



Chairman's Workshop – Grid Modernization & Cyber Security

August 14, 2018

Chairman Gladys M. Brown, PA Public Utility Commission

What is Grid Modernization?

According to DOE's Grid Modernization Initiative:

- Greater RESILIENCE to hazards
- Improved RELIABILITY for everyday operations
- Enhanced SECURITY from threats
- Additional AFFORDABILITY to maintain economic prosperity
- Superior FLEXIBILITY to respond to variability
- Increased SUSTAINABILITY through energy-efficient and renewable resources.

How is PA Modernizing?

A number of distinct PA initiatives work as a whole toward modernization...

- Infrastructure Improvements through LTIP & DSIC
- Smart Grid evolution through advanced metering
- Distributed Energy via net-metering/AEPS
- Alternative ratemaking - HBI782
- Energy Efficiency via Act 129
- Electric Vehicles facilitation via policy considerations
- Pushing policies to foster CHP investments

Modernizing PA's Grid – Act II

Act II of 2012

- Long-Term Infrastructure Improvement Plan (LTIIP)
 - A 'baseline' for Commission evaluation
 - 5 to 10 year plan outlining accelerated replacement
- Distribution System Improvement Charge (DSIC)
 - Facilitates more expeditious recovery of investment costs
- Fully-Projected Future Test Year
 - Reduces regulatory lag

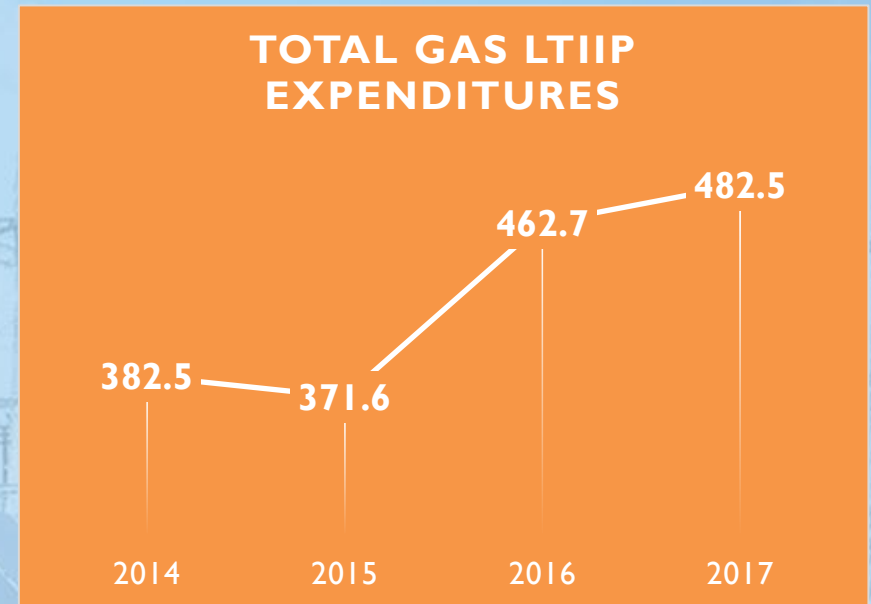
Incentivize utilities to update infrastructure through reduction in regulatory lag

Balance with consumer protections on over-earnings

Act II Investments

Nat Gas Utility Historical LTIP Expenditures

NGDC	2014	2015	2016	2017
Columbia	\$ 148	\$ 121	\$ 119	\$ 117
PECO	\$ 38	\$ 44	\$ 48	\$ 54
Peoples	\$ 89	\$ 98	\$ 117	\$ 142
PGW	\$ 22	\$ 22	\$ 22	\$ 34
UGI	\$ 85	\$ 88	\$ 156	\$ 136
Total	382.5	371.6	462.7	482.5



DSIC Customer Protections

Each quarter the Commission sets ROE caps for DSIC.
 Any utility earning an ROE above the cap has DSIC set to 0% for that quarter.
 Utility can fund its distribution operations from base rates.
 DSIC reinstated when utility goes under Cap.

