Agenda

Conservation Advisory Council
Wednesday, May 9, 2018
Special joint CAC and RAC lunch from 12:00 p.m. – 1:30 p.m.
Regular CAC meeting from 1:45 p.m. – 4:00 p.m.

421 SW Oak St., #300, Portland, OR 97204

12:00 Budget Review Project findings and recommendations *(discussion)*
A joint RAC and CAC presentation on the Budget Review Project. After a year-long process involving staff and stakeholder engagement and intake, staff will present findings and draft recommendations to improve Energy Trust's budget development process. Staff are seeking feedback and first impressions.

Lunch will be provided for RAC and CAC members.

1:30 Break

1:45 Welcome, old business and short takes *(information)*

- Introductions, agenda review
- Approve March meeting minutes
- Review revised 2018 meeting dates
- Membership changes
- Invitation to Board of Directors Strategic Planning workshop May 17 and 18

2:00 Air conditioning measure analysis *(information)*
Planning Manager Spencer Moersfelder and Aquila Velonis from Cadmus will present the findings of the second phase of an air conditioning study. The February 2017 presentation to CAC on the first phase of the study is included in the packet materials online for reference.

2:30 Residential measure decision-making approaches *(discussion)*
Residential staff will take council members through an exercise that solicits feedback on decision making during the measure development process. Bring your smart phone and/or laptop to participate in this exercise.

3:00 Break

3:15 2018 CAC Planning Workshop follow-up *(discussion)*
Staff and council members will review the outcomes of the World Café exercise conducted at the March meeting. This is time to confirm the takeaways, for staff to ask clarifying questions of council members and to talk about next steps. Please refer to the appendix to the March meeting minutes for the notes from this exercise, and review prior to the May meeting.

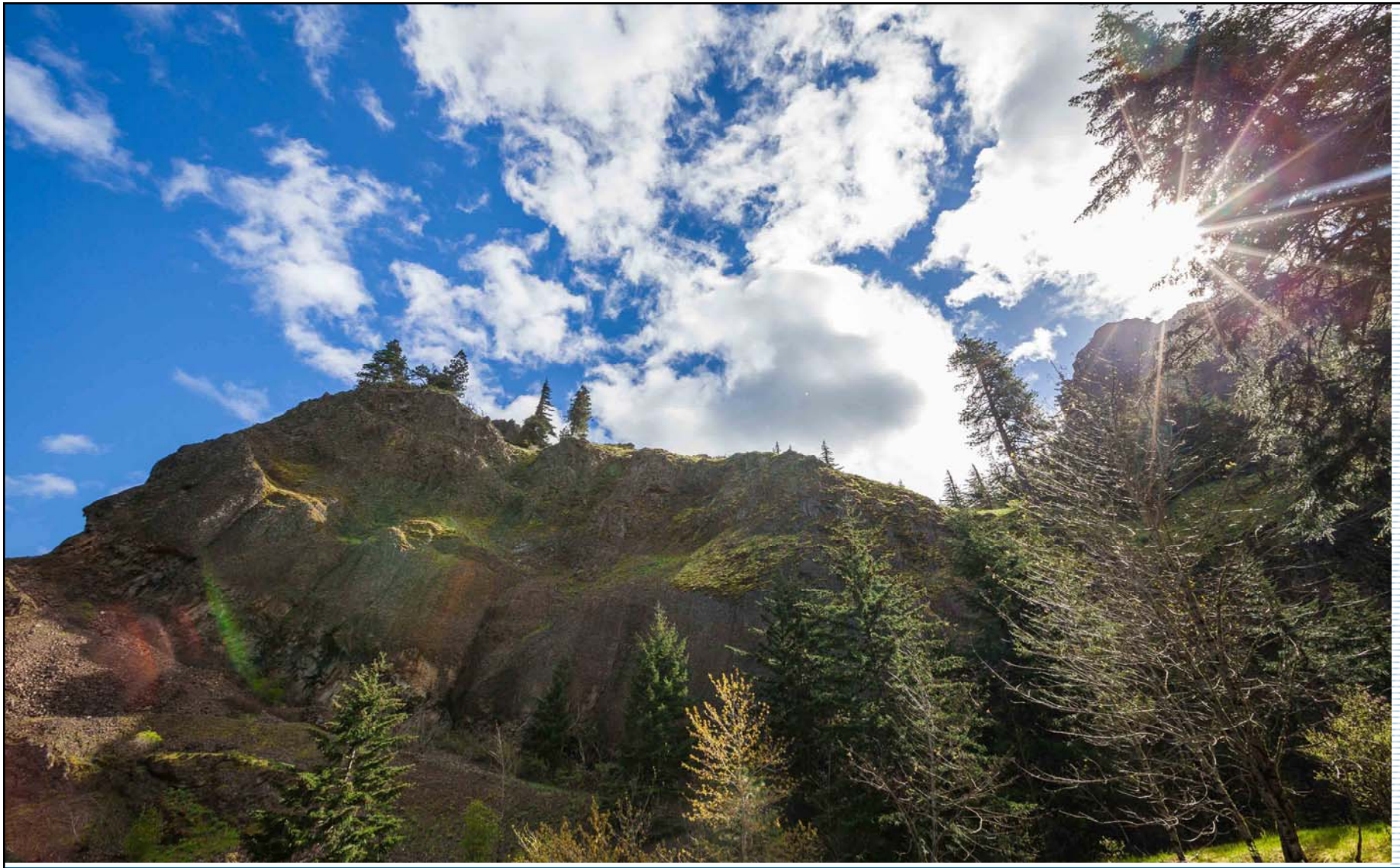
3:35 Preliminary changes to 2019-2020 budget development schedule *(discussion)*
Director of Operations Steve Lacey will give a high-level overview of changes to the engagement schedule for the upcoming 2019 budget process starting this summer.

3:45 Public comment

4:00 Adjourn

The next Conservation Advisory Council is June 20, 2018.

Meeting materials (agendas, presentations and notes) are available online https://www.energytrust.org/about/public-meetings/conservation-advisory-council-meetings/.



Budget Review Project
Findings and Recommendations

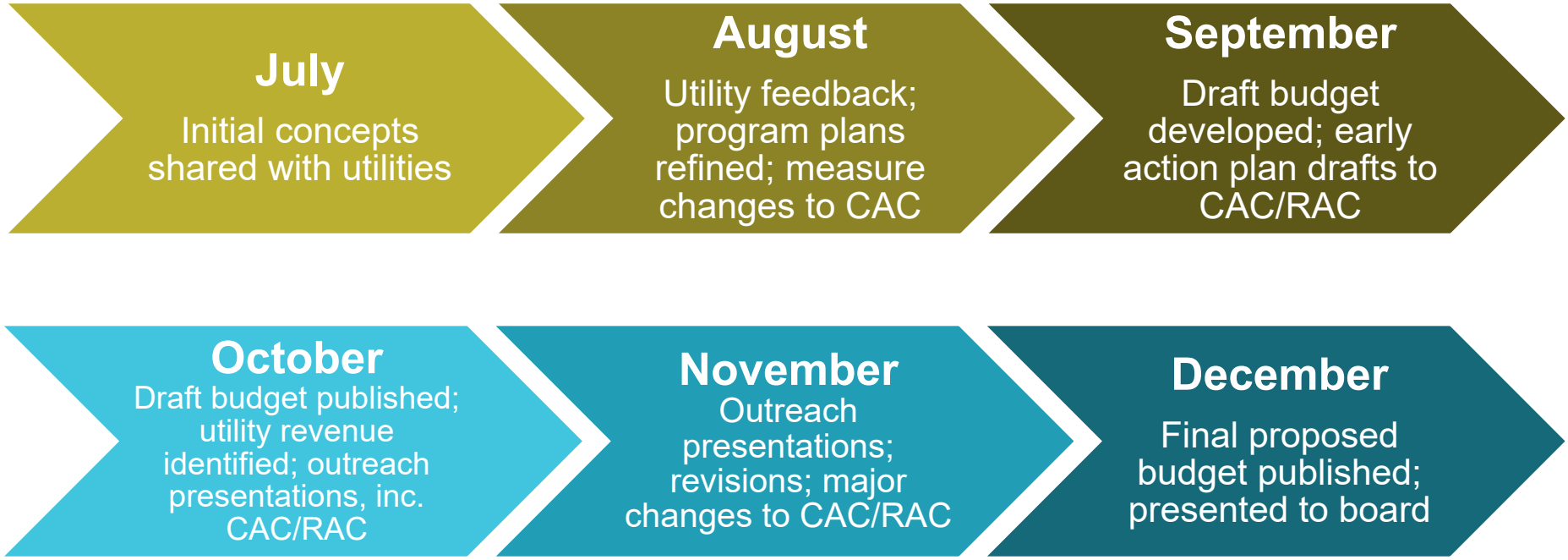
Joint RAC and CAC Meeting; May 9, 2018

Energy Trust of Oregon

Agenda

1. Purpose of the project
2. Project goals
3. Discovery process
4. Recommendations
5. Initial feedback and next steps
6. Q&A
   - Would this proposal work for your organization?
   - Does this proposal address concerns you may have?
   - Do you foresee any unintended consequences?
   - Did the team miss anything?

Process Used to Develop the 2018 Budget, 2018-2019 Action Plan



Purpose of the Project

The budget process at Energy Trust is a long and resource intensive process which is intended to accomplish stakeholder engagement, transparency and accountability, strategic planning, funding, energy savings acquisition and renewable generation, and financial management.

The mission and purpose of the review team is to identify an option for an alternative process that will deliver critical value in a more efficient, effective and flexible manner than the current process.

Discovery Process

1. Created Guiding Principles
2. Mapped and discussed current process
3. Sought feedback from staff and external stakeholders through interviews and surveys
4. Interviewed 5 external organizations
5. Arrived at budget recommendations

External Stakeholder Feedback

Overall Themes

Budgeting represents **significant workload** for all parties

Budget is complex and **the timing is not optimal**; the OPUC and utilities want more time to deliberate, earlier completion, and minimal rate changes.

External stakeholders question if they **have an influence in development of the budget**

External Stakeholder Suggestions

Stakeholders want **earlier involvement** to provide feedback and build the budget in partnership

Utilities need to **know of large pending changes before October**

Utilities want better **alignment with their IRPs;** the budget is not in sync with the 5 utilities' IRP updates and rate cycles

Utilities prefer **steady budgets with minor changes** over big rate swings; they want consistency and predictability

Internal Feedback

Overall Themes

Budgeting represents **significant workload** for all groups

Creating or **revising action plans each year is time consuming**

Very difficult to make changes in the development and implementation of the budget

A lot of work in Q3 and Q4 each year – no time to work on other efforts or projects

Tools are not sufficiently robust to manage programs or internal groups except at a very high level

Staff Suggestions

Better budgeting tools with an ability to make changes or model scenarios

More time for stakeholder input and review

Reduce churn and time required to make changes

More flexibility to move money between programs and sectors

Create staffing plans and strategy separate from annual budget process (budget should flow from staffing plan)

Mixed comments on desire for multi-year approach – some staff want longer-term planning timeframe, while others prefer the flexibility of an annual timeframe

Proposed Process

Background on the Current Process

Proposed Process Components, Defined

Workgroups

Key Drivers

Feedback Suggested Separating Planning from Budgeting

Planning & Budgeting

Goals of the Proposed Process

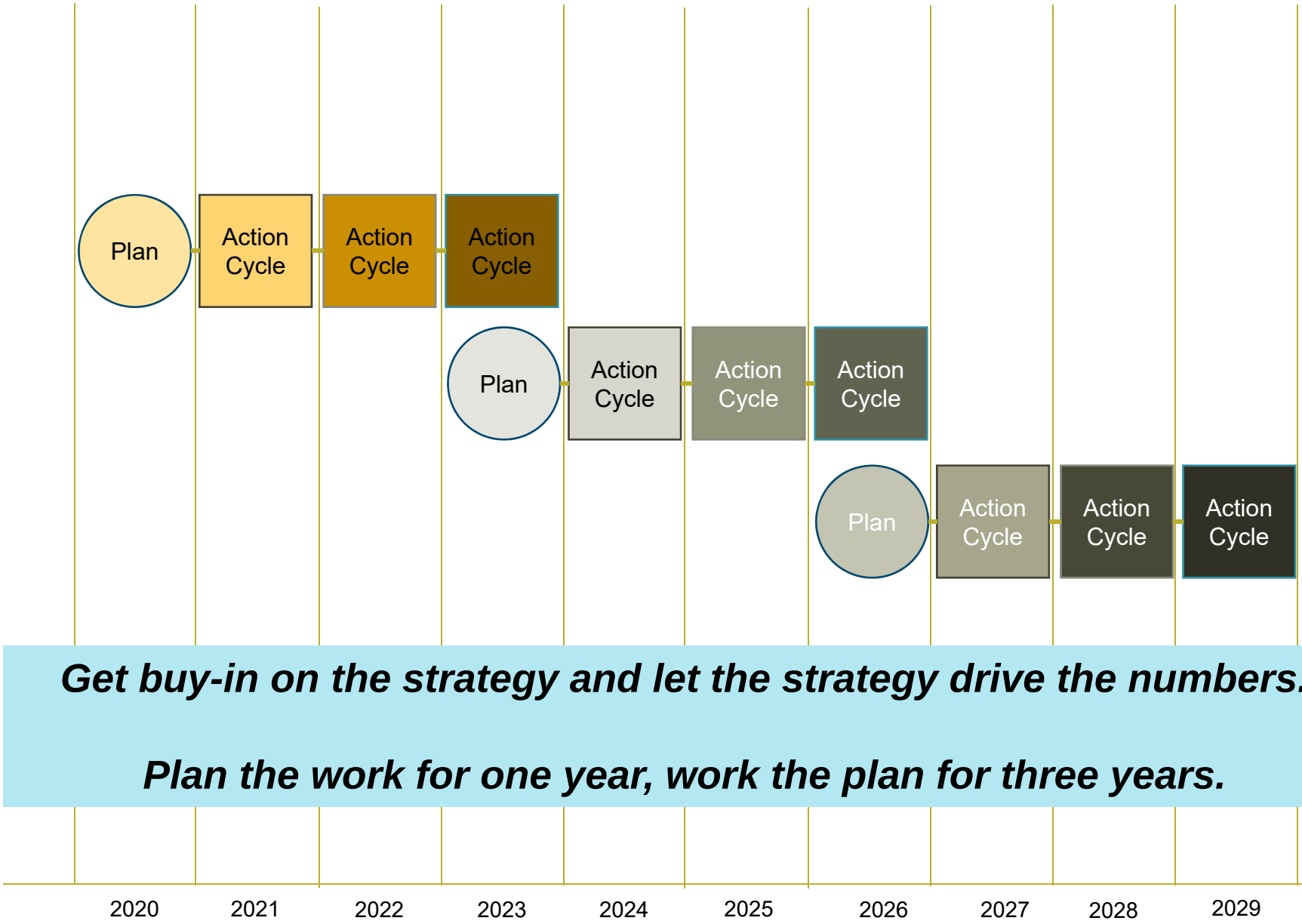
Increase stakeholder participation (via workgroups) in early planning work

Achieve broad stakeholder agreement on

- Key drivers
- Savings and generation ranges over a longer planning period
- Budget ranges required to achieve those projections

Refocusing stakeholder feedback in subsequent years to changing market factors and opportunities.

Additional Process Components



Get buy-in on the strategy and let the strategy drive the numbers.

Plan the work for one year, work the plan for three years.

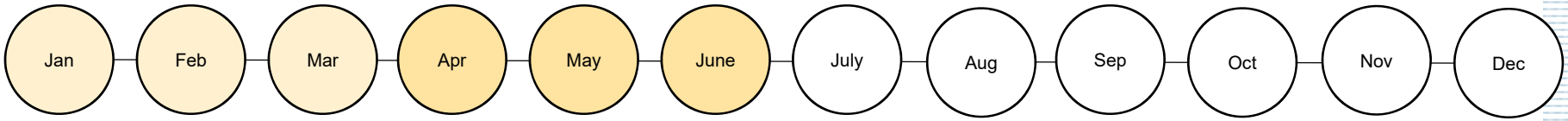
Strategy/Planning Year (2020)

January-March

- Analysis of past year's results
- Engage workgroups
- Draft 3-year Sector Strategies

April-June

- Continue workgroups
- Stakeholder feedback on Sector Strategies
- Finalize measure development for 2021
- Sector Strategies finalized
- Draft 3 year Program and Support Action Plans and budget ranges

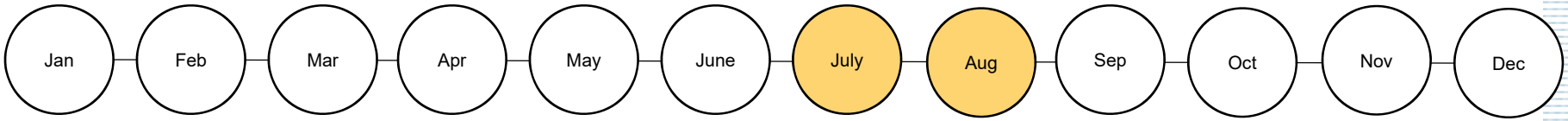


Strategy/Planning Year (2020)

At this point we have 3-year Sector Strategies with draft 3-year action plans and budget ranges

July-August

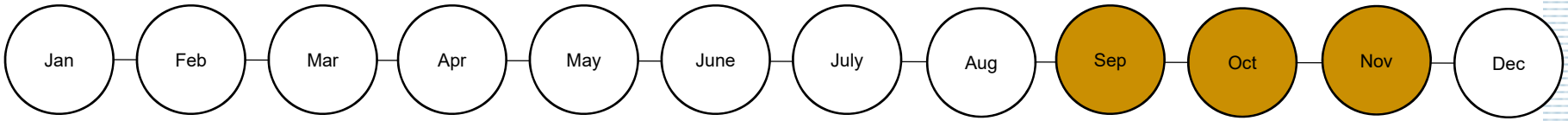
- Comprehensive 3-year plan presented to stakeholders, including workgroups, OPUC, Board and CAC/RAC
- Once approved, this becomes the Business Plan
- Program staff make 2021 budget edits



Strategy/Planning Year (2020)

September-November

- 2021 Annual Budget refined based on feedback
- Final Proposed Budget presentations
- Public comment on Annual Budget
- Final 2021 Budget



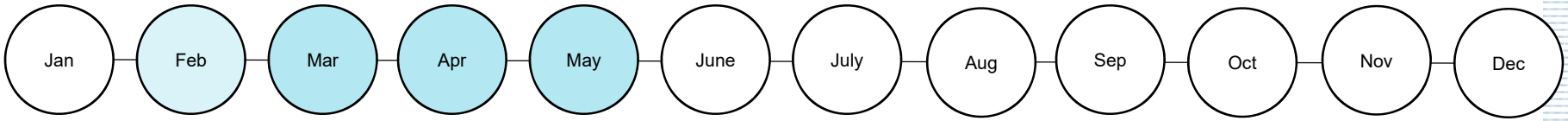
Action Year 1 (2021)

