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April 29, 2014

MEMORANDUM

TO: Council Members

FROM: Tom Eckman and Charlie Grist

SUBJECT: Estimated Savings from Federal Appliance and Equipment Efficiency Standards

At the February Power Committee meeting staff provided an overview of the federal appliance and equipment efficiency standards program and described the historical impact on regional electricity use of these standards. Staff estimated cumulative regional electricity savings from federal standards since 1987 when they were first enacted through 2012 were nearly 1,000 average megawatts. At the May Power Committee meeting staff will present the results of an analysis of the savings and impact on future regional electricity demand of the standards enacted since the 6th Plan was adopted. Staff worked closely with a Bonneville consultant to review the inputs and assumptions to ensure they were consistent with those used in the 6th Plan. When more recent data was available (e.g., data from the Residential Building Stock Assessment), it was incorporated into the analysis.

Summary of Findings

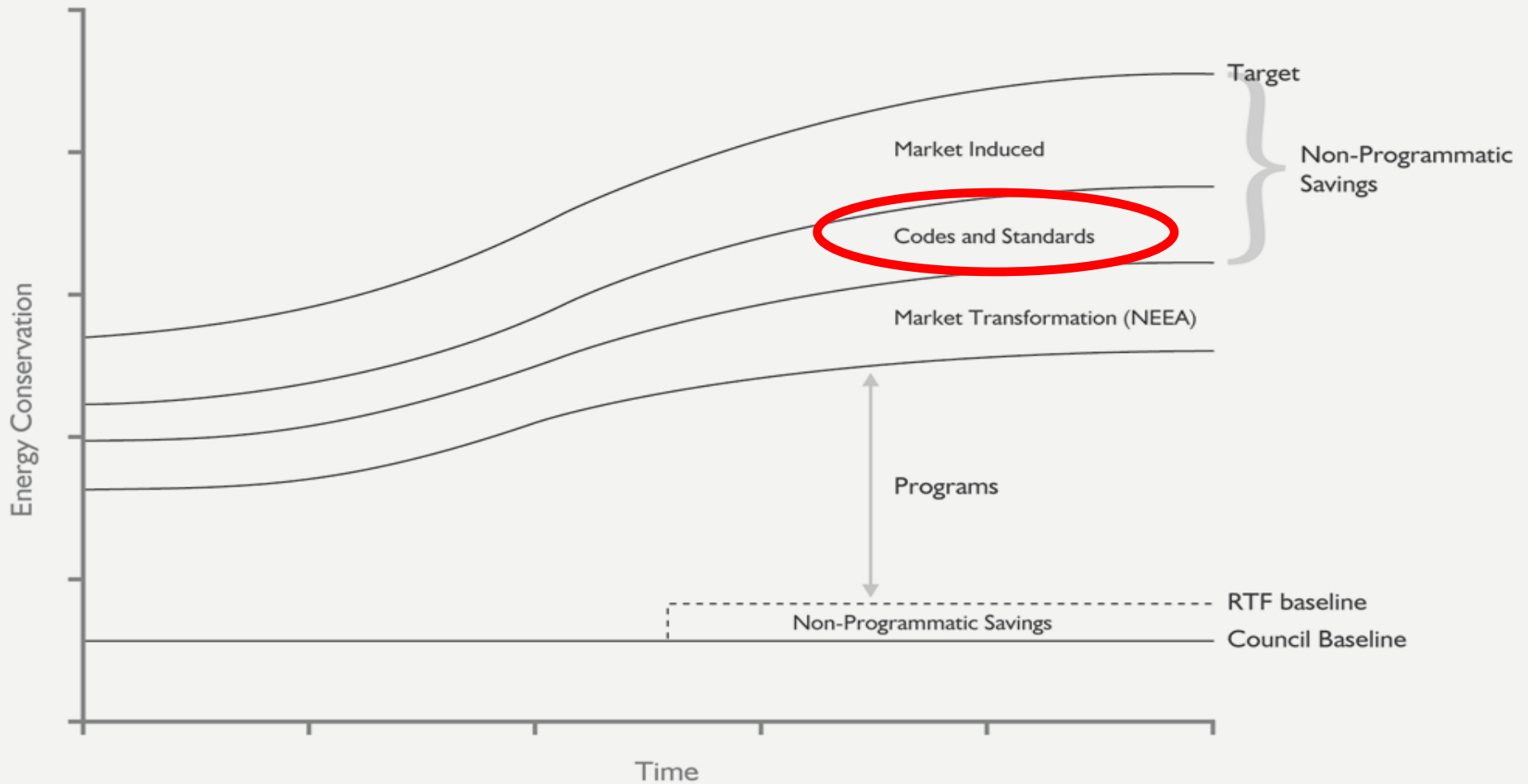
- Near term (2010-2014) savings from standards are estimated to be just over 100 average megawatts, or about eight percent of the 6th Plan's 1200 average megawatt five-year conservation goal
- Near term savings are dominated by lighting efficiency improvements.

- Medium term savings (2015-2019) savings from standards are estimated to be approximately 265 average megawatts, or just over thirty percent of the 6th Plan's goal for lost opportunity conservation resource development during that period.
- Medium term savings come primarily from commercial and industrial equipment and residential water heaters.
- Savings from federal standards adopted since the 6th Plan are estimated to be approximately 780 average megawatts from 2010 through 2029, or about thirteen percent of the Plan's long-term conservation goal.
- It is anticipated that an additional eight federal standards will be finalized by the end of 2014, further reducing regional load growth and capturing additional conservation potential identified in the 6th Plan.

