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Updates on Advanced Metering Infrastructure (AMI): Ohio Deployments

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Ohio AMI Deployment

- In Ohio, three of the four electric distribution utility companies are currently deploying smart grid technologies, including Advanced Metering Infrastructure (AMI) that can provide the functionality needed to offer dynamic pricing rates.

Distribution Company	Planned Smart Meters	Approved Project Cost
AEP Ohio	110,000	$54.5 million
Duke Energy Ohio	700,000+	$509 million
FirstEnergy	44,000	$66 million
Dayton Power & Light	NA	NA

Duke Energy Ohio's Smart Grid

- December 2008: The PUCO approved the purchase and full deployment of Duke's smart grid system, contingent upon a mid-deployment program summary. (08-0920-EL-SSO)
- 2011: Mid-deployment review conducted. (10-2326-GE-RDR)
- June 2012: Commission approved stipulation of mid-deployment review, including rider offsetting costs with benefits.

http://www.duke-energy.com/about-us/smart-grid.asp

Duke (2013 Time of Day Pilot)

- Target participation: 1,000-5,000 additional households (from 2012 pilot)
  - 2012 TOD Pilot Participation: 200 w/ approx. 34% customer attrition rate

- Customer will have a choice of three (3-hour) peak increments during summer and weekdays
  - Summer (June, July, August): 1-4 p.m., 3-6 p.m., or 4-7 p.m.
  - Winter (December, January, February): 7-10 a.m., 8-11 a.m., or 10 a.m.-1 p.m.

TD-2013 Price Summary		Summer	Winter	Spring/Fall
	Peak	$0.400	$0.400	N/A
	Off-Peak	$0.0502	$0.0502	$0.0502

- The ‘Off-Peak’ price offers a 25% discount, when compared to Rate RS from Duke’s Retail Energy Rider.

FirstEnergy's Smart Grid Modernization Initiative

Project Timeline

- June 2010: the PUCO approved "Phase 1" of FirstEnergy's Grid Modernization Initiative in Ohio. (Case Numbers: 09-1820-EL-ATA, 09-1821-EL-GRD, 09-1822-EL-EEC, 09-1823-EL-AAM)
- The project was intended to have multiple focuses, including a volt-var study, a distribution automation study, and a consumer behavior study separated into two different phases.
  - "Phase 1": 5,000 customers
  - "Phase 2": 39,000 additional customers

FirstEnergy Consumer Behavior Study

There were several hypotheses tested through the consumer behavior study, including:

- *Who would respond more?*
  - *Those customers who controlled the programmable thermostat themselves?*
  - *Those customers who had the Company control the thermostat?*
- *Who would respond more?*
  - *Those who have 4 hour critical peak event lengths?*
  - *Those who have 6 hour critical peak event lengths?*

- *The Peak Time Collateral Behavior Effects (i.e. conservation and snap-back)*
  - *Does the Peak Time rebate introduce incremental conservation behavior?*
  - *What is the degree of snap-back consumption after an event?*

- *Would there be a persistent response over called consecutive days of peak time events?*

FirstEnergy's Smart Grid Modernization Initiative

Project Timeline

- October 2012: in compliance with approval of the "Phase 1" deployment, FirstEnergy filed the results of the initial pilot phase in a Consumer Behavior Study report, available here: http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=eccc148e-dd82-4fcc-872f-c530fa63664f

- February 2013: PUCO Staff filed a report recommending the approval of "Phase 2" of the deployment, along with some additional specifications, to help determine if Smart Grid should be implemented on a larger scale for the Ohio based FirstEnergy companies. (*NOTE: This is still pending approval by the Commission*.)