February

- Analysis of past year's results

March-May

- Staff review key drivers and current forecasts against expected Business Plan ranges
- Staff document findings and make recommendations for review by stakeholder workgroups



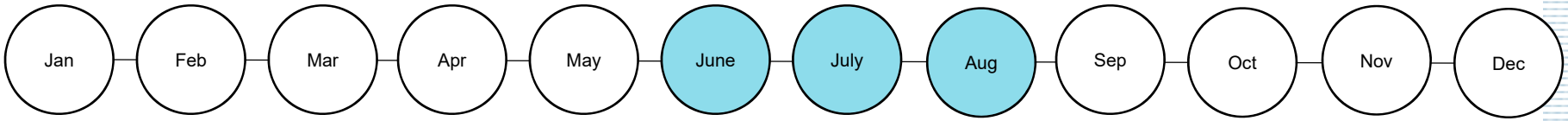
Action Year 1 (2021)

June - August

- If key drivers / metrics indicate potential for deviation from Business Plan ranges, staff analyze impacts and bring recommendation to CAC/RAC
- Staff then update Business Plan, reforecasting savings, generation and budget ranges

-or-

- If Business Plan is within ranges, staff note appropriate changes for draft 2022 budget and notify workgroups/RAC/CAC
- Staff update 2022 budget, incorporating new information from major or minor changes reviewed by workgroups



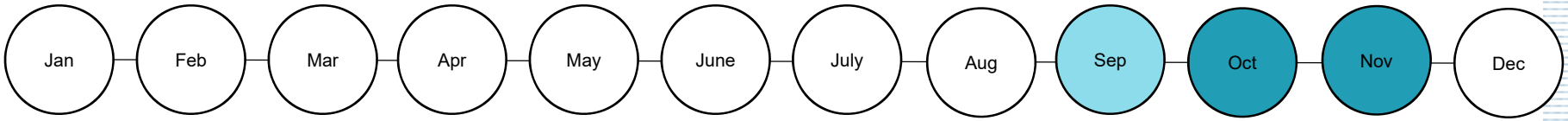
Action Year 1 (2021)

September

- Stakeholder review (OPUC, Board, CAC/RAC, etc.) review 2022 budget
- Public comment period opens

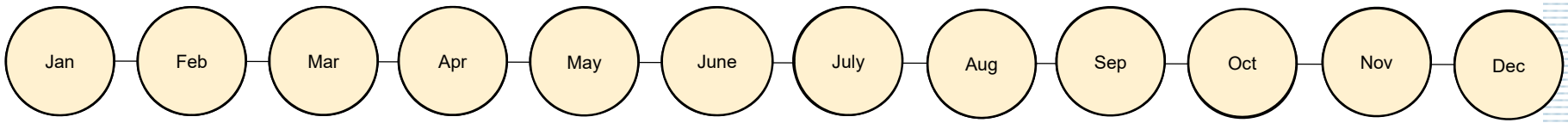
October-November

- Public comment period closes
- Board approval of 2022 budget



Action Year 2 (2022)

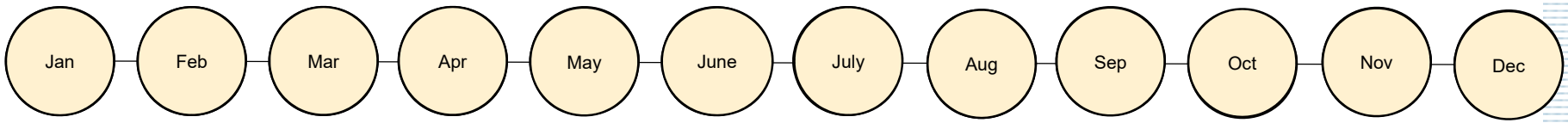
Same as Action Year 1



Action Year 3 (2023)

Executing Year 3 of Business Plan for 2021-2023

Beginning planning process for 2024-2026 Business Plan.



Success Factors and Benefits

Critical Success Factors

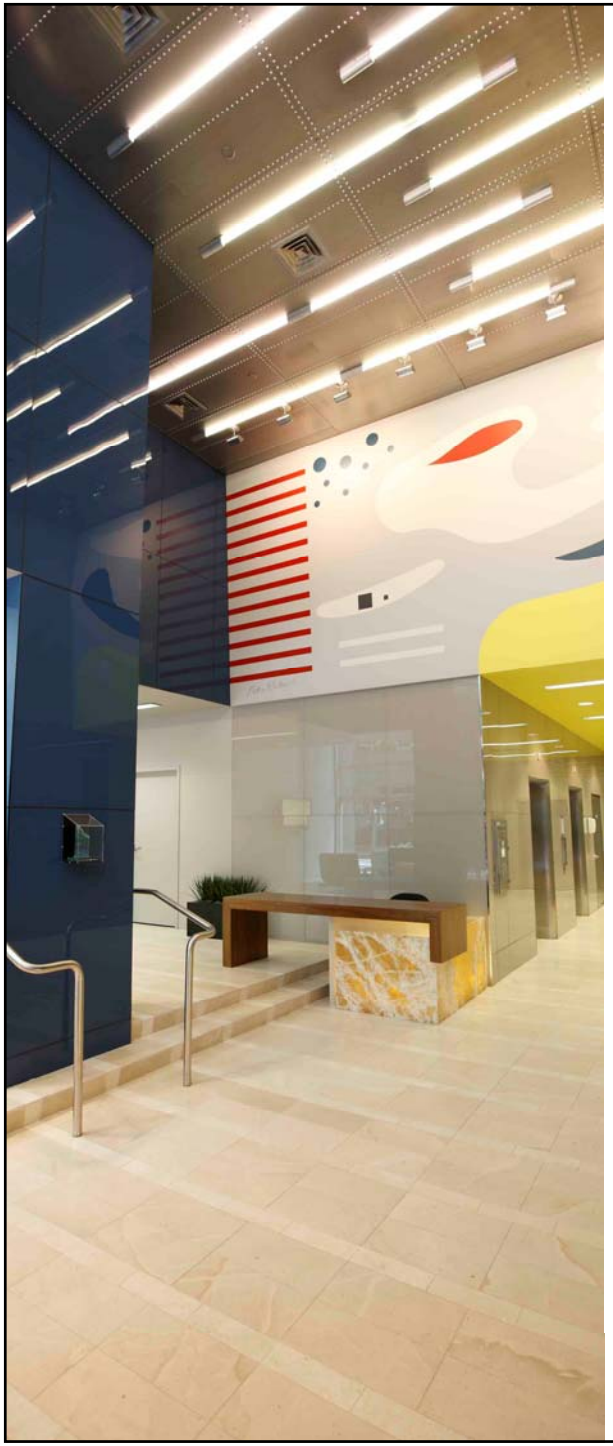
Stakeholder support

Forecasting abilities good enough to support planning

Increased flexibility in use of reserves

Appropriate levels of reserves

New budgeting software



Benefits

Increase stakeholder engagement

Concentrate work on planning, while eliminating some work on subsequent budget periods

Increase program flexibility

Increase strategic perspective of budget planning

Initial Feedback and Next Steps

Report Out Process

Presented to internal Management Team and kept staff apprised

Shared the concept with the OPUC

Presented to all of the utilities

Made a brief update to the Board of Directors and Board Finance Committee

Will bring to full Board on June 6

What we've heard so far

Many questions about the workgroups, with both support and concerns expressed

Cost of the changes

Impact to reserves

Concerns about the accuracy of three-year forecasts in a dynamic market

Next Steps

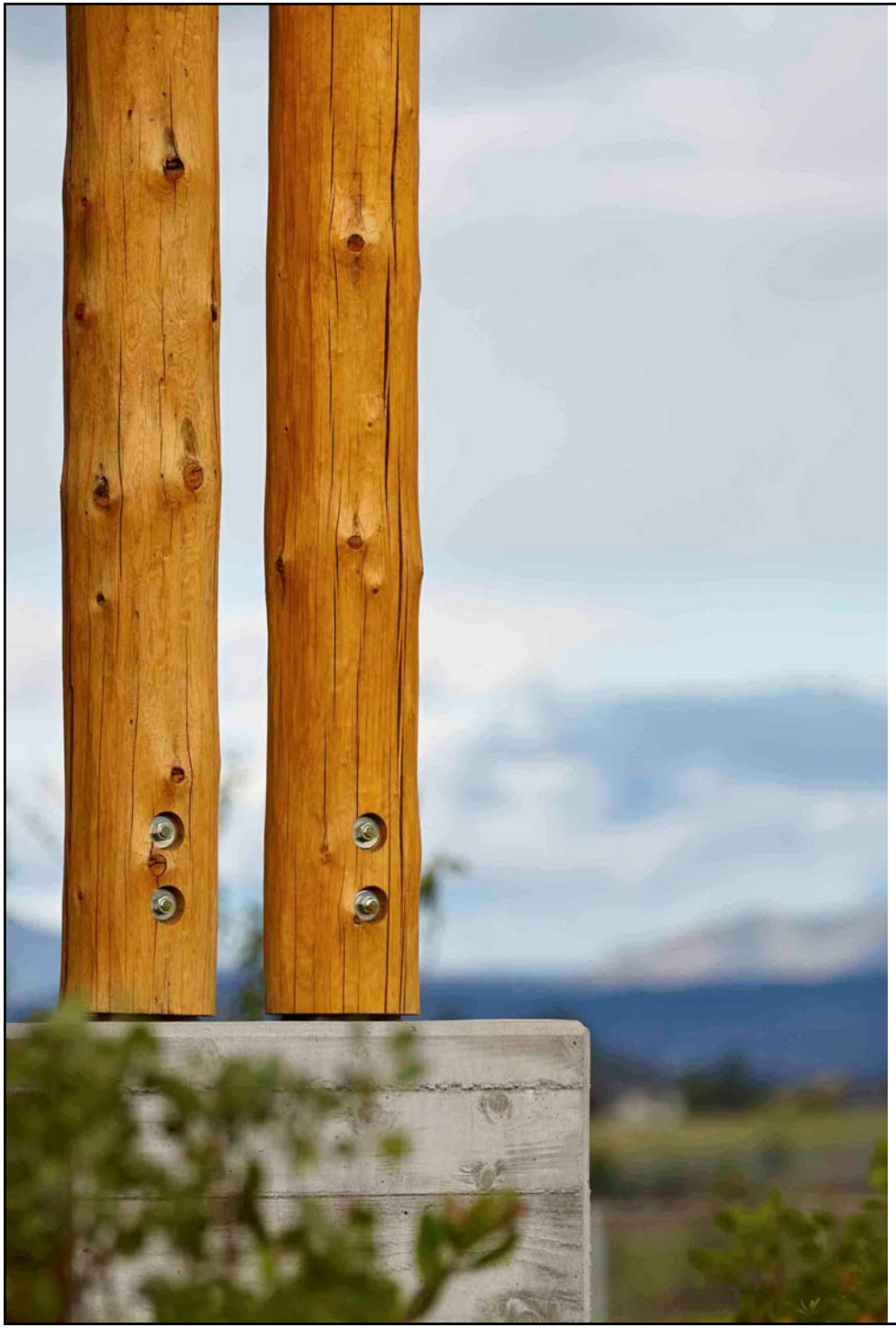
If the recommendations are approved by the Board, the current project would close and a Budget Implementation Planning Team would be created. The new team would work with staff and stakeholders through the remainder of 2018.

In 2019 an Implementation Team would create concrete implementation processes, guidelines and staffing plans.

In 2020, the process would begin.

Questions and Answers

- Would this proposal work for your organization?
  - What works? What doesn't work?
- Does this proposal address concerns you may have raised in the June 2017 survey or elsewhere?
- Do you foresee any unintended consequences?
- Did the team miss anything?



Thank You

Budget Review Team Representatives:

Jed Jorgensen

Oliver Kesting

Pati Presnail

Energy Trust of Oregon

ENERGY TRUST BUDGET PROPOSAL CONCEPT OVERVIEW

In March 2017, a cross-organizational Budget Review Project team was chartered to identify an option for an alternative budget process that could deliver critical value in a more efficient, effective and flexible manner than the current process. The project team performed a deep review of budget processes and outcomes, including many internal and external interviews and surveys to identify root causes of issues and identify opportunities for improvements.

External interviews with OPUC and utility stakeholders uncovered dissatisfaction with many parts of the budget process. All parties noted that budgeting is complex and represents significant workload. Some parties questioned if they have an influence in development of the budget. Participants want more background on assumptions, a better understanding of how we arrive at goals, and earlier involvement to provide feedback and build the budget in partnership. In addition, all parties need more time to review budgets internally and respond to internal questions. The utilities gave strong feedback that they need to know before October if there are going to be significant changes. Utilities also prefer steady budgets with minor changes and they want our budget and goals to align with their Integrated Resource Plans.

Budget process proposal

To address the feedback noted above, the project team proposes a new process that would spread planning and budgeting work over a longer time period, with goals and utility rate impacts specified as ranges over three years. The proposed process has three components:

1. Separate long-term organizational strategy, program action plan and support group action plan processes from annual budget number approval processes.
2. Concentrate and extend strategy, tactics, planning efforts and associated engagement with utilities, the OPUC and stakeholders, into one heavy-lift year that would produce a range of savings and generation forecasts, and revenue requirements, for a three-year period, followed by:
3. Two years of light strategy updates to the plan created in the heavy-lift year, as needed based on market changes that could produce results outside of expectations set in the three-year plan. In the third year, the heavy-lift strategy and planning cycle would restart.

At the highest, most simplistic level, the proposed budget process concept is a repeating, adaptive, three-year process that revolves around two principles:

1. Get buy-in on the strategy and let the strategy drive the numbers, and

2. Plan the work for one year, work the plan for three years.

There are significant assumptions, risks and challenges related to the proposed process. To be successful the concept of ranges must be accepted by stakeholders. The process also assumes reduced need for replanning in the two years following the heavy-lift year. There would also be upfront investment in training, process design and tools.

While the proposal would be a significant change from existing processes, it retains many current budget components and the same organizational values and standards around transparency and accountability. Among other benefits, the project team believes the proposed process could bring significant improvements to engagement with the OPUC, utilities and stakeholders, and increase organizational flexibility.

Conservation Advisory Council Meeting Notes

March 20, 2018

Attending from the council:
JP Batmale, Oregon Public Utility Commission
Holly Braun, NW Natural
Warren Cook, Oregon Department of Energy
Danny Grady, City of Portland Bureau of Planning and Sustainability
Kari Greer, Pacific Power
Charlie Grist, NW Power and Conservation Council
Julia Harper, Northwest Energy Efficiency Alliance
Garrett Harris, Portland General Electric
Liz Jones, Citizens' Utility Board of Oregon
Lisa McGarity, Avista
Kerry Meade, Northwest Energy Efficiency Council
Allison Spector, Cascade Natural Gas

Attending from Energy Trust:
Gwen Barrow
Tom Beverly
Amber Cole
Susan Jowaiszas
Oliver Kesting
Scott Leonard
Dave Moldal
Jay Olson
Amanda Potter
Kate Scott
Julianne Thacher
Jay Ward
Peter West
Robert Wylie
Mark Wyman

Others attending:
Alan Meyer, Energy Trust board
Lindsey Hardy, Energy Trust board
Rick Hodges, NW Natural
Scott Scheuneman, RH Energy
Jeffrey Tamburro, NW Natural

1. Welcome, Old Business and Short Takes

Peter West convened the meeting at 1:30 p.m. The agenda, notes and presentation materials are available on Energy Trust's website at www.energytrust.org/about/public-meetings/conservation-advisory-council-meetings/.

Peter asked if there were concerns or changes to the notes from the last meeting. No changes were noted, and CAC adopted the notes.

2. Legislative Update

Jay Ward provided an update on the short legislative session. Staff monitor and track on bills that could intersect with Energy Trust's work, and do not advocate or lobby for any proposed legislation.

Jay Ward: The legislative session ended March 3. There were a few bills that involved energy, which we monitored as the session progressed. For instance, SB 1552, titled the Ratepayer Protection Act, would have capped the public purpose charge at 1.5 percent, capped Energy Trust salaries and refunded money set aside to remove the four Klamath River dams. It was considered to be largely unconstitutional.

Holly Meyer: Under what grounds was it unconstitutional?
Jay Ward: Mainly the cap on utility return on investment. They couldn't service debt at that level.

Jay Ward continued. The Homewrap bill was sponsored by Representative Marsh. It was called a kind of Residential Energy Tax Credit replacement, but it would have capped households at the $180,000 income level from qualifying for the program. It also included a 25 percent low-income set-aside, and manufactured home replacement. Enhabit and the NW Energy Coalition were supporters. It had bipartisan support and almost unanimously passed out of committee. It was with Ways and Means at the end of the session.

Jay said there were two similar cap-and-invest bills in both the House and Senate. They were heard in their committees and passed on a partisan vote, but both expired. At the end of the session, the governor was given $1.4 million to do studies in the interim, and the Senate President and Speaker of the House created a joint committee on carbon. They would like to bring the clean energy bill back next session.

Holly Braun: Why didn't Homewrap get through?
Jay Ward: The budget request was seen as too high. Oregon Housing and Community Services indicated that they would have to scale up and hire up to deliver it, and it was too costly.

3. World Café Exercise: 2018 CAC Planning

Peter West: At the last meeting, we had a presentation on what topics staff shuld bring forward to the Conservation Advisory Committee and how we engage with members. We gave out homework to all of you, and we appreciate the feedback we received. The homework assignment was intended to identify essential parts of the discussions we have at CAC. Topics you identified were large and wide.

> We have seven more CAC meetings this year, and we need to get your engagement on the right topics at the right levels during those meetings. We also want to look at the meeting format. Does it need to be the same type of format and layout as we've always done in the past? Lastly, what topics should come to CAC and what are the priority topics?
>
> Today we'll have a World Café discussion moving to help you engage with us on this planning exercise. It's a fast way of engaging and collecting information. It's also intended to clarify and give us themes to work with. We'll take this information, distill it down and draft some guidance that we can bring back to CAC in May.
>
> The packet includes the charter and topics for discussion. In our synthesis of the homework you completed, a few categories jumped out at us: innovation and new initiatives, program design and redesign, policy context, strategic plan input, challenges and barriers facing programs, and accomplishments.
>
> We also heard some suggestions in the homework you completed. There was a request that materials come out earlier. And we heard that materials could be at a higher level, and with implications and questions at the policy or strategic level. Another comment was that we should screen for topics that are longer term. There was an interest in more roundtable discussions, too, to provide an opportunity for more dialog with each other, rather than staff largely presenting to CAC members.

Amber Cole described the World Café exercise. First, CAC members worked in small groups to review the topics suggested by the group through the homework exercise, and added additional topics for consideration. Then, CAC voted to identify which topics to explore in more detail during the second half of the meeting. The six topics in order of the most votes from council members:

1. Customer research and insights
2. Context—market trends, policy issues affecting programs
3. Program innovations
4. Challenges and barriers facing programs
5. Program delivery to historically underrepresented groups

6. What's working and not working nationally

CAC members, staff and public in attendance then broke into small groups and explored each topic. Topics were posted around the room as "stations" and after five minutes the groups rotated to a new station. At each station, each group was asked to discuss and clarify the following about the topic:

1. What are essential questions CAC should discuss on this topic?
2. What about this topic is most essential for CAC to discus/review?