Impact of Federal Appliance Standards Regional Loads and Conservation Goals

May 6, 2014

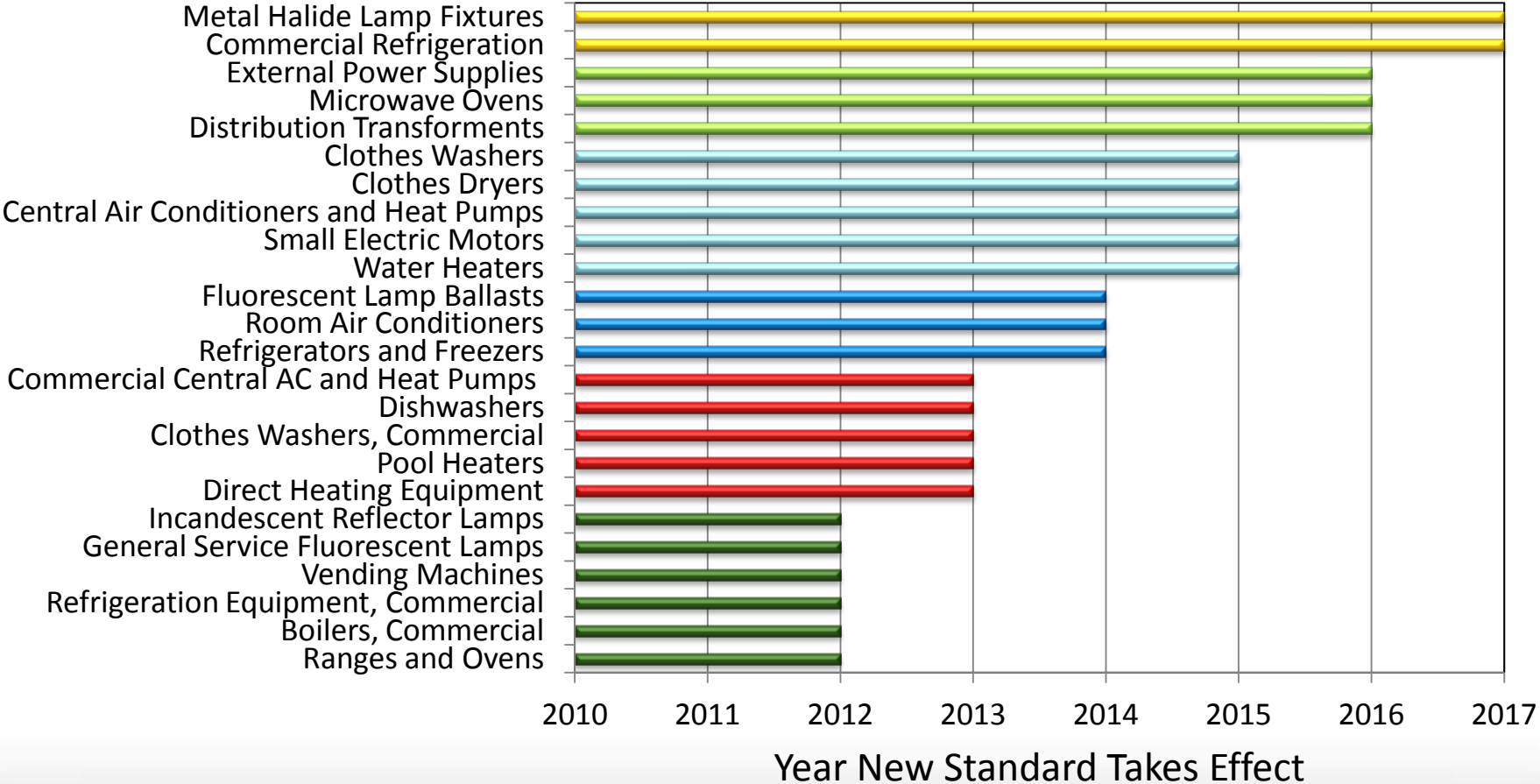
Savings from Many Mechanisms



Today's Presentation

- **Estimated savings from federal efficiency standards during the 6th Plan's first (2010-2014) and second (2015-2019) five years**
 - **How much savings will federal standards contribute towards the 6th Plan's regional conservation goals?**
- **Estimated impact of federal efficiency standards on 2015 to 2029 load growth**

24 New Federal Efficiency Standards Take Effect by 2017 Capturing Some of the 6th Plan's Efficiency Potential



Not Yet Released

Published
02/03/14

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01/28/14

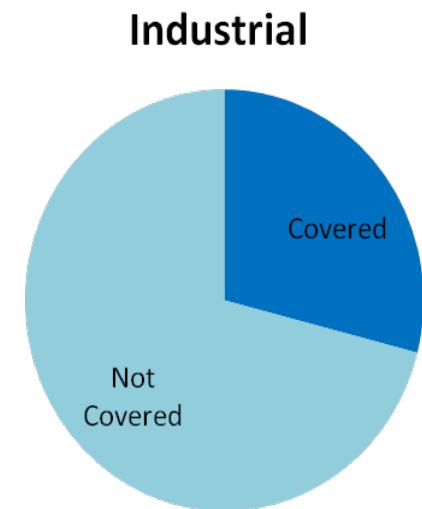
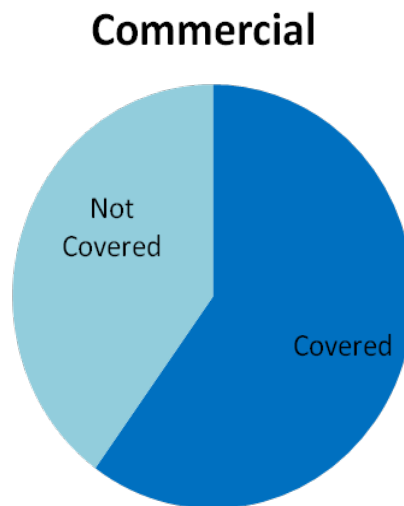
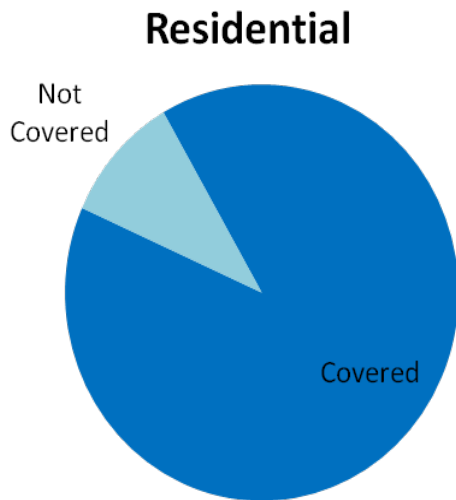
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And There Are Eight More on the Way in 2014 DOE Rulemaking Schedule

Date	Product	Rulemaking Stage
	Battery Chargers and External Power Supplies**	Final rule ✓
	Commercial Furnaces**	Proposed rule or neg. determ.
	Commercial Packaged A/C and Heat Pumps**	Proposed rule or neg. determ.
	Commercial Water Heaters**	Proposed rule or neg. determ.
	Furnace Fans**	Final Rule
January	IRLs (Certain ER, BR, and Small Diameter)**	Proposed rule
	Packaged Terminal A/C and Heat Pumps**	Preliminary analysis
	Residential Boilers**	Preliminary analysis
	Automatic Ice Makers	Proposed rule
	Dehumidifiers	Preliminary analysis
	Metal Halide Lamp Fixtures	Final rule ✓
	Ceiling Fans and Ceiling Fan Light Kits	Preliminary analysis
February	Commercial Refrigeration Equipment	Final rule ✓
	General Service Fluorescent Lamps and IRLs	Proposed rule
March	Commercial Clothes Washers	Proposed rule
	Wine Chillers and Misc. Refrigeration Products	Preliminary analysis
April	Walk-In Coolers and Freezers	Final rule
May	Automatic Ice Makers	Final rule
	Electric Motors	Final rule
June	Commercial Furnaces*	Final rule
	Commercial Packaged A/C and Heat Pumps*	Final rule
	Commercial Water Heaters*	Final rule
	IRLs (Certain ER, BR, and Small Diameter)	Final rule
July	Commercial and Industrial Pumps	Proposed rule
	High-Intensity Discharge (HID) Lamps	Proposed rule
	Residential Boilers	Proposed rule or neg. determ.
August	Fans and Blowers	Proposed rule
	Single Package Vertical A/C and Heat Pumps	Proposed rule
October	Packaged Terminal A/C and Heat Pumps	Proposed rule
	Vending Machines	Preliminary analysis
November	General Service Fluorescent Lamps and IRLs	Final rule

Extent of Federal Standards Influence?

