

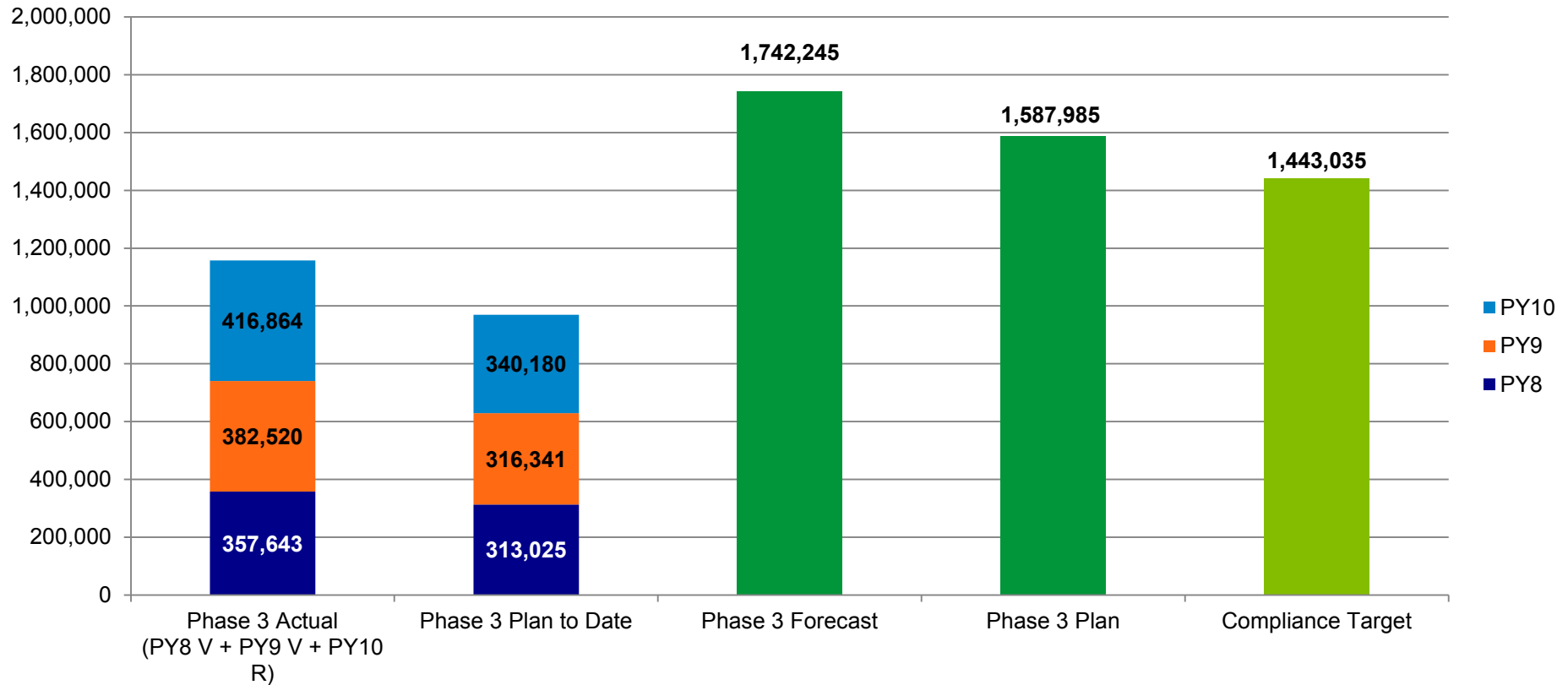
PPL Energy Efficiency Update PPL Stakeholder Meeting July 18, 2019

Agenda

- **Overview:** Dirk Chiles
- **Residential Update:** Mary Ann Kelly-Merenda
- **Low Income Update:** Sean Pressmann
- **Non-Residential Update:** Heather Bash
- **Demand Response Update:** Sean Pressmann
- **Question and Comment Period:** All
- **Closing:** Dirk Chiles

Overview: Portfolio Savings

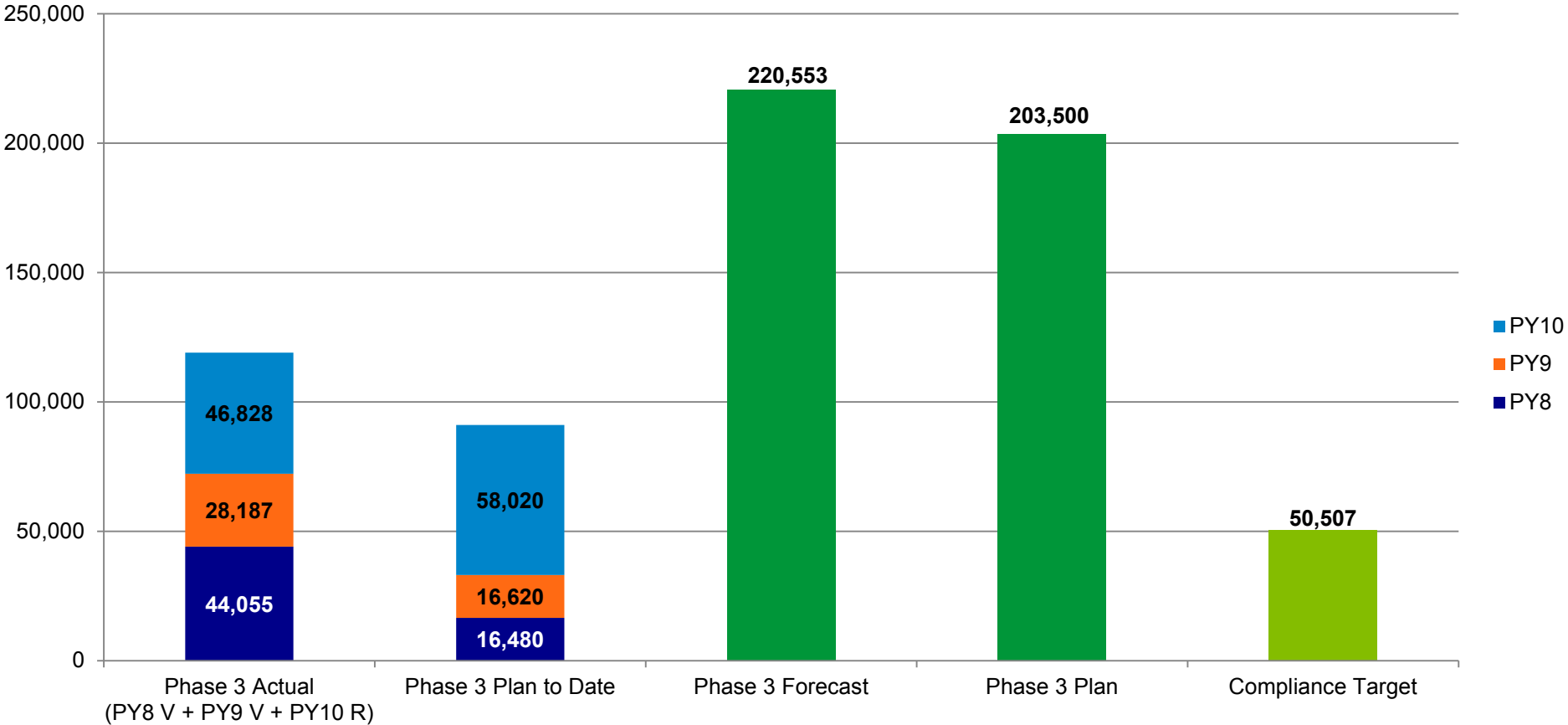
Portfolio Savings (MWh/yr)



