Energy Decarbonization Pathways

Washington Utilities
and Transportation Commission

Appendix B
What We Heard Report

SSG

UTC
Washington Utilities
and Transportation
Commission

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Overview

This document reviews the engagement approach used to solicit feedback from interested and affected parties, how that feedback was used and key themes that emerged through the engagement process for the Washington Decarbonization Pathways Examination.

Engagement Approach

The engagement process for the study sought to involve interested and affected parties to assist in the development of relevant pathways for the project. These interested and affected parties include, but are not limited to:

- Members of the utility sector (natural gas utilities, electric utilities and related industry groups and associations);
- Government organizations;
- Businesses and economic organizations;
- Representatives of the construction and real estate sector; and

Civil society organizations, including environmental groups, equity-seeking groups and groups concerned with energy poverty.

Engagement Planning

At the outset of the project, SSG developed an engagement plan to ensure interested and affected communities had opportunities to inform the process and provide feedback to ensure a relevant and comprehensive analysis of energy decarbonization pathways.

The engagement plan was informed by pre-engagement interviews with key stakeholders, thought leaders and community influencers from several groups to hear about how they would like to be engaged and who should be engaged. These interviews helped SSG identify baseline knowledge about the project among stakeholders, preferences for engagement, stakeholder groups that might otherwise be missed and other potential issues and opportunities for the engagement process. Additionally, SSG collaborated with UTC staff to conduct a risk and impact assessment that informed the engagement plan.
To review the engagement plan and pre-engagement interview summary, please see Appendix A.

Engagement Objectives

The engagement plan laid out engagement techniques to achieve six objectives, designed according to the International Association for Public Participation (IAP2) methodology, a global standard in public engagement. The objectives focused on:

- Informing impacted communities and parties about the Energy Decarbonization Pathways Examination and how they could participate in the process and progress on the project;
- Informing impacted communities and parties about the energy sector, decarbonization and its potential impacts on the energy system, economy and society;
- Involving impacted communities and parties in documenting their suggested approaches to and concerns about decarbonization and in gathering their input on approaches and assumptions for decarbonization pathway modeling; and
- Informing impacted communities and parties about how their feedback and participation shaped the Energy Decarbonization Pathways Examination.

Interested and Affected Communities

Interested and affected (impacted) parties were grouped into the following categories:

- The utility sector, including natural gas utilities, electric utilities and related industry groups and associations;
- Government/public organizations;
- Businesses and economic organizations;
- Construction and real estate sector;
- Transportation sector;
- Civil society organizations, including environmental groups, equity-seeking groups, community groups and groups concerned with energy poverty;
- State Tribes; and
- Others.

  These parties were identified through the pre-engagement process and consultation with the UTC.

Engagement Activities

Interested and affected communities engaged with the project in a number of ways, including via the Decarbonization Advisory Group, public meetings, surveys and an equity focus group.

Kick-off Meeting

The active public engagement period began with a kick-off meeting on May 27, 2022, and the publication of the engagement plan on the project website. This meeting shared information about the project and provided information about how interested and affected parties could get involved.

The Decarbonization Advisory Group

The Decarbonization Advisory Group was created to provide a venue for individuals from diverse interested and affected communities to provide input into the development of the Energy Decarbonization Pathways Examination.

The consulting team worked with the UTC to create a group with representation from diverse interested and affected parties, including groups that might have been left out in other UTC engagement processes and/or found it challenging to participate in past processes.

The DAG was comprised of individuals from:

- State government agencies and local governments;
- The natural gas sector;
- The renewable energy sector;
- Environmental organizations, including environmental justice advocacy groups;
- Relevant unions;
- The construction sector; and
- A volunteer from the public.

One representative was requested for each participating organization. DAG members were asked to commit to attend all four meetings so that they could build their depth of knowledge of the project and provide informed input throughout the development of the decarbonization pathways.

The DAG met four times over the course of the project to provide input on scenario assumptions, decarbonization actions and pathways, policy considerations and equity considerations related to the decarbonization pathways.

See Appendix B for a summary of DAG meetings and input.

Technical Meetings

Four public Technical Meetings were organized in parallel to the DAG engagement process. Like the DAG, participants had an opportunity to provide input on scenario assumptions, decarbonization actions and pathways, policy considerations and equity considerations related to the decarbonization pathways.

See Appendix B for a summary of Technical Meetings and the input gathered.

Surveys

Two public surveys were used to gather broader input. The first survey informed respondents about the project and gathered input on the decarbonization actions under consideration for the Electrification and Alternative Fuels scenarios. The survey received 639 responses. See Appendix C for a summary of feedback.

The second survey gathered information about public concerns and priorities related to the impacts of decarbonization on the economy, energy costs, public health and the environment. The survey received 543 responses. See Appendix D for a summary of feedback.

Both surveys offered valuable insights into the needs and preferences of participants, as well as the local context. While the consulting team and UTC made efforts to share the survey with diverse groups, the survey samples were not representative of Washington as a whole. In both surveys, a majority of respondents identify as white and male, reside in urban counties, hold a bachelor's degree or higher-level qualification, are 55 or older and have a median household income of $100,000-$149,000. Relative to Washington's population as a whole, Black, Indigenous and People of Color are underrepresented, while people with bachelor's degrees or higher-level qualifications are overrepresented. Additionally, respondents tended to be older, wealthier and more urban than Washington's population as a whole.

Equity Focus Group

SSG undertook a focus group in March 2023 with a diverse cross-section of Washington residents who are from or work with highly impacted communities, vulnerable communities and other populations subject to inequities related to the energy system. The focus group gathered information about which groups are disproportionately burdened by Washington's energy system, as well as what actions should be taken to minimize unintentional negative impacts of decarbonization on these groups. See Appendix E for a summary of feedback.

Feedback on Modeling Assumptions

At the outset of the project, the engagement activities focused on gathering input on modeling assumptions for the decarbonization pathways. The first two DAG and technical meetings provided participants with an overview of the assumptions for the Business-as-Usual scenario, Business-as-Planned scenario, an Electrification scenario and an Alternative Fuels scenario. Additionally, the first survey gathered public input on the actions in the draft electric and alternative fuels scenarios.

This feedback enabled the modeling team to refine the scenario assumptions. Additionally, the team created a Hybrid scenario that was shaped by feedback calling for a combination of actions in the Electrification and Alternative Fuels scenarios.

Key Themes and Considerations

In addition to providing feedback on the modeling assumptions, participants shared their perspectives on climate action, opportunities and barriers for implementing potential decarbonization actions, and equity considerations. Key themes and considerations are captured below.

Perspectives on Climate Action

→ Support for climate action is high.

Support from climate action among participants is high. In both the first and second surveys, the majority of respondents indicated they are very interested or interested in climate action in Washington state (76% and 66%, respectively). Additionally, over half of respondents to the second survey (56%) indicated that they are either supportive or very supportive of climate action in Washington.

→ An expressive minority does not support climate action and/or is concerned about government overreach.

At the same time, a vocal minority is not supportive of climate action, this study, or both. For example, in the first public survey, 21% of participants provided responses indicating they are not supportive of climate action.

Additionally, some respondents consider climate action to be an imposition on personal freedom, with some respondents to both surveys saying they felt decarbonization would impose upon their freedom of choice with respect to the energy, appliances and modes of transport, as well as their lifestyle.

Perceptions of Natural Gas

→ Some participants do not support a reduction in natural gas use.

About one tenth of respondents to both public surveys expressed support for natural gas. Some participants of other engagement activities expressed support for natural gas as well. Participants' comments in favor of natural gas fell into five main themes.

First, many of these participants considered natural gas to be more affordable than other energy sources. They worried that decarbonization of the natural gas system would lead to higher energy costs with negative impacts for households and the economy. Additionally, some participants worried about job losses in the natural gas industry.

Third, participants considered natural gas to be more reliable than Washington's electric system. Participants said natural gas is necessary in areas vulnerable to power outages (i.e., rural, Tribal) during extreme weather events, as well as because of issues related to the reliability of the electric grid.

Fourth, some participants said they believed natural gas is cleaner and more efficient than other energy sources in the draft pathways. Finally, some of these participants were against climate action altogether or said they didn't believe in climate change.

→ Some participants are concerned about harmful qualities of natural gas.

On the flipside, many other participants in the engagement process supported the reduction of natural gas use. Participants provide three main reasons for this sentiment. First, many of them believed reducing natural gas is critical for decarbonization. Additionally, participants

expressed concerns about pollution created by natural gas and its impacts on human health. Finally, participants were concerned about the negative environmental impact of natural gas production (i.e., fracking).

Electrification

→ Most participants support electrification actions, but have serious concerns about implementing them.

Throughout the engagement process, participants expressed widespread support for electrification actions. For example, in the DAG and Technical Meetings, participants made just one negative comment criticizing the whole scenario. Additionally, in the first public survey, more participants expressed support for the draft package of electrification actions than alternative fuels actions.

At the same time, many participants expressed concerns about the viability of rapid electrification, resource adequacy, sectors that are difficult to electrify and energy security (a lack of energy diversification), with many participants opposing electrification for those reasons. These concerns are detailed further under the relevant themes below.

→ Participants are concerned about the reliability of Washington's aging grid and how it might worsen with electrification.

A common concern that emerged throughout the engagement process had to do with the supply of renewable energy and the reliability of the grid. Many participants, including those who did and did not support electrification, expressed concerns about the capacity of the grid to handle electrification actions. They said the grid is already vulnerable to power outages and unreliable — something many expect will worsen as electrification increases. Many participants who opposed decarbonization or expressed support for natural gas cited a lack of grid stability as a concern. Some participants also noted that climate change could also pose additional stress on the grid, reducing its reliability.

Many participants described grid stability as an equity concern. For example, in the equity focus group, as well as in surveys and the DAG and technical meetings, participants raised concerns that low-income and rural households might struggle to heat their homes during power outages if they are pushed to electrify and do not have a backup natural gas supply. Additionally, in the fourth DAG and Technical Meetings, participants commented that a reliable and stable grid is important for ensuring a just transition.

→ Prioritize improvements to the grid.

Due to concerns about the capacity of the grid to support electrification, several participants suggested prioritizing improvements to the grid before undertaking decarbonization actions.

→ Tribal, low-income and rural communities are vulnerable to outages.

Throughout the engagement process, participants raised concerns about how rural communities already vulnerable to outages could be affected by electrification, noting that housing tends to be less energy efficient in rural areas and that the electrical grid is less reliable. Many rural communities, or portions of them, find themselves facing frequent blackouts, in part because they are at the end of transmission lines and because of the aging grid. In other cases, households are not connected to the electrical grid at all.

Participants said low-income households are among the worst affected — with consequences for their health and well-being. Many participants worried that electrifying heating without a backup heating source, such as a fossil fuel generator or wood stoves, could lead people to freeze during a power outage. Some said it could lead to deaths. Equity focus group participants said Tribal communities tend to have less reliable power with community members who live in substandard or inefficient housing, and that it takes longer for their power to come back on after an outage.

→ Investing in weatherization and backup energy is critical for rural and Tribal areas.

In the DAG and technical meetings, as well as the equity focus group, many respondents said investing in backup energy for rural and Tribal areas is critical due to the vulnerability of these areas to power outages, as well as draftier buildings in rural and Tribal communities. Some participants recommended backup heating fueled by natural gas.

→ Energy efficiency and conservation is critical.

Many participants in the DAG and technical meetings, as well as the first public survey, commented on the importance of prioritizing energy efficiency and conservation in order to minimize the amount of new generation capacity that must be built to decarbonize.

Alternative Fuels

→ Alternative fuels are necessary for successful decarbonization.

One of the most common concerns about the proposed Electrification scenario was a lack of energy diversification. As noted above, participants involved in all elements of the engagement process raised concerns about resource adequacy. Participants cited three main reasons for supporting energy diversification. First, due to concerns about the reliability of the grid and supply of renewable energy, many participants indicated that having access to alternative fuels would make the energy system more resilient and ensure energy security. Second, participants said that non-electric energy could provide backup power in the event of a power outage. Finally, participants commented that alternative fuels could play a critical role in decarbonizing hard-to-electrify activities, including many industrial processes.

→ Participants have mixed opinions about the alternative fuels scenario.

In the first public survey, fewer respondents expressed support for the draft Alternative Fuels scenario than the Electrification scenario; however, over half of respondents support elements of the Alternative Fuels scenario.[1] Their comments on the advantages and disadvantages of the draft Alternative Fuels scenario and specific actions echo common themes that came up throughout the engagement process.

Participants focused on the following benefits of alternative fuels actions:

- They incorporate diverse energy sources beyond electricity, which can improve resilience of the energy system and reduce strain on the grid.
- They make use of existing infrastructure.
- They help decarbonize hard-to-electrify industrial processes.
- They expect the actions to lead to lower energy prices.

At the same time, participants raised several concerns about alternative fuels actions. These included the greenhouse gas emissions that could be generated during the creation or burning of alternative fuels, the limited supply of clean hydrogen and renewable gas, the safety of alternative fuels and a lack of available technology to enable the use of alternative fuels at scale.

[1] Note: The other engagement activities were not designed to assess the level of support for each scenario.

→ Participants are concerned about the viability of alternative fuels, limited alternative fuel supplies and safety.

In multiple DAG and Technical Meetings, as well as the first public survey, participants raised concerns about the viability of alternative fuels. Many commented on the limited supply and relatively high cost of RNG and clean hydrogen. They worried that it would be difficult to increase the supply to the level needed to implement the alternative fuels actions and that the draft Alternative Fuels scenario would not be cost effective. Respondents also commented that technologies needed to implement the alternative fuels actions do not exist at scale.

Many participants worried that creating large amounts of RNG and clean hydrogen could have negative environmental impacts. For example, some participants suggested that RNG should only be created with waste feedstock because tapping into other resources could cause environmental harms. Participants also worried about the level of energy required to create hydrogen. They noted the greenhouse gas impacts of non-green hydrogen and worried it might be used for alternative fuels actions if enough green hydrogen could not be supplied at scale. Finally, several participants were concerned about the safety of widespread adoption of hydrogen, a highly combustible fuel.

→ Many participants recommend dedicating alternative fuels to hard-to-electrify processes.

Many participants recommended dedicating alternative fuels to hard-to-electrify industrial processes and transportation (e.g., heavy-duty vehicles, aviation) given their limited supply, relatively high cost and potential climate impacts.

Renewable Energy

→ Participants are concerned about the renewable energy supply.

Another set of common concerns that emerged throughout the engagement process had to do with the stability and availability of renewable energy. For example, in the first public survey, some participants raised questions about whether the grid would become less stable due to the intermittency of solar and wind power generation. Similarly, in the DAG and Technical Meetings, some participants commented that the seasonal variability of renewable resources need to be considered in scenario development. In a few cases, participants considered whether current battery technology would be sufficient to ensure a steady supply of renewable

energy. A few participants suggested incorporating tidal energy into the mix, while some questioned why hydro was not mentioned in the scenario assumptions.

→ Distributed renewable energy and storage can contribute to a just transition.

Some participants of the DAG and Technical meetings, as well as the surveys, described distributed renewable energy and storage as a source of opportunity. They noted that distributed solar energy and storage can increase energy resilience and create local jobs.

→ Renewable energy siting must involve local communities.

Some participants highlighted equity considerations related to renewable energy siting. For example, in the DAG and Technical Meetings, participants commented that it is important to ensure low-income populations are not economically impacted by the location of utility-scale solar. Additionally, some participants recommended community outreach and engagement be part of the siting and permitting process.

Similarly, in the equity focus group, participants said that the perspective of rural communities and Tribes are not sufficiently considered during the siting and development of renewable energy projects, which can result in problematic outcomes and exploitation.

Other Sources of Energy

→ Some respondents recommended including nuclear energy.

Some participants of the DAG and Technical Meetings, as well as respondents to the first public survey, said nuclear energy should be included in the decarbonization scenarios to increase the chances of successful decarbonization. Some said they believed decarbonization would be impossible without nuclear energy. Nuclear energy is part of the supply-side scenario for this project. (Respondents were commenting on demand-side assumptions.)

→ Some respondents recommended including geothermal energy.

Some participants also said that Washington should incorporate geothermal energy into its decarbonization plan. Geothermal energy is part of the supply-side scenario for this project. (Respondents were commenting on demand-side assumptions.)

Equity and Affordability

→ Energy cost, affordability and cost of living are prominent concerns.

Energy cost, affordability and the cost of living were the most prominent concerns about decarbonization that emerged during the engagement process. Participants from diverse backgrounds raised concerns that decarbonization would make energy and living in Washington less affordable.

In the first public survey, the cost of decarbonization actions were respondents' most frequently cited concern. Respondents expressed unease about the size of government investment required for decarbonization, how much it would cost households and businesses to partake in decarbonization (e.g., undertaking energy efficiency retrofits, installing solar panels, purchasing zero-emissions vehicles) and that decarbonization actions could raise energy rates. Participants also worried that decarbonization actions would increase the cost of living in Washington more generally, such as by leading to higher rents for energy efficient homes.

In the second public survey, where respondents responded to questions on the importance of social, economic and environmental considerations related to decarbonization, energy costs, average household energy savings and the level of energy burden ranked as the most important considerations.

In the equity focus group, participants said the high housing costs in Washington negate the benefits of lower monetary energy costs. In the focus group, as well as other points of engagement, participants said that an increase in energy prices would burden low-income households already struggling to pay their bills.

Similarly, energy costs and affordability were a recurrent theme in the DAG and Technical Meetings, as well as the first public survey. Many participants supported or preferred the use of natural gas to options presented in the draft modeling scenarios because they believed it would be cheaper.

