1st Year vs. Lifetime Savings Goals

Minnesota Webinar

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Energy Futures Group Consulting

Expertise
- Efficiency
- Renewables
- Electrification
- Building Codes

Services
- Policy Devt
- Program Design
- Evaluation
- Cost-Effectiveness
- Testimony

Range of Clients
- Govt Agencies
- Advocates
- Regulators
- Utilities

Clients in 30+ states, 5 Canadian provinces, Europe & China
Presentation Overview

1. Pros and Cons of 1\textsuperscript{st} year Savings Goals
2. Alternatives to 1\textsuperscript{st} Year Savings Goals
3. IL’s Cumulative Persisting Annual Savings Goals
1st Year Savings Goals
1\textsuperscript{st} Year Savings Goals: Pros & Cons

**Pros**
- Easy to understand
  - annual savings as % of sales
- Easy to benchmark
  - everyone reports it
  - that’s why it is the basis for ACEEE scorecards

**Cons**
- Doesn’t account for savings longevity
  - no relationship to $ value of savings
  - no relevance to system planning/IRP needs
- Perverse incentives to pursue short-lived savings
  - Many short-lived savings are cheap on $/1\textsuperscript{st} year kWh basis…
  - …but expensive on $/lifetime kWh basis
Hypothetical Example:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Savings/Year</th>
<th>Measure Life</th>
<th>Cost</th>
<th>Cost/unit of 1st year savings</th>
<th>Cost/unit of lifetime savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure 1</td>
<td>20 therms</td>
<td>1</td>
<td>$10</td>
<td>$0.50</td>
<td>$0.50</td>
</tr>
<tr>
<td>Measure 2</td>
<td>100 therms</td>
<td>20</td>
<td>$200</td>
<td>$2.00</td>
<td>$0.10</td>
</tr>
</tbody>
</table>
Implications for EE Prioritization

- Affects *program* emphasis within portfolio
  - Residential Behavior most obvious example
  - But definitely not the only one
- Affects *measure* emphasis within programs
Implications for Program Choice/Emphasis

2018 Midwest utility plan, with my adjustments to savings life for Res Behavior (increased to 3 years), LED lamps governed by EISA (decreased to 4 years) & C&I retro-commissioning (increased to 5 years). Portfolio includes three programs not shown that all have costs >300% of portfolio average both ways (low income, multi-family retrofit, single family retrofit).
Partial list of 100+ measures from 2018 Midwest utility program plan. Measures selected to show range of impacts – not necessarily representative of variation across all measures in program. Most values shown at 250% are much higher (cut off to make viewing easier).
Alternatives to 1st Year Savings
Range of Options

1. $1^{st}$ year savings + short-lived measure limits
2. $1^{st}$ year savings + bonus for long-lived measures
3. $1^{st}$ year savings + avg. measure life adjustment factor
4. Lifetime savings
5. Discounted lifetime savings
6. NPV of net benefits
7. Cumulative persisting annual savings
1st Year Savings + Short-Lived Measure Limits

- **Pros:**
  - Preserves easy-to-understand 1st year savings goals
  - Curbs excessive promotion of short-lived savings

- **Cons:**
  - Arbitrary (3 years? 5 years? Other?)
  - Blunt instrument
    - Treats all measure lives above/below cut-off as equal
  - Reduces portfolio flexibility

*Used in several European countries*
Pros:
- Promotes longer-lived measures

Cons:
- Arbitrary (10 years? 15 years? Other?)
- Blunt instrument
  - Treats all measure lives above/below cut-off as equal
- Distorts meaning of 1st year savings values
- Much of bonus may go to measures that would have been promoted anyway

*Used in MI utilities’ shareholder incentive mechanism several years ago*
1st Year Savings + Avg Measure Life Adjustment

- **Pros:**
  - Preserves easy-to-understand 1st year savings goal
  - Assigns equal value to all measure life increments
    - Advantage vs. arbitrary cut-offs for limits/bonuses/penalties

- **Cons:**
  - Effectively values future savings same as current savings
    - May or may not be equally valuable to system

*Functionally same as lifetime savings, just expressed differently*
*No known examples*
Lifetime Savings

- **Pros:**
  - Conceptually easy to explain/understand
  - Assigns equal value to all measure life increments
    - Advantage vs. arbitrary cut-offs for limits/bonuses/penalties

- **Cons:**
  - Effectively values future savings same as current savings
    - May or may not be equally valuable to system
  - Harder to put goals in context (e.g. relative to annual sales)