Overview: GNE Savings

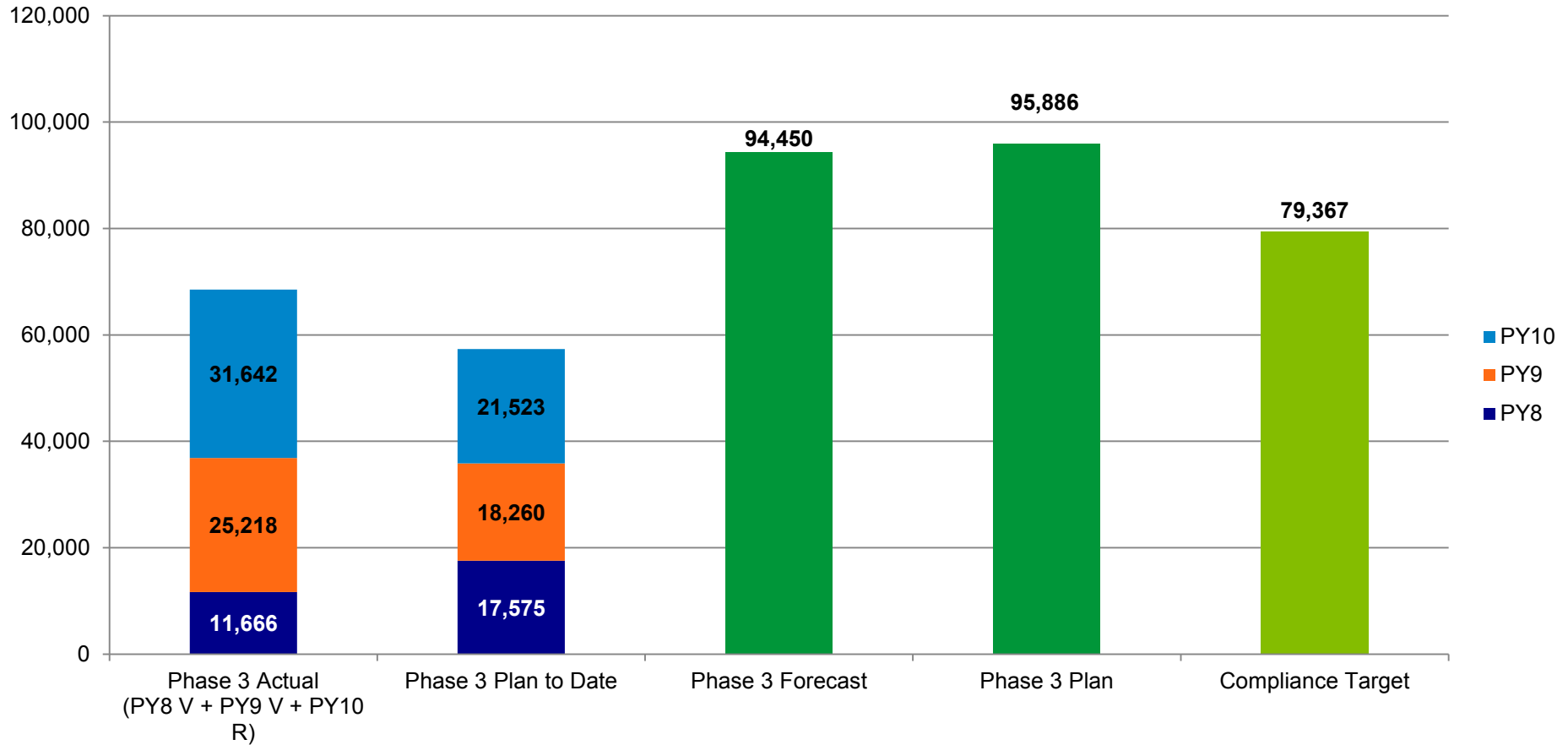


GNE Savings (MWh/yr)



Overview: Low Income Savings

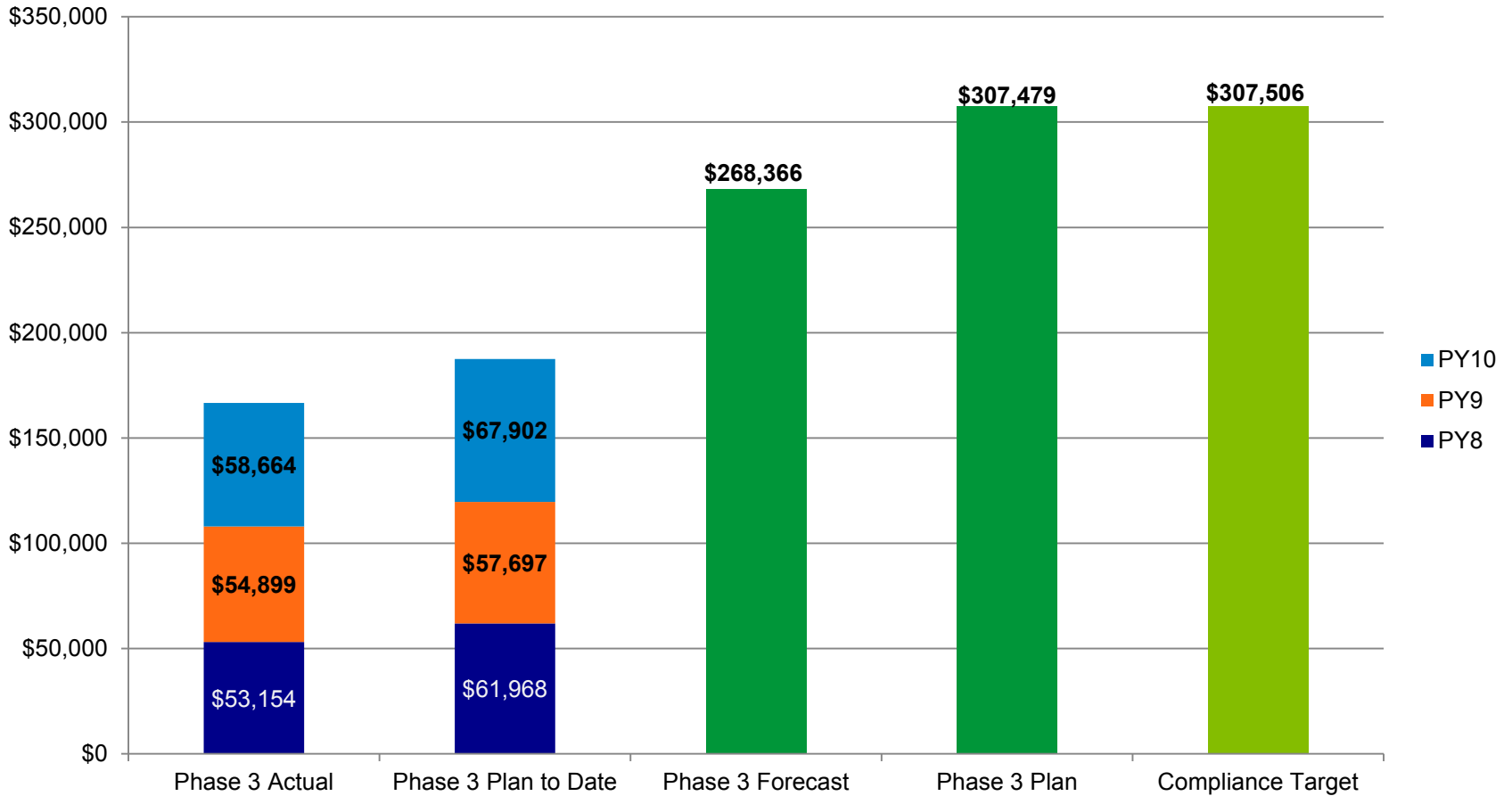
Low Income Savings (MWh/yr)



Overview: Portfolio Costs

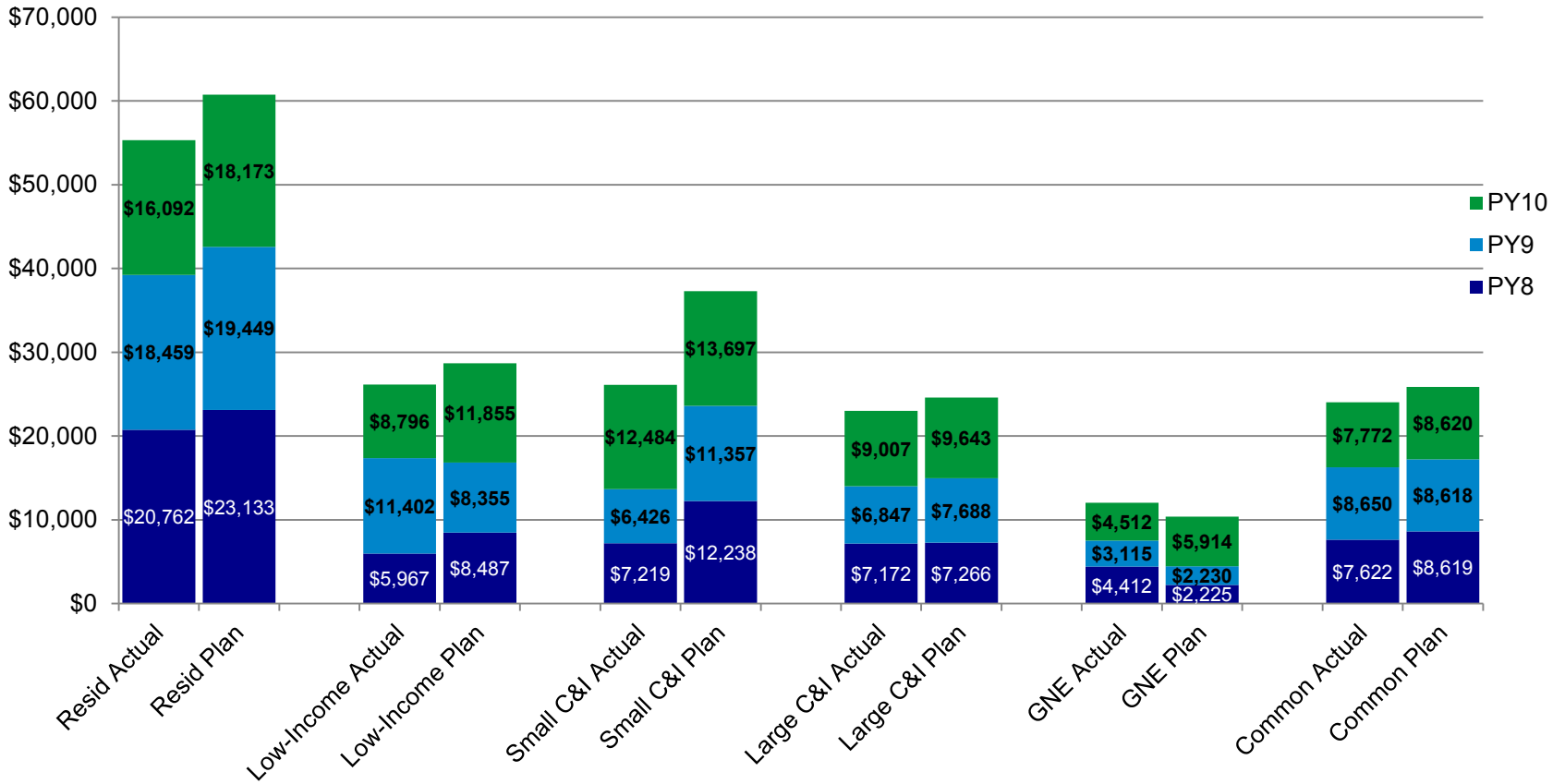


Portfolio Costs (\$1,000)