→ Diverse, intersectional equity considerations are relevant to the pathways.

Throughout the engagement process, several participants flagged the need for implementation efforts to incorporate equity considerations to enable equitable participation in

decarbonization actions and ensure inequities are not worsened as a result of decarbonization efforts. Several respondents also said decarbonization could contribute to reducing inequities.

Participants of the equity focus group recommended that intersectional equity considerations be incorporated into implementation planning from the perspectives of diverse groups. This is underscored by the diverse groups participants identified when commenting on equity throughout the engagement period. Groups that are burdened by Washington's energy system include, low-income, Highly Impacted, Tribal, BIPOC and rural communities, as well as people living next to freeways, seniors and renters. Participants of the equity focus group described low-income groups as among the most vulnerable, particularly when low-income groups are at the intersection of multiple potentially vulnerable identities (e.g., low-income and BIPOC, low-income and rural, low-income renters, etc.).

In this vein, participants also highlighted the importance of considering who pays for and is penalized by decarbonization actions and incorporating these considerations into policy. For example, one participant of the equity focus group said that, if a sales tax is created to fund decarbonization actions, it could harm low-income communities by increasing their costs. Another participant of the equity focus group worried that the way the natural gas rate base is adjusted as natural gas infrastructure is decarbonized could increase rates — a theme that was echoed in DAG and Technical meetings and responses to the first survey.

→ Tribal communities face unique challenges.

Individuals with Tribal heritage that participated in the equity focus group highlighted unique challenges faced by Tribal communities.[2] One explained that most Tribes do not own the utilities or substations serving them, which can make it difficult for them to install renewables on reservations. Participants also highlighted systemic inequities and unique negative impacts facing tribes. For example, one participant noted that outages tend to be longer in Tribal areas compared to nearby non-Tribal ones. Additionally, a participant explained how the negative impacts of the energy system are layered on top of ongoing environmental degradations and pollution, as well as cultural and health impacts of climate change.

[2] The engagement process involved scant participation from people with Native American heritage. Any further development of decarbonization pathways based on this study must involve efforts to engage Tribal communities through the appropriate processes to ensure their concerns are duly considered.

Financing Climate Action

→ Households and organizations need incentives and funding to participate in decarbonization.

Another prominent theme that ran throughout the engagement process had to do with the provision of incentives and funding for decarbonization. Several participants said funding and incentives would be necessary to help households and businesses undertake retrofits and other decarbonization measures. In some cases, such as for low-income households, non-profit organizations, or small businesses, the cost of such measures may be out of reach. In other cases, incentives can push households and businesses to take action and do so more quickly. Ideas mentioned during the engagement period include rebates, grants, tax incentives and others.

Special attention must be paid to Highly Impacted, low-income and vulnerable groups. Throughout the engagement process, several participants raised concerns about affordability and the ability of low-income and other marginalized groups to participate in the energy transition. For example, many recommended financial support to enable these groups to undertake energy efficiency retrofits. They noted that rebate programs do not work for those who do not have the capital to invest in retrofits upfront and that low-income and marginalized groups need direct financial assistance.

Co-benefits and Co-harms

→ Public health and air pollution are important considerations for evaluating decarbonization pathways and actions.

Air pollution and its impact on health came up throughout the engagement process. Several participants described a reduction in air pollution as a benefit of decarbonization and a potential downside of alternative fuels actions involving natural gas and RNG. The importance of this issue was underscored by the second public survey. Just over half of respondents considered public health impact to be a very or somewhat important consideration when evaluating the decarbonization pathways. Respondents to the second survey also expressed a high level of concern about pollution with 60% indicating air pollution is a very or somewhat important consideration.

→ Economic impacts are important considerations for evaluating decarbonization pathways and actions.

Comments about potential positive and negative economic impacts came up throughout the engagement process. On the one hand, participants expressed support for a range of economic benefits they expected would arise from decarbonization actions, including job creation, increased innovation and economic growth in the emerging sectors related to decarbonization.

On the other hand, participants expressed concerns about the potential for decarbonization to increase energy rates, as well as the cost of living and doing business, which they said could harm the economy and lead to increased taxes. Participants were also concerned about job losses that could arise from decarbonization actions and recommended initiatives to transition workers in affected sectors into other industries.

Interestingly, in the second public survey, economic considerations were ranked as important by participants, but less so than energy costs, affordability and health. The economic considerations they evaluated included economic development and the number of net jobs created. Some suggested that potential metrics consider quality alongside quantity: for example, will decarbonization create more stable employment than temporary jobs?

Community Collaboration

→ Communicate with and educate the community.

Some participants from all aspects of the engagement process said communicating with and educating the community about decarbonization and actions is important and can help improve public support and participation. Participants of the equity focus group identified a need for accessible communication on decarbonization, both in terms of providing information in places where people can access it easily, as well as via the language used. For example, they expressed concerns that low-income groups do not receive or understand information about energy efficiency rebates, which can make it difficult to take advantage of them.

→ Engagement with communities burdened by the energy system during the development of decarbonization policies and programs is critical.

Equity focus group participants highlighted a need to engage communities burdened by the energy system during the development of decarbonization policies and programs. Participants said vulnerable and impacted communities should be involved in shaping solutions for decarbonizing their communities. Participants also said that Tribes are not sufficiently engaged with respect to renewable siting and developments. This was underscored by comments in other elements of the engagement process.

→ Financial support is necessary for Washingtonians to participate in the energy transition.

Throughout the engagement period, participants expressed concerns about the affordability of the energy transition for households and businesses. Participants made several suggestions about how the government can help finance climate action, including drawing on federal funds like those from the Inflation Reduction Act, capitalizing on private investment, financial support and loans for retrofits, funding for low-income households to undertake retrofits, implementing a carbon tax, taxing big greenhouse gas emitters (e.g., big companies, fossil fuel companies), providing tax breaks and charging households different power rates based on income.

Participants recommended special attention be paid to low-income and other marginalized groups to ensure they have equitable opportunities to participate in and benefit from decarbonization. For example, in the equity focus group, participants explained many rebate programs are unsuited for low-income groups who cannot afford to pay for improvements, such as heat pumps and sealing their home, upfront.

Appendix A

Engagement Plan and
Pre-Engagement Summary Report

Energy Decarbonization Pathways Examination

Engagement Plan

June 2022

This plan has been prepared for the Washington State Utilities and Transportation Commission (Commission) by SSG. SSG has a contract with the Commission to conduct the Energy Decarbonization Pathways Examination.

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Background

The intent of this Engagement Plan is to outline the purpose, desired outcomes, approach, and roles and responsibilities of the engagement portion of the Energy Decarbonization Pathways Examination.

Engagement Narrative

In 2021, the Washington Legislature directed the Utilities and Transportation Commission to "examine feasible and practical pathways for investor-owned electric and natural gas utilities to contribute their share to greenhouse gas emissions reductions as described in RCW 70A.45.020 [of Washington state law], and the impacts of energy decarbonization on residential and commercial customers and the electrical and natural gas utilities that serve them."[1] RCW 70A.45.020 mandates that anthropogenic emissions of greenhouse gases in Washington state be reduced to 1990 levels by 2020, to 45 percent below 1990 levels by 2030, to 70 percent of 1990 levels by 2040, and by 95 percent of 1990 levels by 2050.

The engagement goal for the Energy Decarbonization Pathways Examination is to involve all interested and affected parties (aka collaborators[2]) to assist in the development of relevant pathways related to the decarbonization of the energy utility sector for the legislature to consider. This work will include:

- Identifying greenhouse gas reduction pathways for investor-owned electric and natural gas utilities; as well as
- Understanding the impacts of energy decarbonization on residential and commercial customers and the electrical and natural gas utilities that serve them.

The legislature will use this information to inform discussions on decarbonization targets and policies for investor-owned natural gas utilities.

[1] Senate Bill 5092 Section 143.4.

[2] Note: engagement practitioners are moving away from the use of the term "stakeholder" and toward using the following terms: interested and affected parties or impacted parties to denote members of the public. Both terms are used throughout this document.

Who are we trying to reach and who can participate?

Any interested person or group is welcome to participate in the engagement process. To develop a well-rounded approach to public engagement for this project, SSG conducted pre-engagement[3] interviews with a diverse range of members of the public to help us understand who needs to be involved in providing feedback. These interviews helped identify baseline knowledge about the project among interested and affected parties, preferences for engagement, relevant groups that might otherwise be missed, and other potential issues and opportunities for the engagement process.

The goal of pre-engagement was to connect with key collaborators, thought leaders, and community influencers from a variety of groups to hear from diverse perspectives. As a result, the following groups of participants (also see Table 1, later in this document) for the engagement process were identified in pre-engagement:

- Utility sector, including natural gas utilities, electric utilities, and related industry groups and associations;
- Government/public organizations;
- Businesses and economic organizations;
- Construction and real estate sector;
- Transportation sector;
- Civil society organizations, including environmental groups, equity-seeking groups, community groups, and groups concerned with energy poverty;[4] and
- Other interested parties.

[3] Pre-engagement, the practice of speaking to a representative group of stakeholders to ask them how to best engage, is a best practice in engagement planning and design. It is embedded in the International Association for Public Participation (IAP2) planning protocol, which is recognized as the global standard for public engagement.

[4] Energy poverty describes a circumstance in which an individual, household, or community cannot access or afford energy. In Washington, energy poverty is measured through data on energy burdens and income. A household is considered to be facing a high energy burden when it spends more than 6% of its income on energy (to fuel cars and power and heat homes) and a severe energy burden when it spends more than 10% of its income on energy. In 2018, 11% of Washington households faced a high or severe energy burden, according to the Washington State Department of Commerce. (*See: Washington State Department of Commerce. Revised: Statewide energy burden data [RCW 19.405.120(3).], (April 29, 2021), https://deptofcommerce.app.box.com/s/czuj8tqaj9i5i7c8gyhld8htscbn9xsk.)* These statements are based on nationally accepted definitions of high and severe energy burden. *(See American Council for an Energy Efficient Economy, "National and Regional Energy Burdens", 2020,* American Council for an Energy Efficient Economy, "National and Regional Energy Burdens," 2020, https://www.aceee.org/sites/default/files/pdfs/ACEEE-01%20Energy%20Burden%20-%20National.pdf.)

How can interested parties participate in the engagement process?

A description of engagement methods is outlined in this plan, and can be found in the Phase 2: Active Engagement Period section, further into this document.

Interested parties have a variety of options and choices in how to participate, depending on level of interest and time availability. These include:

- Participating in the Introductory Open Meeting/Educational Webinar.
- Joining the Decarbonization Action Group (Please note that members of this group are expected to attend all workshops as the feedback required builds on each workshop; see Phase 2: Active Engagement Period section for time commitments).
- Participating in the open Technical Meetings workshops (attendance at all meetings is recommended but not required).
- Taking and sharing the Public Online Survey 1 - Decarbonization Opportunities and Challenges (see Phase 2: Active Engagement Period section for the expected timeframe for launch).
- Taking and sharing the Public Online Survey 2 - Decarbonization Actions (see Phase 2: Active Engagement Period section for the expected timeframe for launch).
- Keeping up to date with project updates on the website (https://www.utc.wa.gov/regulated-industries/utilities/energy/natural-gas-decarbonization) and submitting feedback.

Interested and affected members of the public are encouraged to participate in a way that works best for them.

Engagement Context

SSG is assisting the Washington State Utilities and Transportation Commission (Commission) to develop and examine pathways for decarbonizing energy utilities. These pathways will consider emerging technological, economic, and policy trends related to the energy system and renewable energy. This project will provide the Commission with various possible strategies and actions for mitigating greenhouse gas emissions and shifting to renewable energy. For each pathway examined, the analysis will evaluate the environmental, health, and economic costs and benefits to customers, equity considerations for low-income customers and highly impacted communities, and regulatory changes to facilitate the decarbonization of the services that gas utilities provide.

Supporting Strategic Documentation

SSG conducted situational research to inform the engagement strategy and Decarbonization Pathways Engagement Plan. SSG reviewed existing strategic documents, planning initiatives, and climate modeling related to this project to develop a plan and modeling method for the Energy Decarbonization Pathways Examination. Drawing on examples, principles, and approaches from these documents will increase the examination's alignment with the State's climate action goals and ensure modeling is grounded in the local context.

What is being decided and who decides?

By June 1, 2023, the Washington Utilities and Transportation Commission will use the Energy Decarbonization Pathways Examination to report to the legislature on "feasible and practical pathways for investor-owned electric and natural gas utilities to contribute their share to greenhouse gas emissions reductions as described in RCW 70A.45.020, and the impacts of energy decarbonization on residential and commercial customers and the electrical and natural gas utilities that serve them."[5] The legislature will use this information to inform discussions on decarbonization targets and policies for investor-owned natural gas utilities.

[5] Senate Bill 5092 Section 143.4.

Engagement Approach

The Engagement Approach is the framework that will ensure all interested and affected communities are given opportunities to inform the process and provide feedback to create the best Energy Decarbonization Pathways Examination possible.

What's Out of Scope?

Facts are not up for debate and thus are outside the scope of engagement. The facts for this engagement include the following:

- Climate change is real and primarily driven by human activity.
- By January 2023, SSG will submit the Energy Decarbonization Pathways examination to the UTC.
- The UTC will use the examination to present a report to the Washington State legislature on the energy decarbonization pathways that were examined and associated considerations.
- The Engagement Plan will be designed to allow all interested and impacted communities to inform and provide feedback to create the best Energy Pathways Examination recommendations possible.
- Equity will be at the heart of the engagement process and the development of decarbonization pathways.

Guiding Engagement Principles

The guiding principles are designed to ensure that engagement activities help inform the decarbonization pathways by identifying and considering utility impacts; the environmental, health, and economic costs and benefits of decarbonization for impacted communities; and equity considerations for low-income customers and highly impacted communities. The following principles will guide the design and execution of all engagement techniques:

- Engagement conversations will be based on values.
- The Project Team will identify and work to remove barriers to engagement for vulnerable and historically underrepresented community members.

- Engagement meeting formats will be guided by interested or affected parties' preferences.
- Online engagement opportunities will be as interactive as possible. If in-person engagement is preferred, opportunities will be planned with consideration for social distancing, masks, and other COVID-19 safety protocols.
- To raise the community's understanding of climate planning, the Project Team will increase awareness about decarbonization during the active engagement period.
- The Project Team will involve key interested or affected parties in information collection to demonstrate process integrity and build credibility for recommendations.
- Communication of background information and engagement opportunities (times, dates, online venues) will happen in a reasonable time before the engagement.
- Interested or affected parties will have opportunities to provide input and will be informed on how their feedback shapes the final report.
- Concerns and aspirations will be discussed to formulate options for consideration.
- Evaluations of each session will be conducted to allow for adaptive management of the engagement process.

Engagement Objectives

The following are the main objectives of this Engagement Plan described according to the International Association of Public Participation (IAP2) Spectrum of Engagement: inform, consult, involve, or collaborate (see Appendix A).

How to read this section of the plan: Objectives + Techniques

Engagement objectives are strategic and explain the 'Why' of engagement. They outline the purpose (not the technique) of the plan, defining what is successful and meaningful, while being clear about the level of influence participants have. The engagement objectives have been designed based on information available in the project proposal, the pre-engagement summary (see Appendix C), as well as the feedback provided by Washington Utilities and Transportation Commission (Commission) staff to date.

Engagement techniques (such as workshops, committees, surveys) **are tactical and explain the 'How' of engagement**. They appear in the Engagement Phases and Techniques section and are linked with these objectives to show how the techniques achieve the objectives. A

glossary of engagement techniques that will be deployed in this project is available in Appendix B.

The outputs and outcomes drive the techniques selected to achieve these objectives. **Outcomes** are changes in state (e.g., the development of a relationship), and **outputs** are tangible (e.g., a list or a request). The combination of these with the engagement techniques ensure achievement of the objectives.

Engagement objectives are listed first, then outputs and outcomes, followed by the techniques associated with the objective. Further detail on the engagement techniques are provided further on in this document.

Objective 1: *To inform* impacted communities and parties about the creation of the Energy Decarbonization Pathways Examination project, how they can participate in the process, and updated progress on the project.

- **Outcome:** Champions of the project are actively recruited to participate in the process.
- **Outcome:** A broad range of impacted communities (e.g., businesses, equity-seeking groups, environmental groups, energy industry, and construction industries) know how to provide their input, are familiar with the project and enthusiastic about their involvement.
- **Outcome:** Existing community organizations provide regular project updates to their constituents.
- **Output:** Identify a list of champions and community members interested in regular communications and engagement.
- **Output:** Identify a list of existing community organization newsletters, social media channels, and other communication channels to provide regular updates.

Communications Techniques to achieve Objective 1:

- Work with UTC's existing community outreach and communications experts to provide regular project updates via multiple communications platforms.
- Provide regular project updates for UTC/project webpage to encourage engagement, including notification of opportunities for continued participation.
- Provide information updates to community organizations to inform their networks about engagement opportunities.

Objective 2: *To involve* impacted communities in deciding about their preferred ways to be engaged for the Energy Decarbonization Pathways Examination.

- **Outcome:** Identify an efficient, effective, and replicable outreach method encouraging meaningful engagement.
- **Output:** A series of pre-engagement interviews with representatives of the different community sectors of Washington.
- **Output:** A pre-engagement summary report with recommendations for the engagement plan.

Engagement Techniques to achieve Objective 2:

- The pre-engagement interview process.

Objective 3: *To inform* impacted communities outside of the utility sector about the energy sector; decarbonization and its potential impacts on the energy system, economy, and society; and the Energy Decarbonization Pathways Examination.