*Used in WI, MI (shareholder incentives mechanism), & Ontario (gas)*
Discounted Lifetime Savings

- **Pros:**
  - Values all savings over life of measures...
  - ...but treats near-term savings as more valuable
  - Could be better reflection of economic value
    - Depends on avoided costs and how they change over time

- **Cons:**
  - More complex to compute and communicate
  - Potential for reduced transparency
    - If same discount rate not used across all utilities
    - If discount rate changes over time

*No known examples*
NPV of Net Benefits

- **Pros:**
  - Values all savings over life of measures
  - Goals nominally expressed in terms of their actual value

- **Cons:**
  - Much more complex
    - Difficult to set appropriately challenging goals
  - Key variables – avoided costs – often differ between utilities
    - Impossible to establish goals in uniform way
    - Difficult to compare effectiveness of performance across service areas
  - Key variables – avoided costs – often change
    - Impossible to maintain consistency in goals over time

*No known examples of goals set this way*

*But many states have performance incentives tied to NPV net benefits*
Cumulative Persisting Annual Savings

- **Pros:**
  - Only approach that directly aligns with system planning
  - Inherently adds value to longer-lived measures

- **Cons:**
  - Must set goals many years into future to be effective
  - Does not distinguish between different lives for measures still producing savings in last year for which goals set
    - Increasingly bigger issue the closer you get to last year

*New system in IL; also approach in European Union EE Directive*
Illinois’ Cumulative Persisting Goals
Savings Target Defined Differently

The Old Targets:
- Incremental annual savings as % of sales
  - New annual savings was all that mattered
  - 1-year measures counted just as much as 10-year measures
  - Savings from measures installed previous years irrelevant

The New Targets:
- Cumulative persisting annual savings (CPAS) as % of sales
  - Counts all annual savings from measures installed since 2012 that have not reached the end of their useful life
  - Persisting savings from 2012-2017 measures are deemed
  - Will need to track persisting savings for 2018 and beyond
CPAS Formula

\[
\frac{(\text{Cumulative Persisting Savings from Measures installed since 2012})}{(\text{Avg Annual Sales 2014 thru 2016 from Customers other than Exempt Large Customers})}
\]
New Savings Targets

Cumulative Persisting Savings as % of Annual Sales
(from Customers other than Exempt Large Customers)

- Ameren Target
- Com Ed Target
- 2012-2017 Prog Impacts

New Ameren Savings Required (14.5%)
New Com Ed Savings Required (20.0%)
## ComEd 2018-2021 Plan

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ComEd Target</strong></td>
<td>7.8%</td>
<td>9.1%</td>
<td>10.4%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Savings Persisting from 2012-2017 Programs</td>
<td>5.8%</td>
<td>5.2%</td>
<td>4.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Savings Persisting from 2018 Programs</td>
<td>2.2%</td>
<td>2.1%</td>
<td>2.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Savings Persisting from 2019 Programs</td>
<td></td>
<td>2.1%</td>
<td>2.0%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Savings Persisting from 2020 Programs</td>
<td></td>
<td></td>
<td>2.1%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Savings Persisting from 2021 Programs</td>
<td></td>
<td></td>
<td></td>
<td>2.1%</td>
</tr>
<tr>
<td>Total Savings that Count Towards Target</td>
<td>8.0%</td>
<td>9.4%</td>
<td>10.6%</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

Key challenges with savings “die off”:
- Continuous die-off of Res. Behavior savings
- EISA 2020 standards create savings “cliff” for light bulbs installed in all years
- SEM savings life of 3 years means all 2018 SEM savings need replacing in 2021
Utility Performance Incentives

- EE spending is rate-based
- Utility rate of return tied to goal achievement
  - Up to 200 basis point bonus for 25% above goal
  - Up to 200 basis point penalty for 25% below goal for Com Ed
  - No Ameren penalty unless below 85% of goal
Effects of Goals Based on CPAS

- Increased average measure life:
  - ComEd: 11-12 years in current plan vs ~8-9 years in previous years

- Less emphasis on residential behavior programs
  - ComEd: moderate savings reduction vs. past plans
  - Ameren: very large savings reduction, rotating cohorts

- Residential Lighting
  - ComEd: elimination of all standard LED promotions after 2018

- 2021 created special challenges
  - EISA lighting savings “cliff” affecting any light bulb installed from 2018 on
  - 2018 SEM program savings die-off (due to measure life of 3 years)

- Increased focus on measures lives in TRM update/evaluation work

- Increased focus on savings life in R&D, 3rd party prog procurement
Q&A

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