Fraction of Electric Use Covered by Federal Standards



Impact on Northwest

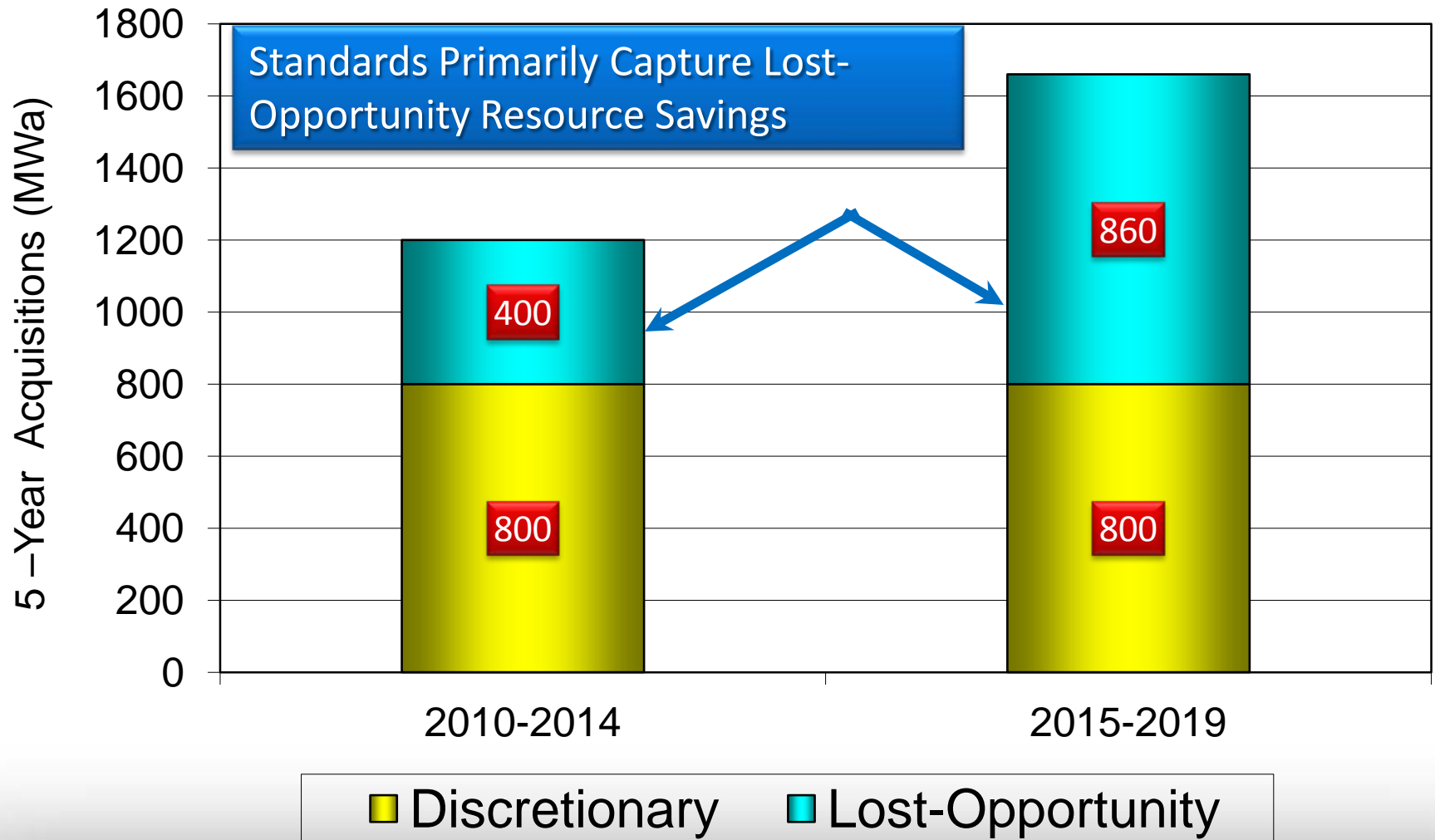
- Council worked with Bonneville and its consultant to estimate the impact of standards adopted since the Sixth Plan
 - Near term impacts (2010-2014)
 - Long term impacts (2015-2035)
- Objective of analysis
 - Determine contribution of standards savings toward achievement of the Sixth Plan conservation targets for 2010 – 2015
 - Determine implications for the Seventh Plan's forecast of post-2015 load growth and remaining conservation potential

Why Are Standards Part of Seventh Plan?



- Impact on load forecasts
- Establish base for conservation potential

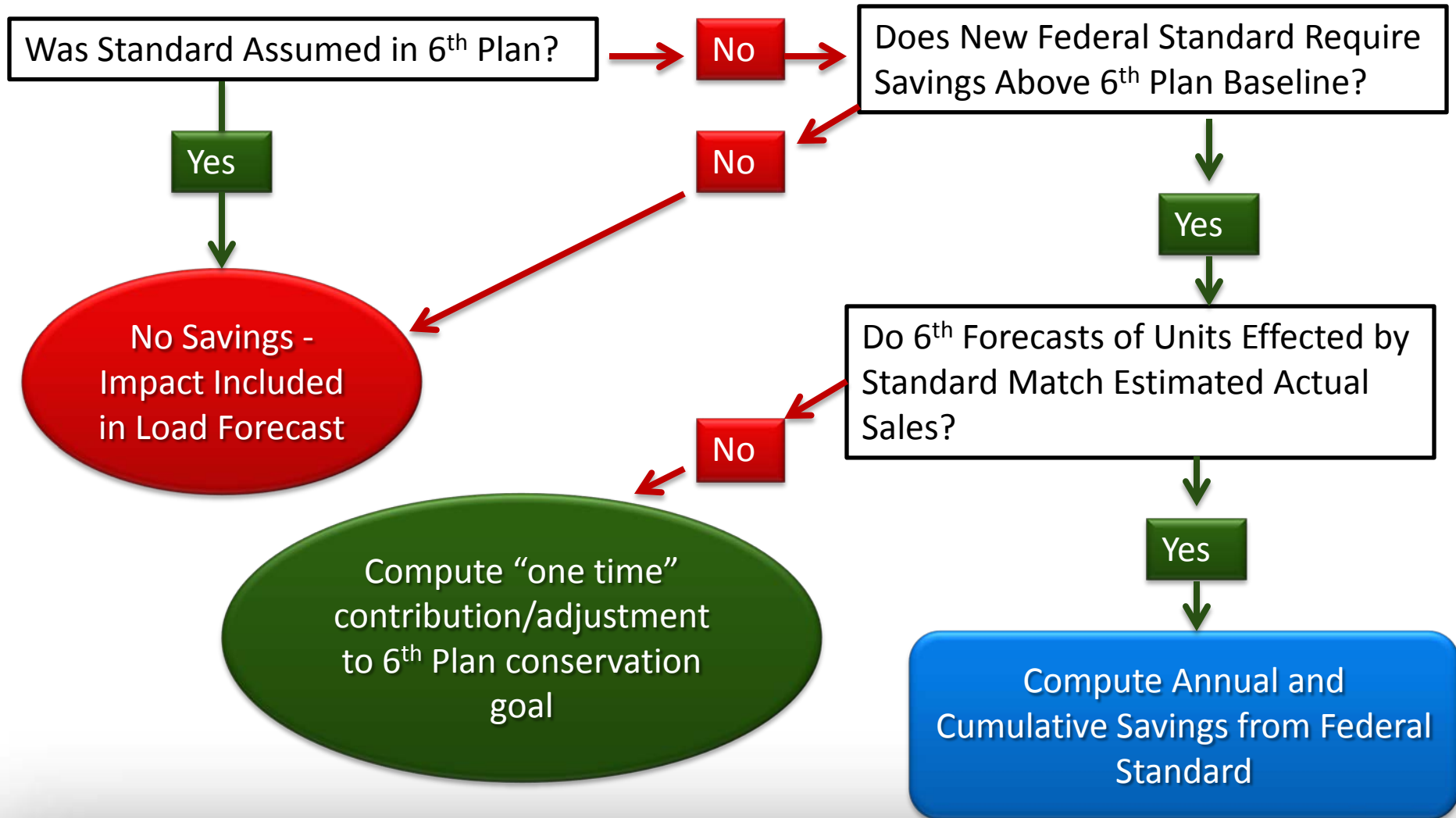
Standards Impact Lost-Opportunity Savings Goals



Analytical Approach

- Focus on federal standards not included in Sixth Plan baseline
- Target analysis on standards with largest impact
- Collect data on actual units shipped and their efficiency
- Account for interactions between standards, state energy codes and utility programs to avoid “double counting” of savings
- Determine “net impact” of standards

Assessment Method



Impact Analysis Focuses Analysis on 26 Standards

Residential

- Residential Dishwashers
- Residential Clothes Washers
- External Power Supply
- Residential Refrigerators and Freezers
- Residential Water Heater
- Residential Heat Pumps
- Torchieres
- Ceiling Fan Lighting Kits

Commercial/Industrial

- Walk-in Coolers and Freezers
- Commercial Refrigeration Products
- Commercial Clothes Washers
- Pre-rinse Spray Valve
- Commercial CAC and Heat Pumps
- Packaged Terminal AC and HP
- Illuminated Exit Signs
- Electric Motors
- Distribution Transformers

Lighting

- Metal Halide Lamp Fixtures
- Mercury Vapor Lamp Ballasts
- Fluorescent Lamp Ballasts
- General Service Fluorescent Lamps
- General Service Incandescent Lamps
- Incandescent Reflector Lamps
- Candelabra & Intermediate Base Incandescent Lamps
- Medium Base Compact Fluorescent Lamps
- High Intensity Discharge Lamps

