

# Balancing Integrated Energy Efficiency and Demand Response Portfolios

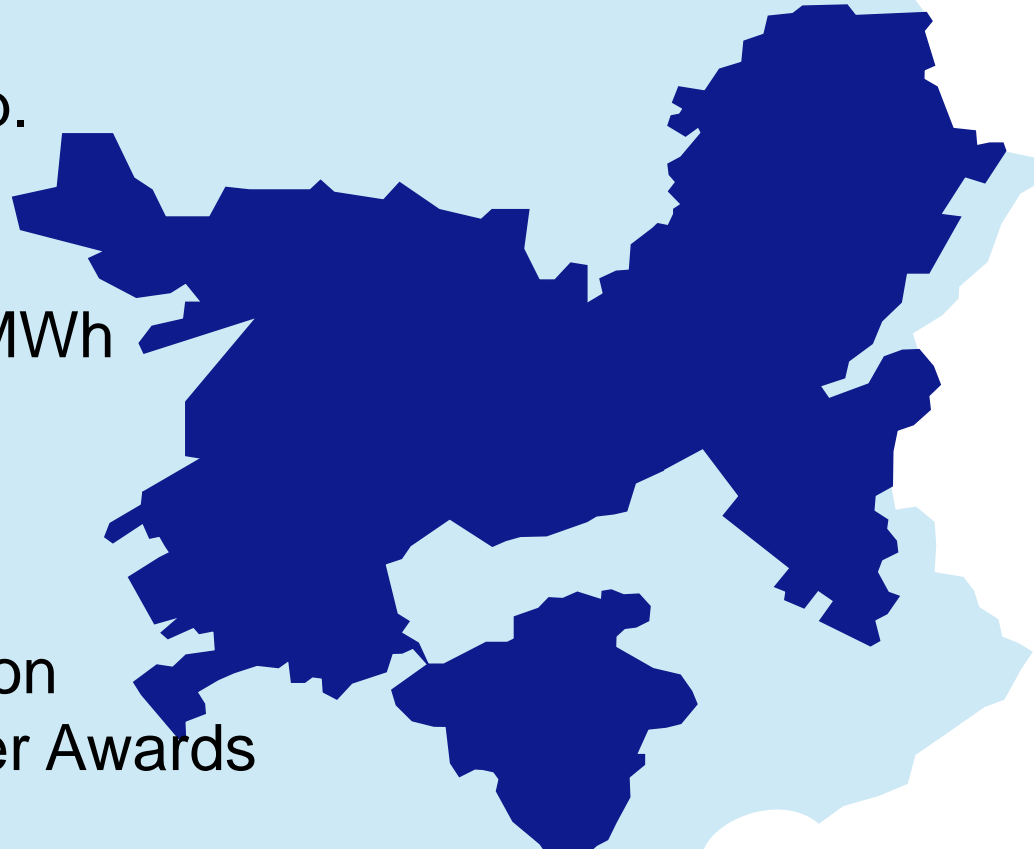
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# About PPL Electric Utilities

- Subsidiary of PPL Corp.
- 1.2 million customers
- Provider of last resort
- 2009 sales 36 million MWh
  - 39% Residential
  - 38% Commercial
  - 23% Industrial
- 2009 revenue \$3.2 billion
- Winner of 16 J.P. Power Awards



# About PA Act 129

- Act 129 became law November 2008
- Principal objectives:
  - Help customers manage their electric consumption
  - Reduce the need for new, more costly & resource-intensive infrastructure
- Requires major Electric Distribution Companies (EDCs) in Pennsylvania to develop and implement an Energy Efficiency & Conservation Plan (EE&C Plan) to reduce energy consumption and peak load within their service territories.

