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January 6, 2015

MEMORANDUM

TO: Power Committee

FROM: Charlie Grist, Tina Jayaweera, Kevin Smit

SUBJECT: Seventh Plan Policy Issues for Conservation

BACKGROUND:

Presenter: Charlie Grist

Summary: Staff will summarize discussions held with the Conservation Resources Advisory Committee (CRAC), focusing on the policy issues which have garnered the most attention from the committee.

The CRAC has had seven meetings in preparation for the Seventh Power Plan, four of which occurred in 2014. Two more are scheduled in January. At each meeting, 40 to 50 people have attended, either in person or via webinar, representing a broad spectrum of stakeholders including program administrators, implementers, evaluators, and advocacy organizations.

There has been a high level of committee engagement on both policy and technical issues. These are reflected in the meeting minutes which are posted on the Council's webpage. The technical aspects of the analysis are also being posted for public review. In addition, BPA has a contract in place to perform a review of the supply curve workbooks and synthesize the information into a master workbook for ease of public consumption.

Policy issues on which the CRAC has spent considerable effort include:

1. Exceptions to use of the frozen efficiency baseline;
2. Treatment of residential lighting given the 2020 Energy Independence and Security Act (EISA) requirements;

3. Inclusion of behavior-based measures into the supply curve; and
4. Treatment of conservation in the Regional Portfolio Model (RPM)

CRAC members were in general agreement with staff's proposed approach on the first and fourth issues. For the second and third issues, CRAC has not reached a consensus opinion and for these. Both of these proposals will be discussed further at the CRAC webinar on January 16 or the CRAC meeting on January 28. The Council will make the final decision on all of these issues when it adopts the draft Plan for public review.

Issue 1: Exceptions to Frozen Efficiency Baseline. Staff proposed that the Seventh Plan analysis continue to use a frozen efficiency baseline except for cost and efficacy of solid-state lighting and data centers given the rapidly changing technologies. CRAC members were in general agreement with staff's proposed approach to these exceptions.

Issue 2: Treatment of residential lighting given the 2020 Energy Independence and Security Act (EISA) requirements. Staff is proposing to treat a portion of the potential from residential lighting programs, in the 2016-2019 time frame, similar to a limited-duration power purchase agreement, because the savings do not persist after 2020. After 2020, a new federal standard for general service light bulbs takes effect and thus captures a portion of the savings potential without need for utility programs. Post 2020 savings from the standard are already reflected in a lower Council's load forecast. The proposed approach to treat the near-term savings as a limited-duration contract purchase available to the RPM sprang from concern of some CRAC members about ignoring potentially valuable savings between 2016 and 2019 in advance of the standards. Staff analyzed the near-term savings and found them to be low cost and potentially valuable as a short-term purchase. CRAC members will review this proposal January 16.

Issue 3: Inclusion of behavior-based measures into the supply curve. There is an underlying question of persistence from behavior-based measures and thus, whether the savings from such measures should be included in the supply curves as a power resource. There was a lively discussion of the issue at the CRAC with members expressing strong opinions on both sides of the question. Examples of behavior-based measures include: enhanced control of lighting, HVAC systems, and irrigation scheduling. There are currently several utility-sponsored programs designed to encourage the adoption and to quantify the impact of these types of measures, at varying levels of rigor. One of the chief areas of concern by CRAC members is the prescription of the programmatic approach to achieve savings. Staff's proposal is to include measures for which savings can be quantified, without prescribing a

program delivery approach to attain these savings. The CRAC will review this approach January 16.

Issue 4; Treatment of conservation in the Regional Portfolio Model (RPM).

Treatment of conservation in the RPM has been enhanced to better reflect conservation acquisitions over time, given future prices and conservation cost-effectiveness levels are uncertain. Savings from measures that are replaced on burnout multiple times within the 20-year planning horizon will be available to the RPM at the next turn-over opportunity if not acquired by RPM in earlier years. The likely impact from this change is a reduction in the market price premium for lost-opportunity measures compared to the Sixth Plan. A similar approach to annual availability will be used for retrofit measures. This will likely supersede the need for a 160 aMW annual maximum used in the Sixth Power Plan. CRAC members were in general agreement that this approach was an improvement over the prior Plan.

Next steps are to elicit feedback from CRAC on the second and third issues at the January 16 CRAC webinar. The following CRAC meeting on January 28 will be used to discuss any additional issues that arise prior to the completion of the draft supply curves in mid-February.

Relevance: Decisions on policy issues will impact the total available potential for conservation over the Plan horizon and the resulting conservation targets in the Seventh Power Plan. Issues for which there is not general support of the CRAC may need to be decided by the Council.

Workplan: 1D. Prepare for Seventh Power Plan and maintain analytical capability; update conservation supply curves.

