SIX GOING ON SEVEN
Data Aggregation and Analysis

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Lakin Garth, Cadmus

TODAY’S AGENDA
- Project Overview
- The Results
- Next Steps
- Q&A
PROJECT OVERVIEW

WE NOW KNOW

WHAT WAS ACHIEVED
HOW IT WAS ACHIEVED
ACQUISITION PROGRESS
COSTS OF ENERGY EFFICIENCY
PROJECT OVERVIEW

Technical Analytics
- Publics
- Contract
- BPA
- Council Staff

Policy Decisions
- IOUs
- Public Utilities
- CRAC
- Regional Stakeholders
- Council Members

OUR PROCESS

1. DATA GATHERING
2. DATA CLEANING
3. DATA MAPPING
4. DATABASE DEVELOPMENT
5. DATA ANALYSIS
6. MARKET RESEARCH
ASSUMPTIONS & CAVEATS

1. We are assuming the data are correct
2. We did the best we could with the mapping
3. We had to make a few judgment calls
4. No adjustments to the actual savings were made

HOW COST DATA ARE ASSEMBLED

OUR GOAL:
Estimate and compare regional costs for achieving energy savings for the region by sector, end-use, measure category & technology.

REQUESTED DATA
Incentives, incremental & project costs, units, & measure lives.

GOOD RESPONSE
We received nearly all that was requested.

DEVELOPED PROXIES
For missing data.
HOW COST DATA ARE ASSEMBLED

WHAT WE CREATED:

- FIRST-YEAR SAVINGS
- ACQUISITION COSTS
- SIMPLIFIED LEVELIZED COSTS
- Sector-Specific ADMINISTRATIVE COSTS
- Estimated from:
  - RCP total utility expenditure
  - Minus 6 Going On 7 collected incentives
  - Neither include O&M, 10% Act credit, etc.
  - Discount rate = 5%
  - 2013$/kWh, 2006$/kWh
  - 2013$/kWh & million 2013$/aMW
  - 2006$/kWh & million 2006$/aMW

HOW DATA ARE BEING USED

- COUNCIL STAFF
  - Inform baseline saturations
  - Adjust available potential
  - Inform ramp rate assumptions

- BPA & REGIONAL STAKEHOLDERS
  - Using to support CRAC participation
  - Comparing utility savings achievements and distribution against the region and the 6th Power Plan targets

Data are available online at:
www.bpa.gov/goto/SixGoingOnSeven
THE RESULTS
(2010-2013)

REGIONAL ACHIEVEMENTS
6TH PLAN COMPARISONS
SPECIFIC TECHNOLOGIES

REGIONAL ACHIEVEMENTS 2010-2013

85% of forecasted savings
178% of forecasted savings
129% of forecasted savings
136% of forecasted savings
REGIONAL COMPARISON TO 6TH PLAN

RCP data has the region at 268 MW.

REGIONAL ACHIEVEMENTS BY SECTOR

- DEI
- Agricultural
- Industrial
- Commercial
- Residential
HOW TARGETS WERE MET

UTILITIES MAINLY HIT TARGETS THROUGH

1 Markets with Strong Customer Demand

2 Technologies with Mature Program & Market Infrastructure

WE INTERACTED WITH THE MARKET IN TWO WAYS:

WE MOVED THE MARKET
• DHPs
• SEM
• T8s

WE FOLLOWED THE MARKET
• TVs
• T8s

END-USE COMPARISON TO 6TH PLAN

SUMMARY OF END USE (2010-2013)

- Regional Achievements
- 6th Plan Forecast
END-USE COMPARISON TO 6TH PLAN

INDUSTRIAL (2010-2013)

<table>
<thead>
<tr>
<th>Process</th>
<th>Lighting</th>
<th>Fans, Pumps &amp; Motors</th>
<th>Compressed Air</th>
<th>Refrigerated Storage</th>
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<tbody>
<tr>
<td>68</td>
<td>36</td>
<td>29</td>
<td>18</td>
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<tr>
<td>48</td>
<td>15</td>
<td>34</td>
<td>16</td>
<td>38</td>
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178 aMW Saved (2010-2013)