AEP Ohio: gridSMART™ Demonstration Project

- March of 2009: the PUCO approved the first phase of AEP Ohio's gridSMART demonstration project, which had three primary components: advanced metering infrastructure (AMI), distribution automation (DA), and home area network (HAN). (08-917-EL-SSO/08-918-EL-SSO)
- Smart meter incentive programs:
  - SMART Shift℠
  - SMART Shift Plus℠
  - SMART Cooling℠
  - eView℠

http://www.gridsmartohio.com/

AEP: SMART Shift[SM]

Applicable Tariff: Schedule RS – TOD1 (Residential Time-of-Day Service)

Monthly Rate Energy Charge ($ per kWh)		
	Generation	**Distribution**
Customer Charge	--	$7.13
For all kWh used during the on-peak billing period	$0.0391135	$0.0568236
For all kWh used during the off-peak billing period	$0.0134186	$0.003805
For the purpose of this provision, the on-peak billing period is defined as 7 a.m. to 9 p.m. local time for all weekdays, Monday through Friday. The off-peak billing period is defined as 9 p.m. to 7 a.m. for all weekdays, all hours of the day on Saturdays and Sundays, and the legal holidays of New Year's Day, Presidents Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.		

AEP: SMART Shift Plus℠

Applicable Tariff: Schedule RS – TOD2 (Experimental Residential Time-of-Day Service)

Monthly Rate Energy Charge ($ per kWh)		
	Generation	**Distribution**
Customer Charge ($)	--	$4.52
Energy Charge ($ per kWh)		
Low Cost Hours	$0.0054393	$0.0258097
High Cost Hours	$0.2476022	$0.0258097

Billing Hours		
Months	**Low Cost Hours (P1)**	**High Cost Hours (P2)**
Approximate Percent (%) of Annual Hours	94%	6%
October 1 to May 31	All Hours	None
June 1 to September 30	Midnight to 1 PM, 7 PM to Midnight	1 PM to 7 PM
NOTE: All kWh consumed during weekends (all hours of the day on Saturdays and Sundays) and the legal holidays of Independence Day and Labor Day are billed at the low cost (P1) level.		

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AEP: SMART Cooling℠ and eView℠

1. The call for electricity is high and there is a need to reduce demand on the power grid.

- A wireless signal is sent from AEP Ohio to your Smart Meter.
- Your Smart Meter communicates with your programmable thermostat and the load control switch(es) connected to the home equipment you enrolled in the program.
- These occurrences are also referred to as "events."
- Events may take place up to 15 different times during the months of May through September between the hours of noon and 8 p.m.[2]

Important note: Customers with electric water heaters and hot tubs may have an additional 15 events occur during the months of October through April between the hours of 5 a.m. and 11 p.m.

2. Your thermostat is adjusted and your electric water heater, pool pump and/or hot tub are temporarily turned off.

- Your programmable thermostat is adjusted by no more than 4 degrees. At the same time, home equipment you have enrolled in the program, i.e. electric water heater, hot tub, and pool pump, are turned off.
- During an event, the thermostat will display a text message and a colored light. If electric water heater, pool pump and/or hot tub are enrolled in the program, the load control switch(es) will display a red light indicating an event is in progress.
- An event lasts no more than five hours.

3. Peak demand for electricity is reduced and the event ends.

- A wireless signal is sent from AEP Ohio to your Smart Meter.
- Your thermostat returns to its original programmed temperature setting and your electric water heater, pool pump and/or hot tub are automatically turned back on.

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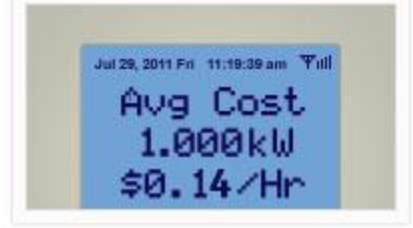

Images obtained from: https://aepohio.com/save/demoproject/

Relevant Rule Reviews:

- NOTE: Additional privacy protections for customer energy usage data and smart meter opt-out policies are currently being developed through the Commission's review of Chapter 4901:1-10 of the Ohio Administrative Code, regarding electric companies.

http://codes.ohio.gov/oac/4901%3A1-10

http://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=12-2050

Questions?