Excerpt from Commission's
 Quarter 1- 2018 Report ->

* Signifies pending rate case

<u>Distribution System Improvement Charge (DSIC) Eligible Utilities</u>		
<u>Return on Equity (ROE) Summary</u>		
	Utility Adjusted ROE (%)	Commission Approved ROE (%)
ELECTRIC		
PECO Energy – Electric Operations*		9.65
PPL Electric Utilities Corp.	11.36	9.65 ✘
Duquesne Light Company*		9.65
West Penn Power Company	9.08	9.65
Pennsylvania Power Company	8.08	9.65
Pennsylvania Electric Company	9.93	9.65 ✘
Metropolitan Edison Company	11.38	9.65 ✘
GAS		
Columbia Gas of PA, Inc.*		9.95
Peoples Natural Gas Company LLC	7.00	9.95
PECO Energy – Gas Operations	9.77	9.95
UGI Utilities, Inc. – Gas Division	7.90	9.95
Peoples-Equitable Division	8.22	9.95
UGI Penn Natural Gas, Inc.*	7.83	9.95
Peoples Gas Company, LLC	10.17	9.95 ✘
UGI Central Penn Gas, Inc.	7.87	9.95

Results of Act 11 Cont'd

Company	Pre-LTIIP Replacement Time (years)	Current Replacement Time (years)
Columbia	94	17
PECO	128	20
PGW	70	40
UGI (Combined)	38	28
Peoples Nat Gas	67	20
Equitable Division	56	20
Peoples Gas	50	20

Smart Meter Deployment

UTILITY	Approximate Customers/Meters	2016	2017
Duquesne Light	622,000	258,500	447,000
Met-Ed	554,476	35,520	259,000
PECO	1,728,963	1,727,006	1,727,006
Penelec	581,832	157,140	426,000
Penn Power	162,450	167,000	167,000
PPL	1,450,000	-	312,511
West Penn Power	709,782	98,800	206,000
Totals	5,809,503	2,443,966	3,544,517
	Approximate % Complete	42.07%	61.01%

Smart Meter Deployment Cont'd

UTILITY	Projected Cost for Smart Meter Deployment	
Duquesne Light	\$	257,000,000
Met-Ed	\$	344,000,000
PECO	\$	455,000,000
Penelec	\$	365,000,000
Penn Power	\$	107,000,000
PPL	\$	470,910,000
West Penn Power	\$	442,000,000
Totals	\$	2,440,910,000