$1.4m/aMW

$2.5m/aMW

2013 First-year Savings Acquisition Cost

AGRICULTURAL (2010-2013)

<table>
<thead>
<tr>
<th>Irrigation Scheduling</th>
<th>Irrigation Hardware</th>
<th>Dairy</th>
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<td>24</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>3</td>
</tr>
</tbody>
</table>

48 aMW Saved (2010-2013)

$0.9m/aMW

$2.3m/aMW

2013 First-year Savings Acquisition Cost
ACQUISITION RATES

CONSUMER

Electronics

Regional Achievements

6th Plan Forecast

INDUSTRIAL

Energy

Management

Regional Achievements

6th Plan Forecast
ACQUISITION RATES

**DUCTLESS HEAT PUMP**

Regional Achievements 6th Plan Forecast

- 2010: 2.6 MW
- 2011: 4.0 MW
- 2012: 3.4 MW
- 2013: 3.2 MW

**HEAT PUMP WATER HEATER**

Regional Achievements 6th Plan Forecast

- 2010: 0.8 MW
- 2011: 0.1 MW
- 2012: 0.2 MW
- 2013: 0.3 MW
ACQUISITION RATES

RESIDENTIAL SHOWERHEADS

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Value</td>
<td>1.3</td>
<td>3.4</td>
<td>5.1</td>
<td>3.2</td>
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</table>

COST BY EMERGING TECHNOLOGY

<table>
<thead>
<tr>
<th>Technology</th>
<th>Levelized Cost per kWh</th>
<th>Region/Program Savings</th>
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</thead>
<tbody>
<tr>
<td>Industrial Energy Management</td>
<td>$0.013</td>
<td>29 aMW between 2010 &amp; 2013</td>
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<tr>
<td>Ductless Heat Pumps</td>
<td>$0.029</td>
<td>13 aMW between 2010 &amp; 2013</td>
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<tr>
<td>Heat Pump Water Heaters</td>
<td>$0.040</td>
<td>0.61 aMW between 2010 &amp; 2013</td>
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<tr>
<td>Residential Behavior Programs</td>
<td>$0.088</td>
<td>7.6 aMW between 2010 &amp; 2013</td>
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TOTAL REGIONAL SAVINGS: 1030 aMW between 2010-2013

PORTFOLIO AVERAGE COST: $0.024/kWh

Levelized Cost
BARRIERS & SOLUTIONS TO EMERGING TECHNOLOGY ADOPTION

**TOP 3 BARRIERS**

- **FIRST COST & COST EFFECTIVENESS**
  - Increased incentives
  - Increased saturation to capture economies of scale

- **LACK OF INFRASTRUCTURE & TRAINING**
  - Regional program development
  - Increased marketing efforts & trainings

- **TECHNOLOGY PERFORMANCE**
  - Conduct research, performance testing or case studies

**LEVELIZED TOTAL COSTS OF SELECT END-USES**

- **PORTFOLIO AVERAGE**
  - $0.049/kWh Total
  - 1,030 aMW savings

<table>
<thead>
<tr>
<th>End-Use</th>
<th>Levelized Total Cost $/kWh</th>
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<tbody>
<tr>
<td>LIGHTING</td>
<td>$0.049</td>
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<tr>
<td>HVAC</td>
<td>$0.034</td>
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<tr>
<td>WolverineELECTRONICS</td>
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<tr>
<td>PROCESS LOADS</td>
<td>$0.070</td>
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<tr>
<td>WATER HEATING</td>
<td>$0.050</td>
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<tr>
<td>REFRIGERATION</td>
<td>$0.060</td>
</tr>
<tr>
<td>IRRIGATION</td>
<td>$0.080</td>
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</table>
IN CLOSE…

FOR BPA, THE PROJECT FINDINGS ARE VALUABLE TO THE REGION

OUR WORK IS COMING TO A CLOSE

COULD THIS WORK BE CONTINUED ON A REGIONAL LEVEL?

NEXT STEPS
### NEXT STEPS

1. Post Six Going on Seven Database  
2. Finish review of Seventh Plan Supply Curves  
3. Develop Draft Comprehensive Workbook  
4. Present and Post Comprehensive Workbook

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### QUESTIONS?

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