Refer to the **Appendix: World Café Exercise—2018 CAC Planning** for an executive summary and notes from the exercise. Also included in the appendix is the full list of topics proposed by CAC members through the homework exercise and the subsequent discussion, including votes on what topics to explore during the World Café exercise.

Based on the feedback and priorities, Energy Trust staff will be developing an internal guidance document to inform what and when topics are brought to CAC, and what staff is looking for from council members in terms of feedback on those topics. This document will be presented to CAC for feedback. Staff will also look to incorporate alternative facilitation techniques at future meetings.

4. Public Comment
There were no public comments.

5. Meeting Adjournment
The meeting adjourned at 4:35 p.m. The next Conservation Advisory Council meeting is Wednesday, May 9, 2018.

Appendix: World Café Exercise—2018 CAC Planning

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1. Executive Summary

Energy Trust staff hosted a series of discussions at the CAC meetings in February and March 2018 to better plan for what topics to bring to CAC and how council members should be engaged on those topics. Energy Trust will use input from these discussions to shape future meeting designs and agendas.

The process

After the February meeting, council members submitted feedback on topics they would like to have presented at CAC through a homework exercise. At the March meeting, council members identified six priority topics that they would most like to hear about and discuss. Essential questions and discussions by topic were also identified, as well as ideas for meeting design and best practices.

Results

Top priority meeting topics identified, in order of most votes from council members: Customer research and insights; Context—market trends, policy issues affecting programs; Program innovations and new initiatives; Challenges/barriers facing programs; Program delivery to historically underrepresented groups; What's working and not working nationally. There was a clear divide of much lower rankings for other items.

Staff propose the other suggested items be handled as part of addressing the top six priorities. “Vetting by CAC before board approval (especially program innovation)” was also ranked by CAC. Board members Alan Meyer and Lindsey Hardy clarified the types of actions it takes as mostly related to policies, budgets and contracts, and not measures or program details. The board uses the CAC notes to understand the feedback brought forward by CAC members on topics they may be considering at the board level. It is possible more discussion may be needed on this point.

To discuss priority topics effectively, council members also provided recommendations on agenda and presentation development, discussion format, assignments and next steps after each meeting. The notes that follow summarize these useful suggestions.

Based on the feedback and priorities, Energy Trust staff will be developing an internal guidance document to inform what and when topics are brought to CAC, and what staff is looking for from council members in terms of feedback on those topics. This document will be presented to CAC for feedback. Staff will also look to incorporate alternative facilitation techniques at future meetings.

2. Full List of CAC Topics Proposed by Council Members

Proposed topics sorted by most votes from council members	CAC member votes
Customer research and insights--who are we serving, reach of programs; including insights from Big Data	10
Context--market trends, policy issues affecting programs; includes research, evaluation, legislation, policy, and policy barriers to Energy Trust work	10
Program innovations and new initiatives – Future sources of savings, pilot prioritization, horizon planning; especially, expanding reach or changing costs, and vetting approaches and delivery contracts	9
Challenges/barriers facing programs - including policy barriers	8
Program delivery to historically underrepresented groups and diversity/equity considerations; includes savings, costs, metrics	6
What's working and not working nationally, including benchmarking	6
Vetting by CAC before board approval (esp. program innovation)	6
Multi-year organization and sector strategic plans - connection to board	4
Collaboration opportunities with partners (how can 1+1=3 ?)	4
Areas of new/different risk for programs	3
Evaluation Committee updates – plans and results, report out - key variables for success, what's not working, including news from outside Oregon	3
Measure reviews, approvals, changes - how will changes roll out? Impacts to customers?	2
Successes/accomplishments of programs – what's working?	1
What can be done with AMI (advanced metering infrastructure, or "smart meters")	1
Program plans and implementation details, especially expanding reach or changing costs	1
Policy implications of planning assumption changes	1
Lessons learned from unintended consequences	1
Avoided Costs: impact on acquisition and utility IRPs (resource plans)	1
Innovation incubation	1
Trends in programs and customer interaction	0
Savings attribution and how to report savings (net-to-gross)	0
Leveraging demand response	0
Annual Energy Trust budget and action plan	0
Commercial and industrial program development – what's new, what's evolving	0
Board learning topics	0
Intentional linkage with board agenda	0
Optimize data available	0
Key variables for success	0
Identify barriers to good policy (why not passing)	0
Interplay of Energy Trust with other sectors (i.e., transportation, housing)	0

3. Essential Discussions for Top 6 Topics

A. Customer research and insights

- *What are essential questions CAC should discuss on this topic?*
    1. What information is being collected, and how can we avoid duplication?
        - What is the cost vs. the benefit of digging into the data
        - Consider a segment of the available data
    2. What do you do with the data and how does it translate to program design?
    3. What does the market want, and how well are we penetrating the segments?
    4. Are we reading all segments of utility customers?
    5. How do you give the market efficiency efficiently?
        - NEBs
    6. Mining customer data for other energy efficiency program opportunities?
        - Time value
        - Targeted DSM
    7. Do we comprehensively mine our own data? Before seeking outside data?
    8. Help CAC understand the current market research and how is Energy Trust using data to engage customers?
- *What about this topic is most essential for CAC to discuss/review?*
    1. Where are the opportunities? Who are participating in programs today?
    2. Vetting research
    3. Identify sources of data/research
    4. Research strategy coordination
- *Other thoughts*
    1. Who are the decision makers?

B. Context—market trends, policy issues affecting programs

- *What are essential questions CAC should discuss on this topic?*
    1. First group
        - How are we measuring?
        - What are underlying drivers?
        - How do programs react to uneven trends in segments?
    2. Second group
        - What are the trends?
        - What are the policies?
    3. Third group
        - Do trends require changes?
        - What's the threshold for response?
        - Impact on customers and trade allies
    4. Fourth group
        - How do they impact Energy Trust as an organization?
        - How do we inform policy?
        - How does energy efficiency fit into a distributed energy future?
        - Who are our allies?
    5. Fifth group

        - How do we mine the opportunity?
        - How do we identify trends/leverage CAC perspective?
        - Identify leading indicators on bad trends
    6. Sixth group
        - What are program implications?
        - What can we do to respond or shape?
        - How do trends impact underserved groups?
- *What about this topic is most essential for CAC to discuss/review?*
    1. Federal
        - Board policy?
        - Where is Energy Trust in policy shaping?
        - Ensure stability for trade allies
        - Cheap energy and cost-effectiveness implications
    2. State
        - What are we going to do?
        - Are we impacting board policy or responding to state / local / federal?
        - How do we position to be successful?
        - How to prioritize response to multiple policies/trends?
    3. Local
        - Different perspectives

C. Program innovations

- *What are essential questions CAC should discuss on this topic?*
    1. What are risks?
    2. What is the technical/program potential?
    3. Timeline/logistics
    4. Can we try out this idea faster?
    5. What is the evaluation path?
    6. Savings shape, grid impacts
    7. Does this solve more than one problem? (address)
    8. Are trade allies involved in the process?
    9. How does it impact people in the real world?
    10. What is driving the change?
    11. Does this program make sense, in our wheelhouse?
    12. Are there opportunities for partnerships, other synergies?
    13. Are there policy barriers—or other barriers?
    14. DSM/renewables intersection
    15. Has it been done before?
    16. CAC members would answer questions, Energy Trust responds
    17. What gap does this fill?
    18. Recommendation to go forward?
    19. How can this be integrated?
    20. Measure life
    21. Are there alternative approaches?
    22. How big is it? Scope/bounds
    23. How does it fit with broader market trends?
    24. What's screening criteria? Tradeoffs?
    25. Cost/benefit

26. Is this change equitable to all customers?
27. Who will benefit?
28. How are we inviting ideas from CAC, others?

- *What about this topic is most essential for CAC to discuss/review?*
    1. How do we define success?
    2. What is the exit strategy?
- *Other ideas*
    1. Sub-group to look at report

D. Challenges and barriers facing programs

- *What are essential questions CAC should discuss on this topic?*
    1. What are real-world implementers (trade allies, contractors) seeing in the market?
    2. Which programs to prioritize with delivery solutions?
    3. How much longer can we continue _____ in current state and what could/should we change?
    4. How can we adapt to keep serving when something goes away or is at risk?
    5. How big of a deal are these? (Prioritization)
    6. What is the root cause of the(se) challenge(s)/barriers
- *What about this topic is most essential for CAC to discuss/review?*
    1. How do we remove these barriers? (AKA discussion is problem solving with CAC)
    2. Research and vetting/reviewing research
    3. Anticipated changes coming down the line, trends
    4. Different perspectives—contractors, customers, programs, Energy Trust, utilities, other groups, stakeholders
    5. Regional differences, focus/considerations (ties with diversity)
    6. Who benefits from status quo?
- *Other thoughts*
    1. Codes, standards, baselines—impacts of those
    2. Policies/fail safes when something isn't cost-effective—keep serving customers
    3. Leverage CAC input and expertise/ideas
    4. Are these embedded in program design, external, regulations/rules, structural
    5. Alternative approaches

E. Program delivery to historically underrepresented groups

- *What are essential questions CAC should discuss on this topic?*
    1. How to define groups?
    2. What is the appropriate cultural context? Regional or economic
    3. How big is the group and where is it?
    4. What are barriers and benefits?
    5. How to hear from these groups and what they need/want
    6. How to find/recruit diversity voices on CAC
    7. Underserved? Who is?
    8. Tradeoffs: getting to this group vs. others, risk political and social of targeting [?]

9. Opportunities
10. Costs
11. How do you measure success?
12. How are others approaching this, including CAC members?
13. Coordination with policy
14. What are the gaps and what is not reaching them?

- *What about this topic is most essential for CAC to discuss/review?*
    1. What delivery methods work best? What are others doing?
    2. How to define the groups?
    3. The ones in blue [?]
    4. How big and where?
    5. What are the opportunities?
    6. What are the barriers?
    7. What is the voice of the delivery agents?

F. What's working or not working nationally?

- *What are essential questions CAC should discuss on this topic?*
    1. What are the missed opportunities? In other words, what are other states/programs doing that we aren't and then dig into why?
    2. How have programs adapted over time?
    3. How would staff determine this information? Examples include research, conferences and report outs
    4. What are best practices? (Nationally or globally)
    5. What's the best way to share information?
    6. What is the context of the new ideas?
    7. Valuation of DSM partnerships
    8. Are there things that work here that can be promoted?
    9. What are they doing in New York, California, Canada, Massachusetts?
    10. How do you learn about what's working?
    11. How is that market unique compared to Oregon?
    12. What does "working" mean?
    13. What are the underlying data and trends behind what's working?
- *What about this topic is most essential for CAC to discuss/review?*
    1. How do we use all this information? Does it fit?
    2. What is the CAC's recommendation to the board?
    3. What's applicable here? Vetting
    4. How would that work here?
- *Other thoughts*
    1. Presentations, white papers, email seeking updates from CAC
    2. Sub-group report-outs
    3. Making connections with other organizations
    4. Supplemental perspective from program design/proposals

4. Meeting Best Practices

Before meeting

Agenda development

- Well-defined agenda
- Prioritization
- Clear objective statements for agenda topics
- Seek input on burning questions (real-time)
- Make sure there's a reason for the meeting
- Flag all agenda items as:
    - Informational content
    - Actionable item for Energy Trust staff
    - Board topic
- If doing single topic, some might not show up. Diversify agenda to get everyone there.
- Highlights and full minutes as part of agenda
- Mix of discussion/presentation
- Never sit for more than 90 minutes
- Discuss next meeting topic at end of meeting before, 10 minute preview and assignment

Assignment development

- Clarify charter
- Send detailed information ahead of time
- Send objectives/expectations ahead of time
- Learning topic with bibliography using secondary research
- Members informed enough to represent
- Get CAC prepared to come with ideas

Presentation development

- Presenter = person working on it (not higher-ups)
- Invite outside presenters to represent perspectives
- Presentations/information from other committees
- Define problem and information available
- History and background on topic/measure, numbers, proof
- Paint scenarios, different options
- Doesn't have to be fully baked, have room for decisions and changes
- Present considerations and potential impact before decision made
- Surface changes in process = right expectations
- Impacts and opportunity analyses
- Barriers to implementation
- Unknowns/needs
- Supporting materials

Discussion development

- Conduct specific outreach to targeted stakeholders/groups who would be interested, fill the room, include diverse perspectives to bring more broad ideas
- Meaningful icebreaker to connect as people
- Set expectations of discussion
- Prepare specific questions for CAC

- Standing questions
    - What are the risks, opportunities, barriers, unknown needs?
    - What should go to board?
- Ground rules for each type of topic/discussion
- Opportunities for back-and-forth feedback
- Facilitated breakouts
- Small groups to ask more questions
- World Café format
- Writing
- Other ways to share input so everyone is engaged
- Anonymous questions

Room set up

- Conducive room set up
- Tech: be able to present remotely
- Name tags—especially for breakouts

During meeting

- Trained, engaging, agnostic facilitator(s) from Energy Trust or outside
- Let people vent first so they are more engaged
- At beginning, check-ins (less than one minute) on what they're working on
- Encourage everyone to speak / contribute
- Comfortable to share diverse perspectives, right vibe
- Let people feel heard
- Make sure interest from participants
- Check in with phone participants
- Mix up the group
- Encourage roundtable style more than popcorn style—deliberately manage conversation and facilitate getting input from everyone
- Identify problem, brainstorm ideas
- Collaborate/discuss
- Facilitated discussion to come to consensus
- Stay conscious of time, when it's done it's done

After meeting

- Instant feedback
- Evaluate meetings
- Summarize/synthesize findings
- Distinct action items and decisions recorded
- Distinguish clarifying questions vs. deep-dive questions
- Meeting minutes include Executive Summary with decisions, questions, action items
- Add context for board: what CAC discussed/asked/flagged
- Board would use CAC to vet what staff puts together
- How to present to board and get input back (loop)
- Question: why is interaction between CAC and board valuable? (Invite board?)
- Path to disseminate within Energy Trust
- Get down to actionable pieces
- Follow-through on topics (go beyond the dots used for voting)

2018 Conservation Advisory Council Meeting Dates

October 2017; Revised April 2018

January	No meeting
February	Wednesday, 2/7, 1:30 p.m.
March	Tuesday, 3/20, 1:30 p.m.
April	No meeting
May	Wednesday, 5/9, 12-1:30 lunch presentation, 1:30 p.m. meeting
June	Wednesday, 6/20, 1:30 p.m.
July	No meeting
August	Wednesday, 8/1, 1:30 p.m.
September	Friday, 9/14, 1:30 p.m.
October	Friday, 10/12, 1:30 p.m. Wednesday, 10/17, 10:30 a.m., invitation to Board draft budget workshop
November	Friday, 11/30, 1:30 p.m.
December	No meeting

Meeting start times may change. In general, meetings end around 4:30 p.m.

Agendas are sent 1 week in advance of each meeting and indicate the actual start and end times. Meeting materials (agendas, presentations, notes) are available online https://www.energytrust.org/about/public-meetings/conservation-advisory-council-meetings/.

All meetings held at Energy Trust offices, 421 SW Oak St, Suite 300, Portland

CADMUS

EnergyTrust of Oregon

Air Conditioning Measure Opportunities Scan PHASE II

Cost Effectiveness Results

Aquila Velonis, Cadmus

Spencer Moersfelder, Energy Trust of Oregon

May 9th, 2018

PHASE II Project Overview

Background: Due to cost-effectiveness limitations, Energy Trust does not presently have any prescriptive measures in place for:

- Central or window AC for single-family homes

PHASE I Purpose: Identify potentially cost-effective residential air conditioning (AC) measures using current Avoided Costs and assumptions from secondary sources

PHASE II Purpose: Perform additional analysis on measures that may be cost effective using updated weather data, building models, incremental costs, and avoided costs

PHASE II Project Overview (continued)

Energy Trust released an RFP to pre-qualified pool of Planning and Evaluation Contractors and selected Cadmus

We reviewed the following AC types for PHASE II in the respective residential settings:

- **Central AC in existing and new single-family and existing mobile homes**
- **Window AC in existing single-family and mobile homes**

We developed scenarios of varying inputs to estimate a plausible range of cost effectiveness results

Cost-Effectiveness Measure Scenarios

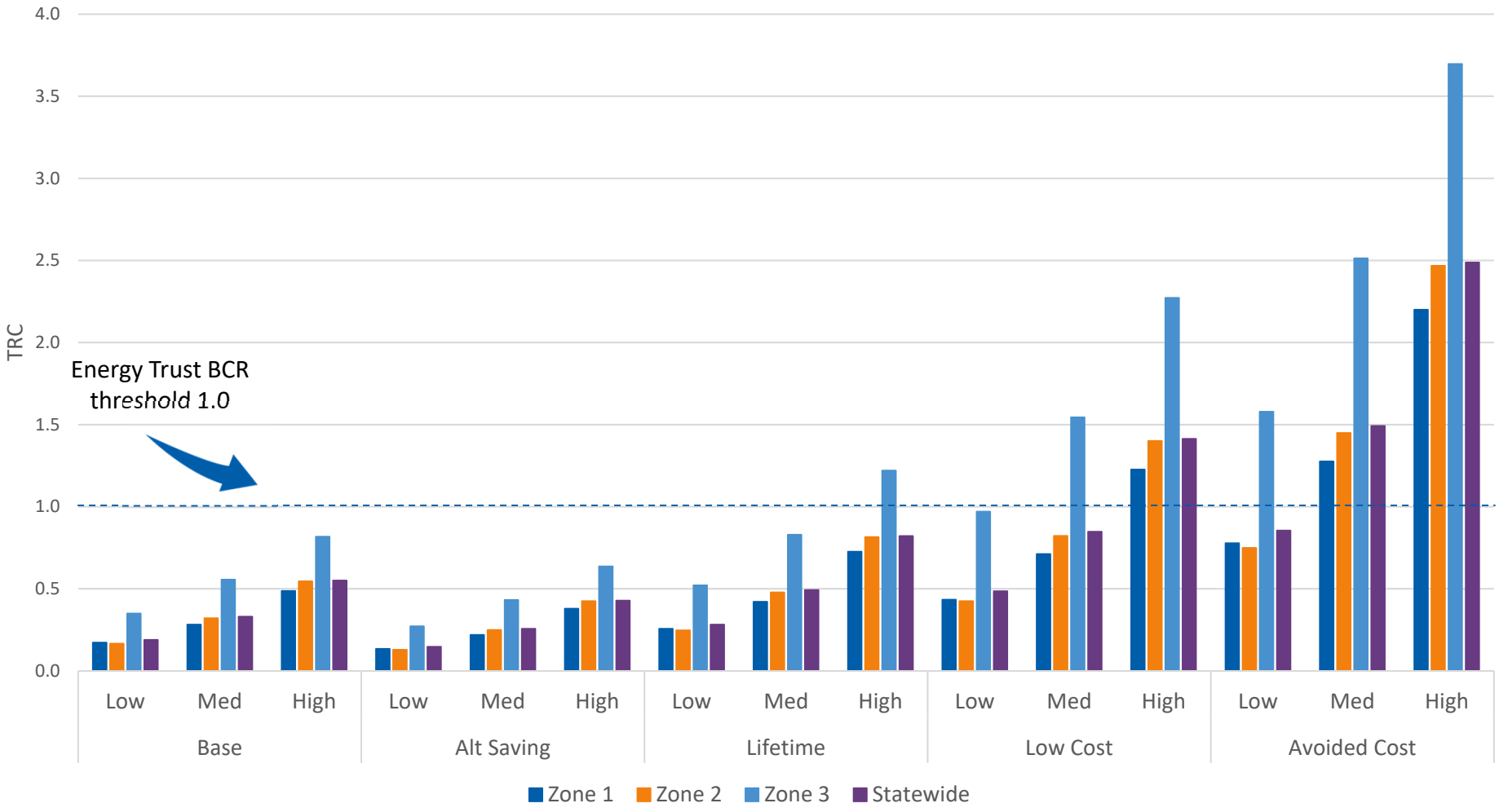
Scenario	Savings	Incremental Cost	Lifetime	Avoided Cost
Central Air Conditioner				
Base Scenario	SEEM Modeling	Energy Trust Survey	15	Energy Trust 2018 v1.0
Low-cost Scenario	SEEM Modeling	IL TRM Cost Data	15	Energy Trust 2018 v1.0
Alternative Saving Scenario	Benchmark Savings	Energy Trust Survey	15	Energy Trust 2018 v1.0
Lifetime Scenario	SEEM Modeling	Energy Trust Survey	24	Energy Trust 2018 v1.0
Avoided Cost Scenario	SEEM Modeling	Energy Trust Survey	15	Energy Trust 2018 v1.A
Window Air Conditioner				
Base Scenario	Benchmark Savings	Cost Research	10	Energy Trust 2018 v1.0
Lifetime Scenario	Benchmark Savings	Cost Research	12	Energy Trust 2018 v1.0
Avoided Cost Scenario	Benchmark Savings	Cost Research	10	Energy Trust 2018 v1.A