- **Outcome:** Impacted communities unfamiliar with the energy sector have a baseline level of knowledge to provide input.
- **Output:** Meaningful and relevant input from impacted communities.

Communication techniques to achieve Objective 3:

- Public education session (e.g., webinar).
- Post educational materials on the UTC website and share with relevant groups.

Objective 4: *To involve* impacted communities and parties, to document their suggested approaches to and concerns about decarbonization; and to identify specifically what should be examined when selecting options for decarbonization pathways.

- **Outcome:** Impacted communities share their concerns about the energy sector and access to energy, including climate change and its impacts on energy.
- **Output:** A list of energy and climate concerns from impacted communities and parties, that can be used to inform the modeling process, development of decarbonization actions, and equity considerations.
- **Outcome:** Impacted communities share their suggested approaches to inform the options for decarbonization pathways.
- **Output:** Input for criteria for prioritizing and selecting decarbonization actions.

Engagement techniques to achieve Objective 4:

- Workshops with Decarbonization Advisory Group (described later in this plan).
- Technical meetings (open to all).
- Two public surveys to gather input from the general public/impacted communities across the state.
- Equity-focused group to refine equity considerations for decarbonization pathways.

Objective 5: *To involve* impacted communities in gathering their input on approaches and assumptions for decarbonization pathway modeling to inform the modeling approach for the Energy Decarbonization Pathways Examination.

- **Outcome:** Decarbonization Advisory Group members are supportive of the Energy Decarbonization Pathways Examination and encourage members of their network and/or team to participate in the engagement process.
- **Outcome:** Impacted communities have an opportunity to provide feedback that informs the Energy Decarbonization Pathways Examination.
- **Outcome:** The public provides their input, are familiar with the Decarbonization Pathways, and are enthusiastic about their involvement.
- **Output:** Identify a list of representatives of key impacted communities for the Decarbonization Advisory Group.
- **Output:** Community survey is sent to the identified list of interested and affected parties and posted on the UTC/project webpage to reach community members.

- **Output:** Identify participants to invite to participate in engagement activities.
- **Output:** Document advice and suggested criteria for the development of decarbonization pathways.

Engagement Techniques to achieve Objective 5:

- Create a Decarbonization Advisory Group and hold four workshops with this group.
- Hold four technical meetings, open to the public, to gather input on scenario modeling, decarbonization actions, and decarbonization pathways.
- Regular project communication with the Decarbonization Advisory Group members and other members of impacted communities.

Objective 6: *To inform* impacted communities about how their feedback and participation shaped the Energy Decarbonization Pathways Examination.

- **Outcome:** Impacted communities understand how their feedback shaped the Energy Decarbonization Pathways Examination and find the process acceptable.
- **Output:** An engagement strategy highlighting the engagement objectives and techniques is used throughout the project.
- **Output:** Post-engagement event participant evaluations.
- **Output:** Engagement "What We Heard" updates provided at key points of the project.
- **Output:** Final engagement summary.

Engagement Techniques to achieve Objective 6:

- Regular communication and project updates.
- What We Heard Summary Report on how feedback from the Decarbonization Advisory Group, technical meetings, surveys, and equity focus group informed the creation of the Energy Decarbonization Pathways Examination.

Interested and Affected Parties Map

For this plan, interested and affected (impacted) parties can be grouped into the following categories:

- The utility sector, including natural gas utilities, electric utilities, and related industry groups and associations;
- Government/public organizations;
- Businesses and economic organizations;
- Construction and real estate sector;
- Transportation sector;
- Civil society organizations, including environmental groups, equity-seeking groups, community groups, and groups concerned with energy poverty; State Tribes; and
- Others.

The project team conducted a pre-engagement process involving interviews with key stakeholders, thought leaders, and community influencers from several groups to hear about how they would like to be engaged and who should be engaged. These interviews helped us identify baseline knowledge about the project among stakeholders, preferences for engagement, stakeholder groups that might otherwise be missed, and other potential issues and opportunities for the engagement process. The full pre-engagement report is found in Appendix C of this document.

In addition to providing feedback opportunities to impacted communities at large during key phases of the planning process, the project team will engage impacted communities through a Decarbonization Advisory Group composed of representatives of impacted communities.

Table 1. List of groups, organizations, and individuals that may be engaged. Please note that this list is not exhaustive and SSG intends to engage with any group, organization, or individual who expresses interest in the Energy Decarbonization Pathways Examination.

Affiliation	Group, Organizations, and/or Individuals
Government	
Local, regional, and federal government	Bonneville Power Administration Local governments Local and regional government committees Northwest Power and Conservation Council Regional/local planning authorities
State-level government	Washington State Utilities and Transportation Commission Washington State Department of Commerce Energy Office Government Agencies working on Building Codes Office of Public Counsel Regulatory agencies Washington State Department of Ecology Washington State Department of Transportation Washington State Transportation Commission Washington State Department of Licensing (DOL) Washington State Transportation Improvement Board Washington State University – Energy Program
Utilities and technical experts	
Transportation sector	Alliance for Transportation Electrification Amtrak and other rail organizations Association of Washington Cities Fuelers Joint Transportation Committee - Washington Legislature Ports and Maritime Groups Northwest Seaport Alliance Regional transportation planning organizations (RTPO) Transit authorities, including King County Metro and Sound Transit Transportation Choice Coalition Washington Highway Users Federation Washington Trucking Association
Utility Sectors	Investor-owned utilities, both gas and electric Municipal utilities Public utility districts

Affiliation	Group, Organizations, and/or Individuals
	Rural electric cooperatives Tribal utilities Other consumer owned utilities WRECA: Washington Rural Electric Cooperative Association
Technical Experts	Building experts, including the Rocky Mountain Institute Low Carbon Resources Initiative (Gas Technology Institute and Electric Power Research Institute) Northwest Energy Efficiency Alliance Technology experts and consultants within the decarbonization sector Local universities Regulatory Assistance Project
Business Associations and Businesses	
Business sectors	Appliance dealers Energy-intensive industries and companies, including Kaiser Aluminum Financial institutions Hospitality industry Manufacturers Small businesses Organic waste industry, including Washington Refuse and Recycling Association
Agriculture and Food Industry	Agricultural manufacturing facilities Food Northwest Washington Farm Bureau Washington Fruit Tree Association Washington Food Industry Association Washington Potato and Onion Association Washington Wheat Growers Association
Associations	Association of Washington Business National Consumer Law Center Northwest Pulp & Paper Association NFIB and other small businesses associations Northwest Gas Association The Coalition for Renewable Natural Gas
Building and Construction Industry	
Construction Industry	Associated General Contractors (AGC) of Washington Building Industry Association of Washington

Affiliation	Group, Organizations, and/or Individuals
	Home builders and home builder associations HVAC dealers Mechanical Contractors Association of Western Washington Northwest Hearth, Patio & Barbecue Association Sheet metal contractors Washington Air Condition Contractors Association
Real estate	Building owners Realtors, including Washington Realtors NAIOP Washington State
Civil Society and Equity Seeking Groups	
Groups focused on climate justice, environmental issues, low-income and affordability advocacy, and equity issues	Climate Solutions Front and Centered Northwest Energy Coalition Puget Sound Sage Washington Environmental Council Community organizations from across the state Climate justice groups Energy Equity Project Initiative for Energy Justice Vulnerable communities Highly impacted communities[6] Washington State Community Action Partnership Initiative for Energy Justice Energy Equity Project Zero Waste Washington
Unions	Laborers including plumbers, pipe-fitters, electricians, and operating engineers Labor groups and unions, including IBEW 77 and Washington & Northern Idaho District Council of Laborers
Utility customers	Alliance of Western Energy Consumers Commercial utility customers, including small-business owners and energy intensive industries Residential utility customers, including low-income customers

[6] As defined in RCW 19.405.020: http://app.leg.wa.gov/RCW/default.aspx?cite=19.405.020

Tribal Communities

Engagement approaches with Washington tribes and other Indigenous communities will be discussed between UTC staff and SSG. The team will follow state guidelines for consultation with Indigenous communities.

For this plan, we must:

1. Ensure that the UTC team and SSG consultants are familiar with the individual policies/processes of each Indigenous group.
2. Collaborate with other UTC project teams in tribal consultations.
3. Follow the individual guidelines for consultation (where they exist) with each Tribe or group to set up a discussion with the appropriate participants.
4. Reach out to Tribes or groups that don't have consultation policies or guidelines to find out who best to invite to a discussion with the UTC.
5. Have meetings to answer the following question: "How would the Tribe like to be engaged in the creation of the Energy Decarbonization Pathways Examination?"
    - A variety of engagement options can be offered and discussed.
6. Based on the response, plan engagement accordingly.
7. SSG can be present, if appropriate, or provide information packages for these meetings to present up-to-date information on the status of the project and the results of engagement efforts to date.

Engagement Phases and Techniques

The engagement timeline will be integrated with the project's modeling activities. Engagement input will inform modeling assumptions and methods and be used to refine the decarbonization pathways.

In addition, the engagement techniques have been designed to provide a transparent engagement process, as identified during the pre-engagement interviews. (The pre-engagement report is available in Appendix C.)

Definitions

Decarbonization Advisory Group

The Decarbonization Advisory Group will be composed of representatives of impacted communities. Participation will be capped at one representative per stakeholder organization (for example, one member from each utility, environmental organization, equity-seeking organization, clean energy organization) and include up to two members of the public.

Participants should commit to attending all four Decarbonization Advisory Group Meetings and have an interest in participating in a detailed analysis of decarbonization modeling, actions, and pathways.

Individuals/organizations can express their interest by contacting policy staff at the Commission (policy@utc.wa.gov).

Technical Meetings

The Technical Meetings will consist of workshops that offer impacted parties an opportunity to learn about and provide feedback on detailed aspects of modeling, as well as other technical and procedural considerations. Technical Meetings are open to all. Participants are encouraged to attend all meetings, but that is not a requirement for participation.

Business As Usual (BAU): refers to a projected scenario where the entity does not take any additional carbon emissions mitigation/decarbonization actions moving forward beyond what is already occurring.

Business As Planned (BAP): refers to a projected scenario where the entity takes some carbon emissions mitigation actions that are currently planned but not enough to achieve a net-zero or low-carbon target in the future.

Phase 1: Pre-engagement Interviews + Engagement Design

Project initiation: March 2022 - May 2022

Activity	SSG	UTC	Objectives	Transparency	Timeframe
Pre-Engagement Interviews and Summary Report **Role in the project:** Identify appropriate engagement and communications techniques to involve diverse stakeholders in the process.	1) Conduct interviews of individuals identified in coordination with UTC (30-minute to 1-hour phone or video call). 2) Analyze interviews and present anonymized findings in a pre-engagement report.	1) Identify participants and invite them. 2) Review and approve the pre-engagement report.	2	Pre-engagement report published on UTC/project website as an appendix to the Engagement Plan.	Completed.
Engagement Plan Design **Role in the project:** Guide engagement approach for project.	Draft Engagement Plan.	Refine and approve	All	Published on UTC/project website.	June 2022
Develop project engagement materials (including promotional materials that can be shared online via. Social media, website, etc.).	Prepare communications materials for the project.	1) Post communications materials on relevant channels. 2) Provide support and guidance.	All	Transparency determined by relevant engagement activity.	Ongoing, throughout project

Phase 2: Active Engagement Period

May - November 2022

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Introductory Open Meeting/Educational Webinar: These meetings will inform participants about the project, the current status of utility emissions, and how they can get engaged. Role in the project: Inform diverse impacted communities about the process and how they can get involved.	Inform. Promise to the public: we will keep you informed on the plan's progress and opportunities for you to become involved.	Prepare the presentation.	Identify and invite participants.	1, 3	1) Open to everyone. 2) Recorded and published on UTC/project website. Recording will be available for groups who are unable to attend during business hours.	May 27, 2022, 2 hour session.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Educational Content For UTC/Project Website: Accessible information on the utility sector, decarbonization, how it happens and why we need it, regulation, and this project. **Role in the project:** Participants less familiar with the utility sector feel prepared to engage.	**Inform.** Promise to the public: We will keep you informed on the plan's progress and opportunities for you to become involved.	Prepare materials.	1) Refine and approve the materials. 2) Post on the website.	1, 3	Published on UTC/project website.	June 2022 publication. Available throughout the project engagement period.
Updates on project progress: Updates on engagement activities and progress are posted regularly on UTC/project website. **Role in the project:** Impacted communities are aware of project progress and opportunities to provide input.	**Inform.** Promise to the public: we will keep you informed on the plan's progress and opportunities for you to become involved.	Prepare materials.	1) Refine and approve the materials. 2) Post on the website.	1	Published on UTC/project website.	Publish between June and November 2022. Available throughout the engagement period.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Decarbonization Advisory Group Workshop 1 - Introduction, BAU, and BAP assumptions: The DAG is composed of members representing key impacted communities. The first DAG workshop will provide DAG members with a chance to meet one another and: 1) Learn about the project and their role, 2) Learn about the current state of emissions and projected emissions under a business-as-usual (BAU) scenario, and 3) Review and provide feedback on the business-as-planned (BAP) assumptions. **Role in the project:** DAG becomes familiar with the project and provides input to help the SSG team finalize the BAP assumptions and scenario.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the workshop and document input. 3) Provide subject matter experts from the SSG team. 4) Create a digital workbook and framework for soliciting input (e.g., online whiteboard, workbook, etc.). 5) Design and implement a post-meeting survey (to gather feedback to improve future meetings and give participants a chance to share any additional feedback).	1) Develop DAG Terms of Reference with support from SSG. 2) Identify and invite DAG members with support from SSG. 3) Review the annotated agenda and provide feedback. 4) Attend the meeting.	4, 5	1) A summary report will be posted online within 2 weeks of workshop. 2) DAG meeting results will be captured and reported in the 'What We Heard' summary at the end of the project. 3) DAG Workshops can be recorded if desired. 4) Members evaluations will be given a survey at the end of each meeting.	Late June 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Public Online Survey 1 - Decarbonization Opportunities and Challenges: The public survey will share information about the project and the current state of emissions and gather input on concerns about decarbonization, as well as opportunities and challenges for reducing emissions. The survey will also solicit ideas from the public on solutions for a decarbonized future, while being presented with different options for consideration. Role in the project: The input will be considered during the design of decarbonization actions and pathways. The survey will also identify challenges that could hamper potential decarbonization actions, as well as concerns about climate action that may need to be addressed.	Consult. Promise to the public: We will seek your comments on the variety of options presented.	1) Draft and finalize a survey. 2) Analyze survey results and prepare summary.	1) Review and approve the survey. 2) Post on the UTC/project website. 3) Share with networks and on social media.	1, 3, 4	1) Open to everyone. 2) Survey results will be analyzed and summarized in a blog or one-pager for the UTC/project website as well as included in the "What We Heard" report.	June 2022. Survey available online via Typeform.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Technical Meeting 1 - Introduction, BAU, and BAP assumptions: The first technical meeting will share information about the project and role of the technical meetings. The current state of emissions, BAU scenario, and BAP assumptions will be shared with attendees. Feedback will be gathered on BAP assumptions and how they might be improved. **Role in the project**: The input will be used to finalize the BAP scenario.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a post-meeting survey (to gather feedback to improve future meetings and give participants a chance to share any additional feedback).	1) Review the annotated agendas and other materials and provide feedback. 2) Attend the meetings. 3) Invite people to participate.	4, 5	1) Open to everyone. 2) Recorded and published on UTC/project website. 3) Meeting results will be captured and reported in the 'What We Heard' summary at the end of the project.	Late June 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Decarbonization Advisory Group Workshop 2 - BAP and Decarbonization Opportunities and Barriers: The second DAG workshop will focus on the BAP results and potential decarbonization actions for the pathways. DAG members will have a chance to review the BAP results and identify opportunities for and barriers to reducing emissions. They will suggest and review potential decarbonization actions, and identify equity considerations. Role in the project: The input will inform the identification of decarbonization actions.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible, and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a meeting evaluation survey (to improve future meetings and give participants a chance to share any additional feedback).	1) Review the annotated agendas, other materials, and provide feedback. 2) Attend the meetings.	4, 5	1) Summary report posted online within 2 weeks of workshop 2) Meeting results will be captured and reported on in the 'What We Heard' summary at the end of the project. 3) DAG Workshops can be recorded if desired.	July 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Open Technical Meeting 2 - BAP and Decarbonization Opportunities and Barriers: The second technical meeting will focus on BAP results and potential decarbonization actions. Participants will have a chance to review the BAP results and identify opportunities for and barriers to reducing emissions. They will suggest and review potential decarbonization actions, identify equity considerations, and provide input on modeling considerations. Role in the project: The input will inform the identification of decarbonization actions.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a post-meeting survey (to gather feedback to improve future meetings and give participants a chance to share any additional feedback).	1) Review the annotated agendas and other materials, and provide feedback. 2) Attend the meetings. 3) Invite people to participate.	4, 5	1) Open to everyone. 2) Recorded and published on UTC/project website. 3) Meeting results will be captured and reported in the 'What We Heard' summary at the end of the project.	July 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Decarbonization Advisory Group Workshop 3 - Decarbonization **Actions:** In the third workshop, the DAG will learn about potential suites of decarbonization actions to model and provide input on modeling assumptions and considerations, potential co-benefits and risks, and potential equity impacts. **Role in the project:** The input will inform the decarbonization pathways and related implementation considerations.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a meeting evaluation survey (to improve future meetings and give participants a chance to share any additional feedback).	1) Review the annotated agendas and other materials and provide feedback. 2) Attend the meetings.	4, 5	1) Summary report posted online within 2 weeks of workshop. 2) Meeting feedback will be captured in What We Heard summary at the end of the project. 3) DAG Workshops can be recorded if desired.	September 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Public Survey 2 - Decarbonization Actions: The second public survey will share information about the actions in the potential decarbonization pathways and gather input on their suitability for the local context, potential implementation challenges, and perceived economic and equity impacts. Role in the project: The input will inform the decarbonization pathways.	Consult. Promise to the public: We will seek your comments on the variety of options presented.	1) Draft and finalize the survey. 2) Analyze the survey results and prepare a summary.	1) Review and approve the survey. 2) Post on UTC/project website.	4	1) Open to everyone. 2) Survey results will be analyzed and summarized in a blog or one-pager for the UTC/project website.	September 2022. Survey available online via Typeform.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Equity Focus Group: The equity focus group will gather representatives of communities who are not heard from as often and who are affected by potential equity impacts of decarbonization and gather feedback to validate the approach for evaluating equity impacts. **Role in the project:** The input will help identify equity considerations related to the decarbonization pathways.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design the session. 2) Prepare the presentation and focus group questions. 3) Facilitate session. 4) Take notes 5) Prepare an anonymized summary report of the input.	1) Curate the invite list for the session. 2) Provide feedback on the session presentation and questions.	4	Open to members of equity-seeking organizations/ representatives. 1) Summary report posted online within 2 weeks of workshop. 2)Highlights of focus groups will be captured in the What We Heard summary at the end of the project.	September 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Technical Meeting 3 - Decarbonization Actions: In the third technical meeting, participants will learn about potential suites of decarbonization actions to model and related assumptions. They will provide input on assumptions, other modeling considerations, potential equity impacts, potential co-benefits, and potential risks. Role in the project: The input will inform the decarbonization pathways and related implementation considerations.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a post-meeting survey (to gather feedback to improve future meetings and give participants a chance to share any additional feedback).	1) Review the annotated agendas and other materials and provide feedback. 2) Attend the meetings. 3) Invite people to participate.	4, 5	1) Open to everyone. 2) Recorded and published on UTC/project website. 3) Meeting results will be captured and reported in the 'What We Heard' summary at the end of the project.	September 2022.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Decarbonization Advisory Group Workshop 4 - Exploring Decarbonization Pathways: In the fourth workshop, the DAG will review the final decarbonization pathways and have an opportunity to provide input on how the pathways might affect health, economic, and equity issues. They will also share their recommendations on how decarbonization actions could be implemented in a way that reduces negative impacts. **Role in the project:** Input used to finalize analysis.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a meeting evaluation survey (to improve future meetings and give participants a chance to share any additional feedback).	1) Review annotated agendas, and other materials and provide feedback. 2) Attend the meetings.	4, 5	1) Summary report posted online within 2 weeks of workshop 2) Meeting will be captured in the What We Heard summary at the end of the project. 3) DAG Workshops can be recorded if desired.	October 2022. 2-hour meeting.