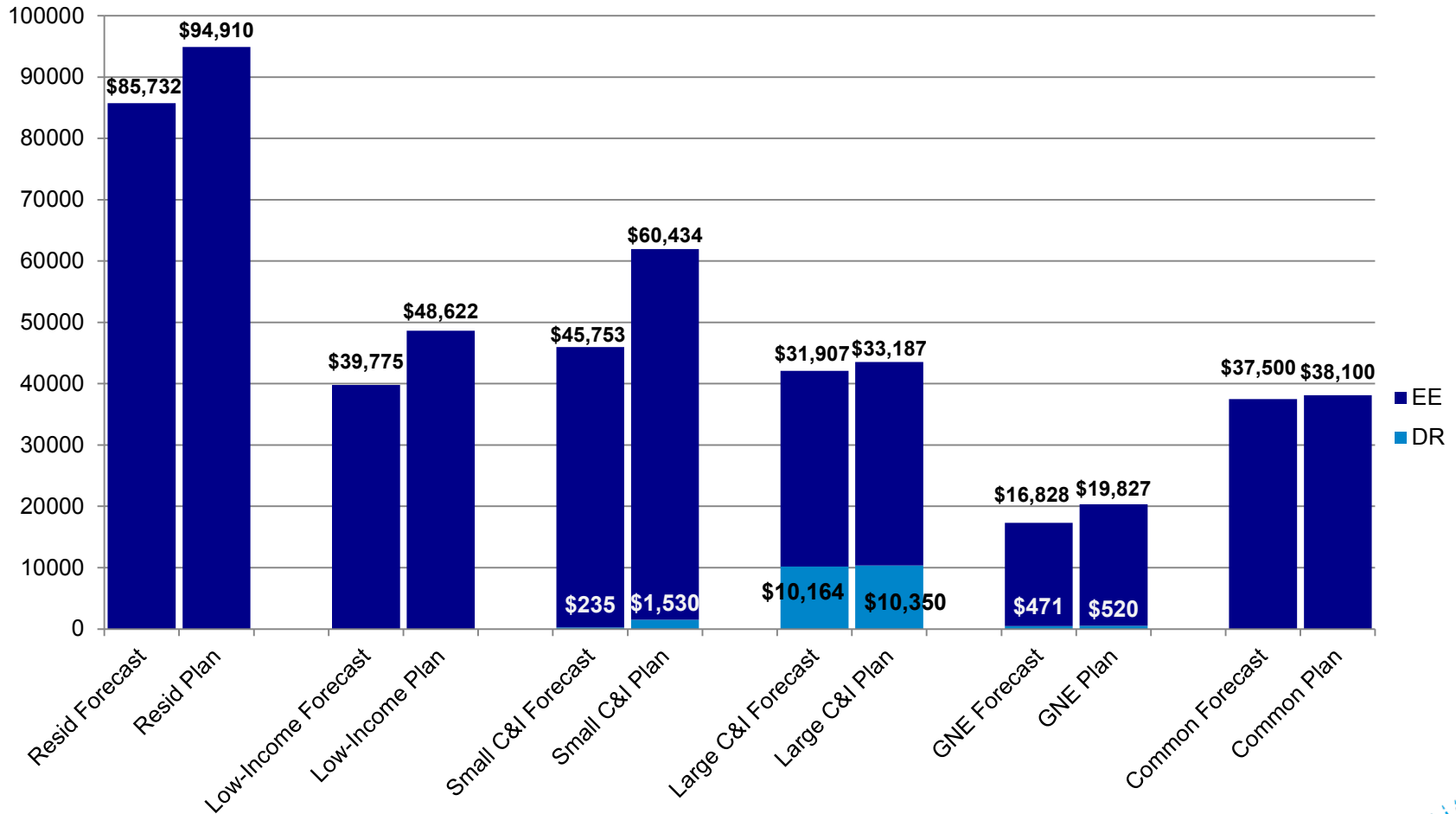
Overview: Phase To Date Costs

Phase-to-Date Customer Sector Costs (\$1,000)



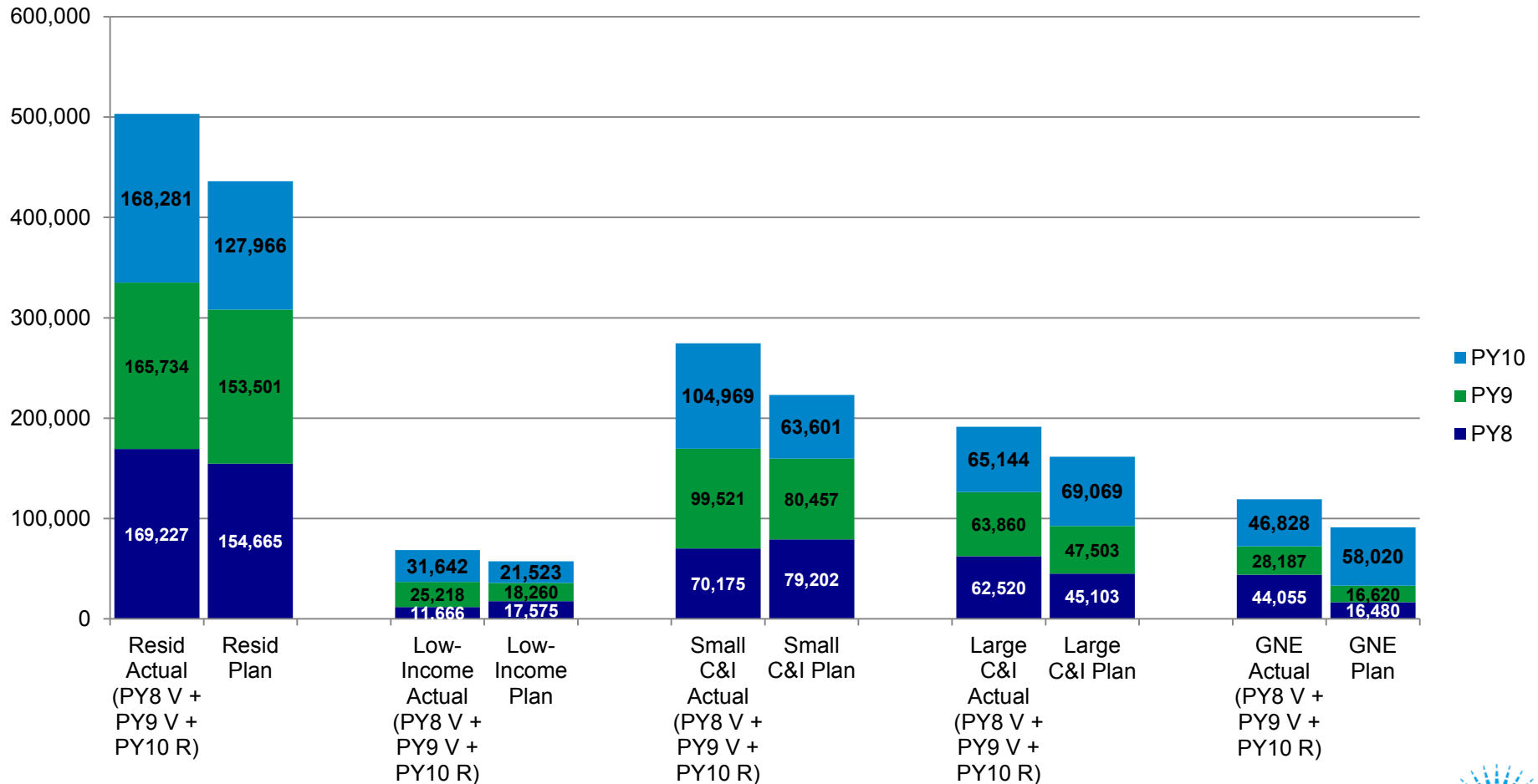
Overview: Phase 3 Sector Costs

Phase 3 Customer Sector Costs (\$1,000)