Smart Meter Benefits

Average Number of Interruptions per Customer



System Average Interruption Frequency Index – a metric to track reliability

EDCs 1 & 2 both utilize advanced metering infrastructure

EDCs 2 & 3 in process of deploying new infrastructure

Smart Meter Benefits Cont'd

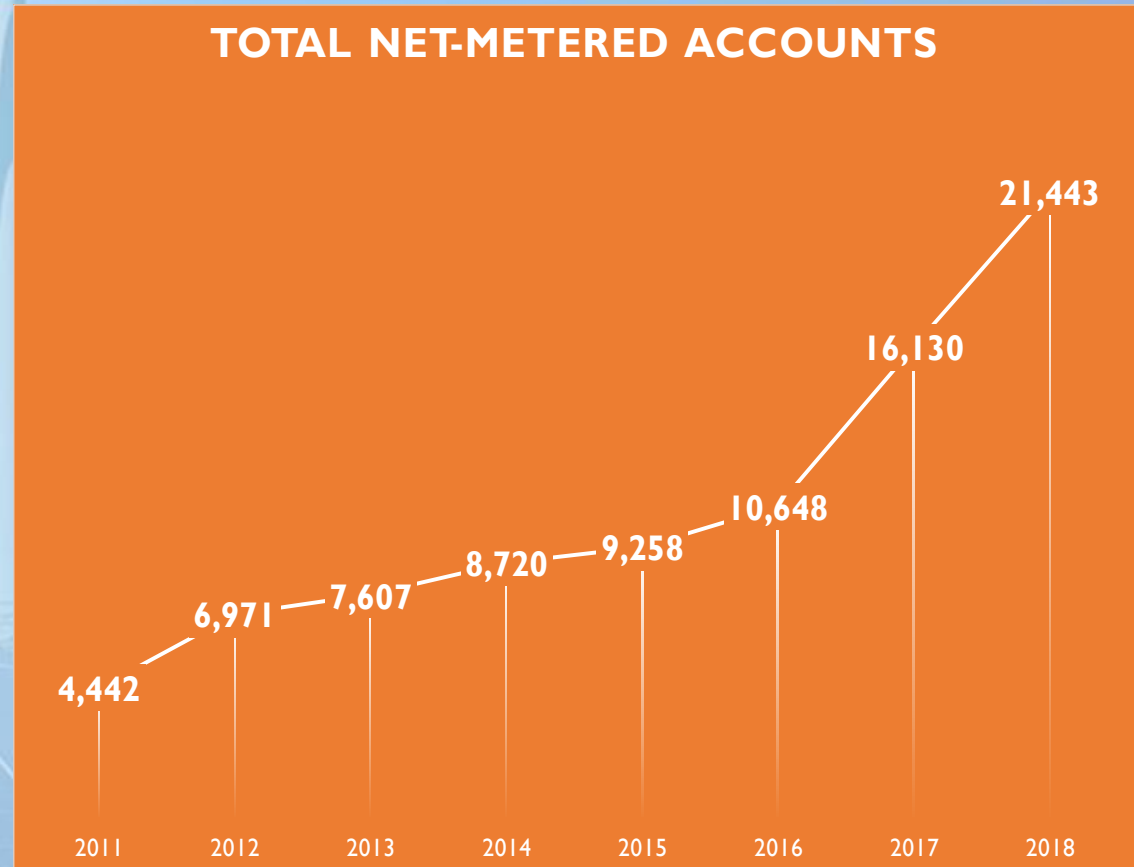
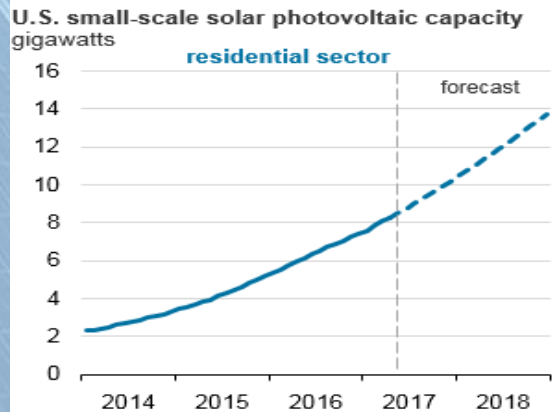
- Remote Connect/Disconnect
 - Example: during Winter Storms Riley and Quinn PECO avoided over 8,000 truck rolls – reducing overall restoration time by 2-4 days – valued savings of \$10-\$20 million
 - Supports local fire departments and emergency responders
- Advanced outage management / better awareness of outages
- Better quality power
- Ability to utilize dynamic prices
- Ability to synergize with smart devices
- Enhanced access to demand response
- SCADA info providing more effective overall grid management
- Ability to identify theft of service

Smart Meter – Data Access

- Commission focus on assuring smart meter data can be utilized, by appropriately licensed entities, to support innovation in energy products
- Directed EDCs to create a web-portal
 - Permits licensed EGSs to access hourly usage data for authorized accounts
 - Streamlines access to significant amounts of usage data
 - Movement from a ‘pull’ system where EGSs must always request info, to a ‘push’ system where certain account information is forwarded to appropriate EGSs
 - Customer privacy protection maintained as a paramount issue