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Technical Meeting 4 - Procedural considerations, health, and equity: In the fourth technical meeting, participants will review the final decarbonization pathways and provide input on constraints, impacts, and potential legislative considerations. They will also have an opportunity to provide input into how the pathways might affect health, economic, and equity issues. **Role in the project:** Input used to finalize analysis.	Involve. Promise to the public: We will incorporate your suggestions and feedback to the extent possible and seek advice in formulating alternatives.	1) Design an annotated agenda. 2) Facilitate the meeting and document input. 3) Provide subject matter experts from the SSG team. 4) Design and implement a post-meeting survey (to gather feedback to improve future meetings and give participants a chance to share any additional feedback).	1) Review annotated agendas and other materials and provide feedback. 2) Attend the meetings. 3) Invite people to participate.	4, 5	1) Open to everyone. 2) Recorded and published on UTC/project website. 3) Meeting results will be captured and reported in the 'What We Heard' summary at the end of the project.	October 2022. 2-hour meeting.

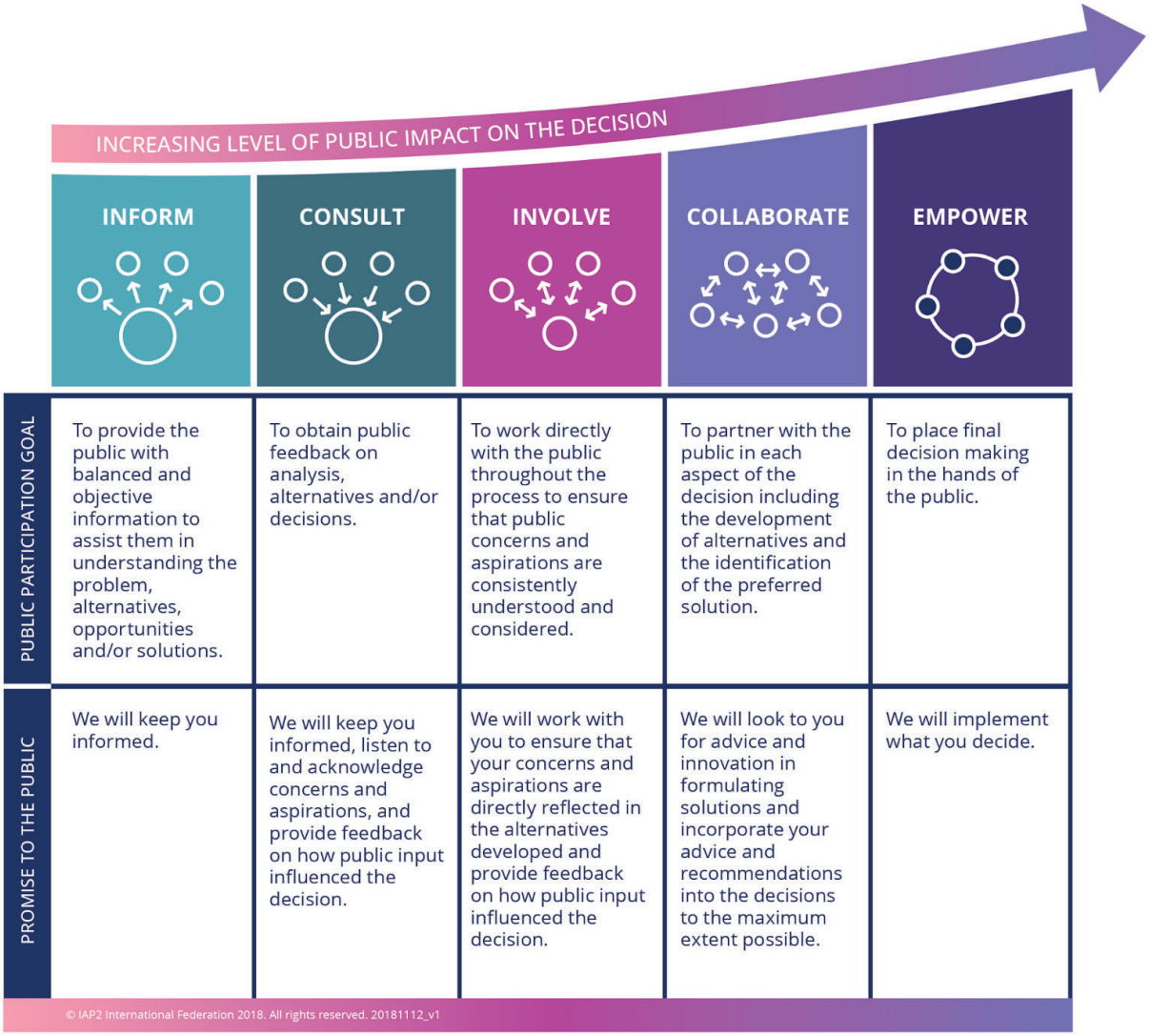
Phase 3: Final Report

December 2022

Activity	IAP2 Level	SSG	UTC	Objectives	Transparency	Timeframe
Final "What We Heard" Engagement Summary Report: The report will summarize and analyze feedback from each of the engagement activities.	Inform. Promise to the public: We will keep you informed on the plan's progress and opportunities for you to become involved.	Draft and finalize the report.	Provide feedback on the draft report.	6	Published on UTC/project website.	December 2022

Appendix A1: IAP2 Public Participation Spectrum

The IAP2 Spectrum of Public Participation can be found on this page: https://iap2usa.org/cvs and by scrolling down to the "IAP2 Spectrum" button.



Appendix A2: Glossary of Engagement Techniques

An advisory group is made up of a group of experts and/or representatives of impacted communities formed to develop a specific project or policy recommendation. The IAP2 level of engagement is typically "Involve" or "Collaborate" (depending on the terms of reference for the advisory group).

Community surveys are used to collect quantitative and qualitative information from a diverse group of stakeholders. They are often designed to receive feedback on the opportunities, challenges, and supports needed to implement an action. The IAP2 level of engagement is generally "Consult" but can also be "Involve."

Focus groups are used to derive sector-specific feedback, as well as to provide a comfortable space to engage with vulnerable or equity-denied groups. A focus group is typically composed of five to eight participants representing a sector/issue, such as equity, policy, transportation, or buildings. Participants partake in a facilitated discussion to provide feedback on the impacts of decarbonization actions within their sector/issue area. The IAP2 level of engagement is "Involve."

Public meetings are open to the public at large and usually include a presentation, as well as an opportunity for participants to ask questions and give feedback. They are organized to facilitate the participation of large groups. Depending on the nature of the meeting, the IAP2 level of engagement is typically "Inform" or "Consult."

Webinars are educational tools used to inform interested and affected parties of the planning process. The goal of webinars is to provide community members with the opportunity to learn about the project and upcoming engagement events, as well as ask project team members questions. The IAP2 level of engagement is "Inform."

Workshops are structured, facilitated events in which participants are able to work collaboratively to reach the identified workshop goals and objectives. Workshops employ a combination of presentation materials (e.g., slideshows) and collaborative engagement materials (e.g., polls, online white boards) to receive feedback at key points in the planning process. They offer a transparent engagement environment in which participants are able to collaborate, hear feedback from other participants, and understand how their feedback will shape the plan. The level of engagement is "Involve."

Appendix A3:
Pre-Engagement Report

Prepared by SSG

March 2022

Introduction

SSG has undertaken a series of pre-engagement interviews with a diverse range of stakeholders to develop a cutting-edge Engagement Plan for the energy decarbonization pathways examination for the Washington State Utilities and Transportation Commission. These interviews helped us identify baseline knowledge about the project among stakeholders, preferences for engagement, stakeholder groups that might otherwise be missed, and other potential issues and opportunities for the engagement process. The goal was to connect with key stakeholders, thought leaders, and community influencers from a variety of groups to hear from diverse perspectives.

Pre-engagement is a best practice in engagement planning and design and is embedded in the International Association for Public Participation (IAP2) planning protocol, which is recognized as the global standard.

The objective of pre-engagement (in the form of interviews, focus groups, surveys, or other techniques) is to gather input from stakeholders on their engagement and communications preferences to help shape the project engagement design process.

SSG and the UTC Project Team identified stakeholder groups to engage and developed a shortlist of potential interviewees. UTC sought their consent to be contacted by SSG for a phone or Zoom interview. Interviewees included representatives of utilities and industry organizations, the construction sector, a municipality, and civil society organizations focused on climate change, clean energy, equity, and energy access.

SSG staff conducted 15 interviews with 27 individuals, by Zoom/phone, between March 1 and March 18, 2022. The following steps were taken in the interview process:

1. UTC staff identified potential interviewees from a variety of stakeholder groups based on SSG's recommended mix;
2. Interviewees were contacted for a phone/Zoom interview by SSG staff and provided a project backgrounder (Appendix 1) and questions (listed below) in advance;
3. Following the interviews, notes were shared with the interviewees to confirm they accurately reflected their input; and
4. Insights from those notes were incorporated into this summary to inform the engagement plan for the project.

Note: interviewees provide a window into the preferences of a particular stakeholder community and their opinions cannot be extrapolated to a larger sample size.

Interview Questions

SSG provided the following questions to each interviewee in advance and asked them during the interview:

1. What actions and policies do you hope will be included in the decarbonization pathways for Washington utilities?
2. What concerns, if any, do you have about this project?
3. Tell me how you think stakeholders will be engaged best? What, if anything, hasn't worked in other engagements you have seen?
4. What communications approaches do you think could be most successful in reaching people interested in this project?
5. Who is essential for us to speak with during this pre-engagement phase of the planning process?
6. Do you have any last thoughts or suggestions for us at this time?

Detailed Pre-Engagement Findings

The following qualitative analysis of the interviews summarizes stakeholder feedback by theme. Each theme summary concludes with the consultant's recommendation for the Engagement Plan.

Conduct engagement with a range of impacted communities.

Every single interviewee recommended the project engage diverse impacted communities, including utilities, businesses, and sectors involved in the low-carbon transition (such as the construction industry), local governments, relevant state government bodies, environmental and clean energy advocates, customers (businesses and households), equity advocates, and Native American communities.

> *"It's important to make sure you bring in newer voices. It's easier to bring the usual suspects to the table."*
>
> *"Through processes like this, the entities that are the ones impacted, such as the businesses that have a financial stake in what happens in the future, have a concern that these top-down strategies are applied to them without their say and may affect their bottom line. Trying to make them partners and getting their ideas to guide how it will happen is a great opportunity."*

Interviewees also indicated that it is important to engage impacted communities that aren't typically involved in regulatory engagement processes, as well as those who have deep knowledge of decarbonization technologies (e.g., for building electrification). One interviewee stressed that it is important to identify what voices might be missing during the engagement process and find ways to engage those groups.

A complete list of groups recommended by the interviewees for engagement is available in Appendix 2.

Engagement Plan Recommendations

- Identify key stakeholder groups that must be engaged for the project and develop a strategy to engage them.
- Early in the project, engage impacted communities that might be less inclined to participate in or absent from the process and elicit their concerns.

Tap into existing networks, organizations, and groups.

In over half of the interviews (9), interviewees recommended working with existing organizations, associations, and groups to gather feedback. Existing groups trusted by various stakeholders, such as business associations, community groups, and civil society organizations could help inform potential participants, in addition to providing input related to their sector. Multiple interviewees (including ones from utilities) recommended working with utilities to reach out to customers and/or engage existing utility working groups related to equity or low-income customers.

> *"To reach those groups that haven't been involved in regulatory processes, work with smaller community NGOs to get the word out."*
>
> *"Nobody knows who or what the UTC is, but, if it's a trusted community organization, then that message would be better received by the community."*
>
> *"There are a larger number of smaller community organizations that are newer to the table, concerned about environmental justice. Engage trusted messengers and bring people up to speed on the conversation so they can provide meaningful impact."*

One interviewee noted that she had previously participated in forums related to climate action that were largely white and largely professional. She said that tapping into community organizations and networks could help bring more diversity to the table.

> *"We … work a lot with BIPOC communities and we work a lot with community reps within those communities. When we talk about the generic climate stuff, I, as an older white woman, am not going to resonate with a Somali or Ethiopian community. We need folks from those communities to bring that message forward to their communities."*

See Appendix 2 for a list of groups recommended by interviewees.

Engagement Plan Recommendations

- Identify organizations and individuals who can help reach out to impacted communities, especially those who are new to or have not previously been involved with UTC processes.
- Partner with organizations and individuals with strong networks to organize engagements, distribute information about engagement opportunities, and reach diverse stakeholders.

- Distribute information about engagement opportunities and conduct engagement activities in physical and digital spaces where impacted communities already congregate.

Transparency is essential.

Just over half of the interviews (8) highlighted the importance of transparency throughout the engagement process. They suggested the Commission communicate transparently about the project, engagement opportunities, key milestones, and the development of pathways.

> *"Stakeholders would be best engaged by an engagement process that is transparent, organized, and has some degree of flexibility. Also, a fixed reference point or somewhere that everyone can go for reference and information to learn about what stages have progressed and at what rate, and where to sign up."*

Additionally, interviewees from the utility sector and clean energy advocates said they would like data and modeling assumptions to be transparent. One interviewee explained that transparency would help with engagement by ensuring everyone understood the pathways and modeling process.

> *"I was on the advisory work group when the state developed the energy strategy. We were frustrated by the data transparency and the assumptions around different pathways. For example, it assumed a lot of imported energy, but didn't identify where that energy would come from. So drilling down into the assumptions that go into the different pathways is important."*

> *"It's hard to suggest actions and policies without the data, we need to know the data for the uses, the anticipated trajectories in different sectors and then you look at an action or policy based on the analysis."*

Interviewees also indicated that transparency would help build trust in the modeling and engagement processes, as participants would understand how the pathways were developed and how their input would be used. One interviewee suggested that all comments and responses be tracked in a public spreadsheet to ensure people felt their input had been considered.

Engagement Plan Recommendations

- Share information on data sources and modeling assumptions and conduct engagement activities to gather feedback on modeling assumptions from impacted communities.
- Publish information on the UTC's website explaining the project, engagement opportunities, and key milestones.
- Clearly state how people can provide input and the timelines for doing so in all communications materials.
- Provide stakeholders with transparent information about how their feedback will shape the project to set clear expectations.

Accessibility—in terms of time commitment, location, and content—is critical.

Most of the interviews (10) indicated engagement activities should be accessible in terms of time commitment, location, and content. Interviewees explained accessibility would be essential to engage impacted communities across Washington who do not typically engage with the UTC or are not well-versed in the subject matter or UTC processes.