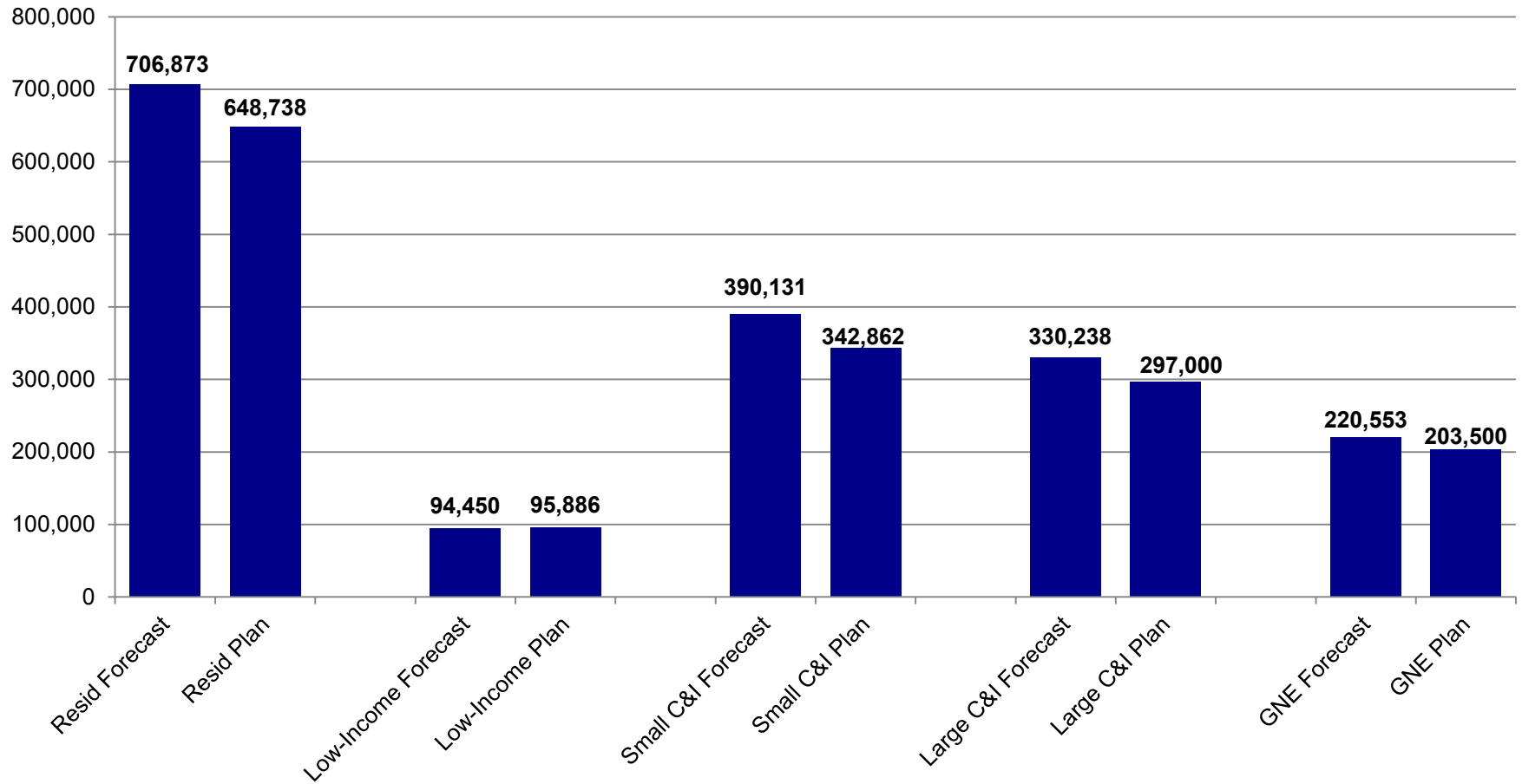
Overview: Phase to Date Sector Savings

Phase-to-Date Customer Sector Savings (MWh/yr)

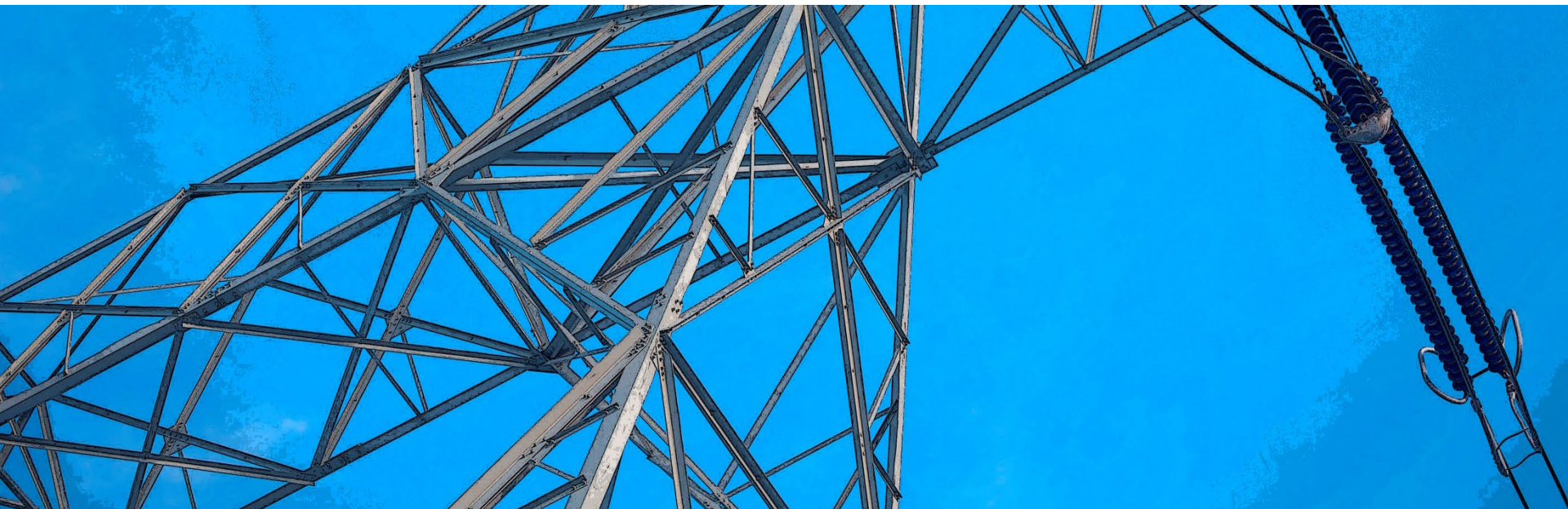


Overview: Phase 3 Sector Savings

Phase 3 Customer Sector Savings (MWh/yr)



Residential Programs



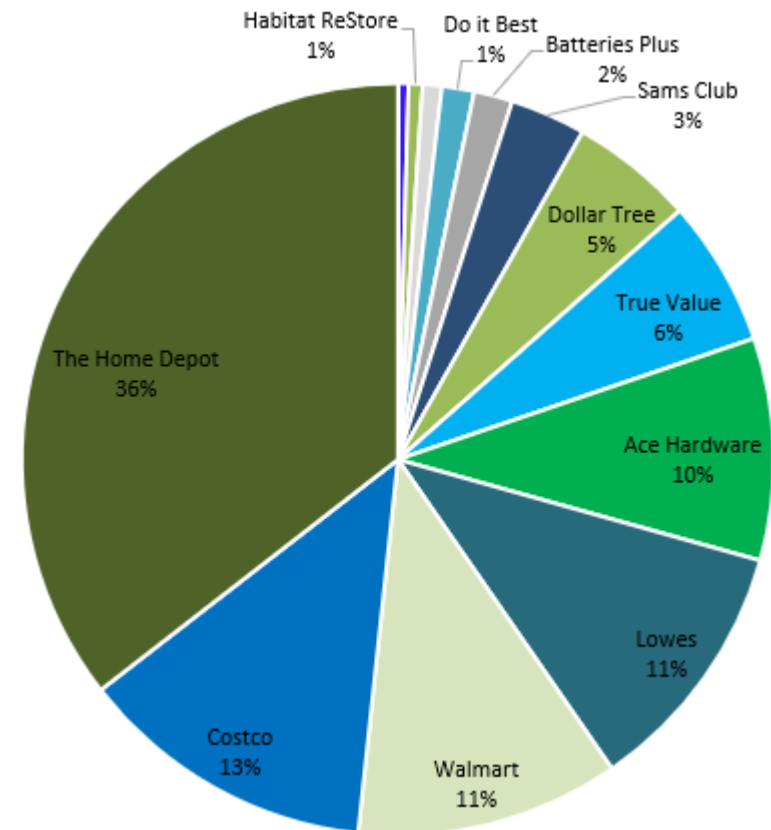
Residential Program: EE Lighting

- Over 2.5 Million LEDs in PY10
- Over 9 Million Phase-to-Date
- PY 10 Reported Savings 110,000 MWh/yr.
- Reported Savings Phase-to-Date 389,000 MWh/yr.
- Very little change in the Diverse Mix of Bulbs

Residential Program: EE Lighting

Retailer	Label	Units
The Home Depot	Big Box	917,458
Costco	Big Box	331,030
Walmart	Big Box	292,690
Lowes	Big Box	285,233
Sams Club	Big Box	84,058
Ace Hardware	Independent	246,825
True Value	Independent	162,747
Dollar Tree	Independent	137,343
Batteries Plus	Independent	42,877
Do it Best	Independent	35,814
Goodwill	Independent	21,260
Habitat ReStore	Independent	15,463
Giveaway bulbs	Independent	11,280
Grocery Outlet	Independent	384
Total		2,584,462

PY10 LEDs by Retailer



Residential Pilot: Connected Lighting

- Launched February 2018
- Evaluated the adoption, use and energy savings potential of home automation and smart lighting technologies
- Established Goal - 300 Participants who purchased
- Offered customers a discounted price of \$95 for the purchase of a connected lighting bundle that included
 - A wink hub
 - Three A-19 standard light bulbs
 - Two BR-30 reflector light bulbs. Participation was limited to the first 300 customers who purchase a kit.
- Customers received a \$50 incentive at the end - kept the product installed for the six months and answered three short surveys.