Scenario Analysis Central AC

- For each of the five central AC scenarios, 864 configurations were analyzed:
  - Each building type across all weather stations: low, median, and high weather ranges (CDD)
  - Cooling zones (1, 2, and 3)
  - Energy Trust territory-wide (state)
  - Efficiency level (SEER 15, 16, 17, 18)
- Propose to provide a plausible range

Scan Findings Central AC

Central Air Conditioner: Single Family Existing - SEER 16 - Zone 1, 2, 3 & Statewide - Scenarios

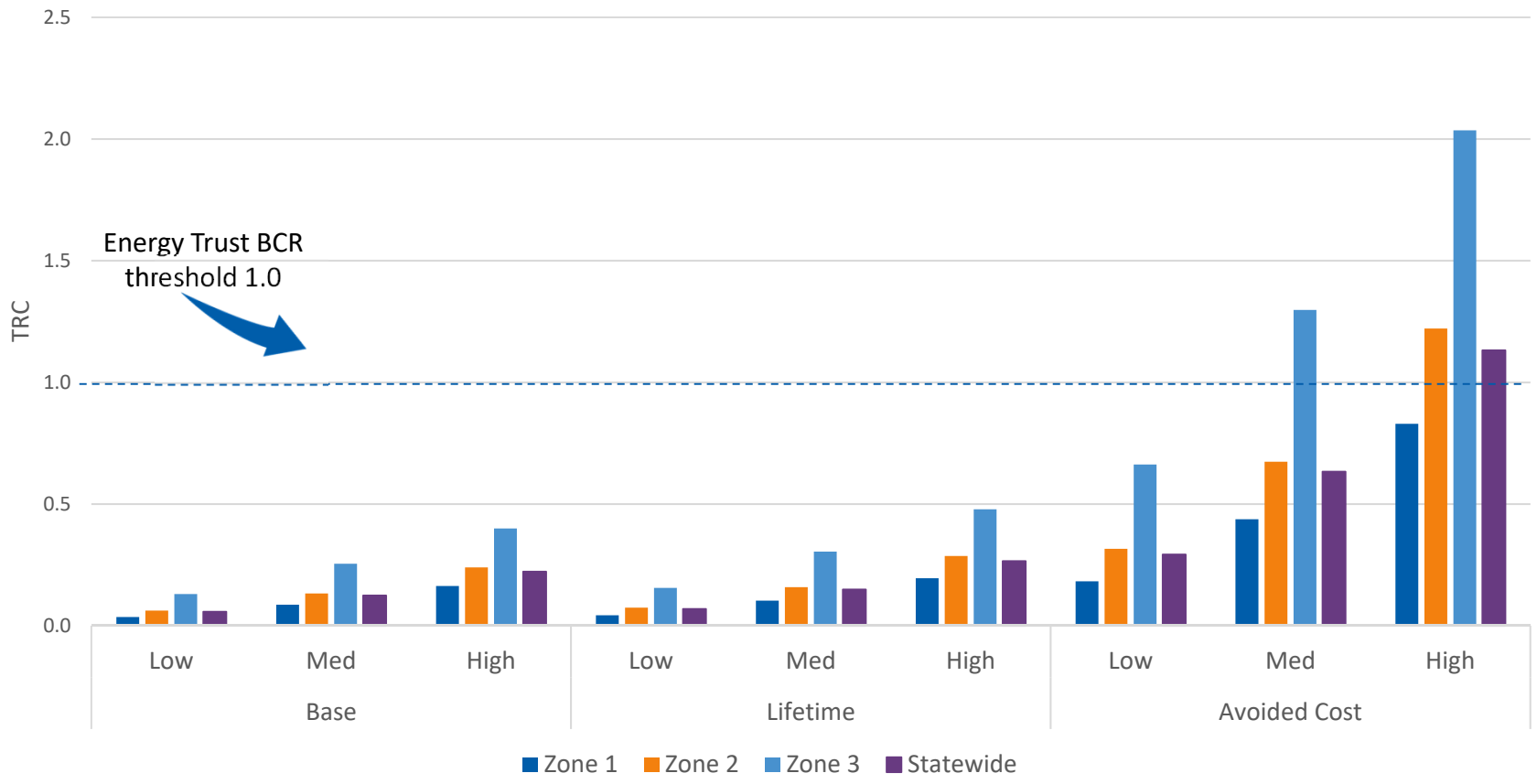


Scenario Analysis Window AC

- Three window AC scenarios of 54 configurations were analyzed:
  - Benchmarked window AC usage (by full load hour/CDD adjustment factor)
  - Across all weather stations: low, median, and high weather ranges (CDD)
  - Cooling zones (1, 2, and 3)
  - Energy Trust territory-wide (state)
  - One efficiency level (CEER 12)

Scan Findings Window AC

Window Air Conditioner: CEER 12 - Zone 1, 2, 3 & Statewide - Scenarios



Conclusions

1. Phase II suggests that AC scenarios are not cost-effective unless significant changes in avoided costs (capacity costs) and incremental costs
2. While not definitive, the weather data indicates a slight increase in CDD over the past 40 years
3. Under certain conditions, the Phase II cost-effectiveness results could warrant an Energy Trust investment or possible introduction of AC program offerings

Considerations For Program Design

- Location and weather trends indicate a large range in cost-effectiveness (two to three times)
- While not conclusive, contractor prices appear to include additional markups for efficient equipment
- High-efficiency equipment (SEER 17 and above) does not prove cost effective
- Valuing the avoided capacity benefits had a substantial impact to the overall cost-effectiveness

Next Steps

1. Investigate regional program offerings of Central AC SEER 15 and SEER 16 equipment
   a. Prescriptive, midstream, etc. ?

2. Re-evaluate cost effectiveness with NEEA's regional HVAC distributor cost survey

3. Continue to monitor avoided costs, AC markets, and of course weather!

4. Work with NEEA that offers a Retail Product Portfolio
   a. Currently developing a midstream window AC buydown of $10 for the region

Q&A

Questions on the study?

Based on the results of the study, what might residential programs do to design a program/pilot offering that may eventually be cost-effective?

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Addendum Slides

Methodology

Data Sources:

- 35 to 44 years of historical weather data from 14 Oregon weather stations
- Oregon-specific SEEM prototype models
  - Started with existing RTF SEEM simulations
  - 2011 Residential Building Stock Assessment data
  - ASHRAE Fundamentals 2009 & ACCA Manual S
  - Building America Research Benchmark Definition, NREL 2009
- Energy Trust Trade Ally equipment cost survey
- PHASE I secondary data and other benchmarking data

Methodology

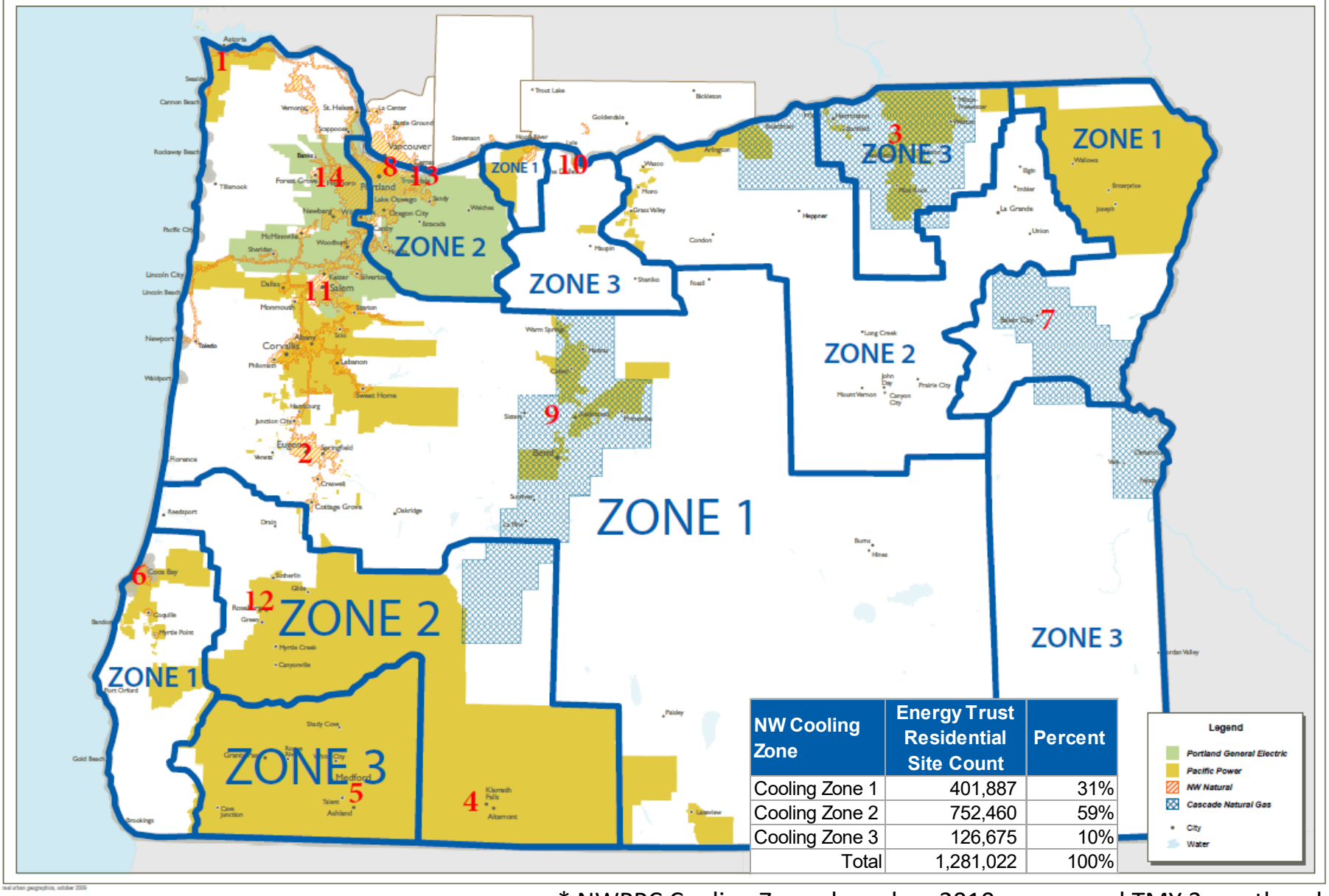
METHODOLOGY
Assessed cost effectiveness of residential AC scenarios by:

- Segment
- New and existing housing stock
- Equipment type
- Measure efficiency
- NW cooling zone: 14 weather stations, CZ1, CZ2, CZ3, and state

Energy Trust Service Territories

1.866.368.7878
energytrust.org

EnergyTrust of Oregon

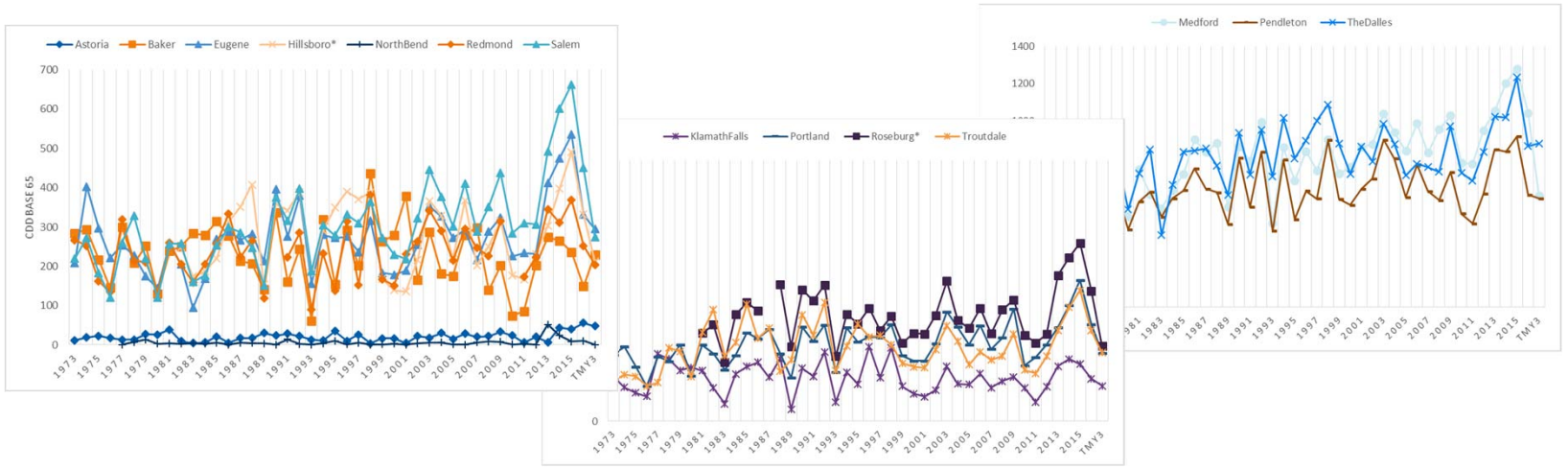


NW Cooling Zone	Energy Trust Residential Site Count	Percent
Cooling Zone 1	401,887	31%
Cooling Zone 2	752,460	59%
Cooling Zone 3	126,675	10%
Total	1,281,022	100%

* NWPPC Cooling Zones based on 2010 census and TMY 3 weather data

Oregon Historical Weather Data

- 1973 to 2016 historical weather datasets of 14 Oregon weather stations
- Purchased White Box Technologies' formatted weather datasets for SEEM modeling
- Cleaned weather files (removed 5 weather years out of 597)
- Identified high, median, and low CDD (base65) for each station



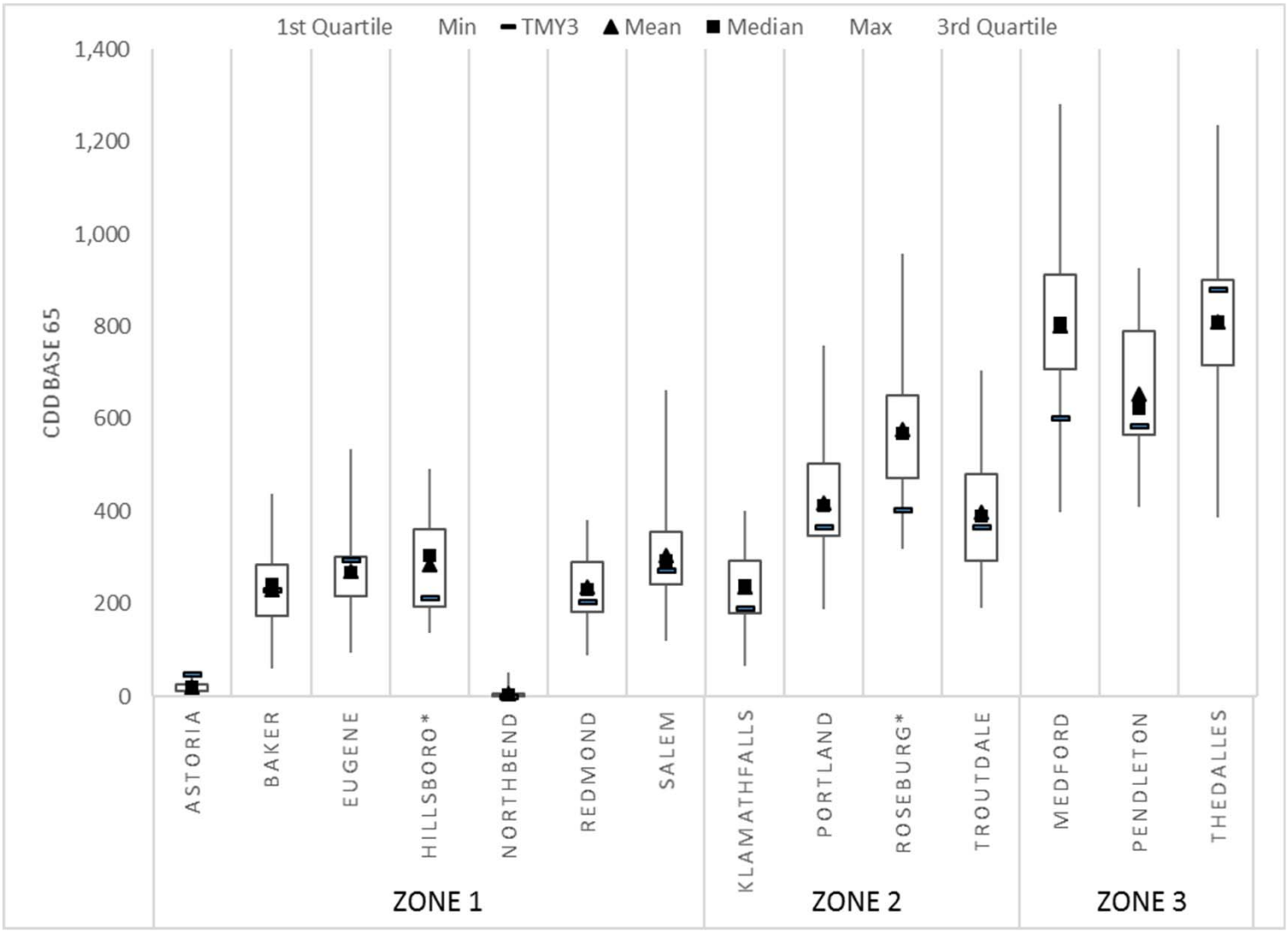
Cooling degree days (CDD) provide an excellent indicator of summertime cooling needs