Background: During the December 2014 Power Committee meeting, staff discussed the issue of frozen efficiency within the context of the load forecast. The other issues have not been previously discussed with the Council for the Seventh Plan.

More Info: CRAC meeting notes and comments from stakeholders are available on the CRAC webpage: <http://www.nwcouncil.org/energy/crac/home/>

Seventh Plan Policy Issues for Conservation

Charlie Grist
Tina Jayaweera
Kevin Smit
January 13, 2015

Agenda

- **Purpose: Brief Council on issues discussed at Conservation Resource Advisory Committee**
- **List of policy issues discussed**
- **Summary of discussions & committee advice**
- **Path forward**
- **Next steps**

List of Issues of Interest

- Exceptions to frozen efficiency
- How to treat the 2020 EISA provisions for general service lighting?
- Which (if any) behavior-based measures should go into supply curve and how to account for persistence?
- Conservation logic in the Regional Portfolio Model (RPM)

Frozen Efficiency

- Frozen efficiency means that we set the baseline at current efficiency levels
 - Include known, upcoming codes & standards
 - Do not account for possible or anticipated changes in baseline efficiency
- Council has used this assumption since the first power plan
- For the Seventh Plan we are proposing a few exceptions to this baseline assumption

Exceptions to Frozen Efficiency

- **Propose treating two measures differently due to rapidly changing cost & efficacy:**
 - Cost & efficacy of solid-state lighting (LED)
 - Electronics (consumer electronics & data centers)
- **Is frozen efficiency baseline appropriate?**
- **If don't freeze, how to forecast changes?**

CRAC Discussion

- **All agree rapid changes are hard to project**
- **Industry comfort with near term changes (3-5 years) is fairly robust**
- **But comfort rapidly diminishes long-term**
- **CRAC agreed that ignoring projected improvements would misrepresent these three markets**

Resolutions

- **SSL: Project cost and efficacy to 2017 based on PNNL report**
- **Consumer electronics: Assume delta between baseline and efficient remains about same**
- **Data centers: Project efficiency improvements based on continued improvement in computation per Watt and computations per server**

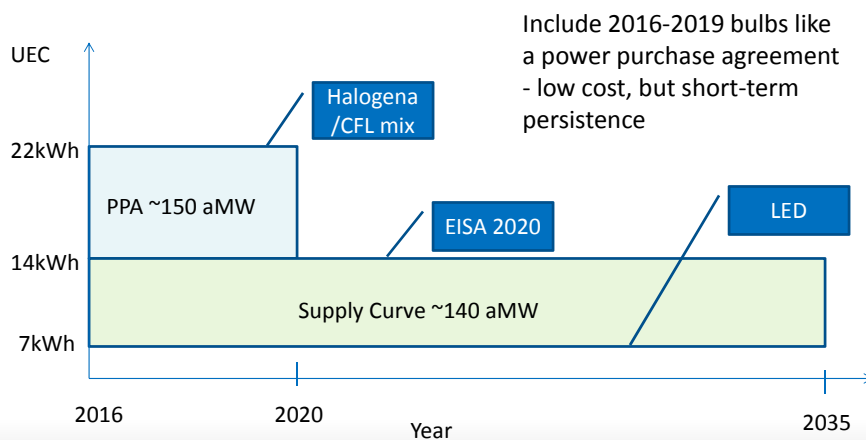
EISA 2020

- **In 2020, baseline for general service bulbs increases to 45 lumens/watt**
 - **Currently, only CFLs and LEDs can meet this (no incandescent bulbs)**
 - **Incandescent bulbs have short (1-2 year) lifetime**
- **What is value of near-term residential lighting programs when savings are short-lived?**

CRAC Discussion

- Given legislation is never certain, is there value in continuing programs to move market toward EISA requirements?
- What is value of programs influence on quality of SSL bulbs?
- What is the impact on 7P Efficiency target if lighting is included in 2016-2019 period?

Resolution (pending)



Behavior-Based Measures

- **Examples:**
 - Industrial strategic energy management
 - Scientific Irrigation Scheduling (SIS)
 - Residential home energy reports
- Do these count as energy-efficiency as defined by the Power Act as “forecast to be reliable and available within the time it is needed”

CRAC Discussion

- Staff proposed persistence of savings is key metric to include, but how to define?
- Industrial and SIS well established, research demonstrates persistence
- Uncertainty around commercial and residential quantification and persistence of savings
- CRAC divided about counting behavior programs as reliable efficiency resource

Resolution (pending)

- Incorporate as physical measures, not as prescriptive program approaches
- Savings come from reductions in run time, tuning of systems, optimized schedules
 - Behavioral programs can capture these savings
 - So can emerging forms of automated controls
- Savings must be persistent
 - Some approaches may require recurring investment