Residential Pilot: Connected Lighting (con't)

- Throughout the pilot period, PPL collected information about customers' interactions with the devices and usability from participating customers, helping us to understand the impact these technologies may have on managing energy usage.
- Participants' primary intentions - increase security and to have convenience controlling lighting remotely
- Non-energy benefits are attractive, but most are still interested in using new technology to reduce energy usage
- 45% said they would not have purchased a connected home device without the discount from PPL Electric Utilities, suggesting this could be a cost prohibitive technology for customers

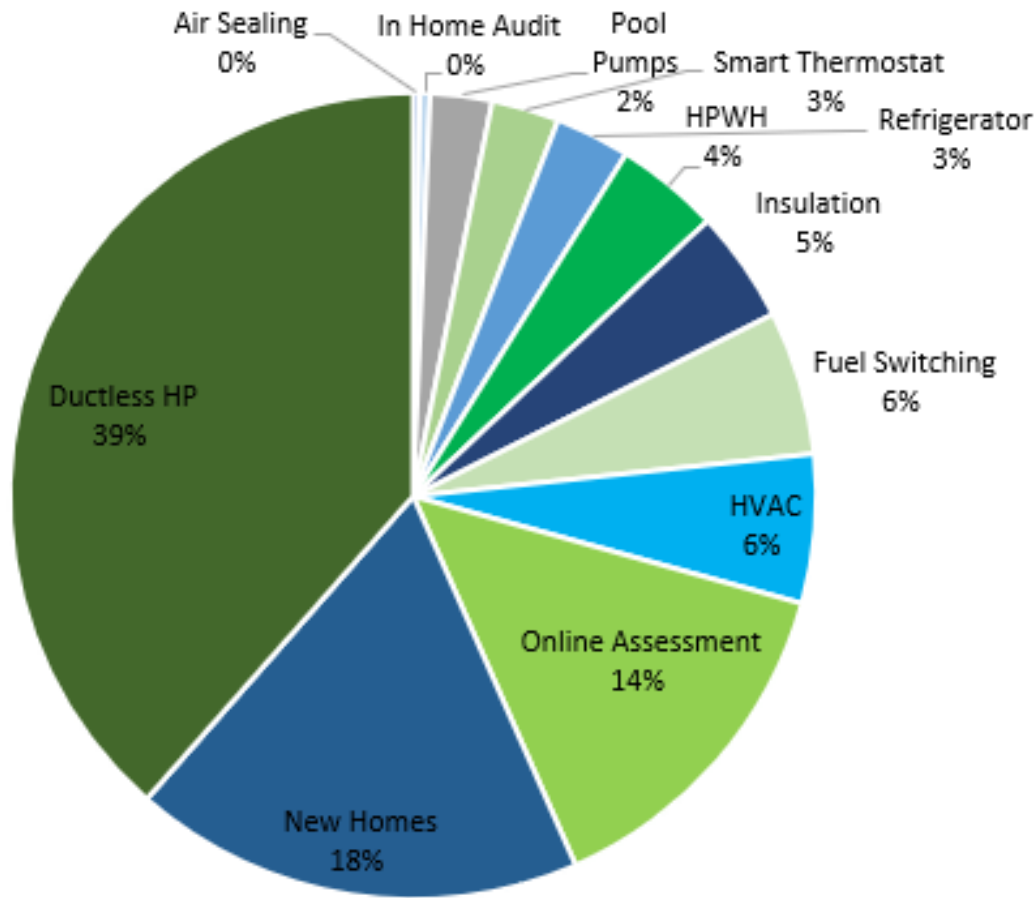
Residential Pilot: Connected Lighting (con't)

- Average number of interactions were relatively consistent over the course of the study period, suggesting participants continued to use the connected bulbs
- Mid and post-pilot surveys showed 94% of kits were still installed
- Survey results indicated that participants were interested in home energy management systems, a technology more directly related to control energy usage
- Based on this data while quantifiable energy savings weren't demonstrated via this pilot, our conclusion is this has energy savings potential if user interaction and use habits are accounted for in administering connected lighting as a measure

Residential Program: New Homes

- **Significant Interest by New Home Builders**
 - 1,002 Homes in PY10
 - Over 3,600 MWh in savings
 - Over \$1 million in incentives
 - 20% growth in incentivized homes over PY9
- **Efficient New Home Construction**
 - Strong Relationships with Builders and Raters
 - Achieved the Following Key Successes:
 - Providing incentives for more than 2,000 homes verified as 15% more Efficient than IECC or ENERGY STAR® Certified in Phase III to date
 - Driving Incentives Up To \$2,500 Per Home For Participating Builders
 - Achieving An Average Savings of More Than 3,000 kWh/yr per Home Annually

Residential Program: Energy Efficiency Homes



**Units rebated in PY10*

- Verified Savings PY9: 18,802 MWh/yr.
- Reported Savings PY10: 20,433 MWh/yr.
- Reporting Savings Phase-to-Date: 52,760 MWh



Residential Program: Energy Efficient Homes (con't)

PY10

- Refrigerators and Ductless HP most popular measures rebated
- Ductless HP: 4,926 units or over 1,800 projects
- Online Assessment/In Home Audit – 7,852 kits
- ASHP/CAC: 2,483 units
- New ASHP Tune-up measure had uptake of 23 rebates

Measure Category	Total kWh/Year
Efficient Equipment	12,793,864
New Homes	3,695,713
Online Assessment	2,883,486
Weatherization	977,012
In Home Audit	83,509
Total	20,433,584

Residential Program: Baseboard Smart Thermostat

- Launched March 2017
- Emailed over 149,000 target customers
- Targeted Trade Allies (HVAC/Electrical Contractors)
- Goal was 20 Participants
- 35 Customers participated
 - 7 customers did not have enough sample data points
 - 6 saved 10,894 kWh – average savings 1,815/yr.
 - 22 used more - 46,474 kWh – average increase 2,112/yr.

Residential Program: New PY10 Pilots

- An Instant Rebate Pilot for heat pump water heaters was launched in November at Lowes locations and online
 - Customers validated their account information through a mobile-friendly website portal which generated a unique coupon code that reduced the purchase price of a qualified energy-saving product instantly at checkout
 - The pilot aimed to demonstrate a cost-effective program design that eliminates additional steps traditionally required for rebate applications
 - Pilot ended on May 31. There were 88 Reservations with only 16 redemptions.
 - We are offering this in PY11, at The Home Depot, for HPWH with the addition of dehumidifiers.

Residential Program: New PY10 Pilots

- Instant Rebate Pilot for LED lighting was launched in February through Lowes
 - Customers validated their account information through a mobile-friendly website portal which generated a unique coupon code for a two pack of LED bulbs.
 - The pilot aimed to demonstrate a cost-effective program design that eliminates additional steps traditionally required for rebate applications.
 - Although this pilot was for a free pack of LEDs, there were 1,957 reservations with only 226 redemptions.
 - We were able to gain additional emails to help us to reach customers regarding about our energy efficiency programs.

Residential Program: New PY10 Pilots

The screenshot shows the PPL Electric Utilities website homepage. At the top, there is a navigation bar with the PPL logo and links for HOME, PRODUCTS, MY ACCOUNT, CART, and a search icon. The main banner is for an "INDEPENDENCE DAY SALE" with American flags on either side. It features two smart thermostat offers: one for the Nest Learning Thermostat with an additional \$60 off and a free Google Home Mini, and another for the Nest E Thermostat with an additional \$15 off and a free Google Home Mini. Below the banner are three promotional tiles: "FREE SHIPPING ON ORDERS OVER \$35" with a cardboard box icon, "Weatherization Products" with a window view image, and "LED Lighting" with a living room image. The "FEATURED PRODUCTS" section displays three items: a Honeywell Lyric T5 Thermostat (rebate price \$99.00), a Nest Thermostat + Google Home Mini (rebate price \$139.00), and a Philips Hue 9W White A19 Starter Kit (rebate price \$61.99). Each product has an "ADD TO CART" button. A disclaimer at the bottom explains the rebate program and provides a link to pplelectricsavings.com. The footer contains the PPL logo, contact information, and a note that the store is available to PPL residential customers.