Not All 26 Standards Produced Savings Over the 6th Plan Baseline

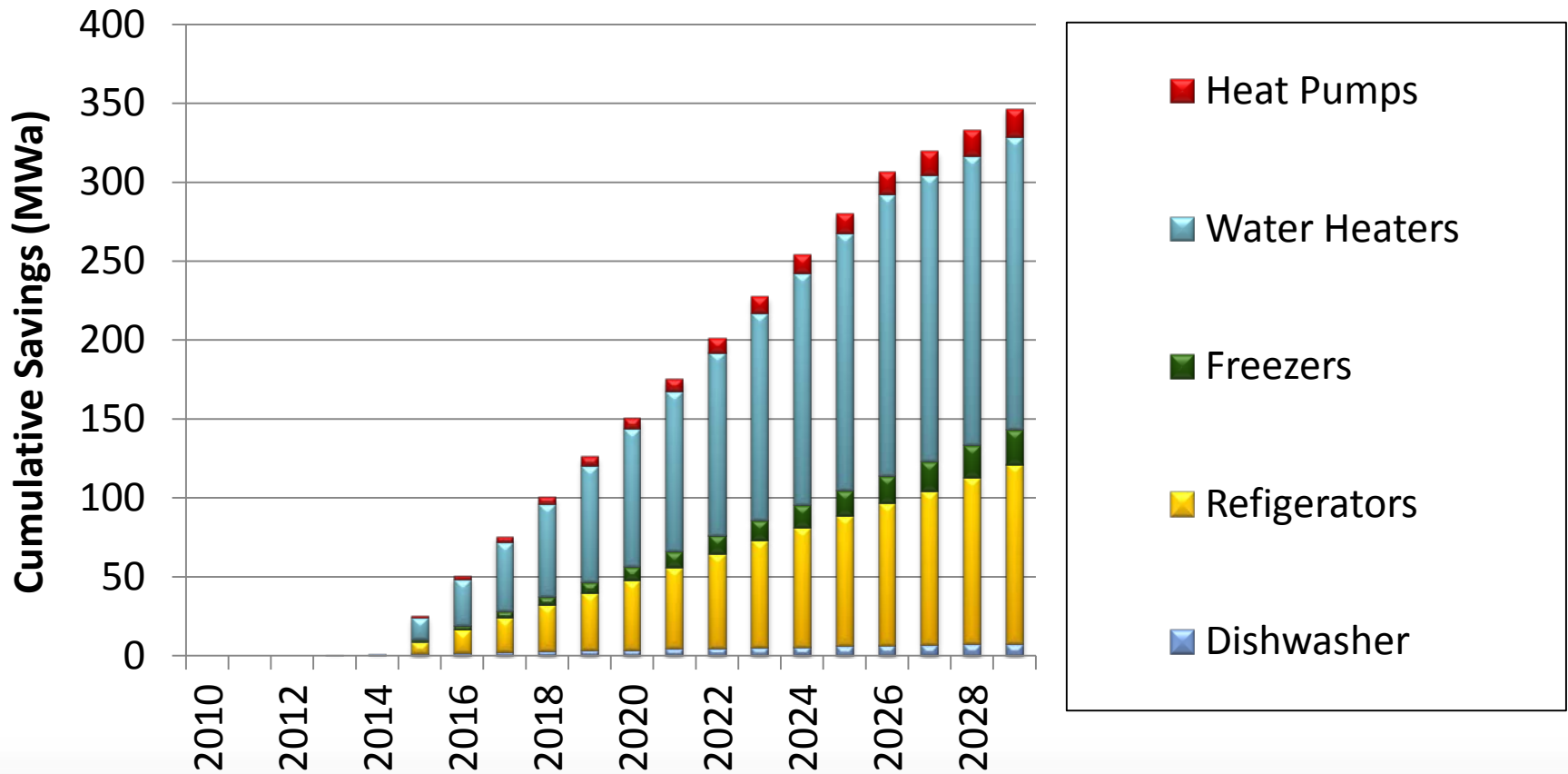
- **Standards Reflected in Sixth Plan Load Forecast**
 - Mercury vapor lamps ballast
 - External power supplies
 - Residential clothes washers
 - General service incandescent lamps
- **Standards that do not directly impact electricity consumption**
 - Commercial oil and gas boilers

Three Bundles of Savings

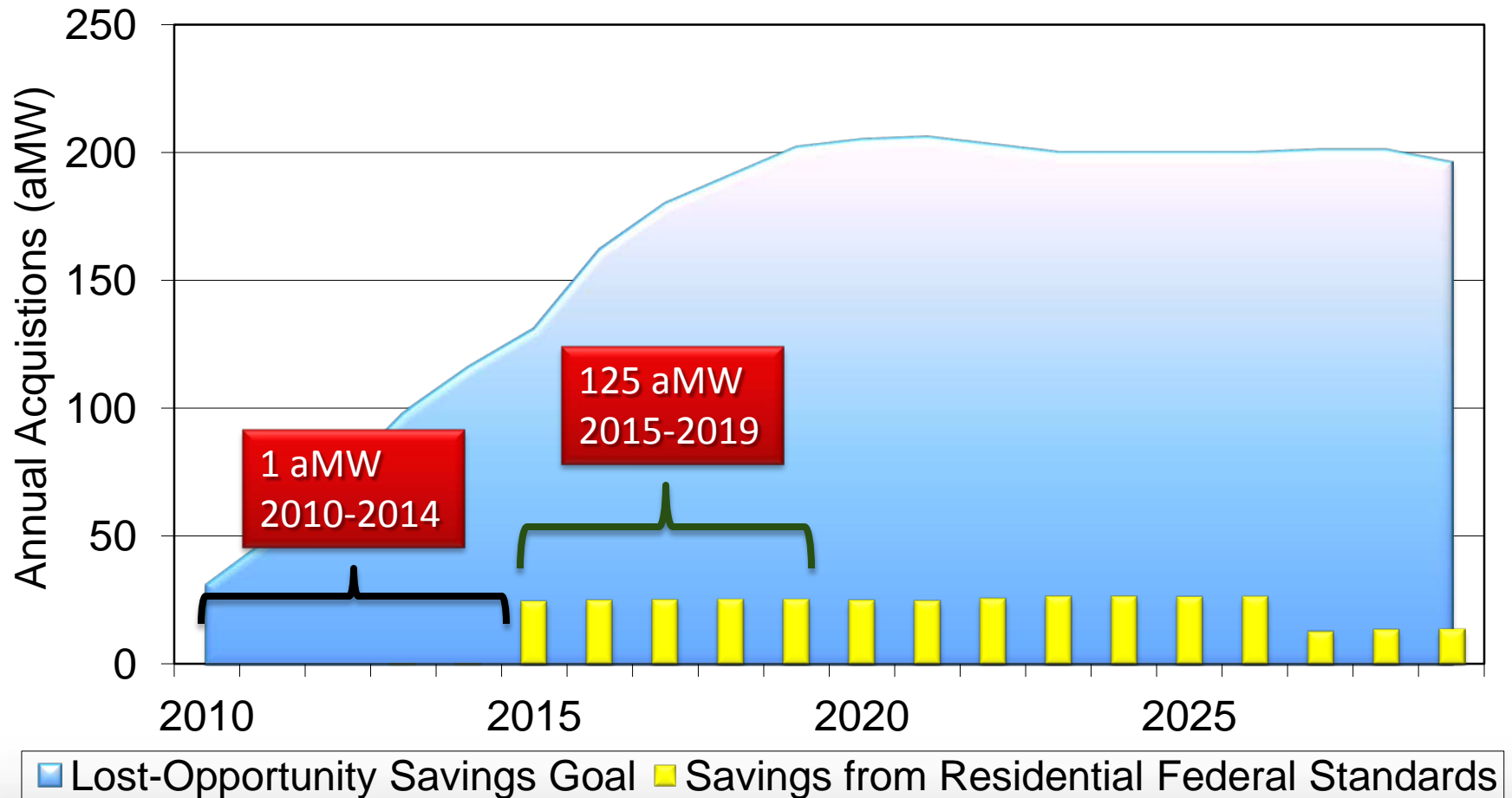
- Residential Appliances & Equipment
- Commercial & Industrial Equipment
- Lighting