High, Low, and Median CDD 65 Years

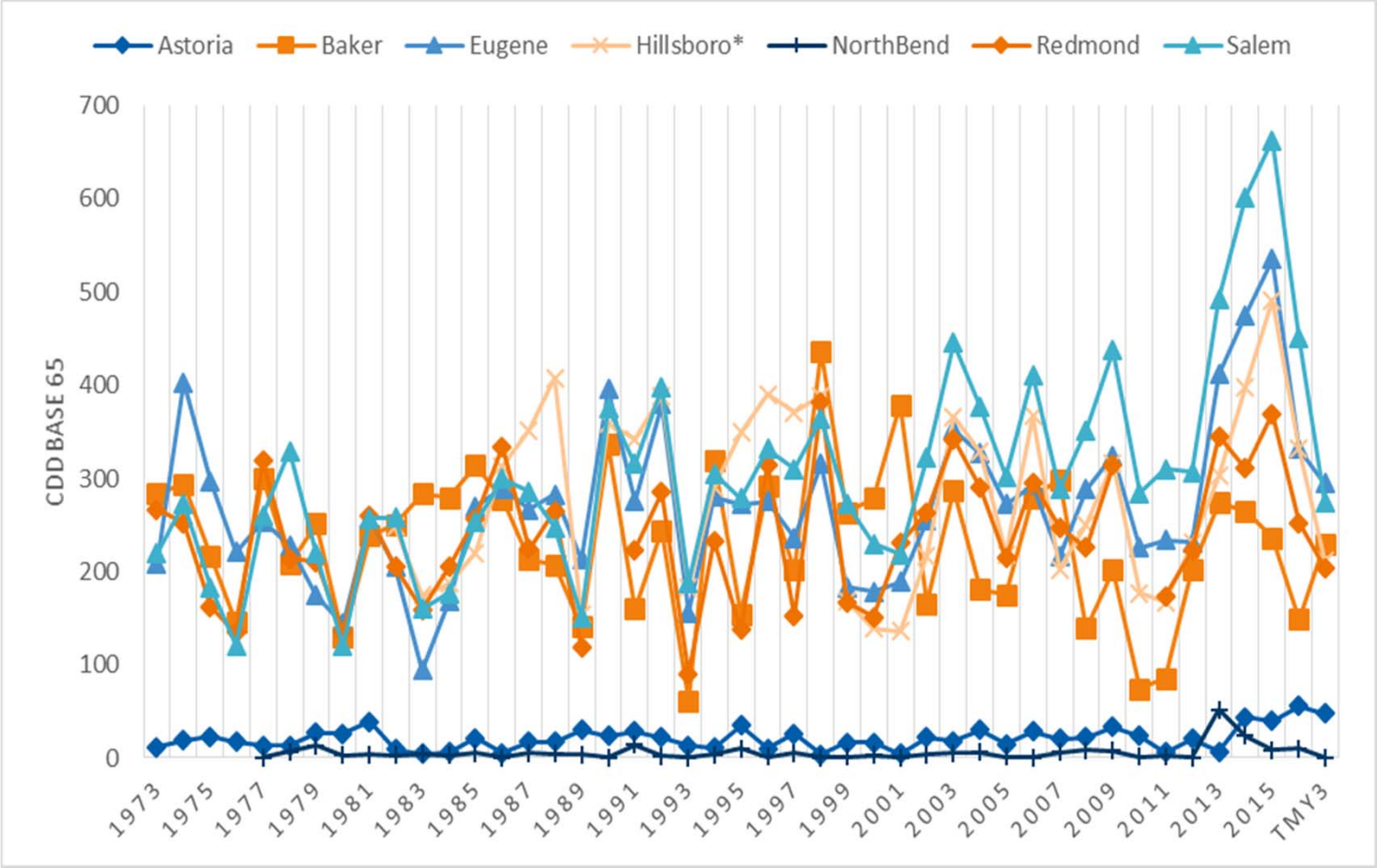
Station	Year with Highest CDD (High)	Year with Median CDD (Med)	Year with Lowest CDD (Low)
Astoria	2016	2012	1998
Baker	1998	1981	**1993**
Eugene	**2015**	1985	**1983**
Hillsboro*	**2015**	2013	2001
Klamath Falls	1996	1987	1989
Medford	**2015**	1991	**1976**
North Bend	2013	1981	1986
Pendleton	1974	2007	**1993**
Portland	**2015**	2005	**1976**
Redmond	1998	2001	**1993**
Roseburg*	**2015**	2002	**1983**
Salem	**2015**	2007	1980
The Dalles	**2015**	1979	**1983**
Troutdale	**2015**	2002	**1976**

*Hillsboro and Roseburg only contained data back to 1982 and 1981, respectively.

Cooling Degree Day Statistics

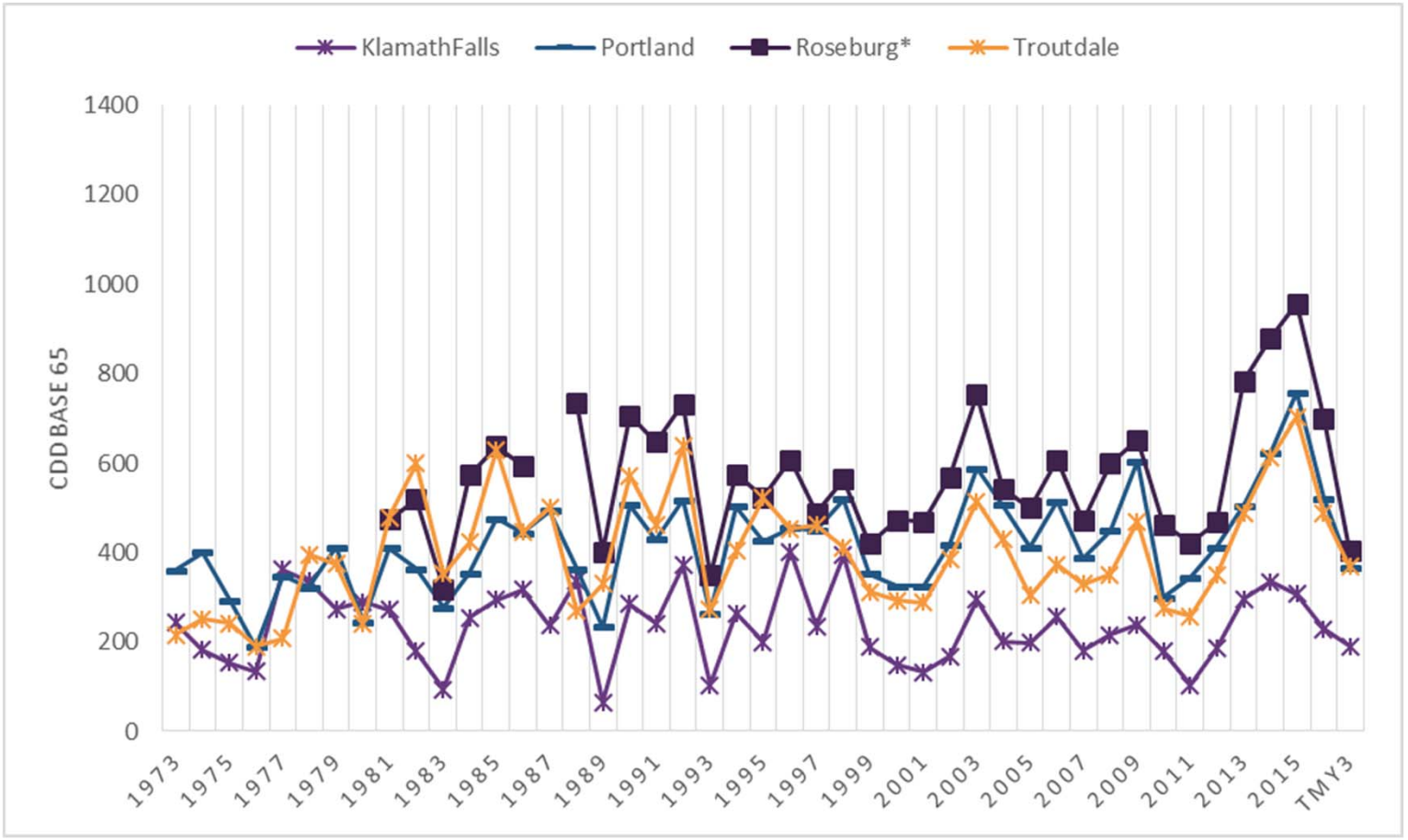


Zone 1 Historical Cooling Degree Days



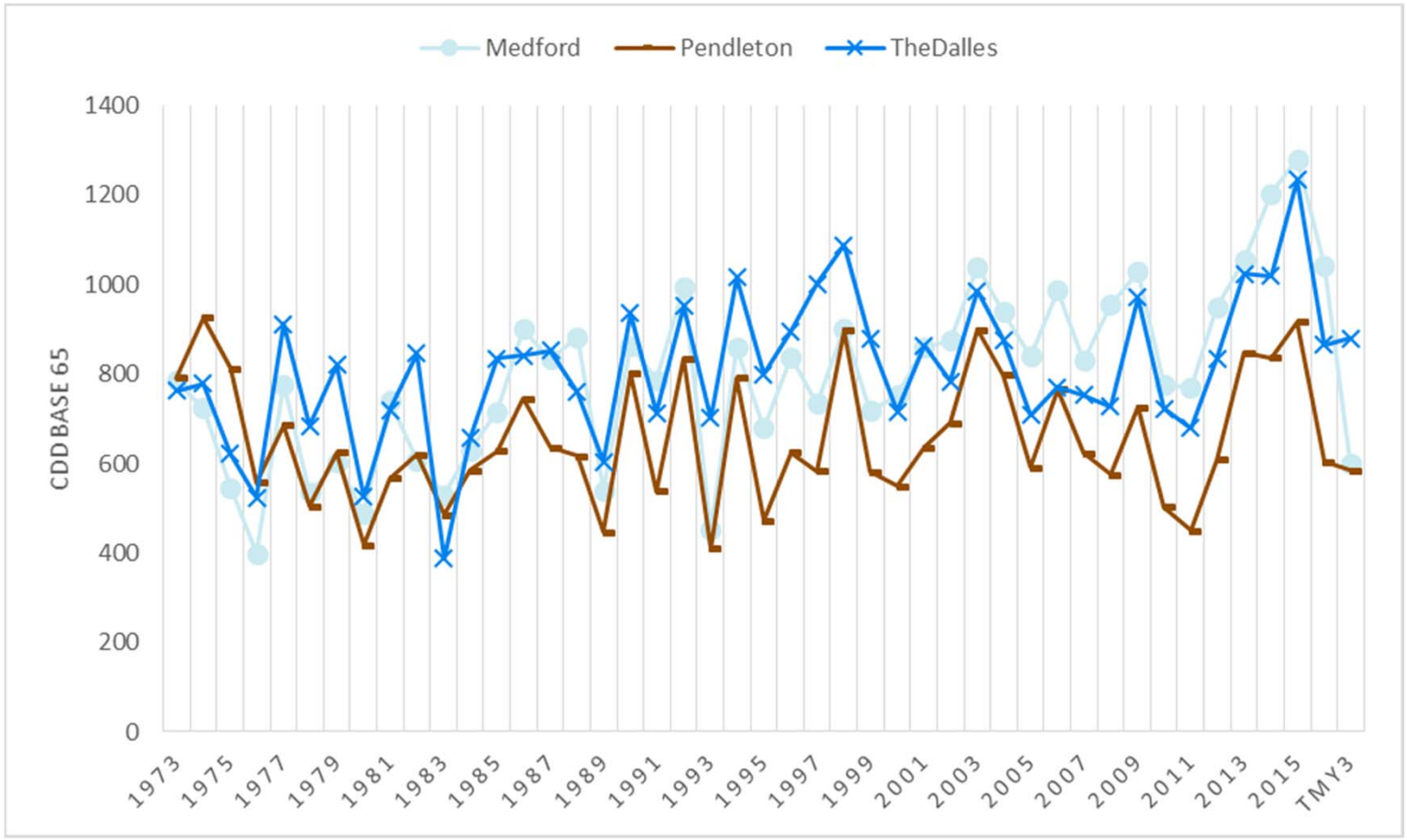
*Hillsboro only contained data back to 1982.

Zone 2 Historical Cooling Degree Days



*Roseburg only contained data back to 1981.

Zone 3 Historical Cooling Degree Days



Cost Research Central AC

- Conducted Energy Trust Trade Ally central AC incremental cost survey
- Cadmus and Energy Trust contacted 27 contractors and received 4 responses through repeated attempts

Survey Participant Characteristics				
Installed efficiency levels	**SEER 13-13.99**	**SEER 14-15.99**	**SEER 16-16.99**	**SEER 17+**
Percent	45%	6%	44%	6%
Installed equipment sizes	**2 Ton**	**3 Ton**	**4 Ton**	
Percent	49%	38%	12%	
Percent of survey sample installations	**Contractor 1**	**Contractor 2**	**Contractor 3**	**Contractor 4**
Percent	4%	8%	19%	69%

Table note: Totals may not sum to 100% due to rounding.

SEEM Modeling Input Sources

Model Parameter	Single-Family Existing	Single-Family New Construction – Code Built	Single-Family New Construction – ENERGY STAR Built	Mobile Home Existing
Home Size & Geometry	RTF Prototype Standard Dimensions	RTF Prototype Standard Dimensions	RTF Prototype Standard Dimensions	RTF Prototype Standard Dimensions
Envelope Insulation & Sealing	Single-Family SEEM Runs[1]‡ & 2011 RBSA[2]	RTF ENERGY STAR HOMES SF-Oregon 2012[3, 4]	RTF ENERGY STAR HOMES SF-Oregon 2012[3,4]	Manufactured Homes SEEM Runs[5] & 2011 RBSA[6]
HVAC Equipment Sizes	ASHARE 0.4% Design Temperatures[7]	ASHARE 0.4% Design Temperatures[7]	ASHARE 0.4% Design Temperatures[7]	ASHARE 0.4% Design Temperatures[7]
Cooling Temperature Setpoints	2011 RBSA[2]	2011 RBSA[2]	2011 RBSA[2]	2011 RBSA[2]
Internal Moisture Gains	Building America Research Benchmark Definition[8]	Building America Research Benchmark Definition[8]	Building America Research Benchmark Definition[8]	Building America Research Benchmark Definition[8]

[1] RTF's SEEM modeling. Workbook name: SEEMruns_SingleFamilyExistingHVACandWeatherization_Feb2016.xlsm (SEEM v.97). Online at: https://rtf.nwcouncil.org/measure/air-source-heat-pump-upgrades-sf

[2]NEEA's 2011 Residential Building Stock Assessment: Single-Family Characteristics and Energy Use, September 18, 2012. Online at: http://neea.org/docs/reports/residential-building-stock-assessment-single-family-characteristics-and-energy-use.pdf

[3] RTF's measure assessment. Workbook name: ResNewSFEStarOR_V3_5.xlsm. Online at: https://rtf.nwcouncil.org/measure/energy-star-homes-sf-oregon-2012

[4]RTF's SEEM modeling. Workbook name: NewConstructionSingleFamilySEEM94Runs_OR_2_2 (SEEM v.94). Online at: https://rtf.nwcouncil.org/measure/energy-star-homes-sf-oregon-2012

[5]RTF's SEEM modeling. Workbook name: ManufacturedHomesWxSEEMWorkbookRuns05052015.xlsm Online at: https://rtf.nwcouncil.org/measure/commissioning-controls-sizing-mh

[6] Northwest Energy Efficiency Alliance. *Residential Building Stock Assessment: Manufactured Home Characteristics and Energy Use.* January 30, 2013. Online at: http://neea.org/docs/default-source/reports/residential-building-stock-assessment--manufactured-homes-characteristics-and-energy-use.pdf

[7]ASHRAE Fundamentals 2009 & ACCA Manual S system selection procedures.

[8]Building America Research Benchmark Definition, NREL 2009 Online at: http://www.nrel.gov/docs/fy10osti/47246.pdf

Updated SEEM Parameter	Past SEEM Inputs	Updated SEEM Input
Cooling Setpoint	78F day/ 78F night (Single-Family) 74F day/ 78F night (New Single-Family) 74F day/ 80F night (Manufactured Homes)	74.2F no setback (all homes)
Internal Latent Load	0 (lb/hr)	lb/hr =0.222+ 0.103 X N Bedrooms + 0.00001 X Conditioned Floor Area

Survey Incremental Cost Results

Energy Trust Survey Average Costs Summary for Central AC Installation per Ton

Installation Scenario	Efficiency Level	Per Ton (Two-Ton)	Per Ton (Three-Ton)	Per Ton (Four-Ton)
Average Incremental Cost	SEER 15-16.99	$225	$164	$147
	SEER 17-19+	$979	$723	$637

Window AC incremental cost from 34 online product retail prices:

$38.60 per unit

Zone and Statewide Weighting

Station	Zone	Population Weight	Zone Weight*	Statewide Weight*
Astoria	1	32,041	6%	3%
Baker	1	8,805	2%	1%
Eugene	1	35,192	6%	3%
Hillsboro	1	222,699	39%	17%
North Bend	1	18,266	3%	1%
Redmond	1	62,536	11%	5%
Salem	1	192,351	34%	15%
Zone 1 Subtotal	***1***	***571,890***	***100%***	***45%***
Klamath Falls	2	28,908	5%	2%
Portland	2	329,900	57%	26%
Roseburg	2	37,697	7%	3%
Troutdale	2	179,003	31%	14%
Zone 2 Subtotal	***2***	***575,508***	***100%***	***45%***
Medford	3	106,396	80%	8%
Pendleton	3	18,627	14%	1%
The Dalles	3	8,602	6%	1%
Zone 3 Subtotal	***3***	***133,625***	***100%***	***10%***

*May not sum to 100% due to rounding.