# PPL Electric's Timeline and Targets

## PPL's Plan Timeline



## PPL's Target Timeline



\* Average for the top 100 load hours during summer

# Additional Requirements

## EE&C Plan must:

- Be cost-effective per the Total Resource Cost Test at the program level
- Provide energy efficiency and demand response programs for all customer classes
- Obtain 10% of the reductions from institutional customers (government, schools, universities, & non-profits)
- Provide dedicated low-income programs for customers

# Additional Requirements, cont'd

## EE&C Plan will:

- Allocate program costs to the customer class that incurs the benefit
- Be capped at \$246 million through May 2013
  - Average of \$61.5 million per year (2% of PPL EU's 2006 revenue)
- Recover Plan costs from customer through a line-item charge
  - Pass-through with no rate of return

## The PUC will:

- Impose penalties from \$1 million to \$20 million for not meeting targets

# Other Criteria

- All programs are voluntary for customers
- Many programs have retroactive eligibility to July 1, 2009
- All programs except Time of Use Rates are available to customers who shop for electricity or take default supply from PPL Electric Utilities
- Time of Use Rates are for default supply customers only

# Developing The EE&C Plan

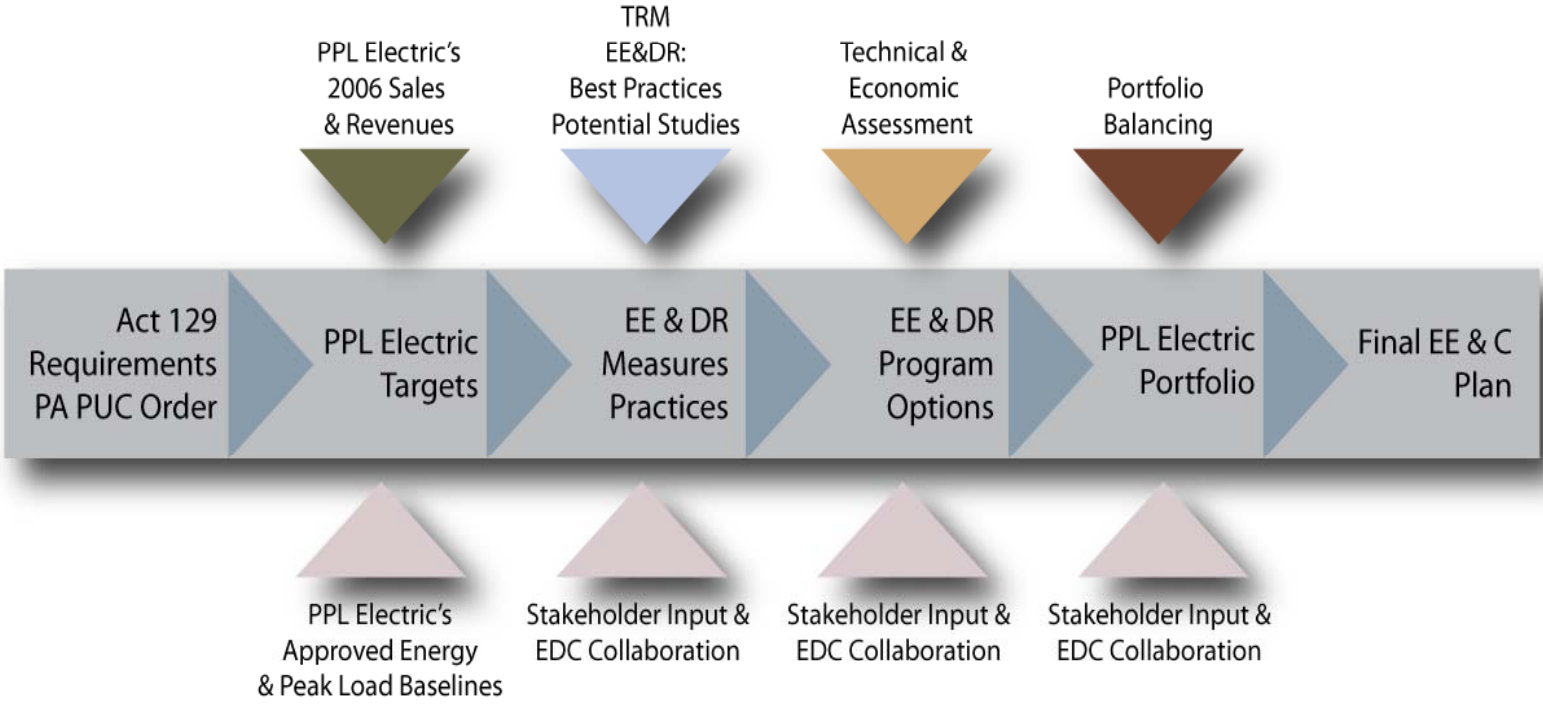
- PPL Electric began preparing its plan in early 2009
- The Cadmus Group was retained to develop the portfolio model and help with the plan