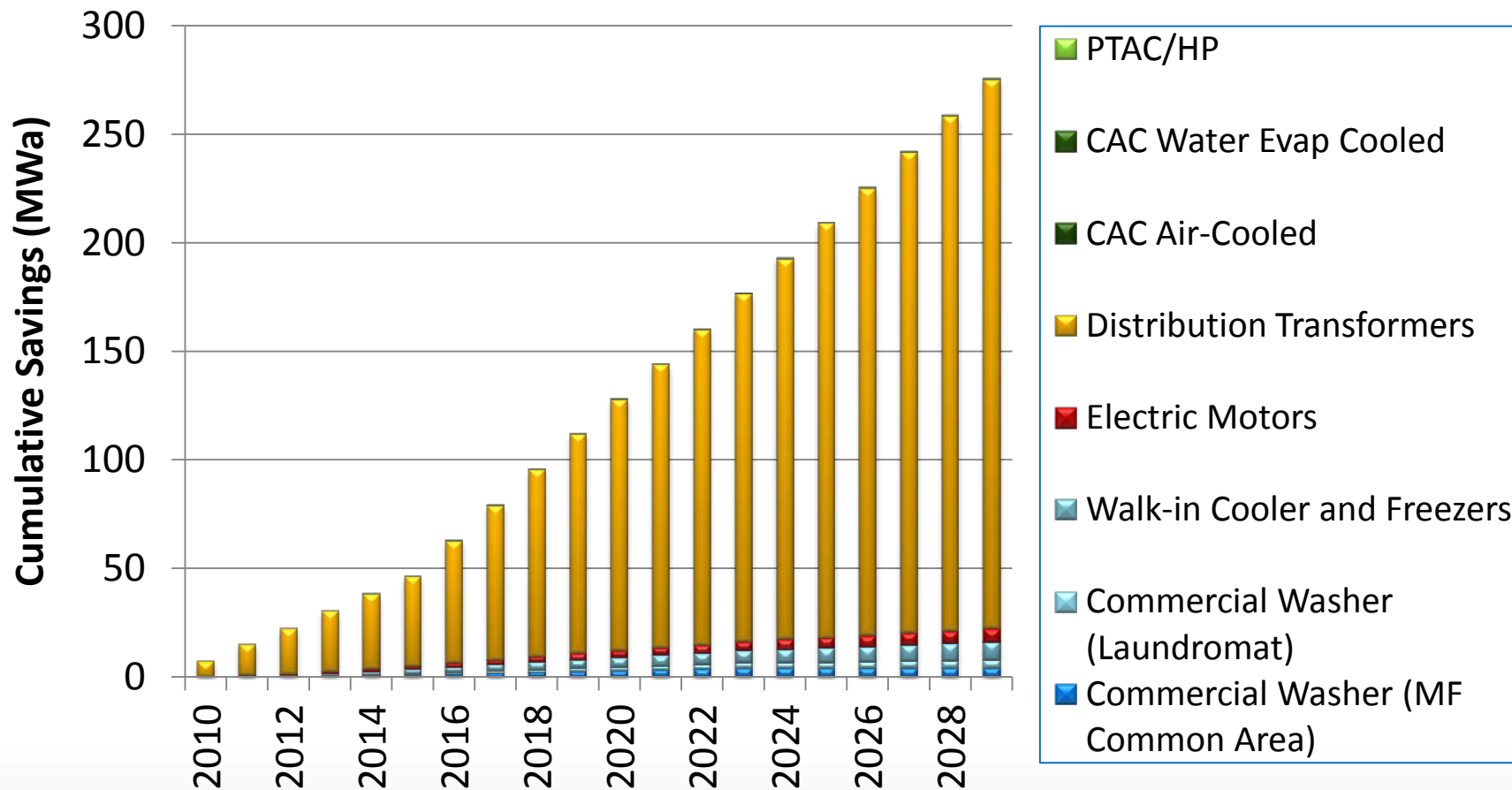
Residential Appliance and Equipment Savings From Seven Federal Standards That Take Effect by 2015 Are Just Under **350** Average Megawatts by 2029



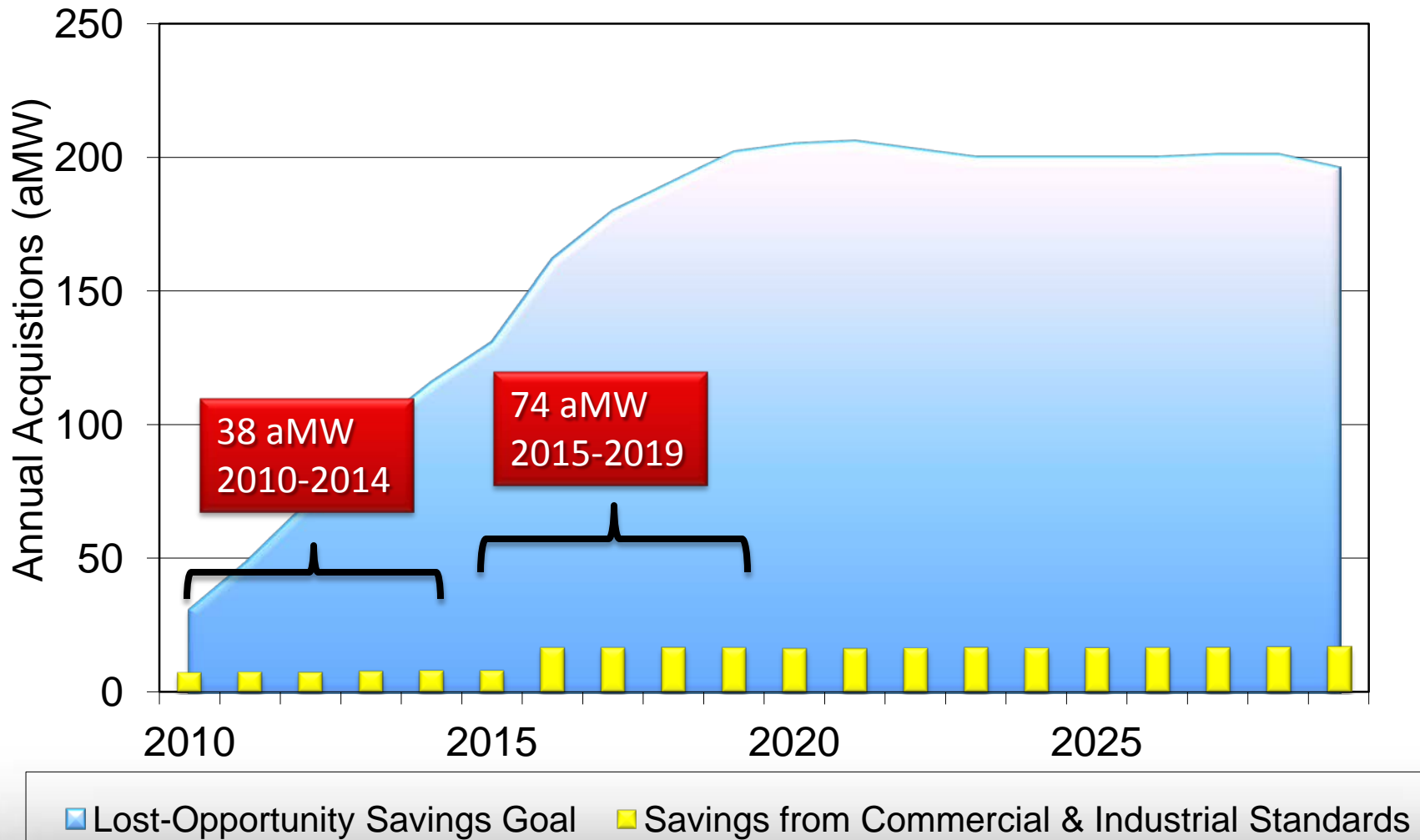
However, The Estimated Contribution of Residential Appliance and Equipment Standards Savings to Sixth Plan Conservation Goals Is Small Over The Near Term



Commercial & Industrial Equipment Savings From Eight Federal Standards That Take Effect by 2015 Are Nearly **280** Average Megawatts by 2029