> *"Given that this is going to be statewide, the [UTC] needs to be deliberate about making sure they have geographic representation, they're meeting people where they are, and providing a variety of ways for people to contribute."*
>
> *"Sometimes, with the UTC, it can be challenging because of the formality of the regulatory systems; it can be challenging to bring people up to speed and integrate folks who are new to engaging."*

Interviews highlighted three key dimensions of accessibility. First, they suggested people with varying availability should have opportunities to engage. For example, meetings during the workday are not suitable for engaging those whose jobs do not make time for them to attend. Hours-long meetings, such as those in past UTC engagements, can also be tiring and hard to follow, especially for those outside of the utility sector.

> *"Many groups want to participate and get their voice heard, but the time and resources that it takes can be very resource intensive."*
>
> *"Whether it's on the website, calling in or in-person, there needs to be a variety of ways to reach out to people, rather than doing a four-hour marathon session to talk about this. [...] by the end of it you're just exhausted."*

"We have to have realistic expectations about how people will engage and how much. [...] Some people won't be able to respond, but they can be kept in the loop in an engaging and transparent way, even if it's just an email every few weeks letting people know what's going on and telling them about opportunities to engage."

Second, interviewees said it is important to inform and gather input from impacted communities in physical and digital spaces that are accessible to them. Some interviewees (3) expressed concerns that the UTC's website and notification system are not user-friendly, especially to those unfamiliar with the UTC. They suggested sharing information outside of the docket system and sending email updates that clearly explain progress on and changes to the project.

"[You] need to know who the audience you are trying to reach when creating a communication plan, which is thinking about language and access preferences."

"Is there a way to make the notices that go out more informative and engaging? Right now, if you sign up for a notification list, you get a very cryptic email every time something happens in the docket. And you can't tell what has changed. You have to dig up the notice and find out."

"The commission's website is clunky to use if you've never used it before, so if everything is going through the commission's website it might not be easy to access for those who don't know the docket number. If you want to reach some stakeholders who are not the experts ... I think you have to consider something outside the normal docket system. Whether you do legislative informational hearings or governor's office updates or through the UTC email updates, those mechanisms may allow you to reach a broader population."

Finally, interviewees said content must be presented in an accessible manner for the engagement process to be successful. They said that accessibility is shaped by a variety of factors, including the vocabulary used to engage potential participants and how and where information is presented. Interviewees also indicated that education would be essential for a successful engagement effort (see section on education below).

"When things are termed [...] in carbon emission reductions, it turns half the people off. It gets the policy or climate planners interested, but not the general public. But, when this is framed as a [health, safety, and equity issues], there'll be a broader range of folks that will want to engage."

"I think the Commission and the State need to do a better job of telling the story of what's happening so it's interesting."

Multiple interviewees (5) encouraged using approaches that have not been traditionally used by the UTC. For example, interviewees recommended presenting information in formats other than long, written documents. Interviews also noted that different engagement techniques should be used to reach diverse impacted communities (see section on diverse engagement techniques below).

> *"The framework [the UTC is] used to working through is …. 'Here's a 30-page summary of what we think based on 30 people we heard from.' That works well for some people, such as executives and attorneys, but [the UTC needs] to move past that with this project."*

One interviewee noted that it is hard to find basic information, such as annual statistics on utilities, on the UTC's website. She said that UTC previously posted annual statistics with basic information about utilities, including how many customers they have and what their annual sales are, but now refers people to the annual report. She said this made the information less accessible to the general public, as only people who are experts in the sector are likely to dig through the annual reports.

Engagement Plan Recommendations

- Map out key impacted communities and identify communication and engagement methods that are accessible to each of them.
- Identify impacted communities that may struggle to access information and engagement opportunities through the dockets system and identify physical and digital venues to engage them.
- Provide engagement opportunities that are accessible, in terms of time, location, and content, to impacted communities who do not traditionally engage with the UTC.

Educate impacted communities about the project and its potential impact.

Multiple interviewees (5) said that it is important to educate impacted communities who are not professionals in the utility sector about decarbonization, the utility sector, and the project to make it easier for them to participate in the conversation and provide meaningful input.

> *"If there was a meeting that was like 'Gas utility regulation 101', it could get people who are interested, but nervous about participating, a little more comfortable."*
>
> *"Take the time to talk through the state of the carbon-intensive industry, the desire to decarbonize, and what the impacts and benefits might be. … Provide education for meaningful feedback."*

> *"We prefer to see a process that's based on education surrounding the full picture of different greenhouse gas reduction strategies which also again include existing policies and directional priorities in Washington and other states that are similarly far along in considering these issues."*
>
> *"If we can get to a place where everyone is brought along in this conversation and understands the key modeling inputs, the better the conversation will be when it comes to the policy around the next steps—and huge implications—of the energy transition."*

One interviewee recalled a similar project in Oregon where the local commission held a "level-setting" conversation in which commission staff presented baseline statistics about gas utilities in Oregon, explained how rating works, and shared what they had heard from stakeholders so far. "That was really helpful to have upfront," she said.

Engagement Plan Recommendations

- Inform impacted communities who are not professionals in the utility sector about decarbonization, the purpose of the project, and potential impacts of decarbonization.
- Hold events and develop clear, accessible materials to raise awareness among impacted communities about the project.

Consistent, timely communication is essential to keep impacted communities engaged.

Interviewees in almost half of the interviews (7) said it would be essential to communicate information related to engagement opportunities in a consistent, timely manner. Multiple interviewees indicated that inconsistent information and last-minute changes can hinder engagement.

> *"People are very attuned to not being kept in the loop on a good timeline. If you don't get things to people until the morning of an engagement, folks may not be sympathetic."*

Interviewees also made specific suggestions about how to communicate information in a clear and timely manner. One suggested there be a clear way to sign up for engagement events and that participants should get a calendar invite by email right after they sign up. Another interviewee recommended there be a webpage that is easy to find, communicates how to sign up for meetings, and provides opportunities to give comments. A third interviewee suggested sending out regular emails about the project to keep stakeholders in the loop.

Engagement Plan Recommendations

- Communicate regularly with impacted communities about the project, key milestones, and engagement opportunities.
- Spread clear, accessible information about engagement opportunities through multiple channels.
- Create and regularly update a centralized, accessible webpage with information about the project and engagement opportunities.

Use diverse communication and engagement techniques.

Most interviews (9) emphasized the importance of deploying diverse communication and engagement techniques to reach impacted communities. Interviewees said diverse approaches are necessary to engage those who do not typically participate in UTC processes and ensure they are able to access those opportunities. Interviewees also noted that diverse approaches can ensure that people with varying levels of capacity have opportunities to participate. They emphasized that different approaches are suitable for different impacted communities.

Interviewees recommended a mix of engagement techniques to cater to those who want to dive into technical details, as well as those who want to provide higher-level input. For example, utilities and clean energy advocates are likely to be interested in providing detailed input into the modeling process, the data used, assumptions, and decarbonization actions. In contrast, members of the public might wish to provide higher-level input that is less technical. Interviewees said that the UTC's current approach to engagement works well for professionals in the industry but is less engaging for those outside of it.

> *"The people who've participated in the past tend to be into the weeds. They want deep data and numbers. They want to move through the issues quickly so they can dig into the weeds. Increasingly, there is also a contingent of folks who say, 'I need to be here at the table, and I need you to slow down. I can't constantly download information for two hours.' Keep in mind that both types of people show up and are pretty valuable in this process. People don't respond to 'Here's our agenda and we're going to talk for three hours and pipe in when you pipe in.' Collaborative agendas and face-to-face processes are helpful."*
>
> *"Having key members identified to work through the technical detail and then having regular updates that are manageable by the larger community would be a good way to approach it."*
>
> *"The utilities will need space to dive deep into analysis without being shut down."*

Interviews recommended the UTC use a mixture of online and in-person engagement approaches. They said that online engagement is more accessible for those who cannot make it to physical venues, but in-person engagement makes it easier for diverse impacted communities to build rapport with one another and collaborate.

> *"Though virtual provides the opportunity for more people to join in conversations, in-person conversations flow better because it's more personable, easier to build connections and find common ground."*
>
> *"I find engagement is a lot better in person. People are more engaged when they are in person."*
>
> *"We've tried to do a lot of breakout rooms [in virtual meetings], which can be somewhat successful, but true engagement with processes in the virtual world have been difficult."*

Interviewees recommended engaging impacted communities one-on-one, as well as through focus groups, workshops, and large group meetings. They also recommended providing participants with non-verbal methods of providing input, such as through surveys, digital whiteboards, or formal written submissions. One interviewee noted that the option to submit formal, written feedback is useful for those we cannot make it to meetings.

> *"I do think it's important to incorporate multi-methods in engagement. Mural [online digital whiteboard platform] and things like that freak some people out—like utilities and attorneys used to a different format—but others find that exciting."*

At the same time, interviewees noted that small and large meetings have different advantages. For example, it can be difficult for some people to speak up or feel engaged in large groups. While smaller group activities may make it easier for participants to provide deeper input, large groups might be necessary to give diverse stakeholders opportunities to hear from one another and collaborate. One interviewee suggested engaging a "diverse, core group" of people for in-depth conversations over the course of multiple meetings, in addition to providing opportunities for one-off participation. Another interviewee suggested holding targeted engagements with specific impacted communities.

> *"In really big virtual meetings, it's easy for people to sit back and listen and for a couple of voices to dominate. Small breakout groups of five people that are facilitated might get more perspectives. I have not seen breakout groups used much at the UTC. A lot of the dockets are the commissioners talk, utilities talk, advocates talk, and then the commissioners talk."*

"What I've seen is that you can get these big tables and they collapse under their own weight. The team will need to be really deliberate to make sure that individuals have the opportunities to share their feedback."

"Primarily, it should be bigger group conversations. It's important to dig in with stakeholders individually from time to time. I do think from a transparency standpoint, it is important to have folks together in a room."

Engagement Plan Recommendations

- Undertake widespread and in-depth engagement with impacted communities. Use a mixture of engagement techniques in events that bring small and large groups of stakeholders together with the aim of obtaining deep and broad input while giving diverse stakeholders opportunities to collaborate and find common ground.
- Implement technical and non-technical engagement opportunities to enable diverse impacted communities to provide feedback.
- Arrange engagements directed at key stakeholder groups, including businesses, utilities, and civil society organizations, as well as engagements that bring diverse stakeholders together.
- Consider developing a project advisory committee that is representative of key impacted communities to provide input throughout the project.

Gather meaningful input while effectively using time.

Some of the interviewees described engagements in the past where their input had not felt meaningful or in which their time had not been effectively used. For example, some interviewees described situations in which input had been gathered even though the outcome felt predetermined. Another noted that, while open-ended conversations and engagements can be helpful for brainstorming, they may not generate focused feedback for the development of decarbonization pathways. A third stakeholder recalled participating in a multi-week stakeholder process in which he felt the same quantity and quality of input could have been gathered in one-on-one sessions or through gathering a few representatives together for an afternoon.

> *"It should be a judicious use of people's time. Not having a lot of long meetings will be helpful."*
>
> *"Some stakeholder engagement activities have been perceived as ticking a box. You bring people to the table, you ask them questions, you record answers and then you're done. That's why I say people need to be educated about the issue and that there needs to be engagement with local community members who can bring people together."*
>
> *"It's very helpful to try to focus people's attention on the specific places where you think their input is crucial. […] I appreciate when stakeholder time is used in a disciplined way."*

Engagement Plan Recommendations

- Organize focused engagement activities and identify how each engagement activity will contribute to the project.
- Communicate to stakeholders about when and how their input will be gathered, as well as how it will be used.
- Make efficient use of time.

Create balanced spaces for impacted communities to provide input.

Multiple interviewees said it would be important to ensure that utilities do not dominate the engagement process. For example, one interviewee from a civil society group described a case in which about 10 people each from multiple utilities attended a public meeting. Although many of the utility representatives were there to observe and take notes, the utilities dominated the conversation and the situation left stakeholders new to the process hesitant to contribute.

"Being outnumbered by utilities all the time can make it undesirable to get involved. […] And some folks on the advocacy side were new to the process and didn't contribute. People new to the UTC are unsure when and how to speak up, so they don't."

In contrast, one interviewee from a utility described another case in which he had seen environmental groups dominate the conversation. Another noted that the engagement could "be very skewed" without "enough of a diverse representation." A third interviewee said it would be important to create "balancing conversations and dynamics" in engagement spaces.

Engagement Plan Recommendations

- Ensure stakeholders from the utility sector do not dominate engagements.
- Consider creating opportunities for impacted communities to provide input separately and in a group.

Polarization could negatively affect engagement.

Interviewees from utilities and environmental advocacy groups expressed concerns that engagement activities could become polarized in ways that could hinder discussion. Interviewees noted that this project is highly political; engagement will involve groups that have conflicting opinions and views on decarbonization.

"The topic of climate gets everyone interested and passionate."

"It's going to be a very political process. It will be high-profile for advocates and gas utilities. Constructive conversations are going to be challenging. People will be charged. They will be in their corners."

Interviewees said that large group meetings can become polarizing spaces. An interviewee from a natural gas utility recalled a Zoom meeting on decarbonization in Oregon that "quickly got out of control" with participants becoming "negative" and "accusatory."

"The facilitators had to shut it off and received backlash for closing the public forum. It's a hard balance to strike because of emotions."

Interviewees from utilities and civil society organizations also expressed concerns that the engagement process could be or appear biased, which could increase polarization. "Many parties will have more of an anti-gas agenda," an interviewee from a natural gas utility explained. In contrast, an interviewee from a clean energy advocacy group worried that too much emphasis would be placed on emerging solutions like RNG and hydrogen rather than "cost-effective solutions" like energy efficiency retrofits.

"If the stakeholders are not feeling that the convener of the discussion is unbiased it can lead to contentious feelings in the process."

Both utilities and civil society organizations suggested that transparent disclosure and discussion of data and assumptions could help decrease polarization. One interviewee referenced the engagement organized by Gridworks in partnership with PG&E as a successful model for building community consensus for decarbonizing gas systems.[7]

"Lack of transparency and robust stakeholder discussion is a huge concern for me. Another concern is bias. I hope the analysis can remain neutral. It's important to have stakeholder engagement to provide input in assumptions and analysis. [...] Assumptions are absolutely key, so making sure there is transparency around assumptions would be super important."

"We know it's going to be emotionally charged. It needs to be fact-based from both sides. You'll get some protectionism from the utilities, while others will be seeking the end of natural gas altogether."

"A transparent review of what's going on with modeling is important. The assumptions could be emotionally charged."

Engagement Plan Recommendations

- For engagement events, co-develop operating values with participants to include expectations that everyone will be treated with respect and establish the norm that those who do not comply will be removed.
- Identify concerns that could polarize conversations and develop a strategy for responding to them.
- Develop collaborative activities that enable impacted communities to raise their concerns and identify common ground.

[7] Over a six-month period, PG&E and Gridworks facilitated engagement discussions with the project's Technical Advisory Committee, resulting in consensus among 14 diverse organizations that were previously in disagreement, engagements with 250 thought leaders and policymakers, and the adoptions of primary recommendations for engagement.

Stakeholders value holistic analysis with consideration of equity and affordability.

Over half of the interviews (9) raised concerns about energy costs and affordability. Interviewees from across the spectrum said it would be important to consider how decarbonization could affect energy prices and, consequently, businesses and low-income communities; they raised concerns that high energy prices could increase inequality and energy poverty. One-third of the interviews (5) indicated it would also be important for the project to consider convenience and reliability of energy sources, especially in underserved, rural areas. Interviewees also said the project should consider the diverse urban, semi-urban, and rural settings in the state; rural low-income communities east of the Cascades are likely to be particularly affected by the transition to low-carbon fuels and increases in energy costs.

> *"Equity impacts are very important. We need to make sure we are not leaving low-income communities and communities of color behind. We need to help those folks transition to an electric system."*
>
> *"For a lot of rural low-income folks who don't live in multi-family buildings, especially east of the Cascades, the cost impacts of [decarbonizing] the wrong way can potentially be dangerous."*

Several interviewees said affordability (11) and equity (6) should be a key concern in the development of decarbonization pathways. Some interviewees indicated that a focus on equity and affordability would be essential to keep the project on track and garner support for decarbonization. One interviewee recommended drawing on a framework on equity and buildings developed by the Urban Sustainability Directors Network.

> *"Promote policies that enable the entire energy systems to decarbonize, while maintaining energy resiliency, safety, and keeping energy costs affordable."*
>
> *"My other concern is that the efforts to decarbonize are going to result in short to medium term increases in cost. […] without [consideration of costs], it gives the opponents of decarbonization a flag to wave and slows the process."*
>
> *"Take a client-focused approach to maintain affordability, but don't let that be the enemy of decarbonization. Climate change disproportionately impacts low-income populations in the long-term. In the short term, we need to maintain a level of affordability during the transition."*
>
> *"It is important to apply an equity lens at every stage […] When looking at community impacts, ensure [the analysis] encompasses health […] Also, broaden the scope to look and*

consider how customer experience and communities will experience the decarbonization project, as well accommodate, recognize, and correct harms (present and future), and support equitable distribution [of] benefits."

Interviewees also touched on the importance of ensuring marginalized communities can participate in the transition. For example, low-income communities likely need support for residential energy-efficiency retrofits.

"We're really interested in how the gas and electric utilities integrate their systems and help customers transition to cost-effective decarbonization."

"Some of these people are going to be able to make a transition through market incentives, but some are not. Figuring out how to address those who are least able to take advantage of market incentives is something that is very important to consider. In Washington, it's going to have some interesting aspects in terms of an urban and semi-urban population and rural population, and these would need to be addressed in different ways."