Residential Program: New PY10 Pilots

- An Online Marketplace Pilot was launched on December 4
 - Web browser-based storefront that allows customers to order energy efficient products online
 - Incentives are applied directly to the energy efficiency products, and customers can see the pre-incentive price as well as the net customer price
 - Provides Customers
 - Instant Discounts at checkout
 - Free Shipping on orders over \$35
 - Ease of access – laptop, tablet, phone
 - 24 x 7 access
 - Special promotions for additional dollars off specific products

Residential Program: New PY11 Pilots

- **Unitary Controllers**
 - Targets Ductless Heat Pumps rebated in PH3
 - Approximately up to 500 controllers
 - Goal:
 - Determine the energy savings, customer engagement, and feasibility to include in future residential EE programs
 - Similar to a smart thermostat with the ability to program or schedule heating & cooling equipment
 - We are evaluating a variety of controllers to include in this pilot

Residential Program: New PY11 Pilots

- **Residential Midstream HVAC**
 - Targets distributor supply chain
 - Goal:
 - Analyze the savings potential
 - Access portions of the market not historically participating
 - Establish a distributor network
 - Instead of targeting individual customers, targets a smaller number of distributors that serve the broader market
 - Easier access to the entire market at a lower cost
 - A distributor facing portal making participation streamlined for stakeholders

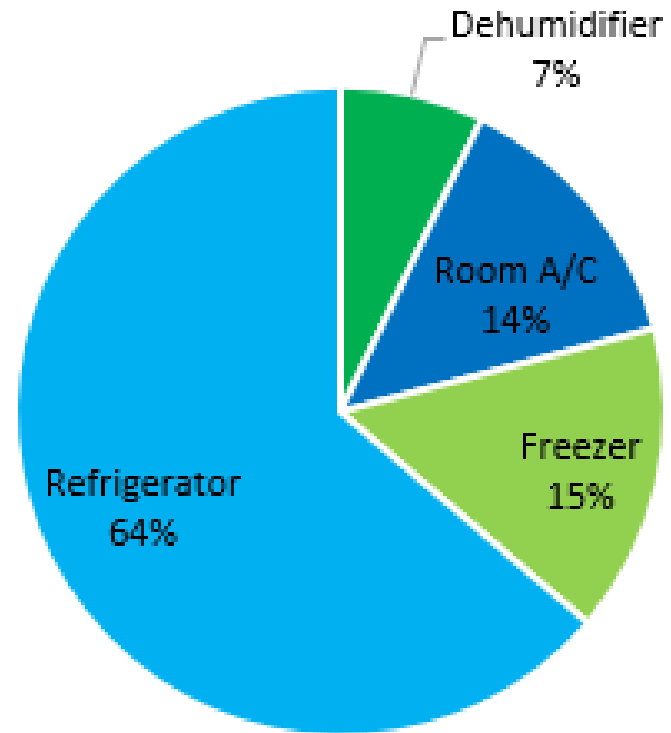
Residential Program: Appliance Recycling

Units Collected in PY10

- 9,060 Refrigerators
- 2,185 Freezers
- 1,949 Room Air Conditioners
- 1,016 Dehumidifiers

Units Collected Phase-to-date

- 25,808 Refrigerators
- 6,437 Freezers
- 4,503 Room Air Conditioners
- 1,682 Dehumidifiers



**Units collected in PY10*

Residential Event: Recycling Roundup

- **Held Two Small Appliance Community Recycling Events**
 - Home Depot – Fruitville Pike, Lancaster
 - Home Depot – Dickson City
- **Collected used Room Air Conditioners and Dehumidifiers**

Lancaster

- 240 participants
- 330 Room ACs
- 110 Dehumidifiers
- Over 147,000 kWh/yr.

Dickson City

- 516 participants
- 632 Room ACs
- 424 Dehumidifiers
- Over 380,000 kWh/yr.

Residential Event: Recycling Roundup (con't)

DICKSON CITY EVENT – May 2019



Residential Program: Student Energy Education

- **Fully Subscribed in PY10**
- 24,000 Students
 - Bright Kids (2nd – 3rd Grade)
 - Take Action (5th – 7th Grade)
 - Innovation (9th – 12th Grade)
- Over 23,000 kits distributed
- In PY10, the New Augmented Reality App was used in all Take Action presentations
- Tier II power strips were in half of the Innovation classes (approximately 2,500 kits)

Residential Program: Student Energy Education (con't)

In PY10, we brought back the popular Bright Ideas Energy Efficiency Student Poster Contest. The contest was organized into three grade clusters: K-2, 3-5, and 6-8. Within each grade cluster, one student grand prize winner was awarded and three finalists were recognized.

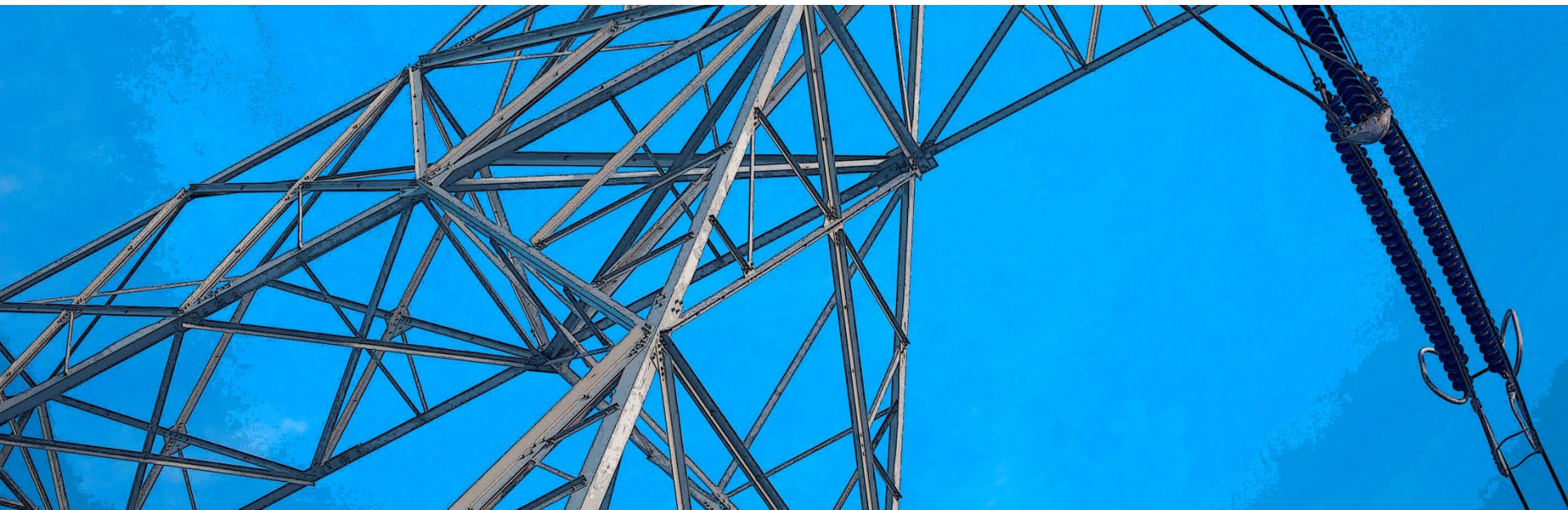
Bright Kids
Poster Contest
Winner and
Honorable Mentions



Residential Program: Home Energy Education

- Savings Were on Target for PY10
- In September & November A/B studies were conducted by using nuanced language differences on the similar home comparison chart.
 - Pilot results showed a positive impact on customer satisfaction: High-use households preferred the new messaging and rated it as *less negative*
- Tested the 'Fresh start' messaging technique in the Edison Birthday Challenge (Feb. 12)
 - 'Take the Challenge' click rates improved by 27% overall as well as for families with children (69%), renters (103%)
- Additional A/B testing done in April and May with results expected late summer

Low Income Programs



Low Income Program: Low Income WRAP

- **Goal:** 7,000 WRAP Jobs Per Year
- **Achieved:** Almost 13,000 Jobs Completed in PY 10
- **Creating More Leads, Increased Marketing, Education**
 - Quick Track Programs (11% take rate)
 - On-Track Auto-Enroll
 - Ran direct mail, email and SM campaigns
 - Tie in other income eligible programs
 - Running customer segmentation outreach
 - High CSAT (91%)
 - Budget Is On Track



Low Income Program: Multifamily Status

- **Significant Increase in MF Penetration Compared to Phase II**
- **Increased Participation:**
 - 10,399 Units Completed Phase-to-Date
 - More than 600 units pending
 - Outreach initiated to more than 500 units
 - Phase II: 1,400 Completed in 3 Years
- **Single Point of Contact for Multi-Family Customers**
- **Master Meter Multi-Family Housing**
 - Jobs - 4320 Units Completed Phase-to-Date
 - Total Buildings - 517 at 75 Complexes
 - Most Have Been in GNE, But Not All (approx. 75/25 split of GNE vs. CI)

Low Income Program: Multifamily Update

- **The Good**
 - Collaboration and Leads Generated from Multi-Family Meetings, Presentations and Webinars
 - Multiple Outreach Points
 - Educating Landlords Has Increased Consent and Participation
 - Reduced Customer “No-Shows”
- **The Challenges**
 - Multi-Family is Slowing
 - Struggles with Finding MMMF-SCI customers