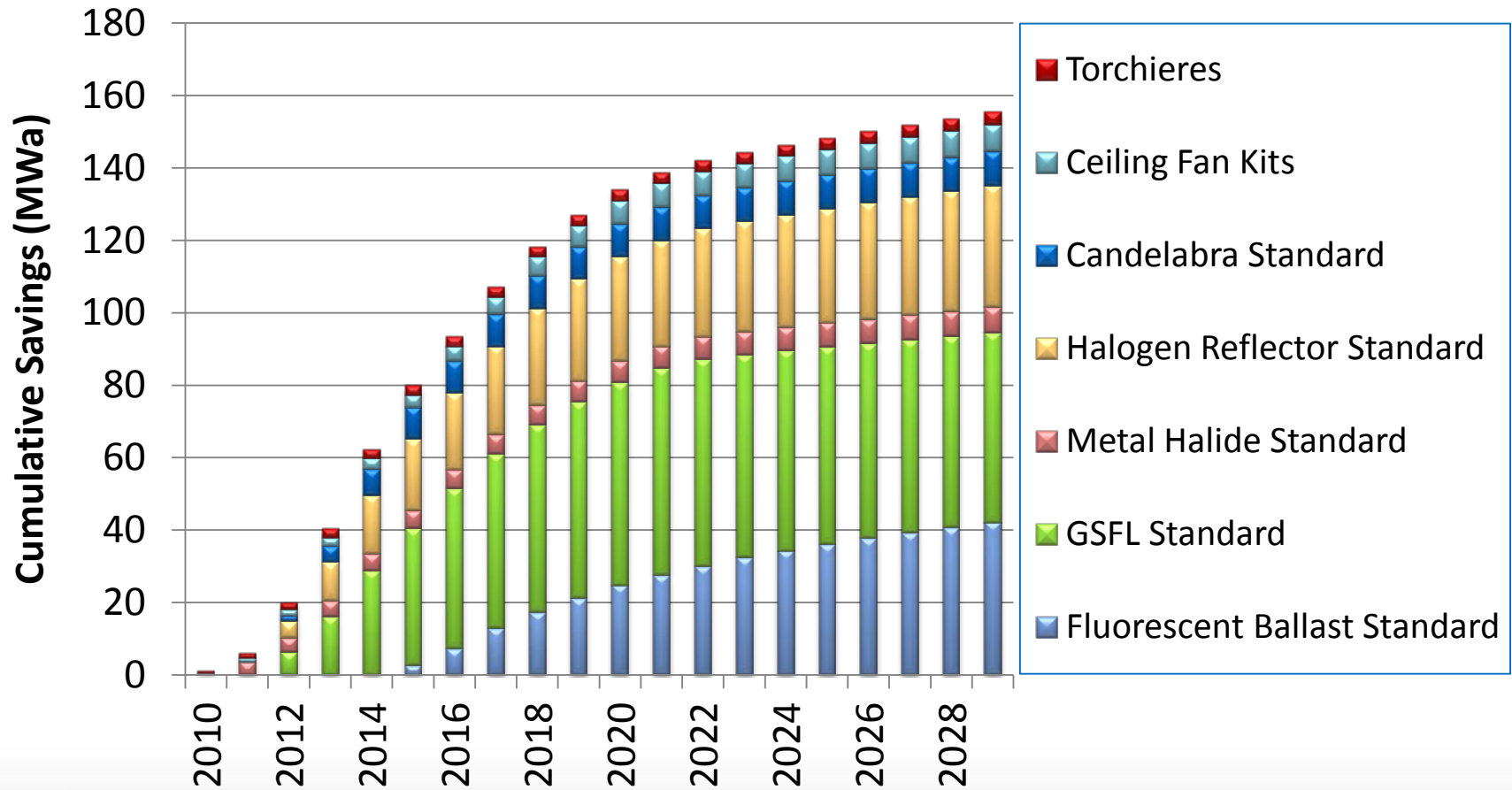
Commercial and Industrial Equipment Standards Savings Are More Significant Than Residential Over The Near Term



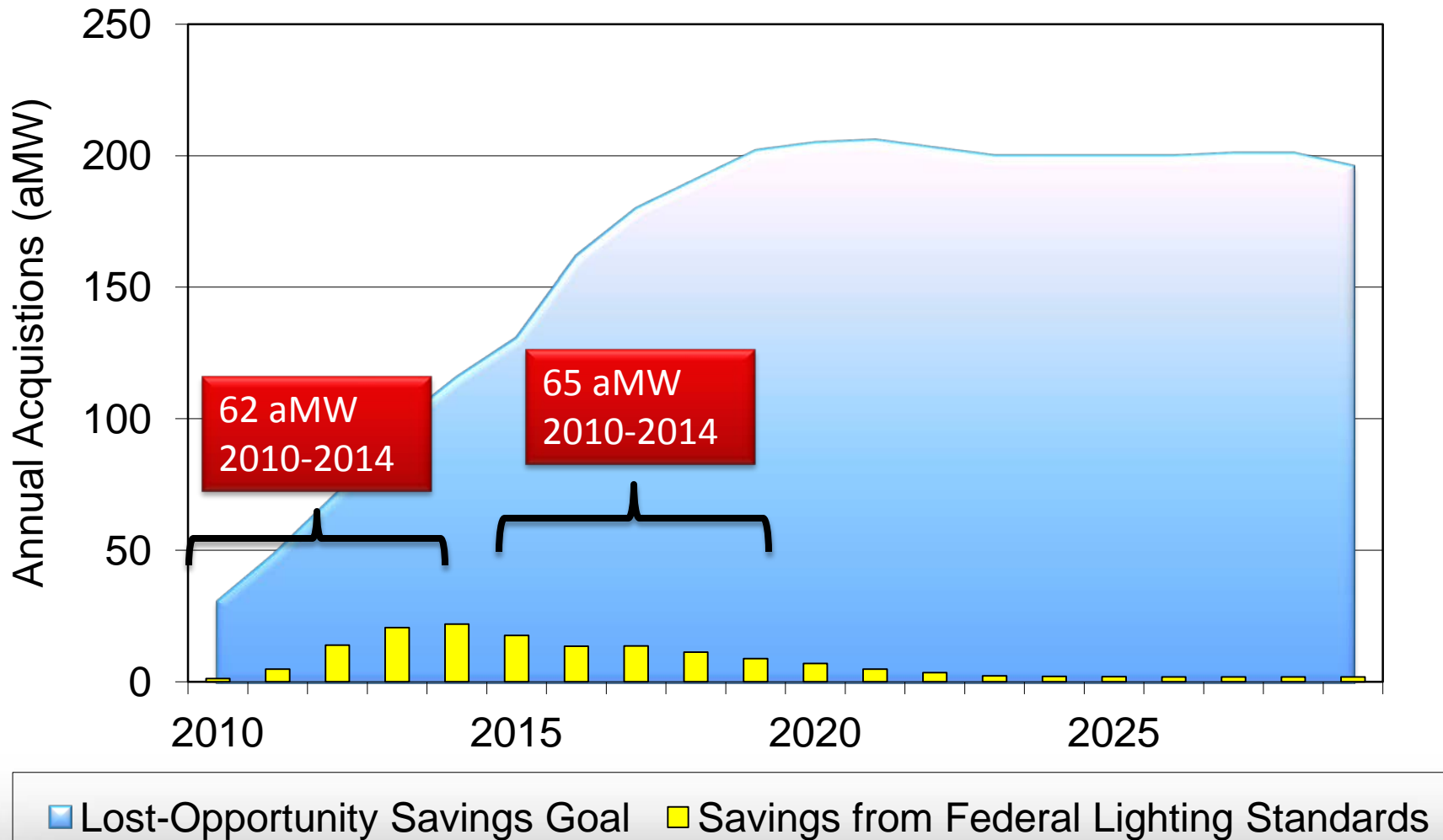
Lighting Standards

- **Lighting standards in Sixth Plan forecast**
 - General Service Incandescent (2012)
 - Mercury Vapor (2008)
- **Seven standards since Sixth Plan (Effective Dates)**
 - General Service Fluorescent Lamps (2012)(2014)
 - Fluorescent Ballasts (2015)
 - Metal Halide Fixtures (2012)
 - Halogen Reflector Lamps (2012)
 - Candelabra Lamps (2012)
 - Ceiling Fan Light Kits (2010)
 - Torchieres (2010)

