

MEMORANDUM

TO: Operation 2030 Funders

FROM: Poppy Storm and Eileen V. Quigley

RE: Operation 2030 Outreach Summary and Recommendations

DATE: September 29, 2022

CC: Clean Energy Transition Board, Ruby Moore-Bloom

Table of Contents

<i>Introduction.....</i>	<i>1</i>
<i>Summary of Key Outreach Input.....</i>	<i>1</i>
Need to Focus on Critical and Time-Sensitive Priorities.....	1
Lack of Clarity Around Building Decarbonization Policy Gaps.....	1
Case for a More Systemic, Regional, and Diverse Approach to Building Decarbonization	2
Successful Building Decarbonization Depends on Reducing First Costs and Building Supply Chain Readiness	2
Understanding Decarbonization within Bigger Picture of Behind-the-Meter Building Performance.....	3
Including Embodied Carbon in Building Decarbonization Targets and Planning.....	3
Thinking Big About Funding.....	3
<i>Recommendations</i>	<i>4</i>
Strategic Priorities.....	4
Research Agenda.....	5
<i>Conclusions and Next Steps.....</i>	<i>9</i>

Introduction

Operation 2030 is a joint project led by the Clean Energy Transition Institute (CETI) and 2050 Institute. The project was developed to frame and jumpstart multilevel mobilization to fully scale building decarbonization activities in Washington by 2030. Operation 2030 is intended to help chart this path with a specific emphasis on time-critical strategic decisions and actions that must happen in the 2020s.

The project currently focuses on building decarbonization in Washington as well as systemic and regional change that extends to Oregon and other Northwest states. This memo summarizes outreach conducted from February through June 2022 about the [Operation 2030 white paper](#) released on January 5, 2022, and recommends strategy priorities related to Operation 2030.

Following the release of the project's first white paper, the project team conducted a targeted outreach effort with 28 organizations working on building decarbonization in Washington (see Appendix A at the end for the list of groups interviewed). The goal of the outreach was to socialize the results of the white paper and to get input on priorities, research questions, and collaboration opportunities from those who were interviewed. The results of this outreach effort were synthesized to identify the most salient ideas, questions, and strategies.

This memo presents highlights from the outreach findings and lays out a set of strategic priorities; a role for Operation 2030 to support and collaborate with other organizations; and a research agenda to answer critical policy and technical questions that arose from the interviews. These outputs will inform the strategy for Operation 2030 activities through the end of 2023 and beyond and will be revised on an ongoing basis.

Summary of Key Outreach Input

The white paper's key findings were generally well received in the outreach meetings and stimulated a broad range of questions and discussion. Common topics, themes, and priorities that stood out above and beyond the main white paper findings are summarized below.

Need to Focus on Critical and Time-Sensitive Priorities

Stakeholders recognized the urgency of early, prioritized, and coordinated action in the 2020s.

Key input:

- Need to zero in on three to five key wins by 2025 and get many organizations to rally around them.
- Need to strike a balance between detailed technical analysis that supports individual policy designs and a larger transition framework that supports interconnectivity and collective impact.

Lack of Clarity Around Building Decarbonization Policy Gaps

Washington state has several leading-edge building sector policies but the impact of existing policies on emissions limits is unclear, and stakeholders need a better sense of where we are versus where we need to be to meet emissions limits.

Key input:

- Although the white paper effectively translates the economy-wide emissions limits into interim milestones and targets for the building sector, there is a lack of clarity around where we are in terms of the current state of the commercial and residential building stock, the level of change implied by current policies, and how much remains that must be accomplished with new policies.

Case for a More Systemic, Regional, and Diverse Approach to Building Decarbonization

Stakeholders pointed out several systemic issues, barriers, and opportunities for achieving building decarbonization from multiple angles. For example, shifting to a whole building performance paradigm at a regional level, the role of voluntary programs, using utility rates to incentivize consumer behavior, and how to simplify state mandates.