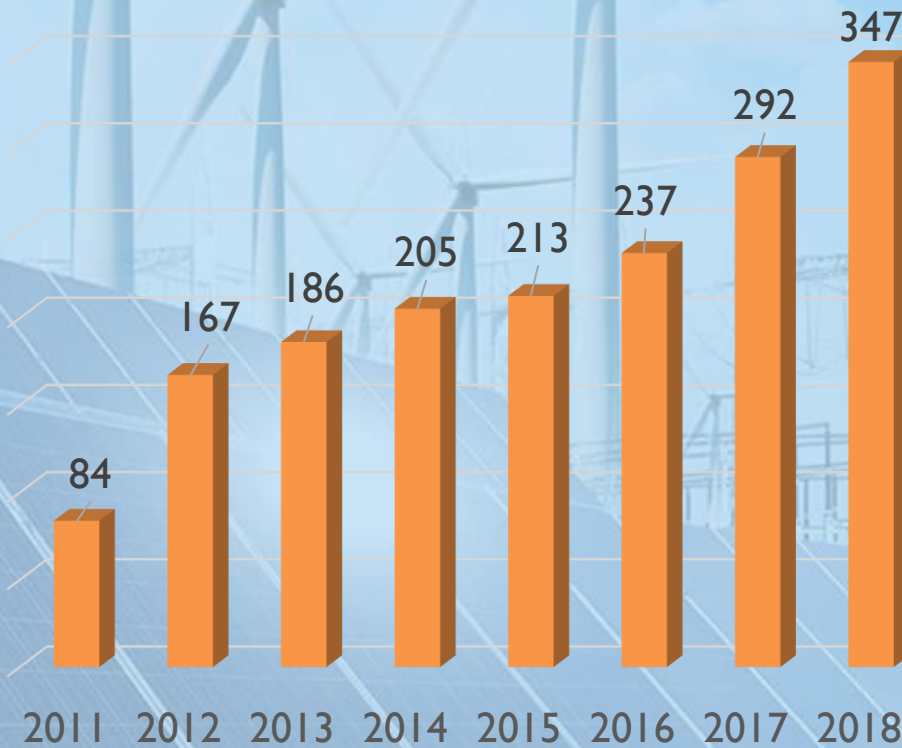
Net-Metering

- Significant growth realized
- Note the jump from '16 to '18
- Approximately 98% of all net-meter accounts are solar
- EIA Projects continued upward momentum given solar cost reductions



Net-Metering cont'd

Net-Meter Account -
Nameplate Capacity (MW)



1 MW = 1,000 kW

2018 figures could serve electric demand for approximately 40,000 to 80,000 homes

Variance depends on capacity factor of resource

Capacity factor =
actual generation/nameplate capacity

Net-Metering Cont'd

- Commission held meetings on the topic of interconnection processes and procedures. Started due to challenges faced from the acceleration of solar net-meter investments.
- Technical and Legal staff worked with EDCs and solar developers on process improvements.
 - Sharing general DER interconnection viability info with solar developers
 - Improving queue management
 - Updating interconnection tariff language

Energy Efficiency

Electric utilities continue operation of EE programs under Act 129
Voluntary programs exist for some smaller electric and gas utilities

Aggregate Phase II
Act 129 Results:
3-year period ending
May 31, 2016

Presently in Phase III
which expires May 2021

Impact	Phase II Verified Gross Savings
Total Energy Savings (MWh/yr)	3,370,614
Total Demand Reduction (MW)	524
TRC Benefits (\$1,000)	\$2,197,248
TRC Costs (\$1,000)	\$1,286,220
TRC B/C Ratio	1.71
CO₂ Emissions Reduction (Tons)	2,597,104

Energy Efficiency – cont'd

This table summarizes EDC reported gross electric energy savings for period from June 1, 2016 to May 31, 2018

EDC	Portfolio					G/E/NP Carve-Out (3.5% of Portfolio Target)					Low-Income Carve-Out (5.5% of Portfolio Target)				
	CO from Phase II (MWh)	Savings to date (MWh)	Savings incl. CO (MWh)	% of Phase III Target	Phase III Target (MWh)	CO from Phase II (MWh)	Savings to date (MWh)	Savings incl. CO (MWh)	% of Phase III Target	Phase III Target (MWh)	CO from Phase II (MWh)	Savings to date (MWh)	Savings incl. CO (MWh)	% of Phase III Target	Phase III Target (MWh)
Duquesne	100,467	159,861	260,328	59	440,916	0	11,931	11,931	77	15,432	3,266	2,739	6,005	25	24,250
Met-Ed	30,482	301,948	332,430	55	599,352	0	12,805	12,805	61	20,977	5,025	20,645	25,670	78	32,964
PECO	0	609,445	609,445	31	1,962,659	0	56,240	56,240	82	68,693	0	46,278	46,278	43	107,946
Penelec	49,695	286,130	335,825	59	566,168	82	17,572	17,654	89	19,816	7,872	22,001	29,873	96	31,139
Penn Power	13,866	90,373	104,239	66	157,371	7,316	5,726	13,042	237	5,508	1,805	6,487	8,292	96	8,655
PPL	0	731,683	731,683	51	1,443,035	0	63,893	63,893	127	50,507	0	39,966	39,966	50	79,367
West Penn	20,540	312,925	333,465	62	540,986	0	45,797	45,797	242	18,935	3,354	20,512	23,866	80	29,754
TOTAL	215,050	2,492,365	2,707,415	47	5,710,487	7,398	213,964	221,362	111	199,868	21,322	158,628	179,950	57	314,075