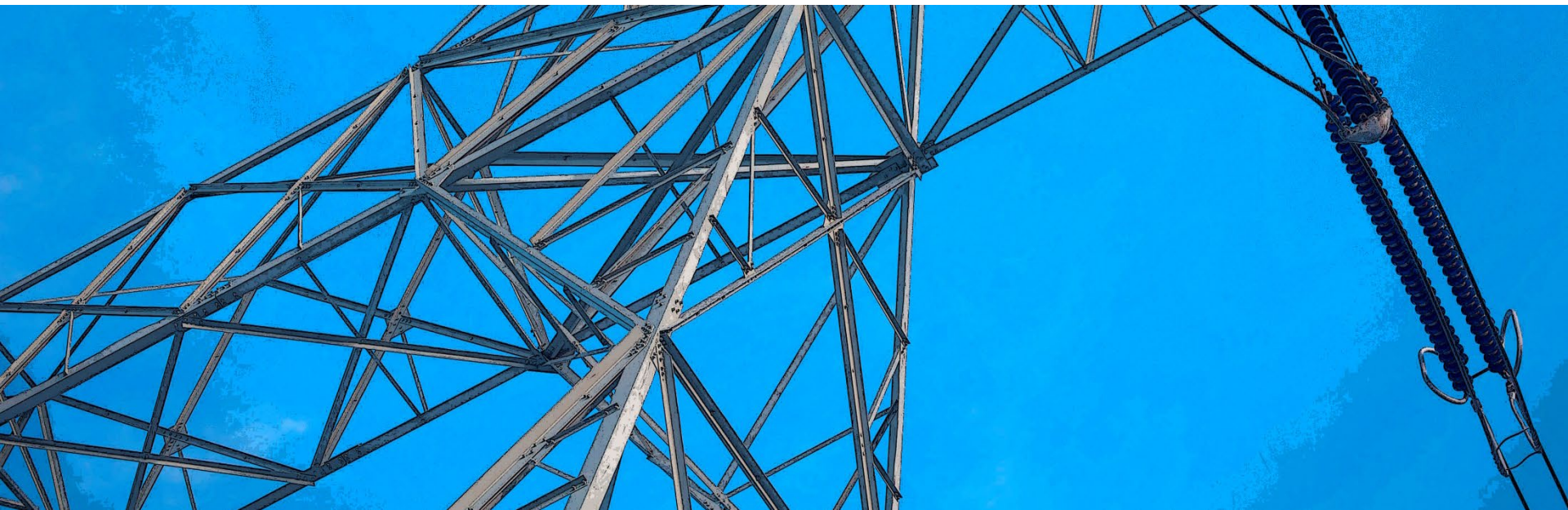
Low Income Program: Update

- **Coordination of LIURP and Act 129**
 - Help Get the Customer Served Faster
- **Act 129/LIURP Coordinated Multi-Family Job**
 - Working on Coordinating a Complex in Northumberland County to Understand the Complexities of Such a Job
 - Other Possibilities in Northeastern PA
- **Coordinated Job Between Electric/Gas companies**
 - Has Proven Difficult Thus Far

Low Income Program: Low Income Kits & Education

- **Goal:** 8,000 Kits
- **Achieved:** Almost 14,000 Kits in PY10
 - Will Phase Out in PY12 if no sooner
- **Updated kits with lower cost to acquire measures in PY10**
 - Switched out smart strips for shower aerators
- **Very High CSAT (98%)**
- **Budget Is On Track**

Non-Residential Programs

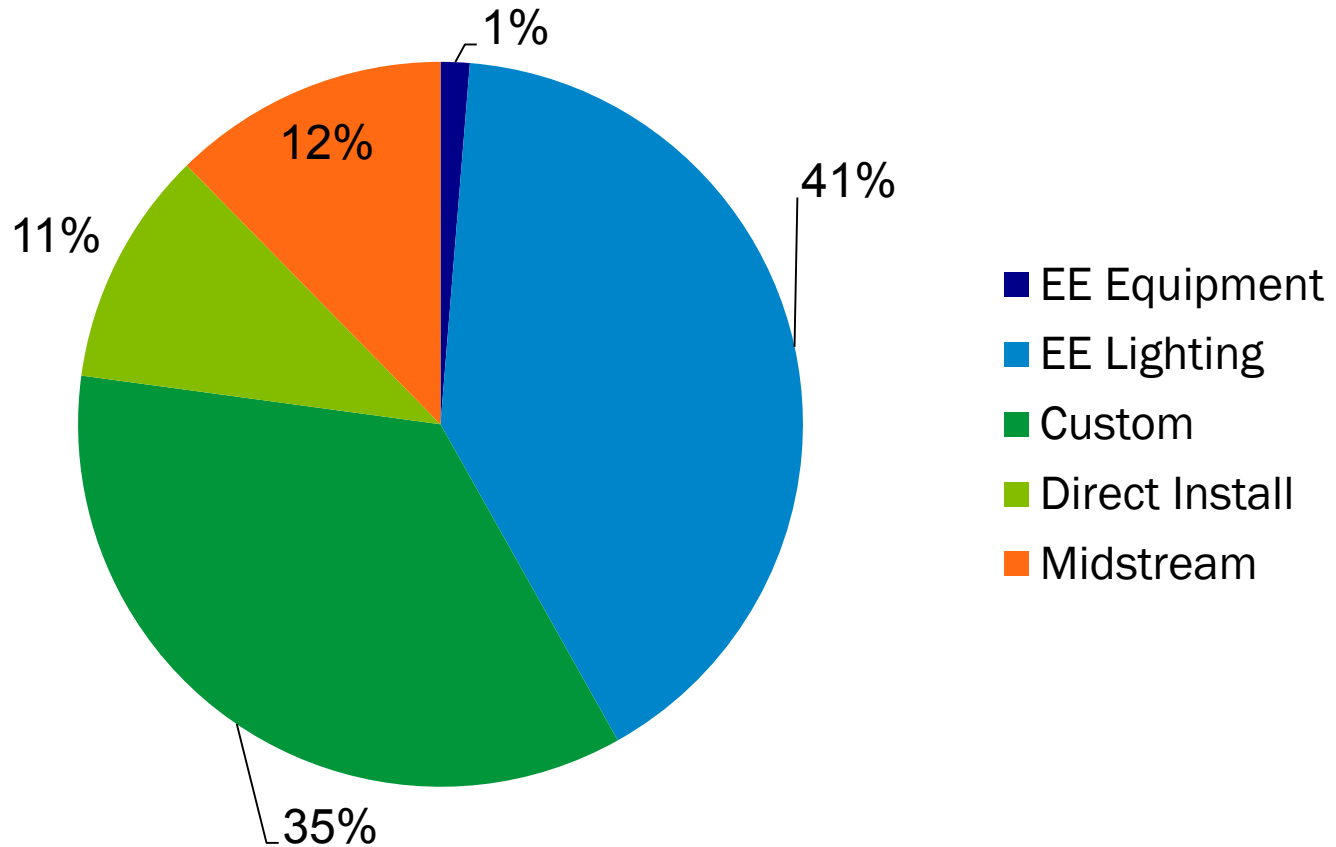


Non-Residential Program: Overview

- **Program Achievements:**
 - **190,754 MWh/yr.** reported energy savings PY10
 - **GNE sector 45,360 MWh/yr.** reported energy savings PY10
 - **\$12,736,400** incentives paid
 - **8,758 PY10 Projects**
 - **7,633 Midstream Projects**

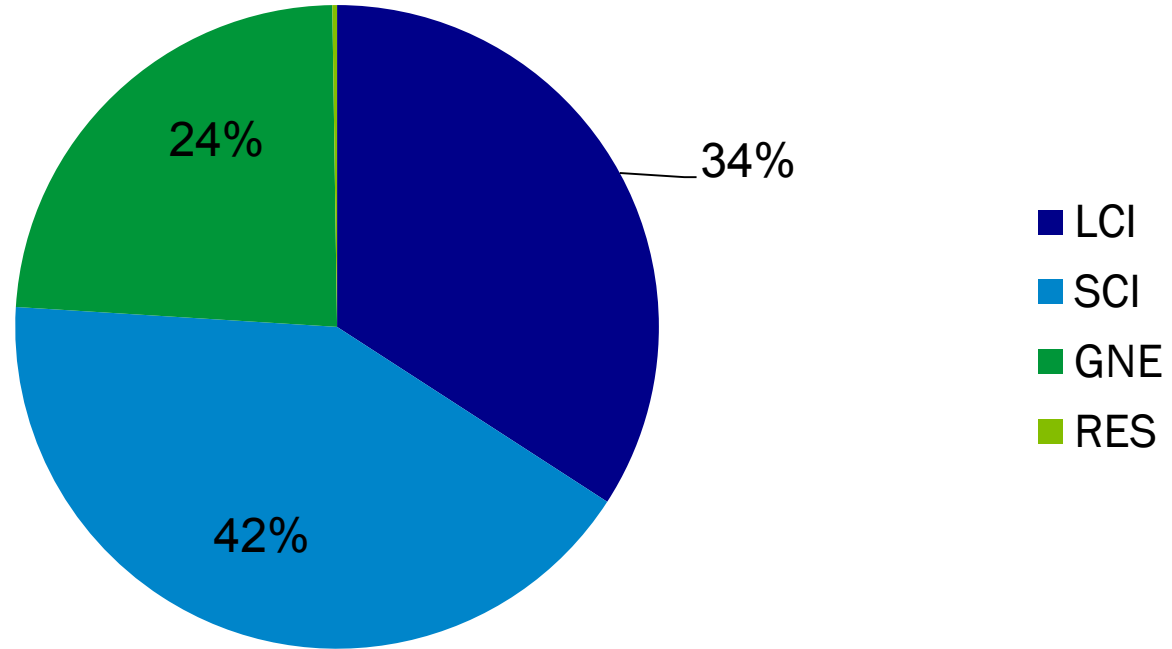
Non-Residential Programs: Overview

Energy Savings by Application for PY10



Non-Residential Programs: Overview

Energy Savings by Sector for PY10



Non-Residential: Efficient Equipment



Program Year 10 Reported Savings for Efficient Equipment:

- Lighting (includes both prescriptive and direct install)
 - 960 Projects
 - 96,138 MWh/yr.
- Equipment (includes both prescriptive and direct install)
 - 72 Projects
 - 3,772 MWh/yr.