Key input:

- There is an inability to transition to whole buildings or performance-based approaches at scale. For example, the [2021 Northwest Power Plan](#) is not organized around whole buildings or performance outcomes and there is an overall need for organizations and market actors to work in sync toward common building decarbonization milestones and targets.
- A regional systemic strategy will be beneficial for both Oregon and Washington; therefore, it would be good to get alignment across policies and regional power planning needs.
- Legislation should not be just all about mandates; there should also be voluntary programs and funding for market actors and building owners to plan and implement building decarbonization.
- Rate design should be considered as an important strategy to facilitate building decarbonization. For example, rates can act as an incentive for consumers and can be designed with an equity lens to address what the transition looks like for low-income customers.
- Need to better understand the Climate Commitment Act (CCA) to assess its potential role and funding for building decarbonization.
- Building performance compliance is too complicated and should be simplified.

Successful Building Decarbonization Depends on Reducing First Costs and Building Supply Chain Readiness

Building decarbonization transition costs are influenced by several factors. Stakeholders provided input on key opportunities for reducing costs across the value chain for high-efficiency electric equipment and installation. Active strategies to decrease costs for electrification and efficiency can streamline building decarbonization implementation.

Key input:

- Need a way of connecting targets/milestones with workforce and market needs, and with policies, working together to ensure accessible and affordable transition.
- Need to consider housing affordability, keeping incremental costs low, and how to make heat pumps less expensive.
- There is a desire and need to increase heat pump production in the U.S., which takes investment, and people are hesitant to do without knowing that the market is there.

- We cannot go with an “every building is unique” model. Standardization = cost reduction. Standardization also means you can focus on distributors and don’t need to convince every engineer.

Understanding Decarbonization within Bigger Picture of Behind-the-Meter Building Performance

Building decarbonization requires eliminating fossil fuel emissions in buildings by 2050. However, the process of successfully implementing building decarbonization, while minimizing impacts to the grid and optimizing building performance benefits, requires a broader whole building perspective.

Key input:

- There is a tension between more comprehensive retrofits versus just equipment replacement. What building performance strategies are really needed to decarbonize buildings versus what is required for grid reliability? What should the targets be for electricity efficiency retrofits, for example, envelope measures, versus kBtu efficiency such as electrification of space and water heating? How do we know how much we need to do beyond the equipment replacements?
- There is a need to tease out the magnitude of efficiency and other complementary behind-the-meter strategies that should be targeted alongside electrification of major end uses.
- Can we stay on a natural replacement schedule, or do we need to start implementing early equipment replacement?

Including Embodied Carbon in Building Decarbonization Targets and Planning

Some stakeholders pointed out the importance of explicitly incorporating embodied carbon into building decarbonization policies. They emphasized the need to account for embodied carbon in existing policies.

Key input:

- Operation 2030’s definition of building decarbonization leaves out embodied carbon. How can we understand the totality of building decarbonization, including both operating and embodied carbon, and the relationship thereof in terms of equipment and materials used for efficiency and electrification?

Thinking Big About Funding

Building energy efficiency and now decarbonization implementation is often approached at the building owner level rather than as a public good or infrastructure like with transportation or the electricity sector. Stakeholders emphasized the need to think big about funding, how multiple funding streams can be leveraged, and how public investment in zero-emission infrastructure can be increased.

Key input:

- Investment should come at the state level, so it’s not hindered by constitutional restrictions on public utility electrification incentives, and the state investment should be at a massive scale. In the 2022 legislative session there was a \$17 billion transportation package. How can we shift our thinking about how we fund building decarbonization so it is seen as public infrastructure like transportation? How many billions should be directed toward the approximately 30-year

transition of nearly four million residential units and commercial buildings in a way that helps drive economic development and addresses historic inequities?

- Washington is perfectly positioned to be a testbed for federal funding for building decarbonization efforts; this type of funding should be explored as soon as possible.
- Heat pump technology is the number one technology that DOE wants to invest in. How can Washington leverage this type of federal investment to expand and dramatically increase productivity in heat pump manufacturing, distribution, and installations?

Recommendations

Based on the input from the Operation 2030 outreach effort, there are several gaps the Operation 2030 project can address with policy and strategy recommendations, analysis, partnerships and convening with other organizations, especially in the 2023 to 2025 timeframe.

Strategic Priorities

The Operation 2030 team assessed the outreach input in relation to the Operation 2030 white paper recommendations and refined priorities as listed in the table below as the most strategic in terms of impact, time sensitivity, Operation 2030's potential role, and stakeholder emphasis and interest.

This table identifies the strategic priority with the year that the activity should be undertaken and whether the priority is one that Operation 2030 could take the lead on.