Energy Efficiency – cont'd

This table summarizes verified demand response savings during the period from June 1, 2017 - May 31, 2018

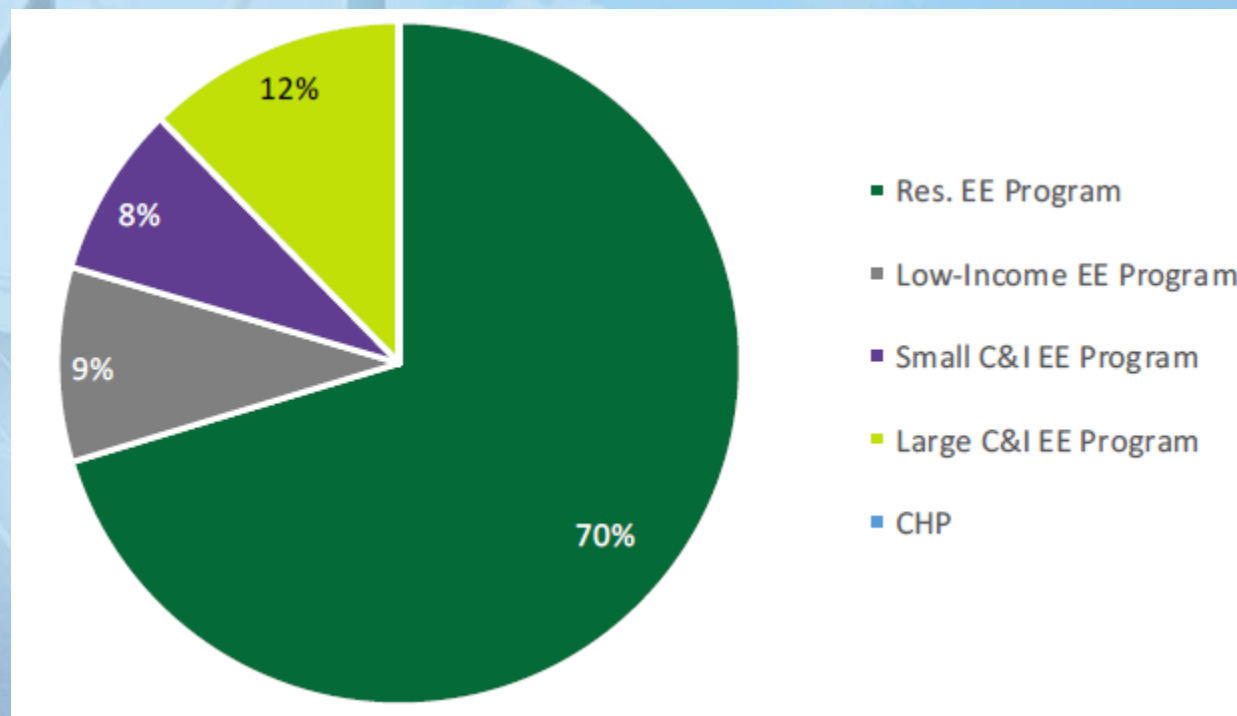
Demand Response – as defined by FERC:

Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.