Finally, multiple interviewees focused on the importance of a holistic analysis of decarbonization pathways, including analysis of the relationship between and role of natural gas and electric systems, as well as consideration of diverse solutions, factors other than emissions reduction, and residential, industrial, and commercial uses of energy. Interviewees recommended the analysis consider the positive and negative economic, health, and social impacts of decarbonization actions.

"It's important to take a holistic approach to decarbonization and approach it from a fuel- and technology-neutral standpoint. Gas utilities need to be set up for success in decarbonization."

"Considerations for jobs and labor are critical in every step in the transition of decarbonization, as we're moving away from GHG-intensive industrial activities and all forms of polluting industrialized activities."

"There are a lot of things about decarbonization that are hard to quantify—benefits and costs that can't be readily plugged into models. If these are hard to quantify, models typically leave them out. I don't think that works anymore."

"It's important to look at impacts and customer preferences. Customer choice and experience is highly important."

Engagement Plan Recommendations

- Educate impacted communities on the potential positive and negative impacts of decarbonization and share quantitative and qualitative analysis on potential impacts.
- Consult impacted communities on their vision for decarbonization and the social and economic changes they hope to see. Ask impacted communities about decarbonization actions and gather their input on potential positive and negative consequences.

Next Steps

Pre-engagement interviews are one piece of information to help inform the engagement plan. Additional sources include project initiation data from the project team and the scoping work of the project team. To complete the engagement plan, SSG will work with staff to map risks related to issues and stakeholder groups.

This initial step in engagement planning and design demonstrated a commitment to engagement best practices and the IAP2 global standard for community-centric engagement design.

Appendix A3.1: Project Backgrounder[8]

Overview

SSG is assisting the Washington State Utilities and Transportation Commission to develop pathways for decarbonizing energy utilities. These pathways will consider emerging technological, economic, and policy trends related to the energy system and renewable energy. This project will provide the Commission with strategies and actions for mitigating greenhouse gas emissions and shifting to renewable energy. The analysis will evaluate the environmental, health, and economic costs and benefits to customers, equity considerations for low-income customers and highly impacted communities, and regulatory changes to facilitate the decarbonization of the services that gas utilities provide.

Technical Process

Utility decarbonization pathways will be developed through two main and interrelated work streams: technical analytics and engagement. The technical analytics team will undertake data collection, modeling, and data analysis to support the development of the pathways. First, they will calculate current utility emissions across Washington. Then, they will use SSG's modeling technology to project "business as usual" (BAU) emissions out to 2050 according to current plans, trends, and regulations. The team will also develop decarbonization scenarios to analyze what measures need to be taken for the Commission to achieve its climate goals.

Engagement

The engagement team will focus on engaging key interested and affected parties to ensure the decarbonization pathways examination includes appropriate actions that not only reduce emissions, but also advance other public goals, such as improving equity and reducing pollution. The team is currently developing the engagement plan, which will detail who will be engaged and how, as well as how to foster ongoing engagement, support, and participation in the implementation of decarbonization actions. The plan will incorporate a mix of online

[8] This document was used in the pre-engagement process. It will not dictate the project going forward.

techniques depending on the needs of the target audiences. Insights from the engagement process will shape the aspects of the technical analysis that form the basis of the decarbonization pathways.

Appendix A3.2: Stakeholders Mentioned

Interviewees suggested engaging the following sectors, groups, and organizations:

Industry	Organization
Agriculture and food industry	• Agricultural manufacturing facilities • Food Northwest • Washington Farm Bureau • Washington Fruit Tree Association • Washington Food Industry Association • Washington Potato and Onion Association • Washington Wheat Growers Association
Businesses	• Agriculture and food industry (see above) • Appliance dealers • Construction industry (see below) • Energy-intensive industries and companies, including Kaiser Aluminum • Financial institutions • Hospitality industry • Manufacturers • Small businesses • Organic waste industry
Business and industry associations	• National Consumer Law Center • Northwest Pulp & Paper Association • Association of Washington State Business
Construction industry	• AGC of Washington • Building Industry Association of Washington • Companies working on conversions • Home builders and home builder associations • HVAC dealers • Mechanical Contractors Association of Western Washington

	• Northwest Hearth, Patio & Barbecue Association • Sheet metal contractors • Washington Air Condition Contractors Association
Environmental organizations and clean energy advocacy groups	• Climate Solutions • Front and Centered • Northwest Energy Coalition • Puget Sound Sage • Washington Environmental Council
Equity and social services	• Community organizations from across the state • Equity-seeking groups and organizations, including climate justice groups • Energy Equity Project • Initiative for Energy Justice • State Tribes • The Energy Project at Opportunity Council • Vulnerable communities • Washington State Community Action Partnership
Government	• Attorney General's Office • Washington State Department of Commerce and Energy Office • Government agencies working on building codes • Other states and jurisdictions with decarbonization goals • Local governments • Public Counsel Office • Regulatory agencies
Laborers and unions	• Laborers including plumbers, pipefitters electricians, and operating engineers • Labor groups and unions, including IBEW 77
Real estate industry	• Building owners • Realtors, including Washington Realtors • NAIOP Washington State
Utility sector	• Utilities • Bonneville Power Administration • Northwest Gas Association • Northwest Power and Conservation Council • The Coalition for Renewable Natural Gas

Utility customers	● Alliance of Western Energy Consumers ● Commercial utility customers, including small-business owners and energy intensive industries ● Residential utility customers, including low-income customers
Technical experts	● Clean building experts, including the Rocky Mountain Institute ● Low Carbon Resources Initiative at Gas Technology Institute ● Northwest Energy Efficiency Alliance Project ● Decarbonization technology experts and consultants within the decarbonization sector ● Local universities ● Regulatory Assistance Project
Other	● Everyone who filed comments on the proceeding docket ● Rural and eastern Washington communities ● State Tribes

Appendix B

DAG and Technical Meetings
Feedback Summary

Appendix B: DAG and Technical Meeting Feedback Summary

Note: The purpose of this document is to provide a summary of the full range of perspectives and recommendations expressed by participants. Opinions and perspectives expressed by participants may include inaccuracies, but were included to represent the range of public input and perspectives.

Overview

The bulk of engagement took place via two parallel streams of four meetings each: Decarbonization Advisory Group Meetings and public Technical Meetings. The Decarbonization Advisory Group was composed of representatives of interested and impacted communities and parties, with representation capped at one representative per stakeholder organization. The goal was to ensure the inclusion of broad perspectives in an ongoing discussion about the Energy Decarbonization Pathways Examination.

In parallel, the Technical Meetings covered the same content as the DAG Meetings, but were open to everyone. These provided an opportunity for anyone to provide feedback without committing to all four meetings.

The four meetings occurred at key milestones during the development of the Decarbonization Pathways Examination. The first set of meetings took place after the development of initial assumptions for the Business-as-Planned scenario, giving participants an opportunity to weigh in on assumptions for the BAP before it was finalized.

The second set of meetings took place after the development of two draft decarbonization scenarios focused on demand-side actions: the Electrification scenario and the Alternative Fuels scenario. Participants provided feedback on draft decarbonization actions. Their feedback included suggestions for a hybrid scenario that combined electrification actions with alternative fuels actions. Such a scenario was added to the analysis to create three potential decarbonization pathways.

The third set of meetings focused on four supply-side scenarios which explored different options for the supply of renewable energy and alternative fuels in the state. Participants provided feedback on the scenario assumptions before the scenarios were finalized.

The fourth set of meetings focused on action implementation, policy considerations and equity. Participants reviewed the final set of actions in the electrification, alternative fuels and hybrid scenarios, and provided feedback on how they could be implemented, as well as their potential social, environmental, health and economic impacts. Their input was considered during the development of equity and implementation considerations.

Note: Comments related to expanding transportation infrastructure, as well as recommendations the study explore how to expand electric transmissions capacity and supply other forms of energy, are out of the scope of the Energy Decarbonization Pathways Examination. Nevertheless, they have been included in the summaries below to capture the full range of feedback provided for this project and make this information available to policymakers working on decarbonization.

The Decarbonization Advisory Group

The Decarbonization Advisory Group is composed of representatives of impacted communities. Participation was capped at one representative per stakeholder organization (for example, one member from each utility, environmental organization, equity-seeking organization, clean energy organization) and up to two members of the public.

Some members were invited to apply directly, while others requested a spot on the DAG. The creation of the DAG was announced publicly at a engagement kick-off event on May 27, 2022 with an invitation for anyone/organization to request a seat. The members are listed below.

- Ernesto Avelar, Laborers' International Union of North America (LiUNA)
- Shay Bauman, Washington State Office of the Attorney General
- Ryan Bracken, NW Natural
- Molly Brewer and Heather Moline, UTC
- Brandon Capps, PacifiCorp
- Brandy DeLange, Association of Washington Cities
- Penelope Gabor, Franklin Energy
- Kelly Hall, Climate Solutions
- Mathew Hepner, Certified Electrical Workers of Washington
- Brandon Housekeeper of Housekeeper Public Affairs, representing Alliance of Western Energy Consumers
- Melinda Hughes, Thurston Climate Action Team

- Dan Kirschener, Northwest Gas Association
- Jonny Kocher, Rocky Mountain Institute
- Caitlin Krenn, Washington Conservation Action (WEC)
- John Manetti, Puget Sound Energy
- Tom Pardee, Avista Utilities
- Mike Parvinen, Cascade Natural Gas Corporation
- David Perk, 350 Seattle
- Eileen Quigley, Clean Energy Transition Institute
- Christine Reid, IBEW Local 77
- Mike Robinson, Open Air Collective and Foundation for Climate Restoration
- Austin Scharff, Washington State Department of Commerce
- Andrea Smith, Building Industry Association
- Mariel Thuraisingham, Front and Centered
- Kurt Swanson, United Association of Plumbers and Pipefitters, Local 32
- Christine Bunch, City of Seattle
- Dave Warren of The Warren Group, representing Klickitat PUD, Douglas PUD, Washington Green Hydrogen Alliance and Renewable Hydrogen Alliance
- Keith Watts, member from the general public
- Amy Wheeless, NW Energy Coalition
- Bill Will, Washington Solar Energy Industries Association
- Cindy Wolf, San Juan County Council
- Monica Zazueta, member from the general public

DAG and Technical Meetings 1

Overview

During the first round of meetings, the consulting team introduced the project and its objectives, provided an overview of the engagement process, described how the energy and emissions model works and reviewed draft assumptions for the Business-as-Planned scenario. Participants had an opportunity to ask clarifying questions about the topics presented. Additionally, they provided feedback on the assumptions for the BAP scenario verbally and via a Miro Board (digital white board). The draft BAP assumptions presented to participants are detailed in Table 1.

Table 1. Draft BAP assumptions shared at the first round of DAG and Technical Meetings.

Action/ Assumption	Details	Sources
Clean Energy Transformation Act (CETA)	Requires Washington's electric utilities to achieve 100% coal-free electricity generation by 2025; 100% carbon neutral electricity generation by 2030 (80% actually generated; 20% can be offsets, RECs, etc.); 100% clean electricity generation by 2045. • annual demand -> hourly demand • determine supply to meet hourly demand (80% demand met by 2030, 100% demand met by 2030) • add capacity if required • assume plant to utility routing is same as what is in place now	SB 5116 (CETA) Final Bill Report
Clean Buildings Act for Washington	Tier 1 - Existing buildings more than **50,000** sqft need to meet energy targets, starting in **2026**. Tier 2 - Existing buildings **22,000** sqft or larger and multifamily buildings need to meet energy targets starting in **2027**.	Washington State Clean Buildings Performance Standard

Action/ Assumption	Details	Sources
Climate Commitment Act	45% reduction by 2030, 70% by 2040 and 95% by 2050 in greenhouse gas emissions. Starting on Jan. 1, 2023, the cap-and-invest program will cover industrial facilities, certain fuel suppliers, in-state electricity generators, electricity importers and natural gas distributors with annual greenhouse gas emissions above 25,000 metric tons of carbon dioxide equivalent. CPACE (HB 2405), Urban Heat Island Mitigation (HB 114), Renewable Hydrogen by PUDs (SB 5588), Solar Fairness Act (SB 5223	SB 5125 Climate Commitment Act SB 5223 SB 5588 HB 2405 HB 1114
Move Ahead Washington	A $16.8 billion comprehensive transportation funding and appropriations package which leverages anticipated funds from the Climate Commitment Act's cap-and-invest allowance auctions to preserve and maintain existing transportation infrastructure, expand transit, cycling and walking infrastructure, replace diesel ferries with hybrid electric ones and support hydrogen and electric vehicle infrastructure deployment across the state. approx $10 billion from CCA and $6 billion from other sources Mode shift: 5% increase in bike/ped and transit ridership between now and 2050, in the urban counties. Rural counties 2%	House 2022 Supplemental Transportation Budget Proposals Legislative Evaluation & Accountability Program Committee Transportation Document
Washington State Energy Code (WSEC)	Relevant elements • New commercial (includes multifamily over 4 stories) 100% electric heat pumps heating and 50% electric heat pump water heating • Buildings between 2013 and 2032 move to 70% reduction in energy use over this time period • Banning of natural gas for space and water heating in some cities	Washington State Energy Code Washington State Energy Code Roadmap

Action/ Assumption	Details	Sources

Advancing Green Transportation	HB 2042 - Encourages electric vehicle and alternative vehicle adoption by providing tax credits, exemptions, grants and technical support for electric and alternative vehicles purchases
	
	HB 5811 - Directs the Department of Ecology to adopt the motor vehicle emissions standards of California, including its Zero Emissions Vehicles program; also requires labels to be affixed that disclose the comparative GHGs for new vehicles, including passenger cars, light-duty trucks and medium-duty passenger vehicles.
	
	● Standards start taking effect in 2024.
	● New personal use and light-duty commercial vehicle sales; **8%** in **2024** and **100%** in **2035**
	● By 2035, deliveries to Washington must be:
	  ○ **55%** Classes 2b–3 trucks – vans, medium pickup trucks
	  ○ **75%** Classes 4–8 trucks – delivery trucks, delivery/service vans, lighter truck tractors, bucket trucks
	  ○ **40%** Class 8 truck tractors – cement trucks, dump trucks, sleeper cab trucks
		HB 2042
		
		HB 5811
		
		Department of Ecology - Zero Emission Vehicles

The DAG and participants of Technical Meeting 1 provided feedback on the assumptions for the Business-as-Planned scenario verbally and via a Miro board. This feedback was used to finalize the BAP.

Feedback on Draft BAP Assumptions

Participants reviewed each action/assumption and answered the following questions:

1. What's missing?
2. What's right?
3. Any surprises or curiosities?

Key elements of their feedback are summarized below, by action/assumption.

General Feedback

Participants suggested including the following legislation passed in 2022 as part of the BAP.

- Renewable Hydrogen - SB 5910
- Building Performance Standards - SB 5722
- Community Solar - HB 1814
- Organic Materials Management - HB 1799
- Electric vehicles/HOAs - HB 1793
- Reducing Methane Emissions from Landfills - HB 1663
- Greenhouse Gas/Facilities - HB 128
- HB 1257 (Energy Efficiency)

One comment recommended the consulting team review the Department of Commerce's 2022 report, *Financial Impact of Fuel Conversion on Consumer Owned Utilities and Customers in Washington,* for questions about the financial impact of fuel conversion.

Finally, participants asked a number of questions about these assumptions. Many of these questions fell under responses to "Any surprises or curiosities?" In that case, those questions are addressed in this comprehensive spreadsheet of questions asked about the project (and not mentioned below).

Clean Energy Transformation Act

What's missing?

One comment said transmission constraints are missing from the draft assumptions.

Another participant said the draft assumptions were missing "public health, environmental benefits, [and] equitable distribution of benefits."[1] These issues are addressed during analysis, rather than as part of the assumptions, and reviewed in other DAG and Technical Meetings.

Two comments pointed out that compliance to CETA is measured on annual electricity, not hourly. Regardless, the analysis included hourly analysis because that is critical to determine how much energy supply is required throughout a given year.

One comment said that "CETA requires utilities to maximize energy efficiency potential [...] but whether that leads to a significant difference in outcomes beginning in 2030 is unknown."

[1] Note: Participant comments have been edited for grammar, punctuation, and spelling.

What's right?

Participants made the following statements about what was right about the project.

- "Consumer-owned utilities are required to plan to meet load on an hourly basis under Commerce's rules. The UTC has yet to adopt rules on this matter."
- "The focus on CETA rather than Washington's RPS, the Energy Independence Act, is appropriate."

Other

One comment said "utilities will need to make investments in transmission and distribution."

Participants suggested the team review the following resources.

- Rules for public utilities, specifically Phase IV: Rulemaking Order, Phase III Rulemaking Order, Phase II Rulemaking Order and Phase I Rulemaking Order.
- Clean Energy Implementation Plans developed by consumer-owned utilities.
- Modeling of CETA in the 2021 State Energy Strategy.

Clean Buildings Act

What's missing?

Participants said the following elements were missing from the draft assumptions:

- Application of the social cost of carbon set in existing rules for utilities and in CETA.
- Recent changes to the State Building Code.
- Assumptions related to the impact of HB 1257 on energy efficiency.

Two comments recommended conferring with the Department of Commerce to ensure the accuracy of the assumptions.

Participants raised questions related to the accuracy of assumptions related to Tier 2 buildings. The consulting team reviewed these questions and, if necessary, corrected the scenarios.

Participants raised the following questions related to implementation.

- Who pays for maintaining EV charging stations?
- Who pays for recycling solar panels?

What's right?

The feedback included one comment on what was right: "including the electric heat pump code for commercial buildings."