Year	Strategic Priority	Op2030 Lead
2023	Building Decarbonization Plans (BDP): Trajectory to 2050 for all building sector segments -Targets -Roadmap (what, why, how) -Interdependencies -Inputs to market development and industrial strategy	No
2023	Building Sector Industrial Strategy: Scale building decarbonization using a comprehensive, sector-level approach and a community and economic development lens	Yes?
2023	Embodied Carbon: Merging operating and embodied carbon into a common roadmap to recognize the urgency of addressing embodied carbon and to open up opportunities for policy innovation	No
2023	Cost reduction initiative to frame and identify key strategies for deep reductions in upfront costs for key building decarbonization strategies such as heat pumps for space and water heating	Yes?
2023	Utility planning and program structure: Upgrade to 2050 goals/targets -Conservation potential assessments converting into utility building decarbonization plans -Rate design to facilitate decarbonization, equity, and peak load reductions -Dramatically increase performance-based program targets	No
2023	Allow public utilities to incentivize electrification	No
2023	System Benefit Metric	No

2023	Shift regional power planning methodology to backcast from 2050 emissions limits	Yes?
2023	2050 trajectory and targets for state building performance standards for all segments, final performance standard and greenhouse gas intensity targets	No
2023	Industry outreach (finance, real estate, labor, large corporations, etc.)	Yes?
2024	Energy code for existing buildings	No
2024	Residential disclosure policy (in conjunction with 2024 energy code development)	No
2024	Labeling harmonized across mandates, policies, programs, and industry (real estate, finance, etc.)	No

Due to the overarching nature of the building sector industrial strategy, we include a more detailed breakdown of its potential elements in the list below. Some of these overlap with priorities listed individually in the table above, but they are also included below to emphasize the interconnected nature of an industrial strategy structured to enable the building sector to transition in a more unified manner:

- Integrated strategy to quickly build large-scale implementation capacity, which would include:
 - Reduce equipment and installation costs
 - Replicable, high-performances design strategies capable of deep emissions and energy reductions in the majority of buildings within each building sector segment
 - Increased building sector productivity
 - Supply chain interventions
 - Workforce and market development
 - Dramatic, target-aligned expansion of Washington building sector manufacturing capacity
 - Labeling and appraisal standards designed to apply across mandates and programs
 - Scalable financing structures to ensure buildings achieve performance
 - State heat pump program, including but not limited to market development, cost reduction, incentives, and innovation hubs
- Large-scale public and private investment in building sector soft and hard infrastructure

This strategy also implies deeper market intervention and support that typical market development or transformation efforts. The main goal of building sector industrial strategy would be to provide a coherent approach and policy framework against which major public and private sector investment decisions can be made.

Research Agenda

Throughout stakeholders raised many important research questions, ideas, and requests during our outreach discussions. The requests ranged from policy research, visualizations, and frameworks to granular technical modeling, analysis, and targets, which are assembled in the table below. Next steps will be to prioritize the research agenda and develop an integrated approach to align and inform Operation 2030 analysis with upcoming deep decarbonization pathways modeling already planned by CETI for the remainder of 2022.

Topic	Research Questions/Actions
Affordability	Strategies for avoiding an “every building is unique” model. Standardization = cost reduction. Standardization also means you can focus on distributors and don’t need to convince every engineer.
Affordability	Isolate how the cost reductions from electrification happen and whom they might affect.
Affordability	Sensitivities on cost scenarios: what if we reduced the cost of heat pumps to cost-competitive with like-for-like replacements or limit incremental costs to a certain percentage?
Affordability	Impact of health benefits and other factors that could increase the \$34 billion savings of electrification versus gas-in-buildings.
Affordability	Need to revamp cost analysis now that we have CCA. The \$34 billion might be under-estimated when we talk about putting a cost on carbon.
Affordability	Investigate what is driving heat pump costs versus other countries. Based on this, what types of regulations or equipment designs need to change (e.g., refrigerants, some are all internal so are plug and play like a refrigerator, how do we make everything plug and play? How do we bring more of the design out of contractors and to manufacturers/distributors, factory-built versus site-built, need to increase productivity).
Affordability	How to use decarbonization to expand the scope of housing affordability?
DER	Better granularity on demand response and onsite renewables in Deep Decarbonization Pathways modeling
Design	Research standardized retrofits that can decarbonize majority of buildings in each building segment. Need to focus on standardization, which will reduce costs. We need to reduce field assembly, get these to the point where they can be pre-assembled. Barrier = capital investment needed; people don’t want to invest without knowing the market will be there.
Design	Test sensitivities for different levels of efficiency (volume of fuel switching, volume of heat pumps versus ER, design strategies) in Operation 2030 retrofit targets.
Design	What are the technical leaps that need to happen? Could have a forum to explore this.
Economic Development	Research building sector economic development strategies
Embodied Carbon	Quantify embodied carbon within DDP analysis. Links in with industry, labor, and the real carbon implications of building sector decisions. For example, when we start looking at how much additional retrofit measures are necessary for grid health, they could take embodied carbon into consideration.
Embodied Carbon	Model embodied carbon, has anyone ever done a large-scale analysis looking at optimizing embodied versus operating carbon?
Equipment	Quantify large costs for upgrading electrical systems in buildings before can put in electric equipment.
Equipment	Can we stay on a natural replacement schedule, or do we need to start implementing early equipment replacement?
Equipment	Number of zero emission replacements versus natural replacements?