Demand Response: Compliance Towards Phase III Averaged Target			
EDC	PY9 Average Savings (MW)	Phase III to date Average Savings (MW)	Phase III Average Target (MW)*
Duquesne	59.1	59.1	42
Met-Ed	45.9	45.9	49
PECO	149.4	149.4	161
Penelec **	0.0	0.0	0
Penn Power	33.5	33.5	17
PPL	126.7	126.7	92
West Penn	81.9	81.9	64

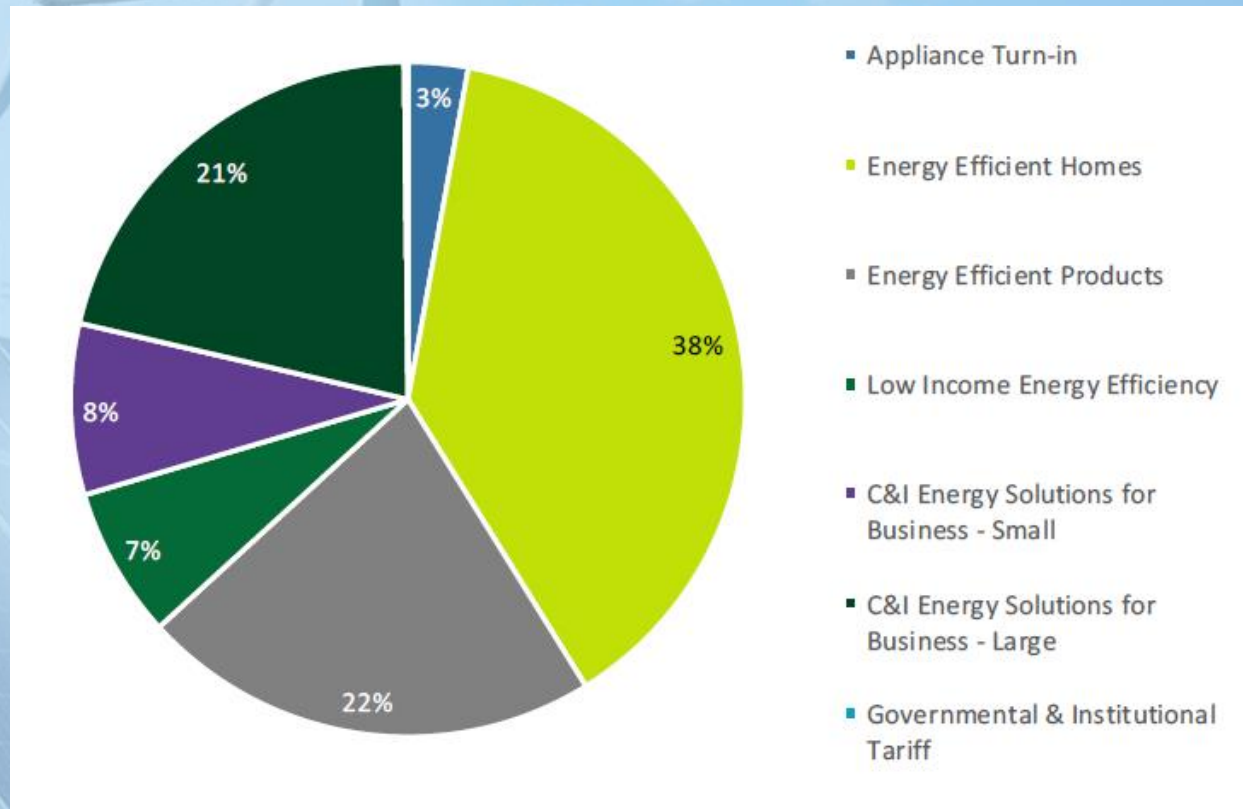
Energy Efficiency – cont'd

PECO's allocation of savings for year ending May 31, 2017



Energy Efficiency – cont'd

Met-Ed's allocation of savings for year ending May 31, 2017

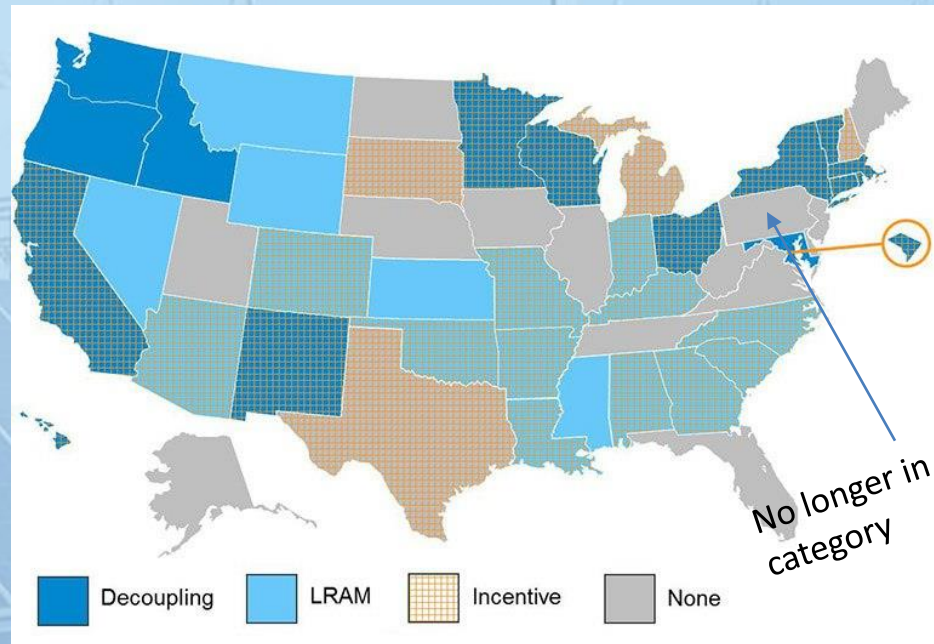


Alternative Ratemaking

HB 1782 establishes new ratemaking authority for the Commission for electric, gas, and water utilities.

Alternative rate methods are established throughout the country. 30+ states have decoupling, lost revenue adjustments, or incentive rates in place for electric.

Alternative rates can assist Commissions in providing incentives for EDC reliability and efficiency investments.



Alternative Ratemaking Cont'd

- Any proposal, whether decoupling, multi-year rate plans, performance based rates, or formula rates, must be established within a §1308 base rate proceeding.
- Commission will commence a proceeding to provide further guidance on requirements for approval of alternative rate proposals.
- Existing policy statement proceeding also may be utilized to help provide further guidance on Commission expectations

Electric Vehicles

Pending Policy Statement on EV charging and resale of electricity
Seeking to provide regulatory clarity for EV development

POLICY STATEMENT ON THIRD PARTY ELECTRIC VEHICLE CHARGING – RESALE/REDISTRIBUTION OF UTILITY SERVICE TARIFF PROVISIONS

