subject to Commission approval
- ✓ Once approved, the Plan will be subject to measurement & verification protocols following implementation, and only qualified energy efficiency (EE) savings and demand reductions (DR) can be counted towards fulfillment of our EE & DR targets
- ✓ Projected EE savings & DR is based on the final Technical Reference Manual (TRM dated May 28, 2009)
  - Where measures were not specifically cited in the TRM, industry accepted EE & DR calculation methodologies, industry benchmarking, technical research, i.e., published studies from the Electric Power Research Institute (EPRI), Lawrence Berkeley National Laboratory (LBNL), etc. were utilized

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Not all DR Measures Result in Energy Savings, But Will be Counted When Verifiable

- ✓ Thermal Energy Storage, also known as off-peak cooling or ice building are designed to produce and store cooling medium for use in air conditioning systems during off-peak hours
  - Peak demand is reduced (shifted to off-peak)
  - Energy consumption remains the same, but can increase or decrease based on a number of factors
  - In the proposed PECO EE&C Plan, no energy savings are stated for this measure
- ✓ Qualified energy reduction measures, or bundles of measures are now considered DR resources which can (and as appropriate will) be bid into the PJM market for four year credit cycles

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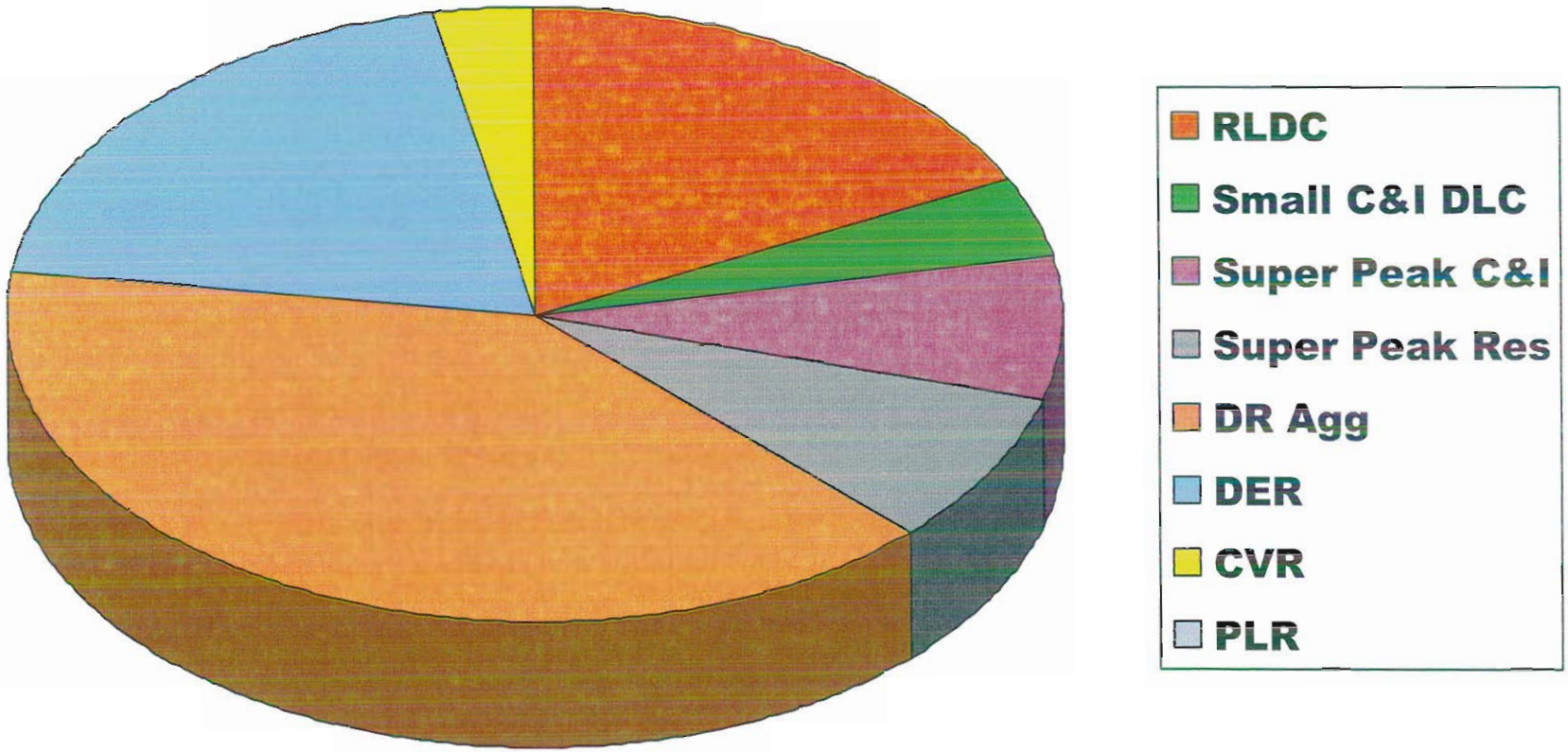
Wide Array of DR Programs Designed to Capture Energy Savings Where Possible and Visa Versa



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✓ Questions and Comments

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