Equipment	Visualization emphasizing that we're trying to keep with natural replacement cycles, so need to look at this more closely and sensitivities around it, visualizing what it really looks like quantitatively and in terms of costs to derail from natural replacement, frame as optimizing policies and timing, there are hard choices here. Need to show why we need to move forward asap.
Equipment	Strategically pruning gas versus install at replacement, do we need to rip out some new equipment to get whole areas off gas?
Equipment	What percentage needs to be straight equipment replacements? How much should receive other envelope retrofits?
Equipment	How to collaborate w/ national efforts on heat pump technology? Advanced Manufacturing Office, investment in supply chain – part of the cost of heat pump is due to shortage of supply chain.
Equipment	If Oregon is also needing heat pumps, how can we move toward regional collaboration instead of competition?
Equity	Comparing gas and electric, and what happens when you front-load the transition for low-income customers versus business-as-usual?
Funding	Visualizations for funding the building decarbonization.
Grid	Need more data + analysis + strategy around how to frame information about grid capacity & load growth.
Grid	How to decarbonize buildings while having enough electricity and clean fuels to support transportation and industrial sector decarbonization (need to look at this nexus in terms of strategy)? Deeper understanding of zero-sum game between building decarb and transportation/industrial decarbonization and industrial sector economic health and development.
Grid	Visualizations of the way we manage the grid.
Implementation	Think deeply about the 80/20 strategy for decarbonizing various building segments and how to build this into policy/program/market strategies. e.g., the utilities deal with the difficult 20%, not the 80% that the market can address (assuming properly structured mandates; restructured cost-effectiveness tests, rates, and carbon pricing; deep cost reduction; massive incentives and subsidies; and a platform of social rights aligned with the scale and pace of the decarbonization transition).
Implementation	Explore opportunities for unionized residential construction (more factory-built work, large-scale subsidized retrofits requiring union labor and low-cost heat pump procurement (show this graphically).
Industrial Strategy	Research building sector elements of federal funding for efficiency and decarbonization
Jobs	Quantify positive job impacts of electrification scenario and how to ensure workers can transition.
Jobs	More research around workforce to show the economic development argument for the Op 2030 goals.
Jobs	How many workers are currently doing work like this? How much can they complete in a year? What is the cost to do that?
Jobs	How much does workforce need to scale? What are the training and workforce development needs?