Benchmarking Central AC

- **Energy Trust's Nest Thermostat Seasonal Savings Pilot Evaluation** (Single-Family Existing)
  - 2016 study of single-family homes with Nest thermostats, conducted a fixed effects panel regression analysis of 572 homes with monthly billing data and 140 homes with interval data.
  - Apex Analytics November 22, 2017. Energy Trust of Oregon Nest Thermostat Seasonal Savings Pilot Evaluation. Online at: https://www.energytrust.org/wp-content/uploads/2017/12/Energy-Trust-of-Oregon-Nest-Seasonal-Savers-Pilot-Evaluation-FINAL-wSR.pdf

- **NEEA's RBSA Metering Study** (Single-Family Existing and Mobile Home Existing)
  - 2011 RBSA whole-house energy use metering study including cooling load research for 12 central air conditioners and nine central heat pumps covering five regions throughout the Northwest.
  - Ecotope Inc. April 28, 2014. Northwest Energy Efficiency Alliance Residential Building Stock Assessment: Metering Study. Online at: http://neea.org/resource-center/regional-data-resources

- **Puget Sound Energy's Assessment of Potential with Conditional Demand Modeling** (Single-Family Existing and Mobile Home Existing)
  - 2009 conditional demand analysis of over 4,300 homes with survey and billing data using Princeton ScoreKeeping models (PRISM) method to estimate end-use consumptions in the Puget Sound region.
  - Cadmus Group, Inc. May 2013. Puget Sound Energy Comprehensive Assessment of Demand-Side Resource Potentials (2014–2033) Appendix D: Conditional Demand Modeling. Online at: https://pse.com/aboutpse/EnergySupply/Documents/IRP_2013_AppN.pdf

- **NEEA's Residential New Home Codes Energy Use Savings Report** (Single-Family New Construction Code Built and Single Family New Construction ENERGY STAR Home)
  - 2011 residential new construction study using SEEM modeling to estimate end-use consumption and savings of 2011 Oregon Residential Specialty Code (2011 ORSC) built and ENERGY STAR homes.
  - Ecotope Inc. August 22, 2012. Northwest Energy Efficiency Alliance 2011 Residential Codes Energy Use Savings. Online at: http://neea.org/docs/reports/2011-residential-codes-energy-use-savings.pdf?sfvrsn=18

Benchmarking Single-Family Central AC

Station	Single-Family Existing SEER 13				Nest Pilot Single Family	PSE Conditional Demand Analysis Single-Family	RBSA Metering Single-Family NW Region
	Low	Med	High	TMY3	(Normalized TMY3)*	(Normalized TMY3)	(Normalized TMY3)
Astoria	95	193	522	247	310	178	N/A
Baker	675	1,335	1,799	1,355	N/A	853	N/A
Eugene	712	1,300	2,487	1,293	669	1,097	N/A
Hillsboro	837	1,289	2,151	1,098	N/A	790	N/A
North Bend	17	145	449	110	246	-	N/A
Redmond	835	1,447	2,172	1,248	664	759	N/A
Salem	798	1,330	2,410	1,323	731	1,021	N/A
Klamath Falls	827	1,421	2,043	1,352	692	707	N/A
Portland	780	1,362	2,332	1,204	787	1,365	N/A
Roseburg	1,252	2,015	3,203	1,421	829	1,500	N/A
Troutdale	516	1,383	2,441	1,292	N/A	1,368	N/A
Medford	1,721	2,750	4,033	2,073	1,070	2,236	N/A
Pendleton	1,438	2,160	3,141	1,888	N/A	2,175	N/A
The Dalles	1,528	2,573	4,027	2,560	1,449	3,271	N/A
Statewide**	835	1,459	2,432	1,283	N/A	N/A	820

*Nest study used TMY3 CDD base 62 than CDD base 65.

**Energy Trust data represents weighted consumptions specific to Energy Trust's territory.

Benchmarking Mobile Home Central AC

Station	Mobile Home Existing kWh Consumption CEER 11				PSE Conditional Demand Analysis Mobile Home	RBSA Mobile Home NW Region
	Low	Med	High	TMY3	(Normalized to TMY3)	(Normalized to TMY3)
Astoria	83	151	380	188	83	N/A
Baker	475	887	1,156	895	397	N/A
Eugene	483	824	1,538	835	510	N/A
Hillsboro	565	841	1,358	734	367	N/A
North Bend	20	122	316	107	-	N/A
Redmond	571	932	1,369	816	353	N/A
Salem	536	850	1,510	857	474	N/A
Klamath Falls	569	935	1,304	892	328	N/A
Portland	528	869	1,481	790	634	N/A
Roseburg	820	1,260	1,967	920	697	N/A
Troutdale	379	894	1,536	843	636	N/A
Medford	1,095	1,720	2,466	1,316	1,039	N/A
Pendleton	945	1,362	1,937	1,212	1,011	N/A
The Dalles	995	1,607	2,438	1,611	1,520	N/A
Statewide*	563	934	1,526	838	N/A	434

*Energy Trust data represents weighted consumptions specific to Energy Trust's territory.

Benchmarking Single-Family New Construction Central AC

Weather Region*	Single-Family New Construction – Code Built kWh Consumption SEER 13				Single-Family New Construction – ENERGY STAR Built kWh Consumption SEER 13				NEEA Oregon Single Family New Construction Code Built (2011 ORSC)	NEEA Oregon Single Family New Construction ENERGY STAR Built
	Low	Med	High	TMY3	Low	Med	High	TMY3	TMY3	TMY3
Zone 1	354	604	1,059	536	345	579	984	511	440	405
Zone 2	387	736	1,258	645	394	694	1,175	618	853	795
Zone 3	813	1,314	1,914	1,035	770	1,206	1,729	961	1,394	1,307

*Energy Trust data represents weighted consumptions specific to Energy Trust's territory.

Benchmarking Costs Central AC

Source	Two-Ton System				
	SEER 14	SEER 15	SEER 16	SEER 17	SEER 18
DOE 2016 TSD	$49	$109	$217	$917	$1,043
NEEP 2013*	$901	$1,382	$2,585		
MA 2015	$13	$147	$325	$993	$1,725
IL TRM 2017	$0	$108	$221	$620	$620
CPUC 2014	$184	$369	$553	$737	$921
Energy Trust—Contractor Survey	N/A	$449		$1,958	

*Estimated 14 SEER based on 14.5 SEER and SEER 16-18 based on data representing 16+ SEER.

Source	Three-Ton System				
	SEER 14	SEER 15	SEER 16	SEER 17	SEER 18
DOE 2016 TSD	$67	$199	$280	$1,053	$1,161
NEEP 2013*	$930	$1,412	$2,615		
MA 2015	$13	$147	$325	$993	$1,725
IL TRM 2017	$0	$108	$221	$620	$620
CPUC 2014	$276	$553	$829	$1,106	$1,382
Energy Trust—Contractor Survey	N/A	$491		$2,170	

*Estimated 14 SEER based on 14.5 SEER and SEER 16-18 based on data representing 16+ SEER.

Source	Four-Ton System				
	SEER 14	SEER 15	SEER 16	SEER 17	SEER 18
DOE 2016 TSD*	$90	$334	$444	$955	$1,182
NEEP 2013**	$960	$1,441	$2,644		
MA 2015	$13	$147	$325	$993	$1,725
IL TRM 2017	$0	$108	$221	$620	$620
CPUC 2014	$369	$737	$1,106	$1,474	$1,843
Energy Trust—Contractor Survey	N/A	$590		$2,547	

*Estimated 4-ton system, based on the average of 3- and 5-ton systems.

**Estimated 14 SEER based on 14.5 SEER and SEER 16-18 based on data representing 16+ SEER.

Central AC Cost-Effectiveness Results

SEER 16: Zone 1, 2, 3, and Statewide

Region	Building Type	Base			Low Cost			Alt Saving			Lifetime			Avoided Cost		
		SEER 16			SEER 16			SEER 16			SEER 16			SEER 16		
		Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Zone 1	Single-Family Existing	0.17	0.28	0.49	0.43	0.71	1.23	0.13	0.22	0.38	0.26	0.42	0.73	0.78	1.28	2.20
Zone 2	Single-Family Existing	0.17	0.32	0.55	0.42	0.82	1.40	0.13	0.25	0.42	0.25	0.48	0.81	0.75	1.45	2.47
Zone 3	Single-Family Existing	0.35	0.56	0.82	0.97	1.54	2.27	0.27	0.43	0.64	0.52	0.83	1.22	1.58	2.51	3.70
Statewide	Single-Family Existing	**0.19**	**0.33**	**0.55**	**0.49**	**0.85**	**1.41**	**0.15**	**0.26**	**0.43**	**0.28**	**0.49**	**0.82**	**0.85**	**1.49**	**2.49**
Zone 1	Single-Family New Code Built	0.11	0.19	0.34	0.21	0.35	0.62	0.11	0.19	0.34	0.17	0.29	0.51	0.51	0.88	1.54
Zone 2	Single-Family New Code Built	0.12	0.24	0.40	0.23	0.43	0.73	0.12	0.24	0.40	0.19	0.35	0.60	0.56	1.07	1.83
Zone 3	Single-Family New Code Built	0.24	0.39	0.57	0.47	0.76	1.11	0.24	0.39	0.57	0.36	0.59	0.85	1.10	1.78	2.59
Statewide	Single-Family New Code Built	**0.13**	**0.24**	**0.39**	**0.24**	**0.43**	**0.72**	**0.13**	**0.24**	**0.39**	**0.20**	**0.35**	**0.59**	**0.60**	**1.06**	**1.79**
Zone 1	Single-Family New ESTAR Built	0.12	0.21	0.35	0.20	0.34	0.57	0.12	0.21	0.35	0.18	0.31	0.52	0.55	0.93	1.58
Zone 2	Single-Family New ESTAR Built	0.14	0.25	0.42	0.23	0.40	0.68	0.14	0.25	0.42	0.21	0.37	0.62	0.63	1.11	1.88
Zone 3	Single-Family New ESTAR Built	0.24	0.38	0.54	0.45	0.70	1.01	0.24	0.38	0.54	0.36	0.56	0.80	1.09	1.70	2.44
Statewide	Single-Family New ESTAR Built	**0.14**	**0.24**	**0.40**	**0.24**	**0.40**	**0.67**	**0.14**	**0.24**	**0.40**	**0.21**	**0.36**	**0.60**	**0.65**	**1.10**	**1.81**
Zone 1	Mobile Home Existing	0.14	0.23	0.38	0.29	0.46	0.77	0.09	0.14	0.24	0.21	0.34	0.57	0.65	1.02	1.71
Zone 2	Mobile Home Existing	0.14	0.26	0.43	0.29	0.53	0.88	0.09	0.16	0.27	0.21	0.39	0.65	0.65	1.17	1.96
Zone 3	Mobile Home Existing	0.28	0.44	0.63	0.62	0.97	1.39	0.17	0.27	0.39	0.42	0.65	0.94	1.27	1.98	2.84
Statewide	Mobile Home Existing	**0.16**	**0.26**	**0.43**	**0.33**	**0.54**	**0.89**	**0.10**	**0.16**	**0.27**	**0.24**	**0.39**	**0.64**	**0.72**	**1.19**	**1.95**

Report appendix contains BCR of all locations and efficiency levels

Window AC Cost-Effectiveness Results

Weather Station / Region	Savings (kWh)			TRC Benefit Cost Ratio - Scenarios								
	CEER 12			Base			Lifetime			Avoided Cost		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Astoria	0	1	2	0.00	0.01	0.02	0.00	0.01	0.02	0.01	0.03	0.09
Baker	2	7	12	0.02	0.08	0.14	0.02	0.09	0.17	0.10	0.40	0.72
Eugene	3	7	14	0.03	0.09	0.17	0.04	0.10	0.21	0.16	0.44	0.89
Hillsboro	4	8	13	0.04	0.10	0.16	0.05	0.12	0.19	0.23	0.50	0.81
North Bend	0	0	1	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.01	0.09
Redmond	2	6	10	0.03	0.08	0.12	0.03	0.09	0.15	0.15	0.38	0.63
Salem	3	8	18	0.04	0.10	0.22	0.05	0.11	0.26	0.20	0.49	1.10
Klamath Falls	2	6	11	0.02	0.08	0.13	0.03	0.09	0.16	0.11	0.39	0.67
Portland	5	11	20	0.06	0.13	0.25	0.07	0.16	0.30	0.31	0.68	1.26
Roseburg	9	15	26	0.10	0.19	0.31	0.12	0.22	0.37	0.53	0.94	1.59
Troutdale	5	11	19	0.06	0.13	0.23	0.07	0.15	0.27	0.31	0.65	1.17
Medford	11	22	34	0.13	0.26	0.42	0.16	0.31	0.50	0.66	1.34	2.12
Pendleton	11	17	25	0.13	0.20	0.30	0.16	0.24	0.36	0.68	1.03	1.54
The Dalles	10	22	33	0.13	0.26	0.40	0.15	0.32	0.48	0.64	1.34	2.05
Zone 1	3	7	13	0.04	0.09	0.16	0.04	0.10	0.19	0.18	0.44	0.83
Zone 2	5	11	20	0.06	0.13	0.24	0.07	0.16	0.29	0.32	0.67	1.22
Zone 3	11	21	33	0.13	0.25	0.40	0.16	0.30	0.48	0.66	1.30	2.04
Statewide	**5**	**10**	**18**	**0.06**	**0.12**	**0.22**	**0.07**	**0.15**	**0.27**	**0.29**	**0.63**	**1.13**

For Reference to the

Phase 2 Air Conditioning Study Presentation




Air Conditioning Measure Opportunities Scan

Cost Effectiveness Results

Aquila Velonis, Cadmus

Spencer Moersfelder, Energy Trust of Oregon

February 8th, 2017

Project Overview

Background: Due to cost-effectiveness limitations, Energy Trust does not presently have any prescriptive measures in place for:

- Central or window AC for single-family homes
- Window AC or PTACs (electric resistance heat) in multifamily units

Purpose: Identify potentially cost-effective residential air conditioning (AC) measures using current Avoided Costs and assumptions from secondary sources. Perform additional analysis on measures that look promising in another phase.

THIS IS AN INITIAL SCAN, NOT A DETAILED ANALYSIS

Project Overview (continued)

Energy Trust released an RFP to pre-qualified pool of Planning and Evaluation Contractors and selected Cadmus

We reviewed the following AC types in the respective residential settings:

- Central AC in existing and new single-family and existing manufactured homes.
- Window AC in existing single-family, multifamily and manufactured homes.
- Packaged terminal AC in new multifamily.

Methodology

Data Sources:

- Energy Trust's avoided costs estimates
  - The value of efficiency-driven peak reduction is included
  - These will be updated mid-2017
- Regional Technical Forum (RTF) unit energy savings workbooks
- Residential Building Stock Assessment data
- US DOE Technical Support Documents (TSDs)
- ENERGY STAR®
- Previous Cadmus analyses

Methodology

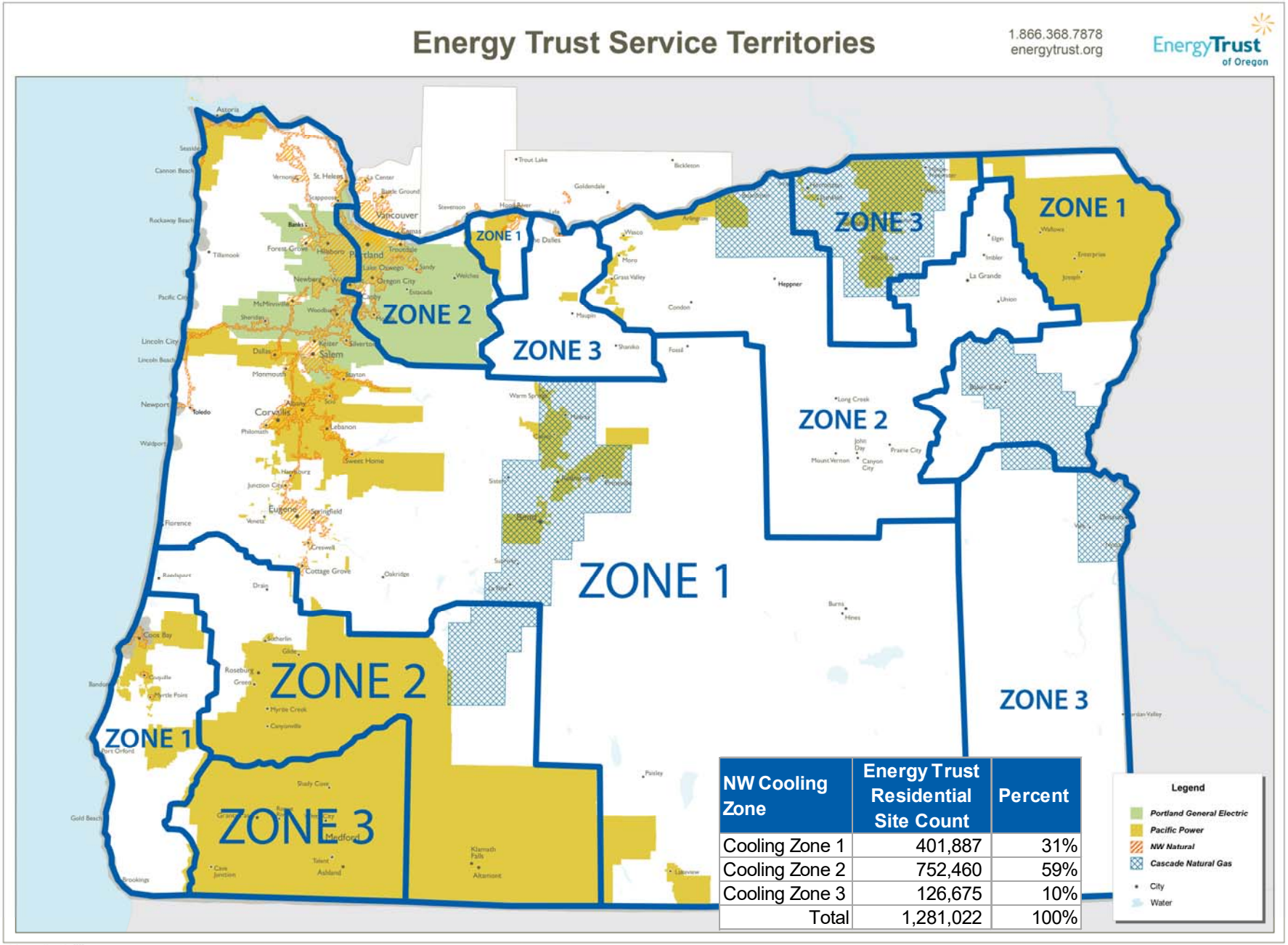
METHODOLOGY
Assessed cost effectiveness of 12 residential AC scenarios by:

Segment
New and existing housing stock
Equipment type
Measure efficiency
NW cooling zone: CZ1, CZ2, and CZ3

Where reasonable, applied liberal assumptions for savings and incremental costs

Cost-Effectiveness Measure Scenarios

Measure Iteration	Segment	Housing Stock	Equipment Type	Channel	Scenario
1	Single Family	Existing Construction	Window Unit A/C	Retail	Incremental Upgrade
2					Early Retirement (Retrofit)
3			Central A/C	Contractor	New Purchase
4					Early Retirement (Retrofit)
5		New Construction	Central A/C	Contractor	New Purchase
6	Multifamily	New Construction	PTAC	Contractor	New Purchase
7		Existing Construction	Window Unit A/C	Retail	Incremental Upgrade
8					Early Retirement (Retrofit)
9	Manufactured Homes	Existing Construction	Window Unit A/C	Retail	Incremental Upgrade
10					Early Retirement (Retrofit)
11			Central A/C	Contractor	New Purchase
12					Early Retirement (Retrofit)



NW Cooling Zone	Energy Trust Residential Site Count	Percent
Cooling Zone 1	401,887	31%
Cooling Zone 2	752,460	59%
Cooling Zone 3	126,675	10%
Total	1,281,022	100%

* NWPPC Cooling Zones based on 2010 census and TMY 3 weather data

Analysis Central AC

Key Assumptions:

- Savings estimated from RTF SEEM models using different climate data
  - TMY 3/TMY 2 - 367 CDD for Portland
  - Results proportioned using 2000-2014 climate data – 471 CDD for Portland
- Costs based on DOE TSDs
- 15 year measure life

Equipment Specifications	Baseline	Efficient Equipment
Upgrades at time of purchase	SEER 13	SEER 15.0, 16.0, 18.0
Early replacement/Retrofit	SEER 11.1	SEER 15.0, 16.0, 18.0

Scan Findings Central AC

- Early replacement/retrofit Central AC measures are not cost-effective in any CZ.