§ 69.3501. Section 1313 of the Public Utility Code (66 Pa. C.S. § 1313).

(a) Section 1313 of the Public Utility Code, 66 Pa. C.S. § 1313 (relating to price upon resale of public utility services), applies restrictions on the resale of utility service to residential customers.

(b) It shall be the policy of the Commission that a person, corporation or other entity, not a public utility, electric cooperative corporation, municipal authority or municipal corporation, owning and operating an electric vehicle charging facility that is open to the public for the sole purpose of recharging an electric vehicle battery should not be construed to be a sale to a residential consumer and should therefore not fall under the pricing requirements of 66 Pa. C.S. § 1313 (relating to price upon resale of public utility services).

Combined Heat & Power

- Finalized a Policy Statement in April of 2018 which...
 - Declared Commission support for CHP
 - Created reporting requirements the Commission can use in furtherance of policy considerations
 - Created a working group to discuss key issues and share best practices

(D) EDCs AND NGDCs ARE ENCOURAGED TO SUPPORT THE DEVELOPMENT OF CHP BY EVALUATING AND IMPLEMENTING NEW STRATEGIES, PROGRAMS AND OTHER INITIATIVES TO PROMOTE THE DEPLOYMENT OF CHP AND TO REDUCE BARRIERS TO SUCH DEPLOYMENT WITHIN THEIR SERVICE TERRITORIES. FOR EXAMPLE, THIS COULD INCLUDE THE IDENTIFICATION OF CHP-APPLICABLE FEDERAL AND STATE INCENTIVES AND FUNDING PROGRAMS AND A METHOD TO MAKE SUCH INFORMATION AVAILABLE TO WOULD-BE PROJECT DEVELOPERS IN A MANNER SIMILAR TO THE REQUIREMENTS OF 66 PA. C.S. § 2806.1(J) (RELATING TO EXISTING FUNDING SOURCES).