Pathways	Focus DDP building analysis questions on supporting policy, program, market transformation, and community and economic development.
Pathways	Better granularity on what's driving energy and emissions increases, for example building stock increases versus fuel switching or bad design.
Pathways	Ensure upstream fossil gas emissions are included.
Pathways	Isolating impact of building electrification versus transportation on energy changes by fuel type, and the relationship thereof.
Pathways	Show how much electricity is required for the gas in buildings scenario.
Pathways	More granular analysis of the energy impacts of sticking with ICE in buildings.
Pathways	Direct comparison of how much is the same with gas versus electricity, but then gas ends up costing so much more, e.g., what you don't get for the extra effort, is it rational from a business case?
Pathways	Show Washington energy waste graphic but just for the building sector, including comparing gas-in-buildings versus electrification so it's clear how much energy is wasted in the gas scenario, and the cost implications.
Pathways	Dig deeper on behavioral change side, this is not an afterthought. This is central to remaking the economy.
Pathways	Major visualization of impact of equipment types and volumes on transition, in language people understand. Make it tangible. This is what xyz number of lighting does, then the heat pumps do this, etc.
Pathways	Need heavy segmentation in terms of building types, vintages, and geographic and demographic distribution, and cross tabs thereof.
Pathways	Need to show how much the pipeline throughput will still be reduced in the gas in buildings scenario. Pipefitters need to see that the pipes will be impacted on both sides. There is an inevitable surge in electrification, so market chaos is not a strategy, need a managed transition.
Policy	What are the strategies to meet the 2030 targets? WA has utility programs, new construction codes, retrofit codes -- are those existing initiatives sufficient?
Policy	Think about how we can use the data and analysis about this path in the advocacy work that we're doing every day. Connecting analysis and visuals to advocacy work.
Policy	How to help people understand the serious implications of the delay when policies don't go through?
Policy	How to make electrification the path of least resistance?
Policy	Lay out policy trajectory for all building sector segments.
Policy	How to think toward building infrastructure as a public good that we invest in at the scale of transportation and industry.
Targets	How far off are we, quantitatively, given our current policies (BPS, etc.) and our goals? Is the state building performance standard work with targets for newer buildings a start on this path? We need to know more about the current square footage vs. what needs to become zero-carbon next: What is additive and what isn't? It would be helpful to see what we're doing today.
Targets	Developing targets table, deeper distinctions like between replacements and other measures and why, extrapolate to equipment, and workforce implications.

Conclusions and Next Steps

The Operation 2030 outreach effort has clarified a potentially pivotal role for the Operation 2030 team. Looking across the strategic priorities and research agenda, there is a clear interplay between the [Net-Zero Northwest \(NZNW\)](#) modeling effort CETI launched in August 2022 and the various types of systemic change identified as strategic priorities.

Washington state energy planning and utility efficiency programs operate within a regional power planning context and leveraging the NZNW modeling could be instrumental in two ways: (1) to demonstrate not only how Washington and other Northwest states can decarbonize their economies, and (2) how the regional power planning methodology needs to evolve to consider the impacts of progressively lower emissions limits on power requirements and demand-side policy and program designs.

The culmination of the strategic priorities emphasized in this outreach effort shows that the essence of the Operation 2030 project role is to help convene working groups around the collective action and systemic change that must be supported by defensible economy-wide modeling capable of informing regional power planning. Operation 2030 can help translate and actualize the NZNW analysis as it relates to building decarbonization to inform the development of the 2026 Northwest Power Plan, as well as other regulatory policies to ensure that cost-effectiveness tests, carbon pricing, and rate designs directly drive building decarbonization.

Additional next steps for Operation 2030 involve developing more detailed strategies for other strategic priorities listed above and securing funding for initiatives focused on strategic priorities that make the most sense for the Operation 2030 project team to lead, at least initially. In addition, the Operation 2030 team should revise the project logic model; prioritize the research agenda; conduct additional outreach, and do a deeper assessment of potential strategic partners to lead one or more of the strategic priorities identified in this memo.

Appendix A. List of Stakeholders

The Operation 2030 Team interviewed the following stakeholder groups:

- BlueGreen Alliance (BGA)
- Climate Solutions (CS)
- Ecotope
- Natural Resources Defense Council (NRDC)
- Northwest Energy Coalition (NWECC)
- Northwest Energy Efficiency Council (NEEC)
- Northwest Power and Conservation Council
- Pacific Northwest National Laboratory (PNNL)
- Portland Energy Conservation, Inc. (PECI)
- Rocky Mountain Institute (RMI)
- Shift Zero, Equity Team (participants included Shift Zero; Phius; Emerald Cities; Health and Equity Alliance; Washington Conservation Voters; and Spark Northwest)
- Shift Zero, Policy Team (participants included Shift Zero; Climate Solutions; 350 Washington; Optimum Building Consultants; Washington Environmental Council; Washington Conservation Voters; and Natural Resources Defense Council)
- UMC
- University of Washington's Carbon Leadership Forum (CLF)
- Washington State Department of Commerce (DOC) Buildings Team
- Washington State University (WSU) Energy Program
- ZERO Coalition Oregon (participants included Portland Energy Conservation, Inc.; New Buildings Institute; Climate Solutions; Earth Advantage; and Energy Foundation)