Industrial, Commercial & Ag

- **Industrial**
 - Update energy management savings based on recent performance
- **Commercial**
 - Update controls optimization & energy management measures included in Sixth Plan with more recent data
- **Agriculture**
 - Update controls savings from scientific irrigation practices

Residential Behavior

- Home Energy Report programs are a means to improve controls, e.g.,
 - Reduced lighting hours of use
 - Temperature setback during vacations
 - Water heater temperature setback
- Estimate savings from control measures, but include as single bundle for cost and life
- Likely savings from these will become more automated in future from advanced control technologies

Example Home Energy Report



From OPower

Conservation Logic in RPM

- **Two critical components for RPM**
 1. Cost
 2. Availability of energy over time
- **Other important components**
 - Shape of energy savings
 - Impact on coincident peak

Cost of Conservation

- **Levelized cost per kWh**
 - Total Resource Cost
 - Net of Regional Act Credit
 - Levelized over 20-year forecast period
 - Levelized cost normalizes different measure lives
- **For RPM: Combine all conservation measures into cost tiers**
 - Each tier a collation of measures in that cost bundle
 - Separate lost-opportunity & retrofit sets
 - Tiers are NOT “programs”

Conservation Availability Over Time

- Three key time parameters passed to RPM for each cost bin
 1. Annual maximum
 2. Total not to exceed over 20-year period
 3. Ramp rate year-to-year
- These factors driven by
 1. Units forecast & stock turnover models
 2. Program ramp rates
 3. Load forecast (future load level)

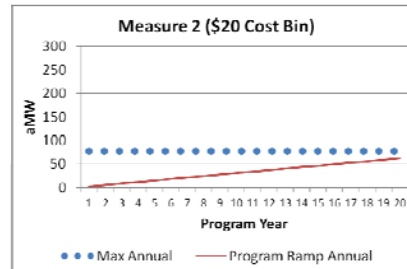
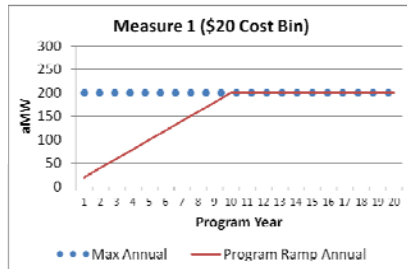
Example

Measure 1:

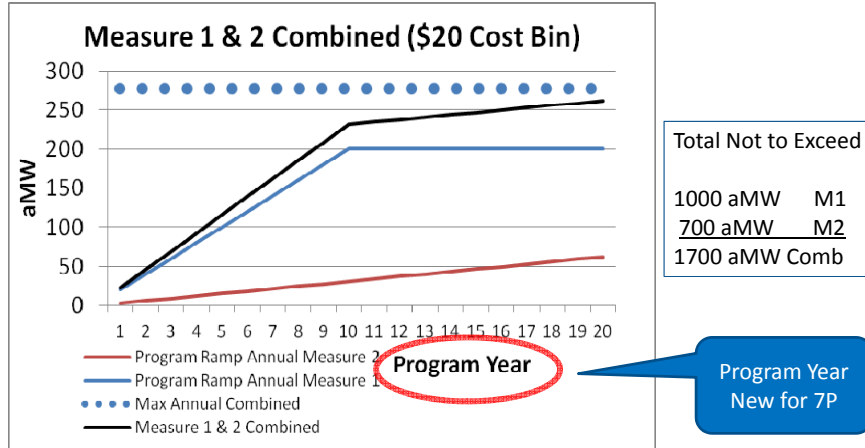
- Total Available 1000 aMW
- Turnover 5 years
- Fast Program Ramp

Measure 2:

- Total Available 700 aMW
- Turnover 9 years
- Slow Program Ramp



Example



Conservation Availability Over Time (2)

- Better reflect availability of fast-turnover lost-opportunity measures
 - We don't know what EE will be cost-effective
 - RPM tests conservation avoided cost decision rules against hundreds of future market prices & load levels
 - Supply curves must reflect availability without foreknowledge of if or when RPM might acquire
- Fast-turnover measures re-present as opportunities in later years, if not acquired in earlier years

Possible Impact

- **More fast-turnover measures available through term of planning period than 6P**
- **May reduce premium for lost-opportunity**
 - **It's not all lost forever**

Retrofit Conservation Logic

- **Same three parameters describe retrofit conservation availability**
 1. Annual maximum
 2. Total not to exceed over 20-year period
 3. Ramp rate year-to-year
- **RPM logic for retrofit to be similar**
- **RPM purchases from all bins up to cost tested**
- **May supersede need for 160 aMW max from 6P**

Next Steps

- **CRAC webinar January 16**
 - Residential issues, Commercial energy management
- **CRAC to meet January 28**
 - More measure reviewed
 - Ramp rates: How fast can EE be acquired
- **Draft EE supply curves to RPM February**