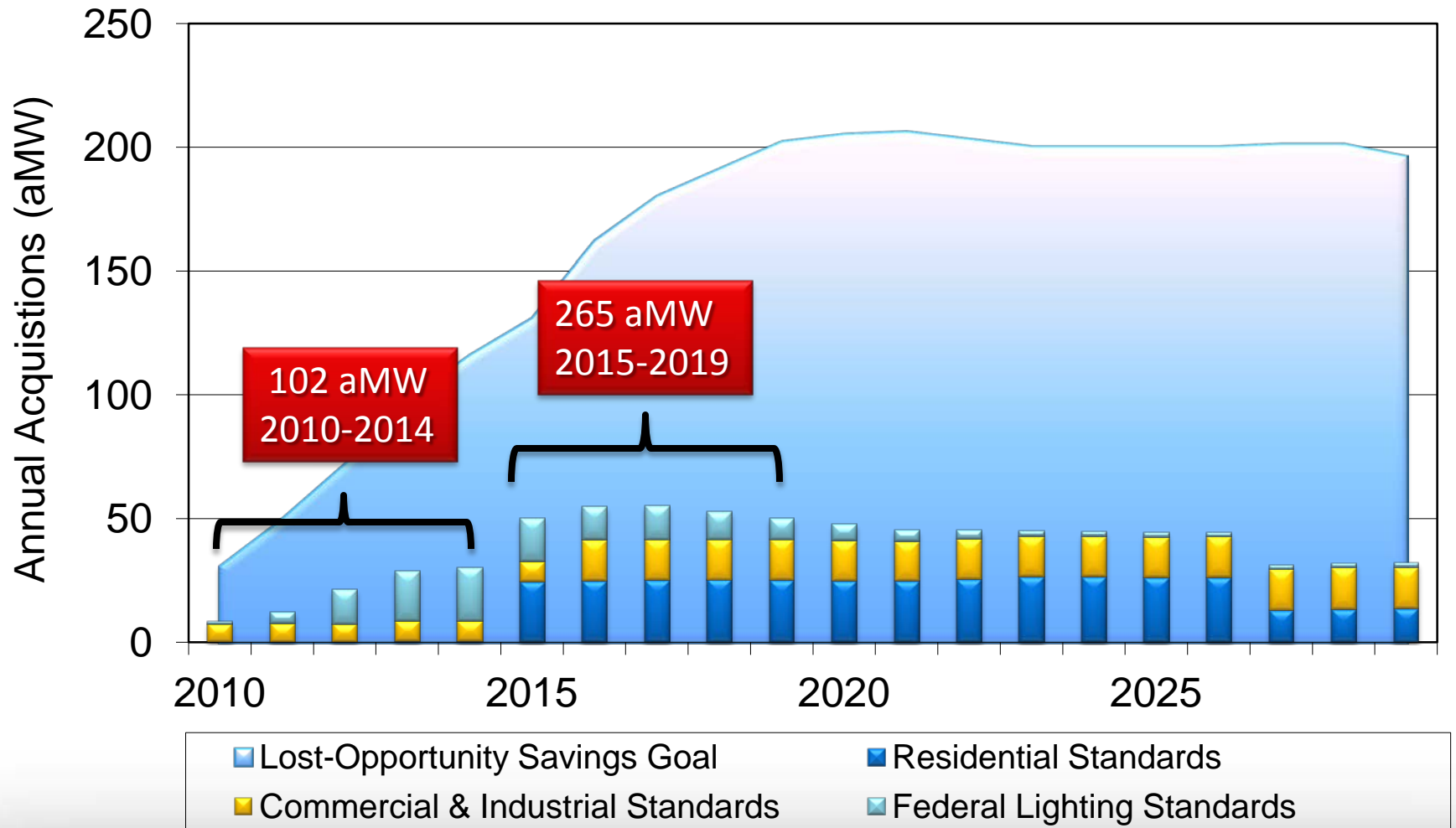
Lighting_Savings From Seven Federal Standards That Take Effect by 2015 Are Over **155** Average Megawatts by 2029



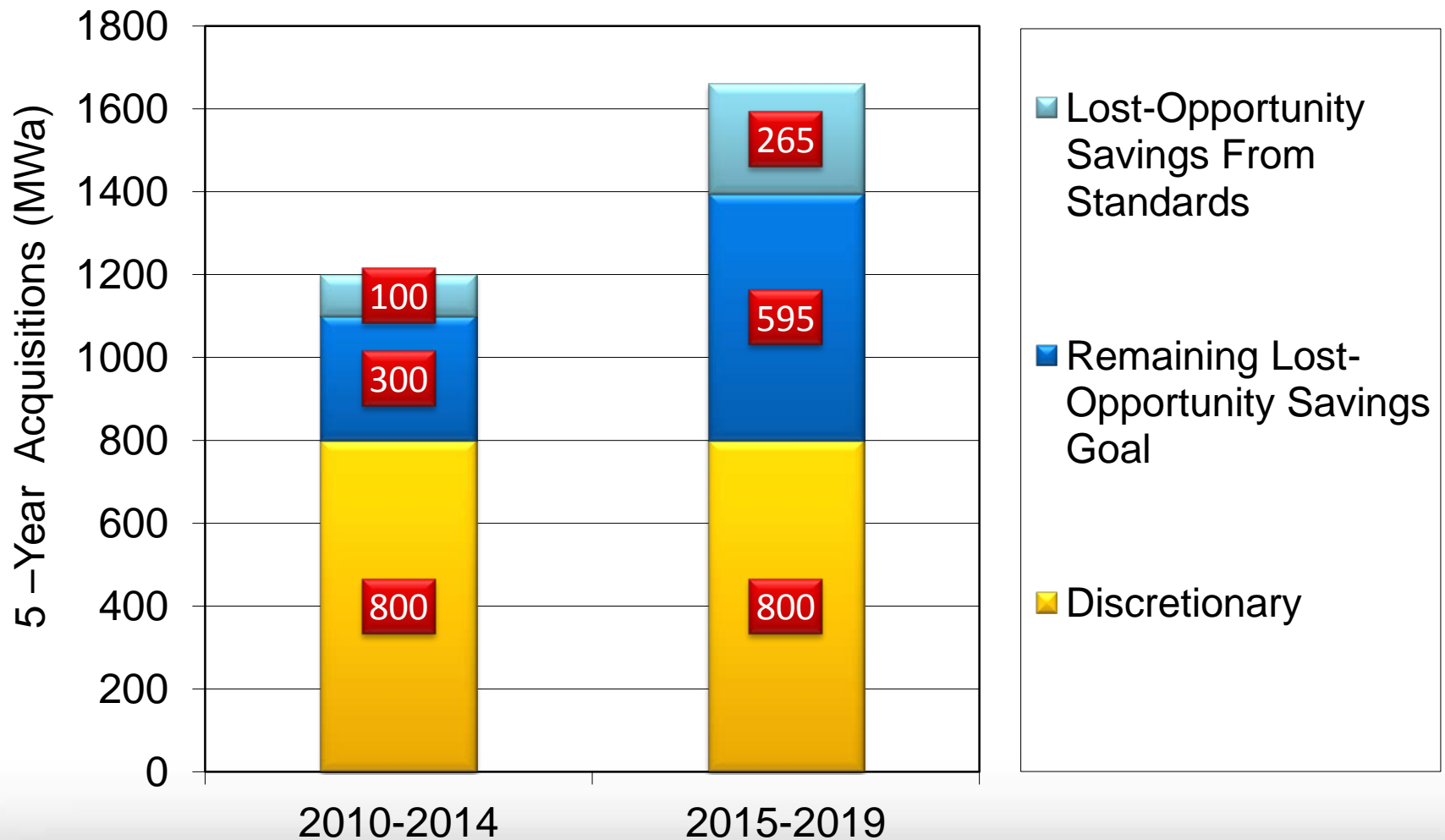
Federal Lighting Standards Have the Greatest Near-Term Impact