- Results for upgrades for Central AC at the time of purchase vary by CZ.
  - CZ3 is cost-effective, CZ2 is prospectively close and CZ1 is not.
  - Weighted CZ results merit a closer look
    - 0.58-0.94 BC-ratio depending on climate data and equipment efficiency

Analysis Window AC

Key Assumptions:

- Savings estimated using two different methods
  1. Adjusted tonnage capacity of RTF SEEM workbook with two sets of climate data:
     - TMY 3/TMY 2 - 367 CDD Portland
     - Results proportioned using 2000-2014 data – 471 CDD Portland
  2. ENERGY STAR calculator
- Costs based on review of 34 on-line retail products
- 10 year measure life

Equipment Specifications	Baseline	Efficient Equipment
Upgrades at time of purchase	CEER 10.9	CEER 12.0
Early replacement/retrofit	CEER 9.7	CEER 12.0

Scan Findings Window AC

- RTF SEEM workbooks are more reliable method for Energy Trust.
- Early replacement/retrofit Window AC measures are not cost-effective in any CZ.
- Results for upgrades for Window AC at the time of purchase vary by CZ.
  - CZ3 is cost-effective, CZ2 is prospectively close and CZ1 is not.
  - Weighted CZ results merit a closer look
    - 0.67 or 0.86 BC-ratio depending on climate data

Analysis Multifamily New Construction PTACs (electric resistance heat)

Key Assumptions:

- Savings estimated using a new construction multifamily RTF workbook
  - TMY 3/TMY 2
- Costs based on DOE TSDs
- 15 year measure life

Equipment Specifications	Baseline	Efficient Equipment
Upgrades at time of purchase	EER 11.0	EER 12.0

Scan Findings Multifamily New Construction PTACs (electric resistance heat)

- Measure is prospectively cost-effective in all cooling zones using TMY3/TMY2 climate data.
- This measure may also be cost-effective if equipment is upgraded at time of failure.

Conclusions

1. Early replacement/retrofit options for central and window AC is not likely to be cost-effective.

2. Equipment upgrades at time of purchase for Central and Window AC in existing and new single-family and in existing multifamily are prospectively cost-effective.

3. PTACs in new multifamily are most likely cost-effective.

Next Steps

1. Discontinue investigation of early replacement/retrofit options for central and Window AC.

2. For equipment upgrades at time of purchase for Central and Window AC Energy Trust will follow-up with a more in-depth analysis of:
    - Climate data
    - Optimizing modeling assumptions for Oregon
    - Cost data

3. For PTACs New Buildings program will review the measure in relation to pending 2018 code release.

Q & A

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Decision-Making Approaches for Residential Measures

May 9, 2018

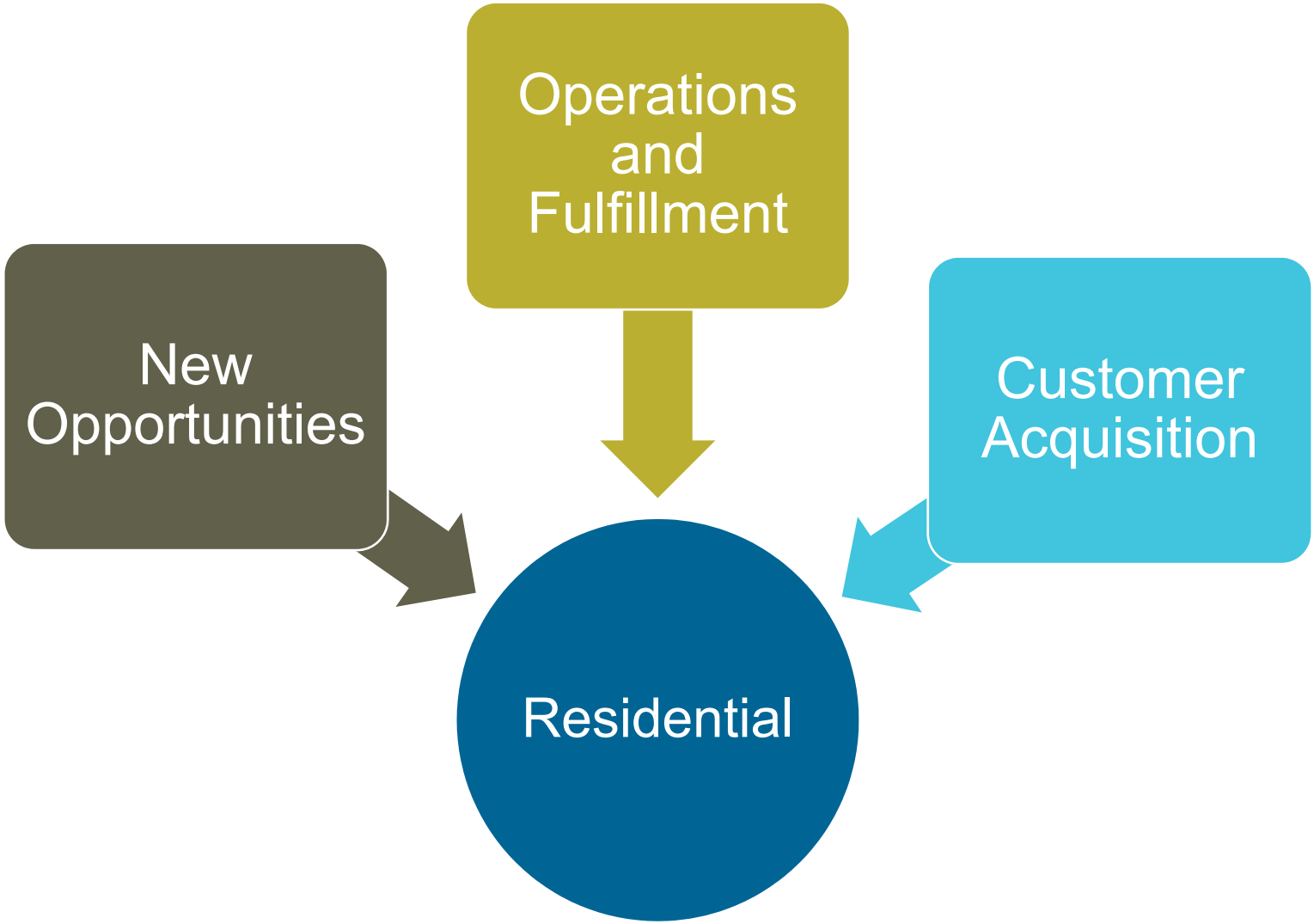
Energy Trust of Oregon

Agenda

Feedback from CAC = interactive presentations, earlier engagement, insight into decisions

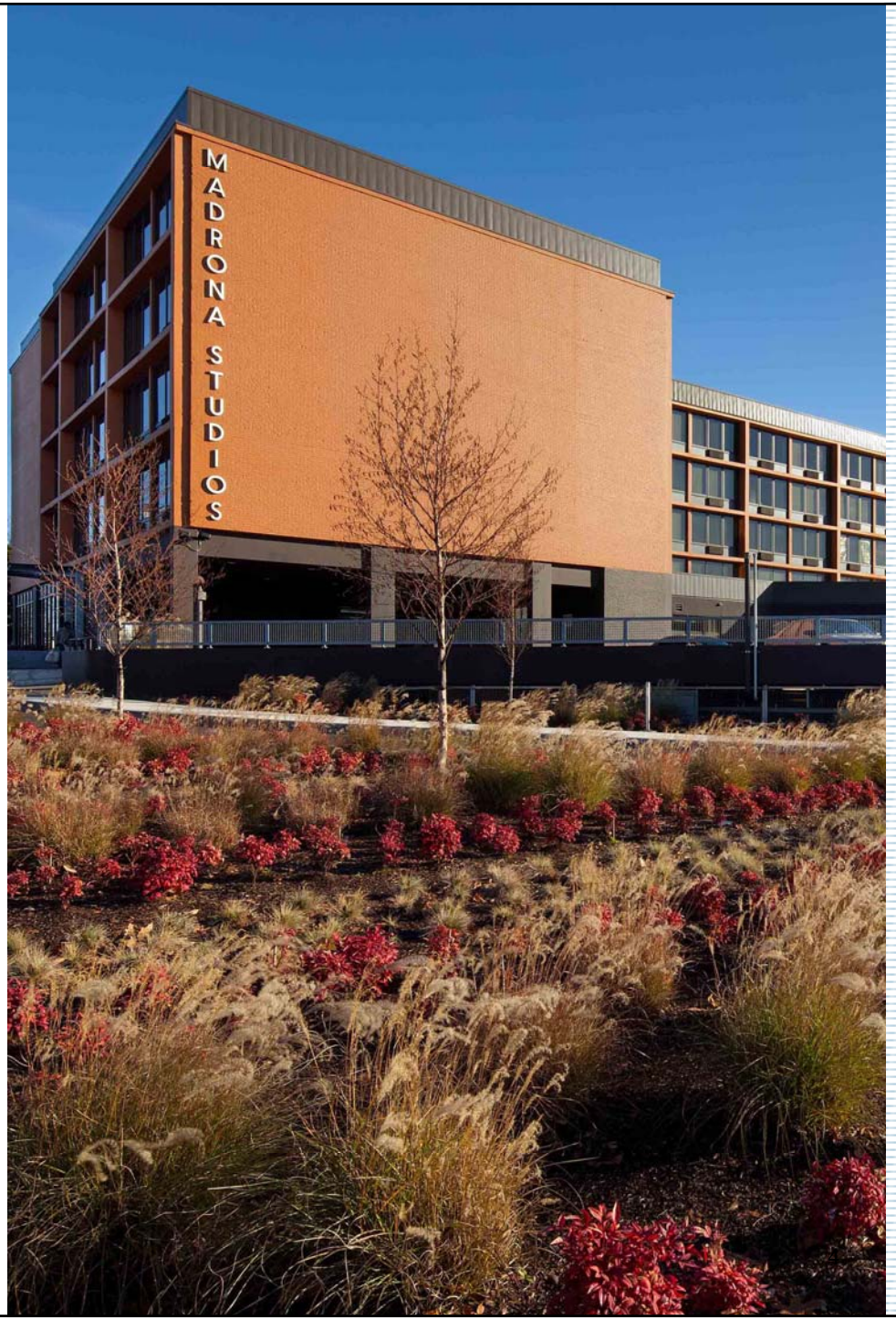
- Residential organizational structure
- What is a Measure Approval Document (MAD)?
- Provide examples measure development decision criteria
- Connect decision criteria to themes
- Solicit feedback from CAC members

2018 Residential Structure



What is a MAD?

- Internal record of decision
- Authorization to implement a cost-effective measure
- Description of the measure (savings, max incentives, etc.)
- Defines delivery channel



Example Criteria in Decision Making

Please note: examples are measure-specific but feedback is meant to be measure-agnostic

1. Learn as you go vs. wait till you know more
2. Downstream vs. midstream
3. Narrow vs. broad (climate, product, customer type)

Example: Central Air Conditioning

Background: Central Air Conditioning

Background

- Limited cost information
- Early screens suggest possibility for cost-effective measure but presently limited to single climate zone (CZ)
- CZ3 represents ~10% of Energy Trust service territory

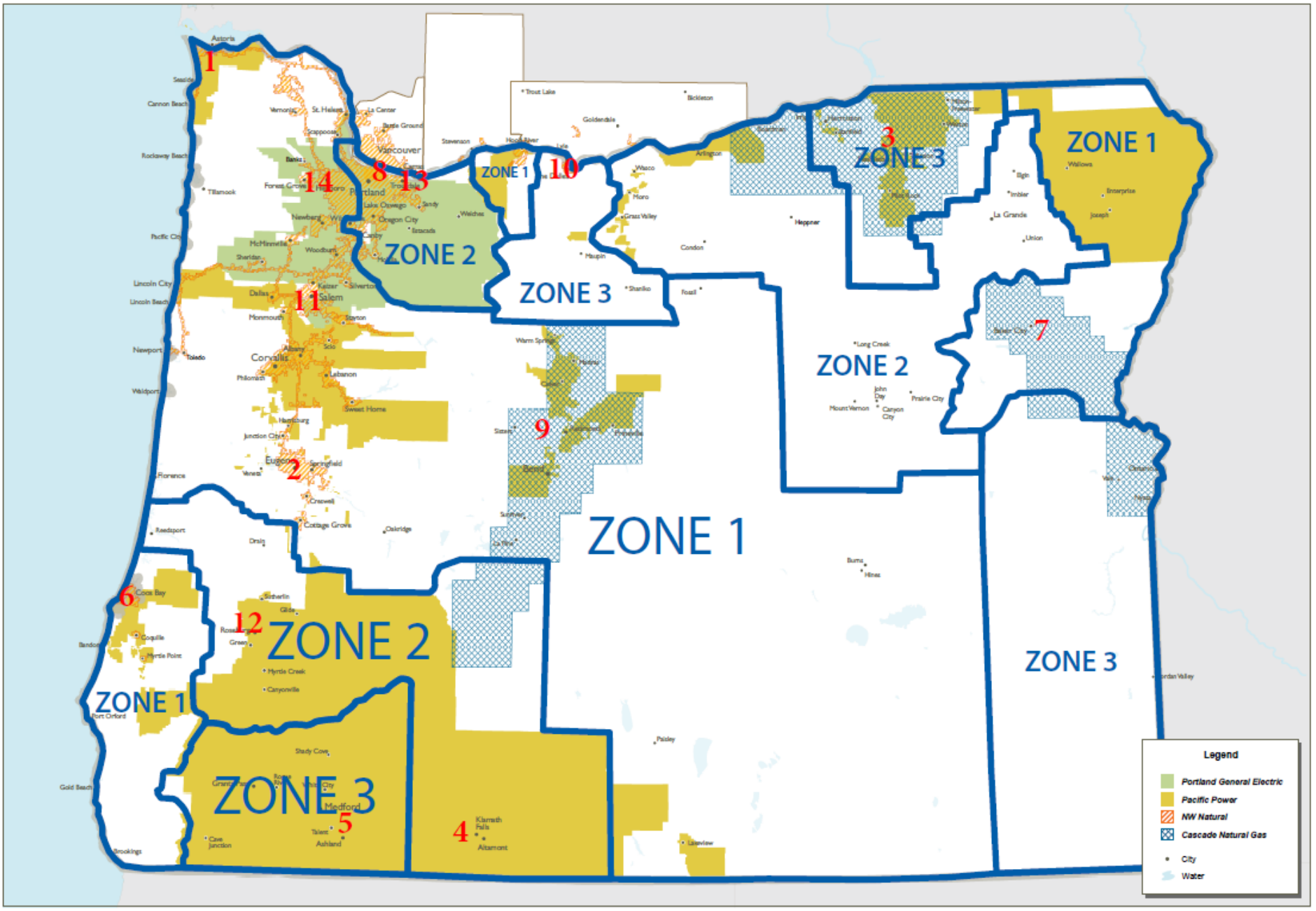
Criteria

- Narrow vs. broad
- Learn as you go vs. wait till you know more

Energy Trust Service Territories

1.866.368.7878
energytrust.org

EnergyTrust of Oregon



Pros/Cons: Limited Delivery Approach

If we went to market with a limited regional approach:

- Pros – launch a measure, learn about technology, learn about customers/contractors
- Cons – investment of resources, low savings potential, risk of customer/contractor confusion

Poll Questions: Central Air Conditioning

What is the best approach to learn more about technologies and markets?

- Go to market with field test
- Delay going to market till further data is captured
- Don't invest resources exploring new technologies, wait for someone else
- Other (opportunity to discuss your answer)

When is it appropriate to invest in a limited measure delivery approach? (multiple choice)

- Supports an emerging technology
- Creates opportunity for expanded participation
- Supports a field test to gather new data
- Never worth it to deliver limited measures
- Other (opportunity to discuss your answer)

Example: Smart Thermostats

Background: Smart Thermostats

Background

- Many products have features with potential for energy savings
- Energy Trust offers $50 incentive for smart thermostats based on product qualification, and maintains a qualified products list (QPL)
- QPL is based on a set of features that previous pilots have shown to save energy
- Two qualified product lines

Criteria

- Narrow versus broad (climate, product or customer type)

Pros/Cons: QPL versus third-party specs

Maintain QPL products list with limited availability

- Pros – higher confidence in savings, meets BCRs
- Cons – limited product choice, difficulty for manufacturers to participate, potential customer confusion, resource intensive

Expand offering to point at third-party credentials

- Pros – easier to manage, fewer program resources, more inclusion
- Cons – less confidence in savings, doesn't meet BCRs, fewer savings due to deration

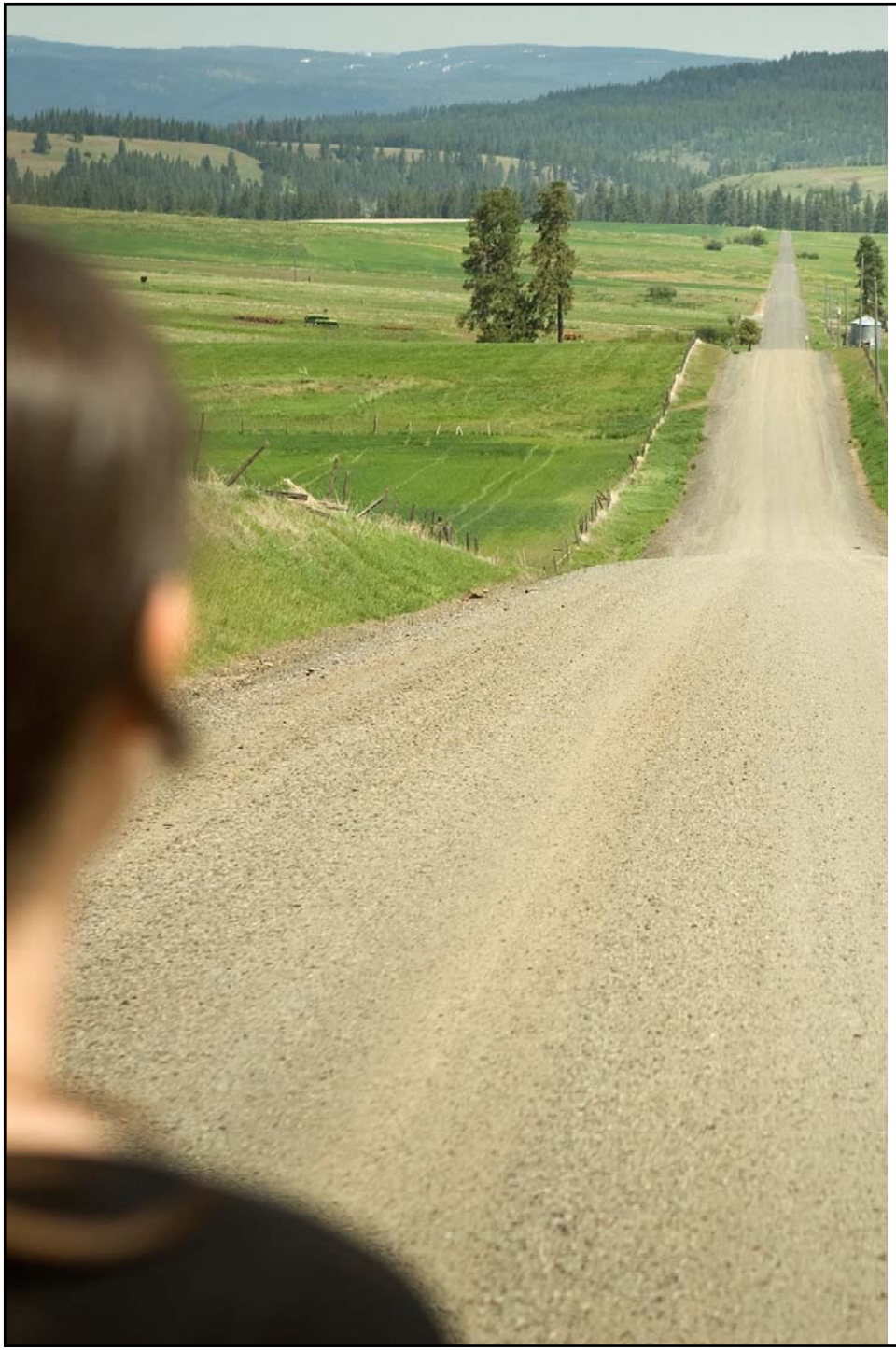
Poll Questions: Smart Thermostats

When is it appropriate to use a qualified model approach with an Energy Trust developed and maintained QPL?