# Primary Initial Challenges

- Limited time to develop and file plan (4 months)
- Many “detailed rules” were undefined or incomplete
  - Technical Reference Manual (how to determine energy & peak load reductions for common measures)
  - How to determine savings from custom measures
  - Cost effectiveness rules
  - Role of statewide evaluator (audit plan/EM&V requirements)
- Balancing multiple, often conflicting objectives of the Act
- Stakeholder input and balancing conflicting objectives
- Limited time to develop and implement program infrastructure
  - Tracking systems, rebate processing, programs, implementation contractors, marketing/advertising
  - Plan approved February 2010. First compliance target is May 2011.

# Plan Development Process



# Plan Development Methodology

Essentially a bottom-up approach:

- Compile exhaustive list of measures and practices
- Determine measure savings (kWh and kW), life-cycle costs, benefits and cost effectiveness
- Integrate measures to create program bundles
- Determine appropriate incentive levels and rebate amounts
- Project annual participation and ramp rates for each program
- Iteratively adjust these assumptions to balance program results
  - Energy targets versus peak load reduction targets, “equitable” distribution of programs and costs among customer classes, and to ensure we are within the cost cap
- Factor in uncertainty
- Repeat the process, Repeat the process, Repeat the process

The analysis required a complex portfolio balancing model

# Balancing Competing Objectives



# Other Important Considerations

- Consultation and collaboration:
  - Other EDCs (consistent programs and rebates where sensible)
  - Stakeholders
- Engaging trade allies, community-based organizations
- Ensuring ongoing dissemination of information and customer education
- Ensuring programs are easy for the customers to understand, accept, enroll, and participate

# The Portfolio

| Program                                       | Load Impacts     |            |
|---|------------------|------------|
|   | MWh              | Peak MW    |
| Appliance Recycling                           | 114,761          | 9          |
| C&I Custom Incentives                         | 140,459          | 15         |
| CFL   | 292,137          | 31         |
| Efficient Equipment Incentive                 | 715,875          | 75         |
| Energy Assessment & Weatherization            | 5,961            |            |
| Energy Efficiency Behavior & Education        | 18,100           | 2          |
| ENERGY STAR® New Homes                        | 5,211            |            |
| ePower Wise                                   | 1,080            |            |
| HVAC Tune-up                                  | 22,176           | 7          |
| Low-Income WRAP (weatherization & appliances) | 18,695           | 2          |
| Renewable Energy                              | 18,490           | 1          |
| Time of Use Rates                             |                  | 10         |
| Direct Load Control (DLC)                     |                  | 32         |
| Load Curtailment                              | 9,750            | 150        |
| <b>Total</b>                                  | <b>1,362,695</b> | <b>332</b> |

# MWhs Versus MWs

- Balancing the portfolio to meet both energy saving and peak load reduction within budget proved to be particularly challenging
- MW targets may be achieved through peak-coincident EE measures or DR
  - EE measures with peak coincident savings are expensive
  - Programs with large saving potential have small peak impacts
  - Peak load reduction from EE installed after Summer 2012 do not count toward MW targets
  - Most DR options tend to be non cost-effective
  - One-year DR contracts are costly
- Peak load reductions are calculated as the average of the 100 hours of highest load in the summer of 2012
  - Actual hours and the actual, peak load reductions are not known until end of summer. Too late to correct shortages.
  - The peak load reductions are not weather normalized
  - Unusually hot or cool temperatures create a lot of uncertainty
- MW impacts are currently split 50/50 between EE and DR
- M&V challenges, especially determining the “baseline” for participants in the Load Curtailment Program.

# Progress To Date

- Most programs fully deployed
- Demand response programs (Load Curtailment and DLC) going through final contract negotiations
- Remaining EM&V issues being worked out with statewide evaluation contractor (SWE)
- Energy reductions are on target
- On budget
- Peak load reductions are still confusing and somewhat uncertain



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