

Resource Planning and Energy Efficiency in the 21st Century

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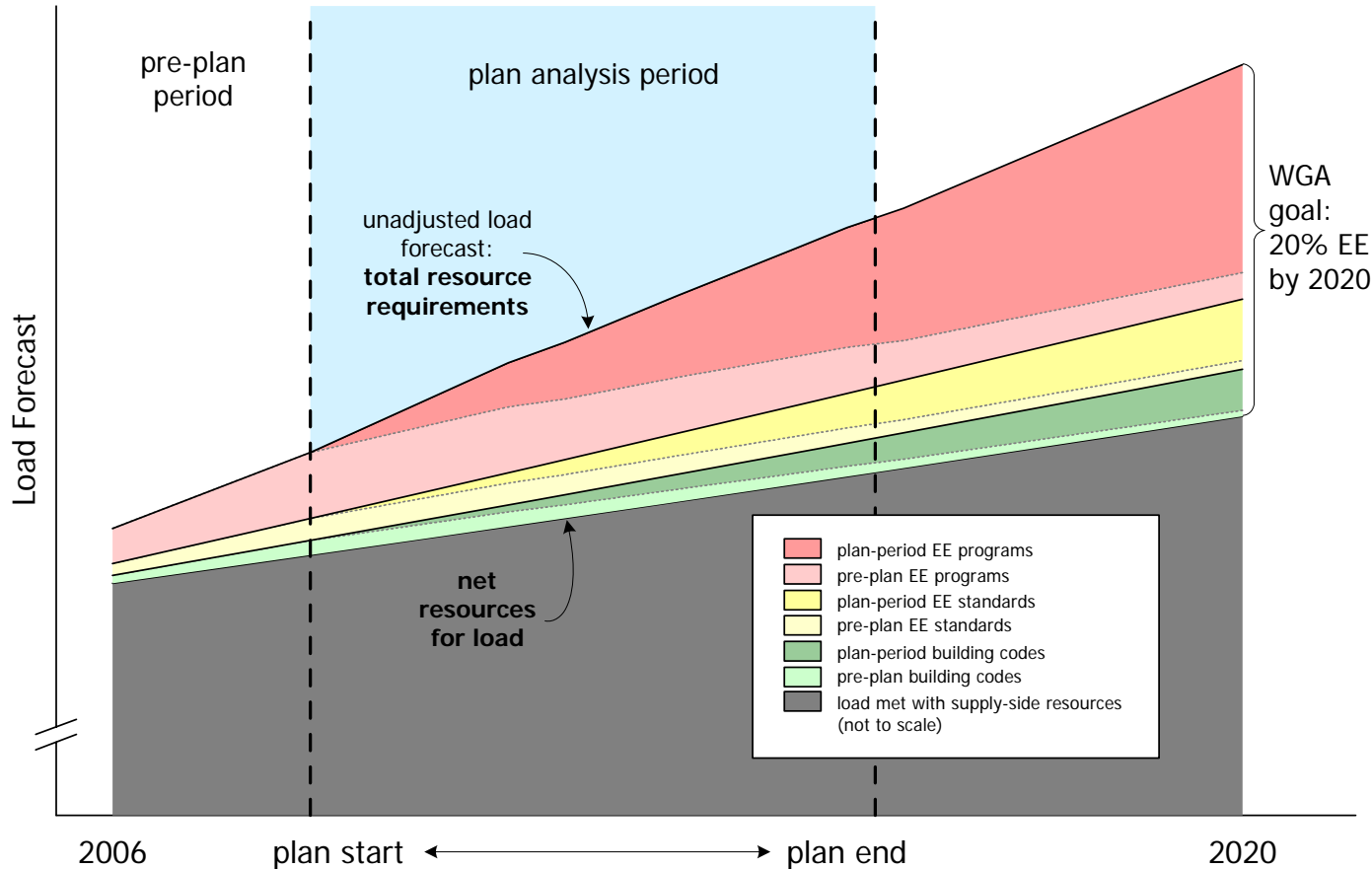
Overview of Topics

- **Role of EE Resources in risk assessment analysis in resource plans (e.g., carbon regulatory risks)**
- **Relationship between DSM Program Planning and characterization of EE resources in IRP plan**
- **Approaches used to model and characterize the quantity and cost of EE resources in IRP plan**
- **Feasibility of using information in IRP plans to track progress toward regional and/or state policy goals (e.g. WGA Clean Energy Goals)**

Presenters

- **Galen Barbose, LBNL**
- **Bill Hopkins, Puget Sound Energy**
- **Suzanne Galster-Doyle, Xcel Energy**

Recommendation: Track EE Explicitly in Load Forecasts



Total resource requirements = load forecast *not* including demand reductions from EE strategies or reserve margins; losses are included.