- There is a high variability between products performance
- Savings potential justifies the added time/effort needed to maintain QPL
- More products are likely to qualify in the future
- Don’t create/maintain Energy Trust QPL, point to other resources to screen measure
- Other (opportunity to discuss)

Closing Discussion

- Was this a valuable exercise?
- How would you like us to use this feedback?
- What follow up is needed?



Thank You

Mark Wyman

Residential Program Manager

Scott Leonard

Residential Senior Project Manager

EnergyTrust of Oregon

Budget Engagement Schedule - 2018

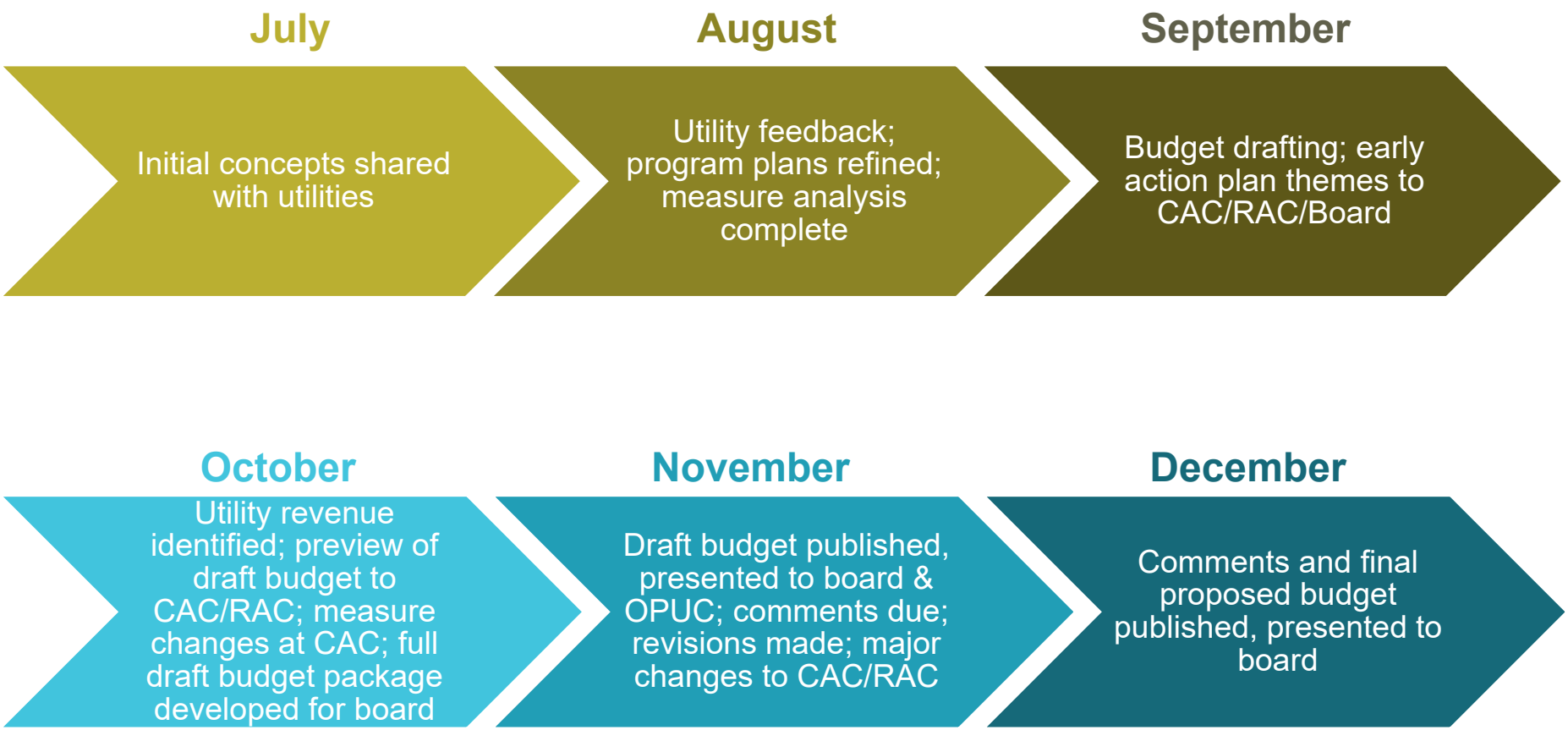
Conservation Advisory Council
May 9, 2018

Energy Trust of Oregon

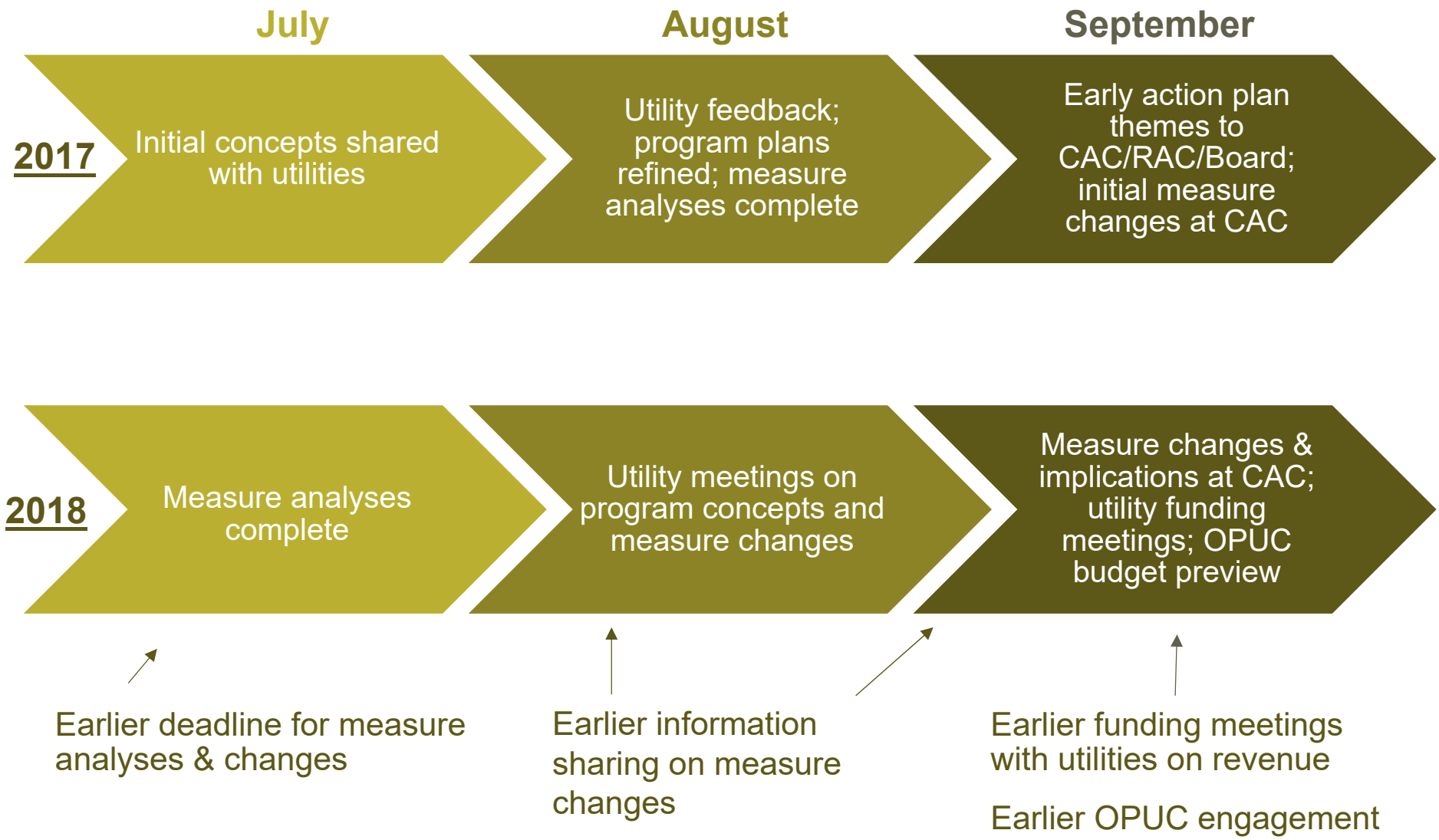
Objectives for Budget Process Improvements

- Publish draft budget earlier
- Create time in the process to respond to input from stakeholders
- Build more time into public comment period
- Expand time for funding meetings with utilities and feedback
- Respond to CAC interests on budget engagement
  - Earlier engagement
  - Focus on major program and measure changes
- Enhance opportunities for stakeholders to provide input for board consideration

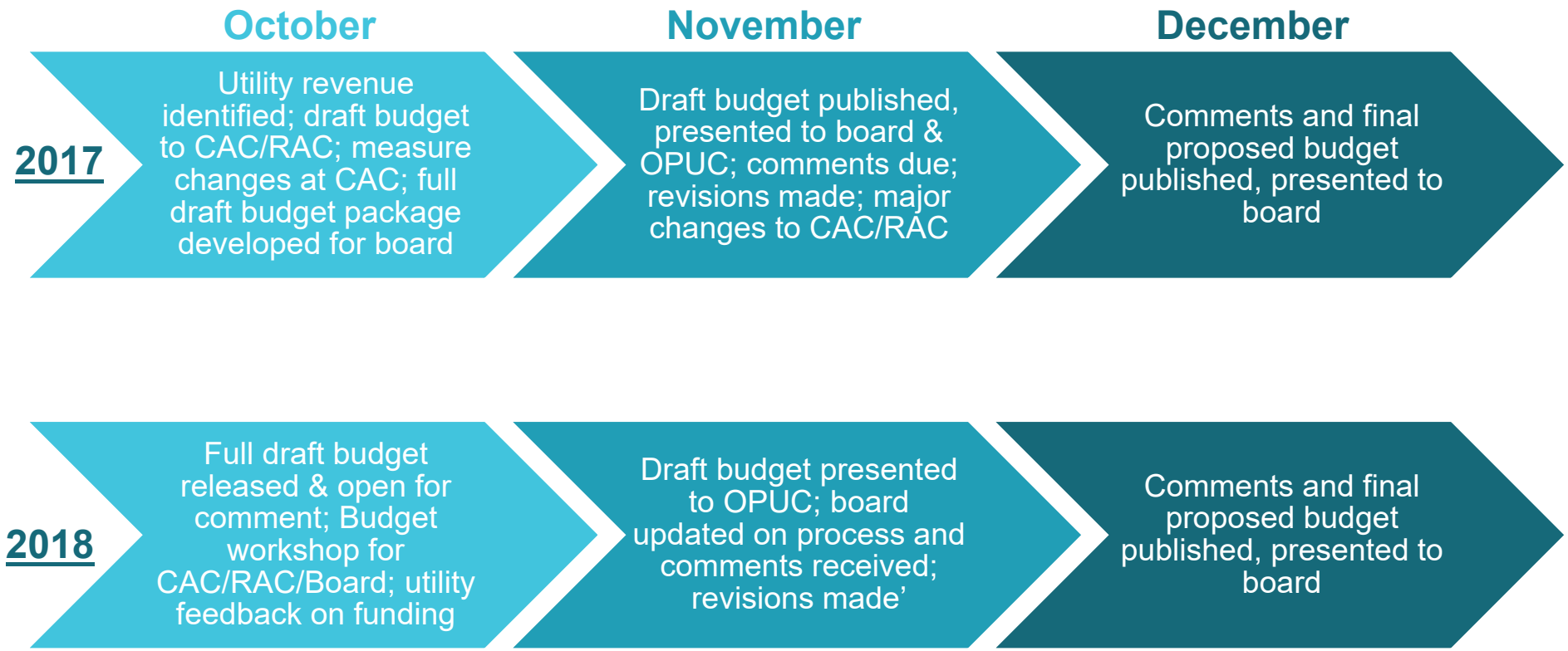
Last Year's Budget Engagement Schedule



Planned Improvements



Planned Improvements



- All stakeholders receive full budget package Oct. 10
- 3-week public comment period begins
- Combined workshop for all stakeholders and board Oct. 17

- Earlier OPUC public meeting & presentation
- All stakeholder comments received before revisions are made
- Changes summarized at Nov CAC/RAC

Thank You

Steve Lacey
Director of Operations
steve.lacey@energytrust.org

Energy Trust of Oregon

2018 Meeting Guidance
Conservation Advisory Council

DRAFT May 8, 2018

The Conservation Advisory Council has a set of 10 operating principles (see the 2018 Operating Principles document). These were affirmed in early 2018 as still relevant, but not complete. The CAC undertook a process to re-examine the role of CAC; how CAC members are engaged; what topics comes to CAC and when; and how materials and issues are presented.

The notes and summary of this re-examination are in the March 2018 meeting minutes. This document distills that information into a set of proposed, additional operating principles guiding CAC meetings through 2018. In early 2019 we will review this guidance and adjust, if needed.

Additions to the current operating principles (proposed):

- Focus more on these key topic areas:
  - Customer research and insights
    - Who are we serving, reach of programs; including insights from Big Data
  - Context—market trends, policy issues affecting programs
    - Includes research, evaluation, legislation, policy
  - Program innovations and new initiatives
    - Future sources of savings or decline,
    - Pilot prioritization and vetting,
    - Horizon planning; especially, expanding reach or changing costs
  - Challenges and barriers facing programs
    - Including policy and market barriers
    - Solicit and vet possible response approaches
  - Program delivery to historically underrepresented groups
    - Diversity/equity considerations; includes savings, costs, metrics
  - What's working and not working nationally
    - Include comparisons to others when available
    - Vet proposed changes
- Bring items early in more draft form
- Expand agenda content to include
  - Short, succinct summary of the topic
  - Objective statement, outcomes expected from the item
- Vary meeting styles
  - Utilize more facilitated, small-group settings and mini-breakouts
  - Foster more CAC member exchanges
  - Shorten and focus presentations
    - Provide more background in the meeting packet, assume CAC members will prepare
- Notify of other Energy Trust meetings
  - Provide links to agendas and materials from those meetings
  - For example, board Strategic Plan workshop, Evaluation Committees, Trade Ally Forums
- Track and report on how CAC input is utilized

2018 Operating Principles
Conservation Advisory Council

Reviewed February 2018

The Conservation Advisory Council (CAC) is one of several standing committees formed by the board of directors to provide advice in support of Energy Trust of Oregon energy efficiency programs.

From the CAC Charter:

> The purpose of the Conservation [and Renewable] Advisory Councils is to advise the board and staff of Energy Trust of Oregon, Inc., regarding issues associated with Energy Trust energy efficiency and renewable energy policies and programs.
>
> The Councils will:
> (a) Review and discuss selected energy efficiency and renewable energy issues prior to Energy Trust decision-making to ensure that the Board and staff have the best available information on such issues;
> (b) Help the Board and staff to identify alternative resolutions of such issues; and
> (c) Help staff identify matters for board consideration.

The CAC provides direct advice and input on budgets, program designs and strategies and the implications and programmatic response to policy or market changes. Final resolution of issues and all decision authority remains with the board of directors.

The following operating principles are a distillation of Conservation Advisory Council meeting discussions concerning the CAC role and meeting process. CAC Operating Principles were initially developed in 2004 to improve and enhance the CAC process. The Operating Principles are reviewed by CAC members and Energy Trust staff at the beginning of the year, updated as needed and adopted. The following items were generally agreed to be the way that CAC should operate in 2018 with future discussions planned to ensure they are comprehensive (see the 2018 Meeting Guidance document).

Energy Trust staff has endeavored to incorporate these principles into the CAC meeting process as a way to enhance the effectiveness of advisory council meetings.

1. Meet in person at least 8 times per year, providing a phone conference line upon request if a CAC member needs to participate remotely.
2. Draft an annual CAC schedule to set expectations for the year and prioritize known issues/ topics for the year to inform annual schedule and meeting agenda development.
3. Whenever possible, distribute meeting agendas, related materials and notes from the previous meeting one week in advance so that CAC members can review and be prepared to engage on topics.
4. Identify agenda items as discussion, information or recommendation needed.

5. Make presentations short and succinct; provide ample time for discussion. Structure the meetings to maximize dialogue between staff, CAC members and other interested parties who attend.
6. Ensure sufficient CAC member input and discussion on warranted topics before polling members for opinions. Document minority viewpoints as well as prevailing opinions.
7. Provide summaries of CAC input in board briefing materials or decision documents where applicable. Summaries should reflect the degree of CAC unanimity.
8. Encourage board member attendance at CAC meetings. Include board members on CAC distribution list to allow the board to review CAC minutes and to choose to attend meetings of interest.
9. Include time on agendas for open discussion and suggestions for future agenda items.
10. Brief new, incoming CAC members on their duties.