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<td>Presentation - Senate Bill 350 Results for Energy Efficiency Savings Through Non-Utility Programs</td>
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<td><strong>Description:</strong></td>
<td>9.7.17: Presentation by Brian Samuelson of CEC</td>
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<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
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<td><strong>Organization:</strong></td>
<td>California Energy Commission</td>
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<td>Commission Staff</td>
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Senate Bill 350 Results for Energy Efficiency Savings Through Non-Utility Programs

Brian Samuelson
Existing Buildings and Compliance Office
Efficiency Division

Joint Commissioners Workshop on Results and Recommendations for SB 350 Energy Efficiency Target Settings
California Energy Commission
September 7, 2017
Outline

• Acknowledgements
• Core Presentation Concepts
• Codes and Standards
• Financing Overview
• Behavioral and Market Transformation Programs
• Industrial and Agricultural
• Combined Results
Acknowledgements

- NORESCO with TRC Energy Services and Center for Sustainable Energy (Efficiency Division’s consulting team)
- California Public Utilities Commission
- Navigant (CPUC’s consultant)
Core Presentation Concepts

• Where appropriate, updated methodologies:
  – Measure-based, energy modeling approach
  – Refined top-down estimates
  – Refined overarching assumptions
  – Reference scenario

• Savings projections categorized by:
  – Program type: Codes & Standards, Financing, Behavioral and Market Transformation
  – Building sector: Residential, Nonresidential, Industrial, Agricultural
CODES AND STANDARDS

• Codes and Standards Results
• Building Energy Efficiency Standards
• California Green Building Standards Code
• Appliance Efficiency Regulations
• Federal Appliance Standards
Codes and Standards Results (Electric)
Codes and Standards Results (Natural Gas)
Building Energy Efficiency Standards (Title 24, Part 6)

- Measure-based, energy modeling approach
- 2019, 2022, 2025, and 2028 Standards
- Existing building stock simulated by 1980s, 1990s, and 2000s vintage models
- New construction represented by models with 2013 or 2016 Standards
- 2029 building stock consists of measures likely to be in Standards by 2028
California Green Building Standards Code (Title 24, Part 11)

- Trends in more local governments adopting reach codes over the years
- Assumed efficiency of next Title 24 cycle
- Applied efficiency of next Title 24 cycle sooner for local governments
- Applied reduction factor for overlap with programs
Appliance Efficiency Regulations (Title 20)

- Updates to current Title 20 standards
- Adoption of new Title 20 standards
- Units Energy Savings and installation and sales from recent sources
- Installation and sales and Naturally Occurring Market Adoption static overtime
- Varying scenarios based on Compliance Adjustment Factor and adoption assumptions
Federal Appliance Standards by U.S. Department of Energy

- Updates to current Fed App standards
- Adoption of new Fed App standards
- Units Energy Savings and installation/sales from recent sources
- Installation and sales and Naturally Occurring Market Adoption static overtime
- Varying scenarios based on Compliance Adjustment Factor and adoption assumptions
FINANCING OVERVIEW

- Financing Results
- Air Quality Management District Programs
- Property Assessed Clean Energy (PACE)
- Local Government Challenge
- Proposition 39
- Energy Conservation Assistance Act
- Low Income Weatherization Program
- Water-Energy Grant
- Energy Savings Program
## Financing Results (Electric)

<table>
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<tr>
<th>Year</th>
<th>PACE</th>
<th>DGS Energy Savings</th>
<th>Energy Savings</th>
<th>Low Income Weather</th>
<th>Proposition 39</th>
<th>ECAA</th>
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### Energy Savings (GWh)

- **Electricity Savings (GWh)**
- **Proposition 39**
- **ECAA**
- **Local Government Challenge**
- **AQMDs**

### Graphical Representation

- **PACE**
- **DGS Energy Savings**
- **Energy Savings**
- **Low Income Weather**
- **Prop 39**
- **ECAA**
- **Local Gov. Challenge**
- **AQMDs**
## Financing Results (Natural Gas)

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<tr>
<th>Year</th>
<th>ECAA</th>
<th>PACE</th>
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**Note:** Values are in millions of therms.
Air Quality Management District (AQMD) Programs

• Refined top-down estimates of energy savings
• Assumed a five percent greater savings beyond current Title 24 projections
• Re-categorized as a financing program as mitigation fees are used to fund projects including energy efficiency
• Lack of AQMD funding and project data to support measure-level analysis
Property Assessed Clean Energy (PACE)