Net Resources for Load = load forecast *including* demand reductions from EE strategies. Does not include reserve margins; losses are included.

- **Clearly track EE strategies in load forecast to establish progress toward WGA goal:**
 - by type (EE programs, EE standards, building codes)
 - by implementation period (pre-plan EE, plan-period EE)
- **To fully capture the value of EE, calculate planning margins based on **Net Resources for Load****

Spreadsheet Tool for Tracking EE Resources Over Time (1)

Data Input: Energy Efficiency Impacts

* summer-peak capacity savings
NOTE: Savings measured at the customer meter should be adjusted to produce "generation-equivalent" values.

| Program Year | Strategy | Incremental Savings (including losses) in Calendar Year... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----------------|--|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | |
| | | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* |
| 2006 | EE Programs | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 500 | 28 | 400 | 22 | 400 | 22 | 400 | 22 | 400 | 22 | 400 | 22 |
| | Building codes | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 175 | 10 | 140 | 8 | 140 | 8 | 140 | 8 | 140 | 8 | 140 | 8 |
| | EE standards | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 75 | 4 | 60 | 3 | 60 | 3 | 60 | 3 | 60 | 3 | 60 | 3 |
| | Total | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 750 | 42 | 600 | 33 | 600 | 33 | 600 | 33 | 600 | 33 | 600 | 33 |

- Spreadsheet tool designed to help utilities/states track EE resources for CDEAC and other regional assessment needs
- Two data input forms collect detailed information on forecasted EE impacts and loads

Data Input: Load Forecast

| | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | |
|---|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* |
| 1. Total Resource Requirements | 100,000 | 5,000 | 101,500 | 5,075 | 103,023 | 5,151 | 104,568 | 5,228 | 106,136 | 5,307 | 107,728 | 5,386 | 109,344 | 5,467 | 110,984 | 5,549 |
| 2. EE Programs | 500 | 28 | 1,050 | 58 | 1,655 | 92 | 2,321 | 129 | 3,053 | 170 | 3,858 | 214 | 4,744 | 264 | 5,718 | 318 |
| 3. Building codes | 175 | 10 | 368 | 20 | 579 | 32 | 812 | 45 | 1,068 | 59 | 1,350 | 75 | 1,660 | 92 | 2,001 | 111 |
| 4. EE standards | 75 | 4 | 158 | 9 | 248 | 14 | 348 | 19 | 458 | 25 | 579 | 32 | 712 | 40 | 858 | 48 |
| 5. Total EE Strategies (2+3+4) | 750 | 42 | 1,575 | 88 | 2,483 | 138 | 3,481 | 193 | 4,579 | 254 | 5,787 | 321 | 7,115 | 395 | 8,577 | 476 |
| 6. Program-adjusted forecast (1-2) ¹ | 99,500 | 4,972 | 100,450 | 5,017 | 101,368 | 5,059 | 102,247 | 5,099 | 103,084 | 5,137 | 103,871 | 5,172 | 104,601 | 5,204 | 105,267 | 5,232 |
| 7. Net Resources for Load (1-5) ² | 99,250 | 4,958 | 99,225 | 4,988 | 100,540 | 5,013 | 101,087 | 5,035 | 101,558 | 5,052 | 101,942 | 5,065 | 102,229 | 5,072 | 102,408 | 5,073 |
| 8. Planning Reserve Multiplier ³ | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% |
| 9. Planning Reserves (6x7) | -- | 744 | -- | 748 | -- | 752 | -- | 755 | -- | 758 | -- | 760 | -- | 761 | -- | 761 |
| 10. Capacity Requirements (6+8) ³ | -- | 5,702 | -- | 5,736 | -- | 5,765 | -- | 5,790 | -- | 5,810 | -- | 5,825 | -- | 5,833 | -- | 5,834 |

| | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | |
|---|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* | GWh | MW* |
| 1. Total Resource Requirements ¹ | 112,649 | 5,632 | 114,339 | 5,717 | 116,054 | 5,803 | 117,795 | 5,890 | 119,562 | 5,978 | 121,355 | 6,068 | 123,176 | 6,159 |
| 2. EE Programs | 6,790 | 377 | 7,969 | 443 | 9,166 | 509 | 10,482 | 582 | 11,930 | 663 | 13,523 | 751 | 15,276 | 849 |
| 3. Building codes | 2,376 | 132 | 2,789 | 155 | 3,208 | 178 | 3,669 | 204 | 4,176 | 232 | 4,733 | 263 | 5,347 | 297 |
| 4. EE standards | 1,018 | 57 | 1,195 | 66 | 1,375 | 76 | 1,572 | 87 | 1,790 | 99 | 2,029 | 113 | 2,291 | 127 |
| 5. Total EE Strategies (2+3+4) | 10,185 | 566 | 11,953 | 664 | 13,748 | 764 | 15,723 | 874 | 17,896 | 994 | 20,285 | 1,127 | 22,914 | 1,273 |
| 6. Program-adjusted forecast (1-2) ¹ | 105,860 | 5,255 | 106,370 | 5,274 | 106,888 | 5,294 | 107,313 | 5,307 | 107,631 | 5,315 | 107,832 | 5,316 | 107,900 | 5,310 |
| 7. Net Resources for Load (1-5) ² | 102,465 | 5,067 | 102,386 | 5,053 | 102,306 | 5,039 | 102,072 | 5,016 | 101,666 | 4,984 | 101,070 | 4,941 | 100,262 | 4,886 |
| 8. Planning Reserve Multiplier ³ | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% | -- | 15% |
| 9. Planning Reserves (6x7) | -- | 760 | -- | 758 | -- | 756 | -- | 752 | -- | 748 | -- | 741 | -- | 733 |
| 10. Capacity Requirements (6+8) ³ | -- | 5,827 | -- | 5,811 | -- | 5,795 | -- | 5,769 | -- | 5,731 | -- | 5,682 | -- | 5,619 |

* summer-peak demand

Spreadsheet Tool for Tracking EE Resources Over Time (2)

Output: Efficiency Resource Summary Tables

Energy Efficiency Strategy Summary
Cumulative Impacts of EE Strategies Implemented Starting in 2006

| | 2010 | | 2015 | | 2020 | |
|---|---------|-------|---------|-------|------------|------------|
| | GWh | MW* | GWh | MW* | GWh | MW* |
| EE Strategy Impacts | | | | | | |
| Cumulative EE Strategy Impacts ¹ | 4,579 | 254 | 11,953 | 664 | 22,914 | 1,273 |
| Forecast Total Resource Requirements (TRR) ² | 106,136 | 5,307 | 114,339 | 5,717 | 123,176 | 6,159 |
| EE Strategies as Percent of TRR | 4% | 5% | 10% | 12% | 19% | 21% |
| EE Strategies as Percent of TRR Growth (since 2006) | 75% | 83% | 83% | 93% | 99% | 110% |
| Impact of EE strategies on forecast load growth | | | | | | |
| Average Annual growth in TRR (since 2006) | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% |
| Net Resources for Load (NRL) ³ | 101,558 | 5,052 | 102,386 | 5,053 | 100,262 | 4,886 |
| Average Annual Growth in NRL | 0.6% | 0.5% | 0.3% | 0.2% | 0.1% | -0.1% |
| Percentage reduction in growth rate | 62% | 69% | 77% | 86% | 95% | 107% |

← WGA goal

* summer-peak capacity

- Data are aggregated into summary tables that provide key EE metrics, including progress toward WGA CDEAC goal

For More Information...

**Energy Efficiency in Western Utility Resource
Plans: Impacts on Regional Resource
Assessment and Support for WGA Policies**

*Hopper, N., C. Goldman and J. Schlegel.
LBNL-58271. August 2006.*

Report and spreadsheet tool available at:

<http://eetd.lbl.gov/ea/EMS/rplan-pubs.html>

Progress Toward the WGA CDEAC Goal: 20% by 2020?

| Utility | Plan EE Program Impacts as % of Total Energy Requirements | |
|----------------|---|--------|
| | 2008 | 2013 |
| Avista | 2.5 % | 4.8 % |
| BC Hydro | 3.8 % | 6.0 % |
| Idaho Power | 0.4 % | 0.9 % |
| Nevada Power | 0.7 % | — |
| NWE | 2.9 % | 5.9 % |
| PacifiCorp | 1.9 % | 3.4 % |
| PGE | 2.8 % | 5.1 % |
| PSCO | 1.4 % | 2.8 % |
| PSE | 5.7 % | 10.4 % |
| PG&E | 5.0 % | 10.1 % |
| SCE | 5.3 % | 10.4 % |
| SDG&E | 6.7 % | 11.3 % |
| Sierra Pacific | 1.4 % | — |

- In 2013, utilities are projected to meet 0.9% to 11.3% of load with EE programs
- **This underestimates actual progress:** EE standards and building codes not included!
- No information on status in 2020
- Bottom line:
 - Some states/utilities on track to meet CDEAC goals
 - **insufficient information in current resource plans to judge progress fairly in other states**