Program Year 10 Incentives
\$7,302,945

Verified Savings (PY8-PY9):

- 186,911 MWh

Non-Residential: Direct Install



Program Year 10 Reported Savings for Direct Install:

- 20,054 MWh/yr. reported savings
- Roughly 21% of efficient equipment savings
 - Lighting reported savings 18,749 MWh/yr.
 - Refrigeration reported savings 1,305 MWh/yr.

Program Year 10 Incentives
\$3,345,072



Non-Residential: Midstream

Program Year 10 Reported Savings for Midstream:

- 7,633 Projects
- 23,542 MWh/yr.
- 28 Distributors, 94 locations

Program Year 10 Incentives
\$1,982,486

Verified Savings (PY8-PY9)

- 17,832 MWh

Non-Residential: Custom

Program Year 10 Reported Savings for Custom:

- 93 Projects
- 67,303 MWh/yr. reported savings
 - 3 Solar projects = 5,110 MWh/yr.
 - 1 CHP = 18,106 MWh/yr.

Program Year 10 Incentives
\$3,450,968

Verified Savings (PY8-PY9)

- 100,566 MWh/yr.

Non-Residential: Continuous Energy Improvement (CEI)

Plan Year 10 Reported Savings for CEI:

- 144 MWh/yr. reported savings
- 4 School Districts
- 18 Participating Schools
 - 10 Elementary Schools
 - 4 Middle Schools
 - 4 High Schools

Program Year 10 Incentives
\$22,473

Verified Savings PY9

- 641 MWh/yr.

MWh Savings To Date

Sector	Verified * MWh/yr	Reported PY10	Total MWh/yr	Phase 3 MWh Goals	% of Goal
LCI	126,369	65,133	191,502	297,000	64%
SCI	107,518	79,811	187,329	312,810	60%
GNE	70,845	45,360	116,205	201,000	58%
RES	1,217	450	1,667		
Total	305,950	190,754	496,704	810,810	61%

* Verified savings thru PY9 by sector

Non-Residential Pilot: Midstream Expansion

Opportunity: Pilot HVAC measures and Food Service measures through a midstream model

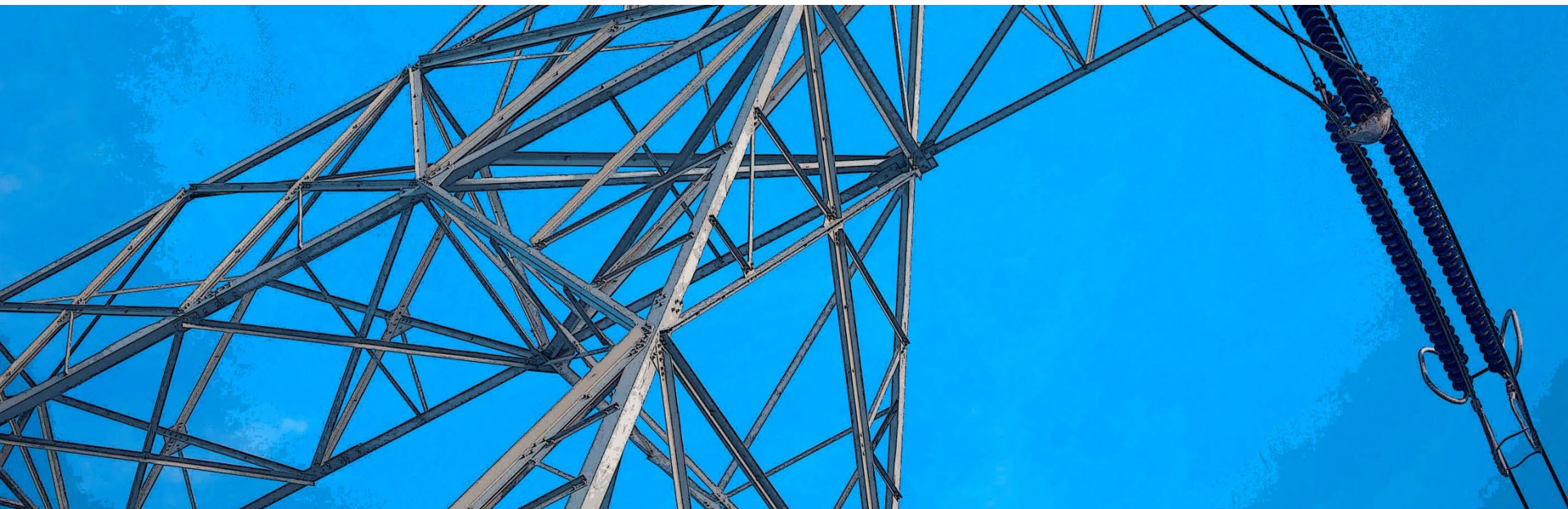
Timeline: early proposal stage

Key Steps:

- **Analyze** market potential and penetration
- **Recruit** build relationships with local distributors
- **Strategize/Create** program mechanisms and collateral material
- **Implement** September 2019-September 2020

Areas to Measure: distributor onboarding and program participation, deployment of PPC website, savings achieved thru midstream channel

Demand Response Program



Demand Response Program: Status

- Demand Response PY10 Season

- We Met All PY10 Targets

- Results - 111.5 MW Avg.

- Maximum of 6 Events Called

- Event 1 – 105.9 MW Avg.

- Event 4 – 120.2 MW Avg.

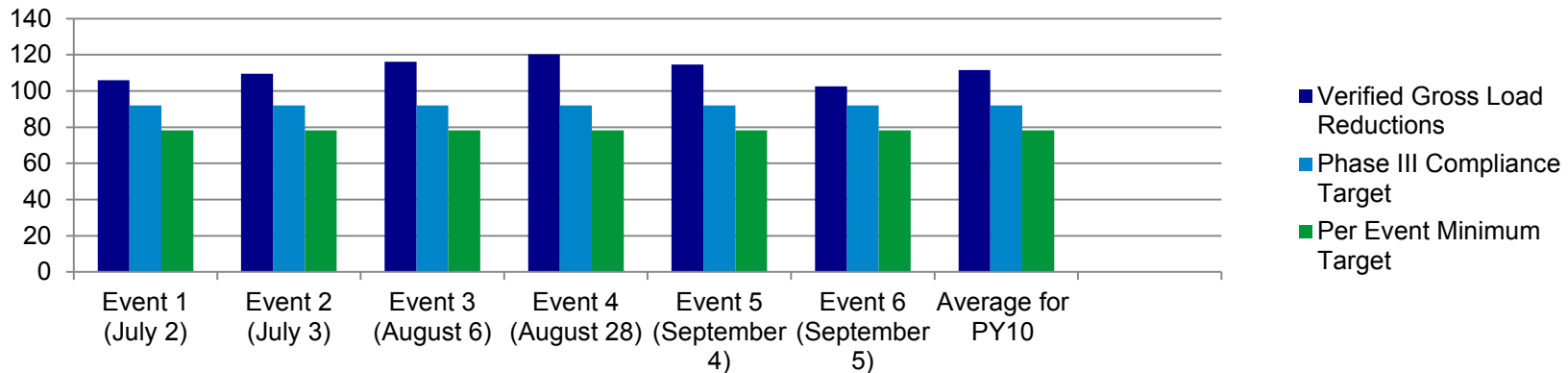
- Event 2 – 109.5 MW Avg.

- Event 5 – 114.6 MW Avg.

- Event 3 – 116.2 MW Avg.

- Event 6 – 102.6 MW Avg.

- New Cumulative Average - 116.5 MW Avg.



Demand Response Program: Update

- **Demand Response PY11 Season**
 - Approximately 132 MWs Enrolled
 - A 92 MW Compliance Target (Avg. Of All Phase 3 Events)
 - Per Event Target of 78.2 MW
- **Events Are Called The Day Ahead At 10:10 AM (Based on 9:45am Forecast) if PJM Day Ahead Forecast Reaches 96% of PJM Peak Load Forecast**
 - Up To Six Events Per Year
 - Each Event Is Four Consecutive Hours

Demand Response Program: Update (con't)

- **Challenges Remain**
 - Few Customers with Large Amounts of the Portfolio
 - Challenging To Always Confirm Each Customer's Intent To Participate In An Event
 - Major Customers Did Not Always Bring Full Commitment
 - Some Customers Have Dropped the Program
 - Cannot Determine Peak Reductions Until Well After The Event Is Over
 - Concerns Raised By Customers Over Consecutive Day Events or Multiple Events In A Week

Contacts

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sdpressmann@pplweb.com; 484-634-3047

Thank you. Questions? Comments?