- Refined top-down estimates of energy savings
- PACE stakeholders affirmed lack of public PACE data
  - Limited aggregate data from PACE Loss Reserve Program
  - Limited market data from PACENation
- Data extrapolated to estimate the full potential of residential and nonresidential buildings
- Pending legislative actions (e.g. SB 242) that call for PACE data collection requirements
Local Government Challenge

• Refined top-down estimates of energy savings
• Estimated baseline energy consumption levels for each project
• Used attribution matrix to identify incremental savings potential through an attribution matrix
• Applied measure savings decay and utility overlap assumptions
Proposition 39

- Refined top-down estimates of energy savings
- Removed savings from solar PV projects
- Assumed savings overlap of 4% based on funding and utility rebate data
- Applied measure savings decay assumptions
Energy Conservation Assistance Act

- Refined top-down estimates of energy savings
- Limited by lack of more granular data
- Removed savings from solar PV projects
- Assumed additional funding of $100 million (through SB 110)
- Applied measure savings decay and utility overlap assumptions
Low-Income Weatherization Program

- Refined top-down estimates of energy savings
- Limited to 2015-2016 project data
- Removed savings from solar PV and retained savings from solar thermal projects
- Applied measure savings decay and utility overlap assumptions
Water-Energy Grant

- Refined top-down estimates of energy savings
- Confirmed that data excluded solar PV projects
- Applied measure savings decay and utility overlap assumptions
Energy Savings Program (DGS)

- Refined top-down estimates of energy savings
- Evaluated new data for 2015-2017
- Conducted interview with DGS staff
- Assumed overlap to be 3% based on funding and utility rebate data
- Assumed no measure decay
BEHAVIORAL AND MARKET TRANSFORMATION PROGRAMS

- Behavioral and Market Transformation Results
- State-Wide Benchmarking and Public Disclosure Program
- Energy Asset Rating
- Smart Meter and Controls Program
- Behavioral, Retrocommissioning, Operational Savings
- Fuel Substitution
Behavioral and Market Transformation Programs Results (Electric)
Behavioral and Market Transformation Programs Results (Natural Gas)
State-Wide Benchmarking and Public Disclosure Program

- Adopted top-down analysis developed by Energy Commission staff
- Assumed benchmarking increased uptake of participation in IOU programs due to benchmarking
- Estimated for 2018-2021 savings based on initial program uptake
- Savings improvements beginning 2022
Energy Asset Rating

- Estimated more savings potential from nonresidential asset rating than residential (HERS Whole House)
- Adjusted assumptions for program uptake, participation and response rates
- Applied consistent top-down approach and same assumptions for benchmarking
Smart Meter and Controls Program

• Assumed IOU AMI savings from 2018 CPUC/Navigant PG Study for bottom wedge
• Included POU savings as incremental savings
• Developed scenario with projected savings from PG study
Behavioral, Retrocommissioning, Operational (BRO) Savings

• Assumed IOU BRO savings from the 2018 CPUC/Navigant PG Study in bottom wedge
• Included POU BRO savings as incremental savings for SB 350
• Captured incremental savings from IOU BRO not included in the 2018 PG study
Fuel Substitution

• Refined top-down estimates of energy savings
• Savings potential based on total natural gas use for space and water heating
• Reference case assumes 10% municipality adoption by 2029
INDUSTRIAL AND AGRICULTURAL

• Industrial and Agricultural Results
• Industrial and Agricultural
Industrial and Agricultural Results (Electric)
Industrial and Agricultural Results (Natural Gas)
Industrial and Agricultural

- Energy savings based on data in the 2018 Potential and Goals Study
- Difference Between Project Administrator Cost-Aggressive and TRC-Reference with GHG adder #1, scenario 2
- Approach applied to both sectors.
COMBINED RESULTS

• Combined Results (Electric)
• Combined Results (Natural Gas)
• Combined Results (Electric and Natural Gas)
Combined Results (Electric)

Electricity Savings (GWh)

- **Non-Utility Programs**: Electricity savings from programs not funded through utility rates.
- **Utility Programs**: Electricity savings from programs funded by ratepayers.

SB 350 Doubling Goal
Combined Results (Natural Gas)

- **Utility Programs:** Natural gas savings from programs funded by ratepayers.
- **Non-Utility Programs:** Natural gas savings from programs not funded through utility rates.

**SB 350 Doubling Goal**
Combined Results (Electric and Natural Gas)
Contact Information

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- Phone Number: (916) 651-3006
- Email: Brian.Samuelson@energy.ca.gov