Other

Participants expressed implementation suggestions related to the accessibility of EV charging stations: One comment said to "[make] sure that multi-family EV residents are EV ready and the cost of retrofits aren't passed along to tenants." Another comment said EV adoption could be hindered by charging stations in dis-repair.

One participant recommended assuming people comply with the Clean Buildings Act because the "non-compliance penalty is very high."

Climate Commitment Act

What's missing?

Two comments identified elements missing from the assumptions:

- Inclusion of social cost of carbon from allowance prices.
- An emphasis on air quality and benefits to overburdened communities.

Another comment shared that the original fiscal note related to CCA might be updated and would affect the assumptions if it is.

Participants made the following comments related to the inclusion of fossil and alternative fuels in the BAP.

- "Renewable natural gas may sound green but it's not an antidote for climate change."
- "There is insufficient focus on our potential ability to replace fossil fuels with chemically-equivalent non-fossil fuels. The problem with fossil fuels is not that they are fuels, it's that they are fossil. In theory, if all the same fuels were used in the same quantities as today, but all those fuels were made from recycled atmospheric CO2, we would immediately be at net zero. The fastest pathway to net zero includes feeding legacy fuel-burning devices with net-zero fuels, in addition to electrifying as much as we can."
- "Burning fuels (regardless of whether they are fossil gas or an 'alternative fuel') create byproducts such as PM2.5, NOx, etc. that cause real, calculable health impacts to the state. We need to include the TRUE cost of continuing to burn fuels."

One participant made an implementation recommendation. Their comment suggested "creating an easy-to-access website that provides real-time energy production graphs like they do in the UK at Drax Electric Insights website."

In another comment, a participant said they would like "to understand the share of the project national resources" required by Washington to help assess how realistic the actions are.

What's right?

The feedback included one comment on what was right: "Modeling the CCA's impact on natural gas utilities is most important."

Other

Participants shared the resources below.

- One comment shared the book *Short Circuiting Policy: Interest Groups and the Battle Over Clean Energy and Climate Policy in the American States* by Leah Cardamore Stokes. The comment explained: "The author argues that organized combat between advocate and opponent interest groups is central to explaining why the US states have stopped expanding and even started weakening their renewable energy policies."
- US Department of Energy. April 10, 2022. "NREL Researchers Plot Energy Storage Under Our Feet." *CleanTechnica.* https://cleantechnica.com/2022/04/10/nrel-researchers-plot-energy-storage-under-our-feet/

Move Ahead Washington

No comments, apart from one question included in the spreadsheet mentioned above.

Washington State Energy Code

What's missing?

Participants shared the following suggestions and insights related to implementation.

- One comment said the Department of Energy's Home Energy Score should be included on real estate and rental listings (specifically, Zillow and Redfin listings).
- One comment recommended incentives to insulate homes with low Home Energy Scores.

What's right?

The feedback included one comment on what was right: "70% energy use reduction by 2032 is based on 2006 Code as a baseline."

Other

One comment noted recent progress on heat pump technology that makes them more effective in northern climates.

Advancing Green Transportation

What's missing?

Participants said national and state clean fuel standards were missing from the assumptions.

One comment shared links to the California Low Carbon Fuel Standard and the Oregon Clean Fuels Program for consideration. The same comment said, "The cost and availability of NG [natural gas] fuels, especially RNG, are driven by these policies."

Another comment recommended the analysis "incorporate non-fossil CNG [compressed natural gas] fuel for trucking and other uses." The comment explained: "Making CH_4 from existing atmospheric CO_2 via ANY pathway avoids the emission [of] new fossil-based CO_2 and avoids additional upstream emissions associated with finding and extracting the fossil fuel. There is a 1.25-to-1 benefit when fossil fuel is replaced by any form of circular fuel made from atmospheric CO_2. (There needs to be a requirement that any energy input is green energy, of course.)"

What's right?

No comments.

DAG and Technical Meetings 2

Overview

During the second round of meetings, the consulting team presented draft actions for two low-carbon scenarios: the Electrification scenario and the Alternative Fuels scenario. The Electrification scenario focused on electrifying as much of the energy system as possible, while the Alternative Fuels scenario included some electrification alongside alternative fuels (RNG, hydrogen).

The draft actions presented during the meetings are summarized in the Tables 2-4 below.

Table 2. Draft actions common to both the Electrification and Alternative Fuels scenarios, presented at the second DAG and Technical Meetings.

Action	Specification
Deep retrofits in the building stock	• Retrofit 95% of existing buildings by 2040 to achieve a 50% reduction in space heating/cooling and other non-water heating energy use
Efficiency improvements in industry	• Improve the energy efficiency of industrial facilities not covered by CPP to achieve a 50% reduction in energy use by 2050
Maximum mode shifting	• Transfer 10% personal-use vehicle trips to electric micro-mobility (e.g., e-bike/e-scooter) in urban counties by 2035
Shift development to higher density residences in urban zones	• Fraction of single new builds to be reduced to 25% of new buildings in counties with high urban density by 2040
Carbon storage and sequestration	• Deploy sufficient carbon storage and sequestration to offset remaining emissions in excess of GHG target
Passive House standard energy code for new buildings	• Set minimum energy standards for new buildings to reach Passive House standards starting in 2035

Table 3. Draft actions specific to the Electrification scenario that were presented at the second DAG and Technical Meetings.

Action	Specification
Rapid electrification of existing residential and commercial heating systems	• Install 100% electric heat pumps in existing residential buildings by 2040 • Install 100% electric hot water heat pumps in existing residential buildings by 2040 • Install 100% electric heat pumps in existing commercial buildings by 2040 • Install 50% electric hot water heat pumps in existing commercial buildings by 2043
Electrification of new appliances in residential and commercial buildings	• 100% new appliance sales electric by 2035 in residential buildings • 100% new new appliance sales electric by 2035 in commercial buildings
Commercial-use vehicles uptake mainly electric	• 100% Classes 2b–3 trucks electric (vans, medium pickup trucks) • 90% Classes 4–8 trucks electric (delivery trucks, delivery/service vans, lighter truck tractors, bucket trucks) • 80% Class 8 truck tractors electric
Electrification of some industrial processes, clean hydrogen and RNG for the remainder	• Deploy electricity in industries – replace 70% fossil fuels with electricity by 2050
Deployment of decentralized solar PV and storage	• Enable distributed energy resources – 24.7 TWh of rooftop solar PV generation by 2035 • Enhance energy storage – Add storage capability to 25% of residential non-apartment building stock by 2035, assume each storage unit is specified to 14 kWh
Renewable electricity imports	• Import sufficient renewable electricity to meet X% electricity demand within the state
Deployment of utility-scale battery storage	• Add 10,000 MW of utility storage capacity

Table 4. Draft actions specific to the Alternative Fuels scenario that were presented at the second DAG and Technical Meetings.

Action	Specification
Natural gas in existing residential and commercial heating systems replaced by natural gas heat pumps	• Install 100% electric and natural gas heat pumps in existing residential buildings by 2040 • Install 100% electric and natural gas hot water heat pumps in existing residential buildings by 2040 • Install 100% electric and natural gas heat pumps in existing commercial buildings by 2040 • Install 50% electric and natural gas hot water heat pumps in existing commercial buildings by 2040
Clean hydrogen and RNG in the natural gas grid	• New round of standards for appliances and equipment beyond those codified in 2021 – 15% hydrogen injected into the natural gas distribution system by 2035 • Use full RNG potential of 87.5 tBTU by 2050
Adoption of hydrogen into residential homes	• Deploy clean hydrogen fuel cells for homes – 5% of homes will have hydrogen fuel cell by 2030
Clean hydrogen and CRNG used in a greater share of light-duty and heavy-duty commercial vehicles	• 100% Classes 2b–3 trucks – 80% EV, 20% ZEV (vans, medium pickup trucks) • 90% Classes 4–8 trucks – 50% EV, 50% ZEV (delivery trucks, delivery/service vans, lighter truck tractors, bucket trucks) • 80% Class 8 truck tractors – 20% EV, 80% ZEV
Industrial processes use clean hydrogen, RNG and other fuels	• Deploy green hydrogen and RNG in industries – 70% hydrogen/RNG adoption by 2050
In-state production of RNG	• Produce sufficient RNG to provide X% of RNG demand within the state
In-state production of synthetic methane	• Produce sufficient synthetic methane to provide X% of demand within the state
In-state production of clean hydrogen	• Produce sufficient hydrogen to provide X% of hydrogen demand within the state

Feedback on Draft Actions

Participants reviewed the actions and answered the following questions:

1. What do you like?
2. What opportunities are there for implementation?
3. What equity considerations are important for this scenario?
4. What actions are missing?
5. What are the barriers to implementation?

Overall Feedback

Two comments recommended developing a hybrid scenario incorporating a combination of electrification with alternative fuels.

Two comments expressed overall concerns. One comment said "too rapid of a transition will increase cost of living."

Feedback on Common Actions

Likes

Participants said they liked the actions related to reducing urban sprawl, energy-efficient buildings, lowering vehicle miles traveled and carbon sequestration. One comment said they liked that the actions could "meet GHG reduction targets."

Missing Actions and Suggestions

Participants identified the following themes for inclusion as new actions or modification to existing actions.

- **Investment in power grid capacity:** One comment indicated "state investment in power grid capacity" was missing from the actions.
- **EV charging:** One comment said fast electric charging needs to be more widespread to enable shift to EVs.
- **Time-of-use tariffs:** One comment suggested incorporating time-of-use tariffs to reduce peak demand.
- **Explore carbon capture:** One comment suggested exploring carbon capture and, if feasible, scaling it up with natural gas to achieve net-zero in combination with wind and solar. However, another comment described carbon capture as unproven and expensive.

Participants expressed the following concerns and dislikes related to the actions.

- **Negative impacts of Passive House standards:** One comment said Passive House standards could lower quality of life. The comment said: "Passive house is about building a tighter home. That means less windows. That means less natural light and a lower quality of life/mood."
- **Risk of carbon sequestration:** One commenter wrote they were supportive of the carbon sequestration actions as long as they are not used to "prolong dirty power generation."

Implementation Opportunities

Participants highlighted the following opportunities for implementation.

- Introducing heat pumps at the end of life of existing systems.
- Providing a model ADU ordinance for higher density to towns and counties.

Barriers to Implementation

Participants highlighted the following barriers to implementation.

- **Costs and Funding:** Two comments said cost is a barrier to achieving the actions. Another comment said lack of funds for transportation mode switching infrastructure, such as bike lanes and rail, could be a barrier. Two other comments said cost is a barrier to reaching the retrofitting targets. Another comment described Passive House standards as "crazy expensive if there is a back-up heat system (likely for eastern Washington)."
- **Availability of technology:** One comment said the availability of technology to reach the target could be a barrier.
- **Local ordinances related to density:** One comment said, "Higher density zoning is highly dependent on local ordinances requiring that change." Another comment said local ordinances could make it hard to put in heat pumps and that "noise ordinances can be prohibitive in urban areas."
- **Lack of safe active and public transportation infrastructure:** One comment said a lack of safe infrastructure for active and public transportation is a barrier. Another said, "We need to make alternative transportation [to cars] safe and easy." A third comment said "micro-mobility seems challenging," but did not specify a reason.
- **Grid capacity:** One comment said "electricity capacity" is a barrier to retrofitting 95% of existing buildings by 2040.

- **Asking people to change their lifestyle:** One comment said that convincing people to change their lifestyle is a barrier to implementation.
- **Willingness to adopt heat pumps:** One comment said "customer willingness to adopt heat pumps is a barrier. Another recommended: "Every time someone replaces a furnace they need to know that heat pumps work well and are cheaper to run and your house is more comfortable — it has to be the obvious choice."
- **Supply chain constraints.** One comment said supply of labor is a barrier. Two comments said supply chain constraints are a barrier.
- **Lack of viable carbon capture and sequestration technologies:** One comment said a lack of these technologies is a barrier to implementation.

Important Equity Considerations

Participants highlighted the following equity considerations.

- **Energy burden:** One comment said the impact of the actions on energy burden is an important consideration.
- **Health and quality of life:** One comment said the impact of actions on air quality and health are an important consideration. Another said that "focusing on density means less yards for children and pets to play in."
- **Jobs:** One comment said the impact of the actions on jobs is an important consideration. The comment suggested partnering with trade unions to train contractors and installers.
- **Cost of housing:** One comment said that the actions could increase the cost of building housing units, which, in turn, could affect equity.

Feedback on Electrification Actions

Positive Feedback

Participants liked the following aspects of the electrification actions.

- **Cost-effective:** "Electrification and energy efficiency are the most cost-effective way to meet our climate protection goals according to the 2021 State Energy Strategy," one comment explained. Another comment said moving to electric appliances would improve affordability.
- **Meets GHG reduction goal:** Two comments said they liked that the electrification actions would enable Washington to meet its climate goals.

- **Inclusion of heat pumps:** Three comments focused on the benefits of heat pumps, including that they are "more efficient than other heating options," "provide both heating and cool — which are necessary for our new typical summer heat waves," and contribute to "reducing overall load on the grid."
- **Distributed energy systems:** One comment said, "Distributed energy systems with electrification offer price stability and grid security." Another comment said, "Vehicle-to-grid and distributed energy may be very helpful in resilience."
- **Positive impact of electrification:** One comment said, "Moving to electric appliances is an improvement for health, safety, affordability and climate!" Another said moving to induction stoves would improve efficiency, reducing overall load on the grid.

On the whole, feedback on the Electrification scenario was positive. However, one comment described the electrification actions as "unrealistic and wasteful of our natural gas infrastructure."

Missing Actions and Suggestions

Participants identified the following themes for inclusion as new actions or modification to existing actions.

- **Demand response:** Two comments said demand response actions are missing from the scenario.
- **Consideration of energy, transmission and transmission capacity:** One comment said that transmission capacity needs to be examined. Three comments said considerations related to the seasonal availability of resources compared with peak need are missing. Another comment recommended adding considerations related to grid battery storage capacity. In addition, a comment asked, "Where is the impact of these measures on the total grid, production, transmission and distribution?"
- **Bioenergy with carbon capture and storage:** One comment said the scenario was missing inclusion of BECCS. "Eastern Washington has good potential for large scale BECCS with sequestration into Columbia basalt formations," the comment said.
- **Interim milestones:** One comment said the actions were missing interim milestones before 2040.
- **Quicker and more ambitious action:** One comment suggesting implementing the requirements for 100% electric appliances sooner to accomplish 50% GHG reductions by 2030. Another comment suggested increasing the goal of 50% electric hot water heat pumps in existing commercial buildings by 2043 to 100%.

- **Incorporate turnover dates for appliances:** One comment recommended incorporating turnover dates for appliances into the goals.
- **Standardize electric codes:** One comment said, "Electric codes need to be standardized for heat pumps, induction and V2X."
- **Consider nontraditional batteries:** One comment recommended considering thermal storage and pumped hydro alongside utility-scale battery storage (interpreted by the commenter as implying "traditional" technology).

Implementation Opportunities

Participants identified the following implementation opportunities for electrification actions.

- **Public funding:** Five comments recommended using public funding for implementation. One comment said supporting the action with public dollars is important because the private sector is "less able to adapt to the cost increases." Three comments highlighted opportunities to fund energy efficiency and electrification actions with funding related to federal laws (Inflation Reduction Act, Bipartisan Infrastructure Law, Defense Production Act), as well as with funding from state and local jurisdictions. Another comment said the CHIPS and Science Act will "help with technological supply chains."
- **Train workers:** One comment recommended partnering with trade unions to train contractors and installers to implement the actions. Another comment suggested using the "federal workforce training program for building energy efficiency and electrification" (through the Bipartisan Infrastructure Law and Inflation Reduction Act).
- **Purchase power agreements:** One comment suggested accessing wind energy, solar energy and battery energy storage systems through PPAs with other states.
- **Health:** One comment indicated the actions provide an opportunity for "healthier homes and businesses."
- **Bioenergy with carbon capture and storage and carbon dioxide removal:** One comment said Eastern Washington "has good opportunities for large-scale BECCS and CDR."
- **Restrict sale of natural gas:** One comment recommended tracking "New York's effort to restrict sale of natural gas and end-use equipment," while another suggested looking at similar efforts in California.
- **Smart grid technology:** Three comments said smart grid technology can be included to help manage the grid. "Smart and distributed grid technologies with local power sources can help with resiliency, cost stability and security," one of the comments explained.

- **Positive economic impact:** "A clear electrification path will promote investment, innovation, training, availability and affordability," one comment said.

Barriers to Implementation

- **Cost and pace of action:** One comment said the cost of energy storage technology is a barrier. Another said the cost of commercial fleet electrification could be a barrier for companies. In addition, one comment said the cost and pace of existing building retrofits is a barrier.

  Two comments said the cost of electric infrastructure upgrades required to retire natural gas are a barrier. One of these pointed to a May 2022 report prepared for the Department of Commerce[2] that found that electrifying and HVAC and water heating systems in single- and multi-family residential buildings is not expected to be cost effective until 2035 due to high capital costs of electrification retrofits and low gas rates. However, the analysis also found that "HVAC electrification can become cost-effective for single-family retrofit customers relative to decarbonized gas."
- **Industrial processes:** One comment questioned whether the goal of replacing 70% of fossil fuel use in industry with electricity is realistic. Another comment said RNG and hydrogen will be needed for processes that require substantial heat.
- **Workforce limitations:** One comment said workforce limitations are a barrier.
- **Willingness to change:** Three comments indicated that the scenario relies on the assumption that people will willingly participate. "People won't just switch or change equipment that currently works," one of the comments said.
- **Lack of energy capacity:** One comment said there is "not enough energy to meet demand." Another comment questioned how utility-scale battery storage will handle multi-day capacity needs. A third comment said "electric heat pumps would be a huge strain on the grid," but the writer was hesitant to install natural gas heat pumps because of the costs associated with monthly gas bills.
- **Reliance on imports:** One comment said, "It is dangerous to rely upon imports for resource adequacy" and recommended a scenario that "assumes no import of capacity on peak."