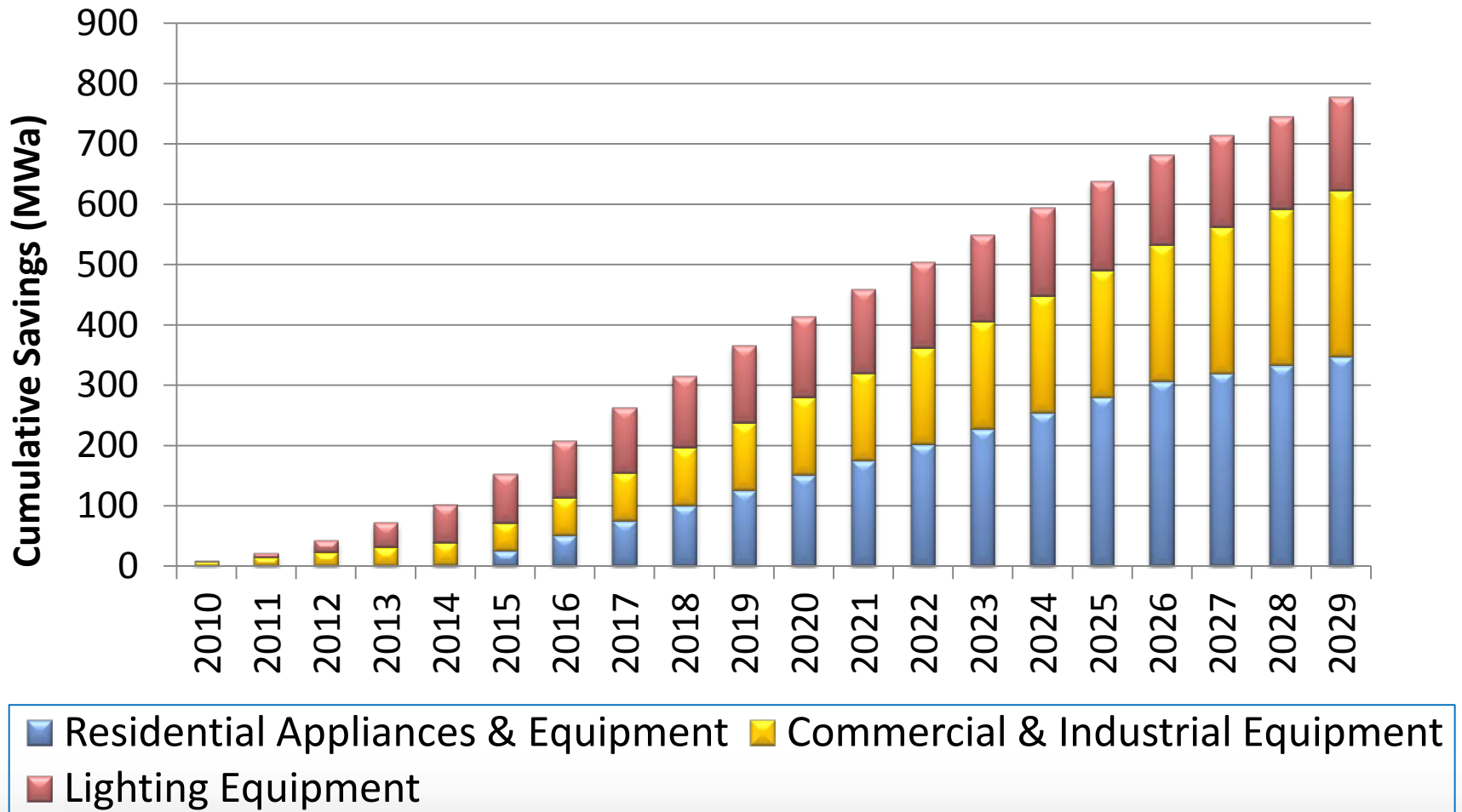
Federal Standards Are Estimated to Save Just Over 100 aMW by 2014 and 265 aMW between 2015-2019, with Lighting Standards Providing the Largest Near-Term Savings



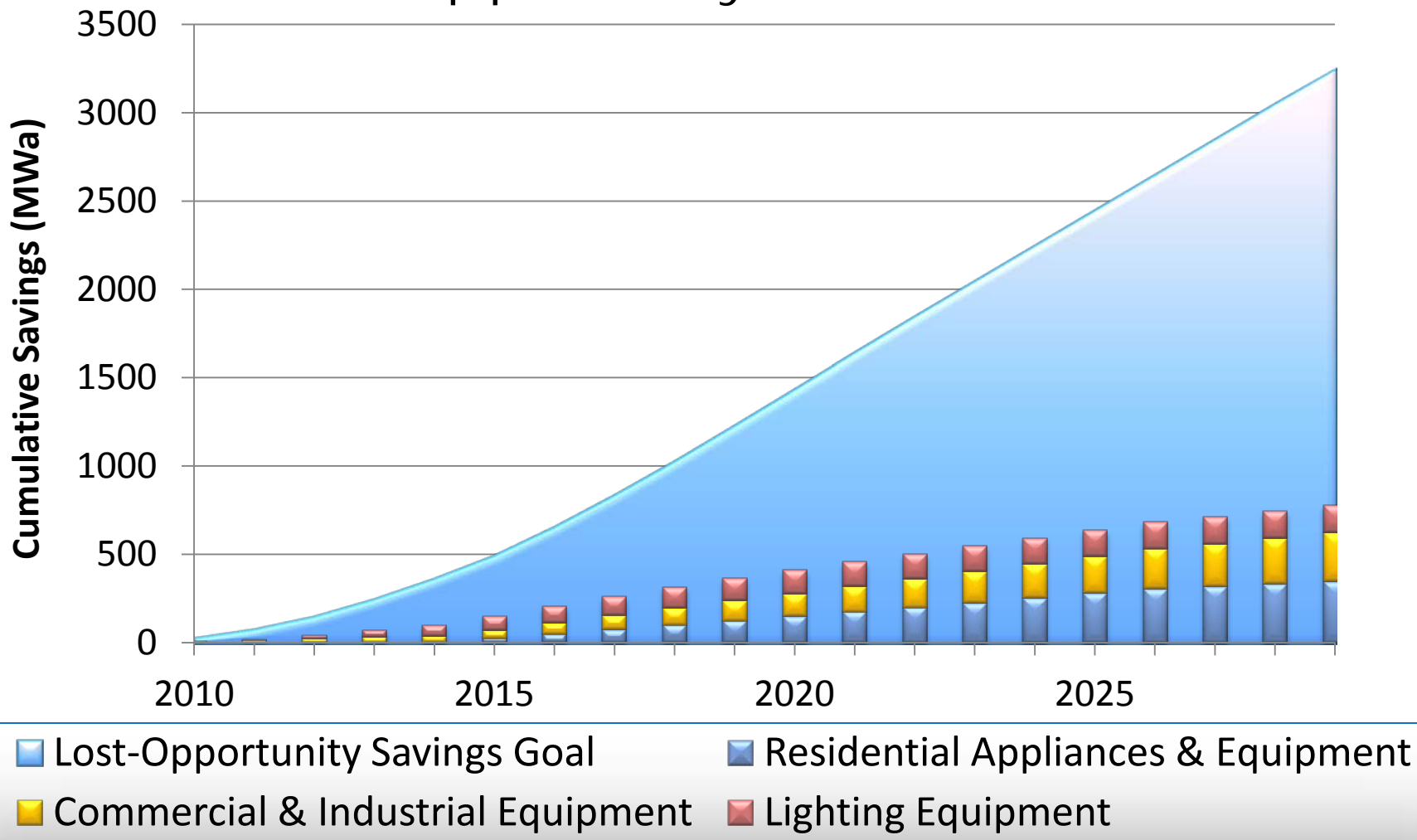
How Much Will New Federal Contribute Meeting 6th Plan Goals?



Total Savings Forecast from Federal Standards Add Up to **780** Average Megawatts by 2029



Federal Standards Adopted The Since Sixth Plan Capture *One Quarter* of The Twenty-Year Lost-Opportunity Potential



Implication for the Seventh Plan

- **Compared to the Sixth Plan:**
 - **Load forecast will be lower, particularly over the long term**
 - **Remaining conservation potential will be lower**
 - **But not as much lower as the load forecast, since standard impact all units, but conservation assessment assumes less than 100% program success**
 - **Conservation programs will need adjust their focus to measures less impacted by federal standards**

Next steps

- **Seek peer review through CRAC and RTF**
- **Incorporate the results into the Seventh Plan's load forecast and conservation potential assessment**
- **Provide results to others in the region for incorporation in their load forecast and conservation potential assessments**