[2] Li, C. et al. Energy+Environmental Economics. May 2022. Financial Impact of Fuel Conversion on Consumer Owned Utilities and Customers in Washington. https://www.commerce.wa.gov/wp-content/uploads/2022/06/WA-COU-Building-Electrification-Final-Report.pdf

- **Solar potential:** One comment said Washington is one of the worst states for solar energy. Two comments questioned how realistic the solar target is.
- **Local permitting and requirements:** One comment said Homeowners' Association and local permitting requirements could be a barrier.
- **Supply chain constraints:** One comment said the availability of insulation, wiring and other materials could be constrained. Another comment suggested looking at the supply chain requirements to meet heat pump goals.
- **Limitations of battery storage:** One comment on the deployment of utility-scale battery storage said, "This is a lot of storage for a technology that doesn't exist."

Equity Considerations

Participants identified the following equity considerations.

- **Equitable employment and economic opportunity:** Three comments said it is important to consider those who will lose jobs as a result of the energy transition. One of these recommended opportunities and retraining for displaced workers, while another said "an equitable and just transition" is important for these workers. A fourth comment indicated the impact of the transition on equitable employment and economic opportunity is an important consideration.
- **Climate adaptation:** Two comments indicated considerations related to climate adaptation, such as incorporating heat pumps with cooling, are important. One of these said these considerations should be prioritized for "vulnerable communities, including BIPOC, lower-income and seniors."
- **Affordability:** One comment identified affordability as an important equity consideration, while another said rate design for electric and natural gas customers is an important equity consideration.
- **Health:** One comment said moving to electric appliances is an improvement because "gas appliances are unsafe and unhealthy."
- **Access to distributed energy:** One comment said, "Opportunities for decentralized energy are limited for those who live in multi-family housing or rent."

Feedback on Alternative Fuels Actions

Positive Feedback on Actions

One comment said the Alternative Fuels scenario is the best option.

Participants liked the following aspects of alternative fuels actions.

- **Selection of energy sources:** One comment said they liked the use of diverse energy sources, including RNG and hydrogen, in the Alternative Fuels scenario. Another comment said, "It is good that clean hydrogen and RNG are being considered."
- **Job creation:** One comment said the alternative fuels scenario "could create jobs and make the state less reliant on other states or countries for energy."
- **Innovation:** One comment said the Alternative Fuels scenario "relies on more innovation than the electrification model."
- **Inclusion of synthetic methane:** One comment said the inclusion of synthetic methane is positive.
- **Use of hydrogen and RNG in hard-to-decarbonize sectors:** One comment said green hydrogen is a good solution for hard-to-decarbonize sectors, while another said RNG can be used in hard-to-decarbonize sectors or for peak energy generation.
- **Potential of RNG to reduce emissions:** One comment said, "RNG can help in reducing emissions from agriculture and waste."

Missing Actions and Suggestions

Participants identified the following themes for inclusion as new actions or modification to existing actions.

- **Non-fossil hydrocarbons:** One comment said that using CRNG is insufficient and recommended including all non-fossil hydro-carbons, including all RNG and synthetic methane, in the alternative fuels scenario.
- **Carbon dioxide removal:** One comment suggested considering CDR for the scenario due to Washington's basalt formations. "This can also help to stimulate Washington's leadership in a new multi-trillion dollar industry," the comment said.
- **Book-and-claim approach:** One comment suggested using Oregon's book-and-claim methodology for energy accounting.
- **Avoid natural gas heat pumps:** One comment said natural gas heat pumps are "not market ready" and the scenario should instead incorporate electric heat pumps with gas furnace backup.

- **Missing considerations related to RNG:** One comment indicated the scenario was missing consideration of methane leaks from RNG. Another comment said RNG should only be used for hard-to-decarbonize applications, rather than electrifying buildings. A third comment said methane use should be reduced, rather than producing more methane.

  A fourth comment recommended considering the limitations of RNG related to decarbonization. The comment pointed to a report by Earthjustice and the Sierra Club indicating that using RNG and other fossil gas alternatives in buildings could hinder decarbonization due to limited availability relative to demand, cost and a mixed environmental record.

- **Include nuclear energy:** Two comments suggested incorporating nuclear energy into the scenario.

Additionally, one comment raised concerns about fracking polluting groundwater and methane leaks.

Implementation Opportunities

Participants commented on the following implementation opportunities.

- **Importing RNG and methane:** Two comments suggested importing alternative fuels from outside Washington.
- **Scale up hydrogen:** One comment suggested creating hydrogen hubs. Another referenced remarks by the European Commission president who called hydrogen a game changer and encouraged growing the hydrogen economy.
- **Using green hydrogen in place of gasoline:** One comment said a positive aspect of green hydrogen is that it can be transported and used with combustion engines. Another comment said green hydrogen could be used for long-haul trucking and aviation. A third comment said green hydrogen can be used to transport renewable energy.
- **Using green hydrogen in industrial processes:** One comment said green hydrogen could be used for producing steel, cement and other processes that are hard to electrify. Another comment said it would be better to use hydrogen for industrial processes rather than space heating due to the potential of leakage from gas pipes.
- **Using green hydrogen for energy storage:** Two comments said green hydrogen can be used to store energy. One of them said, "Green hydrogen may provide a better alternative to stationary batteries when long-term energy storage is needed, like from summer to winter."

Barriers to Action

Participants highlighted the following barriers to implementing the alternative fuels actions.

- Limitations of existing infrastructure: One comment said the amount of hydrogen that can be pumped into existing gas pipelines is a barrier. Another said that hydrogen degrades metal pipes and existing natural gas infrastructure may need to be updated. A third comment noted the potential for leaks and questioned the feasibility of using hydrogen for space heating.
- Cost: Five comments raised concerns about cost. One comment said the cost of the actions is a barrier. Another comment cited the high cost of RNG projects. A third comment said the new technologies required for the actions could be costly. Another comment noted that the equipment required for green hydrogen electrolysis is expensive. A fifth comment said, "Strapping utilities with investment of utility-scale battery storage would be expensive for ratepayers."
- Availability and cost of RNG: One comment said the "availability of RNG is limited" and the "cost of new projects is high."
- Safety issues related to hydrogen: Four comments highlighted safety and flammability risks related to hydrogen. Two of these raised safety concerns related to the use of hydrogen in homes. One of these noted that "getting local fire codes to allow seems like a barrier." Another comment noted: "Gas pipelines already pose a safety hazard — especially in fault zones. Adding hydrogen to the mix seems an unnecessary added risk compared to alternatives." This commenter suggested upgrading to electric appliances instead.
- Availability of required technologies: One comment said that availability could be an issue with the relatively new technologies required for the actions.
- Limitations and inefficiencies of green hydrogen: The feedback included a series of comments on barriers related to green hydrogen, all of which appeared to be from the same commenter. One comment said that "producing green hydrogen requires really cheap electricity [....] green electricity is only cheap when there is an electricity surplus on the grid," and, therefore, the economic viability of green hydrogen would be limited by the level of surplus on the grid.

  Another comment explained that "losses occur during hydrogen electrolysis, transport and the re-creation of electricity from hydrogen," making it far less efficient than battery storage for electricity. A related comment said "green hydrogen will need to improve FASTER than the mainstream storage alternatives because it has to play catch up due to starting late."

The series of comments concluded by pointing out that, if gray hydrogen dominates over green hydrogen, the hydrogen actions could cause more emissions, rather than decreasing emissions.

Equity Considerations

Participants highlighted the following equity considerations related to the alternative fuels actions.

- **Health and environmental impacts:** One comment suggested considering the health and environmental impacts of the alternative fuels actions. Another comment said, "Gas appliances are unsafe and unhealthy compared to electric options."
- **Who pays:** One comment said who pays for infrastructure is an important equity consideration.
- **Stranded assets:** One comment said: "Gas is not a viable solution — we don't want to get stuck paying for stranded assets that don't serve goals or our best interests."
- **Equity considerations related to hydrogen, RNG and synthetic methane production, distribution and safety:** Two comments identified the safety of injecting hydrogen and RNG into the grid as an important equity consideration. One of these indicated the impact of RNG and hydrogen on end-use appliances should be considered. Another comment identified the location of hydrogen storage as an important equity consideration. A third comment asked, "How do we decide what the best uses are of RNG and H2 [hydrogen]?" Another comment indicated the impact of synthetic methane production on communities is an important equity consideration.
- **Option to choose from different energy types:** One comment said, "More options means more opportunities to reduce costs."
- **Impact of fuels and actions on marginalized communities:** One comment suggested considering the impact of emissions from RNG and hydrogen on marginalized communities. Another comment recommended "reducing leakage from fossil fuel production" and "reducing environmental impacts on communities adjacent to fossil fuel storage/distribution/generation." A third comment said, "Resilience and sustainability has a continued impact for older and underrepresented communities."
- **Use of farmland for biofuel production:** One comment advised against the use of farmland for biofuel production as an equity consideration.
- **Climate adaptation:** One comment said climate adaptation considerations, such as cooling from heat pumps, are an important equity consideration.
- **Reducing energy burden:** One comment said reducing the energy burden is an important equity consideration.

Other

The following comment did not fit into the themes above: "It is important to evaluate the fact that the natural gas industry is required to meet targets and they should be given the opportunity to meet those targets without impeding their ability to provide service to customers."

DAG and Technical Meetings 3

Overview

During the third round of meetings, the consulting team delivered a presentation on assumptions for four energy supply-side scenarios: two for renewables and two for fossil fuel and alternative fuels. The first renewable scenario focused on in-state production and exporting of renewables, while the second renewable scenario focused on importing renewable energy. Similarly, the first fossil and alternative fuels scenario focused on in-state production and exports, while the second focused on out-of-state production and imports. The input was used to finalize the supply-side scenarios.

The draft scenarios presented in the meetings are summarized in the tables below.

Table 5. Draft assumptions for supply-side renewables scenarios presented at the third DAG and Technical Meetings.

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Solar	• Existing in-state solar capacity continues through 2050 • Add 18 GW of in-state PV solar by 2050 • Excess in-state generation used when available to produce alternative fuels and charge batteries	• Build on existing utility scale solar in base year (2019) • New rooftop solar additions are only as required by Building Code • Inter-state transmission is expanded and Western Energy Imbalance Market moves to Day-Ahead Market model, allowing more imports than currently • Import up to 15,000 GWh of solar electricity annually from BAs in Arizona, California, Nevada, New Mexico and Utah by 2050	• All new commercial construction over 10,000 square feet equipped with rooftop solar, scaled to roof size and up to 100kW generating capacity • Net-metering customers generate 4% of each utility's peak 1996 electricity demand by 2030 • Address permitting process reforms and long timelines for siting and development • Coordination with Tribes and local and Federal land managers • Fully leverage investment incentives and tax credits from Infrastructure Investment and Jobs Act and Inflation Reduction Act	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to low-income communities • Impacts and benefits to rural communities • Co-location of agriculture, pollinator habitat and solar PV • Operational lifespan of PV and recycling • Pairing systems with battery storage for improved community and system resilience Indicators • Rooftop solar capacity per capita per county • Energy burden • Average annual energy expenditures compared to median household income • Costs of solar installation • Jobs created • New sectors and industries stimulated

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Wind	• Existing in-state wind capacity continues through 2050 • Existing wind imports continue through 2050 but no new imports added • Add 10 GW offshore wind and 7 GW of onshore wind by 2050	• Inter-state transmission is expanded and Western Energy Imbalance Market moves to Day-Ahead Market model, allowing more imports than currently • Import up to 79,000 GWh of wind power from BAs in Montana, Colorado, New Mexico and Wyoming	• Address permitting process reforms and long timelines for siting and development • Identification of least conflict areas for renewable siting in Columbia River Basin • Include wind-based net metering projects up to 100kW as enabled by state legislation • Coordination with Tribes and local and Federal land managers • Fully leverage investment incentives and tax credits from Infrastructure Investment and Jobs Act and Inflation Reduction Act	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to low-income communities • Impacts and benefits to rural communities • Co-location of agriculture, pollinator habitat and wind turbines • Operational lifespan of turbines and recycling • Pairing systems with battery storage for improved community and system resilience • Impacts on migratory species and environmental quality • Potential conflicts with other marine uses and ocean environmental quality Indicators • Energy burden • Average annual energy expenditures compared to median household income • Jobs created • New sectors and industries stimulated

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Hydro	• Existing hydroelectric capacity serving Washington to remain at 2019 levels (22,000 MW capacity) • No new additional hydroelectric capacity added • Implement planned improvements and expansions of existing capacity • Existing Bonneville Power Administration contracts with Washington utilities renewed at same levels in 2028	• Maintain hydropower range of Federal Columbia River Power System of 10,000 - 15,000 average MW (35,000 MW capacity) • Excess hydro generation sold or spilled (water is released) • Existing Bonneville Power Administration contracts renewed on same terms in 2028 • Use imported hydropower as flexible energy option during times of higher hydro output and lower renewable output elsewhere in the West	• Potential removal of Lower Snake River dams which currently account for 3,033 MW hydro capacity, producing up to 900 average MW	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to rural communities • Operational lifespan of existing hydroelectric plants • Opportunities for expanding or improving existing hydroelectric generators • Impacts on migratory species and environmental quality due to fluctuating river flows if hydro is increasingly used as a flexible resource • Balance of competing water uses for energy, recreation, food and water source Indicators • Energy burden • Average annual energy expenditures compared to median household income • Jobs created

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Geothermal	• Ramp up installation of enhanced geothermal systems for space conditioning to no more than 71 GW by 2050	• Continue imports of conventional geothermal power at current rates. Mostly sourced from California.	• Deploy enhanced geothermal by replacing existing gas infrastructure with neighborhood or block-level networks of ground-source heat exchangers, i.e. GeoGrids • Technical capacity for high-temp conventional geothermal is approximately 300 MW along southern Cascades, however quite limited by rainfall, snow and dense forests • Leverage higher capacity for low-temp conventional geothermal in Central and Eastern Washington, building on existing use for heating buildings • SB 5470 passed in 2017 will significantly improve the state's process for getting permission to explore geothermal resources • Conventional geothermal capacity in other states is likely near maximum utilization	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to low-income communities • Impacts and benefits to rural communities • Co-location of agriculture, pollinator habitat and solar PV • Operational lifespan of PV and recycling • Capital and operational costs compared to other technologies Indicators • Energy burden • Average annual energy expenditures compared to median household income • Costs of geothermal installation • Jobs created • New sectors and industries stimulated

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Energy storage	• Continue to use existing 8 MW battery storage capacity • Add up to 1.5 GW battery storage in-state by 2050	• Add up to 4.65 GW pumped hydro storage across Northwest Power Pool region by 2030 • Draw on battery storage from rest of Western Interconnection (proportion of up to 190 GW for entire uS)	• Existing local zoning and building regulations may not address these kinds of emerging technologies, leading to siting delays • Reduced need for additional generating facilities and transmission	Considerations • Duration of battery storage and implications for resilience during extended power outages • Impacts on streamflow and fish and wildlife • Operational lifespan of batteries and recycling Indicators • Jobs created • New sectors and industries stimulated • Opportunities for innovation

Table 6. Draft assumptions for supply-side fossil and alternative fuels scenarios presented at the third DAG and Technical Meetings.

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Hydrogen	• Produce up to 117 tBTU hydrogen in-state using hydro resources when supply outpaces demand • Douglas County PUD hydrogen production plant operates through 2050 producing 735 tons per year (~82 tBtu) on average	• Import all hydrogen except for what is produced at Douglas County PUD and Centralia	• Existing local zoning and building regulations may not address these kinds of emerging technologies • Gas utility infrastructure would need to be retrofitted to include higher blend of hydrogen in pipes • Compressing hydrogen for distribution is energy-intensive • Balance of uses for water for hydro power for green hydrogen production vs. for recreation, wildlife and Tribal resources • Washington could be a site for a hydrogen hub as funded in the Infrastructure Investment and Jobs Act	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to low-income communities • Impacts and benefits to rural communities • Potential leakage rates of hydrogen • Safety and flammability • Global warming potential of hydrogen Indicators • Hydrogen capacity per capita per county • Average annual energy expenditures compared to median household income • Costs of upgrades to existing gas infrastructure • Jobs created • New sectors and industries stimulated

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Renewable Natural Gas (RNG) and Synthetic Methane	• Sufficient in-state production to provide 6% of RNG demand in-state by 2050 • Build on existing in-state production of RNG at landfills and wastewater treatment plants, accounting for 1.3% of current fossil gas consumption • Near term RNG projects produce 5.4 tBTU/yr • Medium term RNG projects produce an additional 5.7 tBTU/yr • Rely on imported RNG and synthetic methane for remaining demand	• Import all available RNG and synthetic methane, up to 87.5 tBTU available annually by 2040 • Based on US supply of RNG projected to be 3,750 tBTU/yr by 2040	• Use existing natural gas distribution and transmission (pipeline) networks when possible • Potential sources of RNG: landfills, wastewater treatment plants, dairy digesters, food waste digesters • Production of small volumes at distributed locations and connection to pipelines is cost-intensive • Public opposition from communities neighboring projects dealing with organic waste • Synthetic methane production is capital intensive but can be co-located with carbon capture	Considerations • Impacts and benefits to Tribal communities • Impacts and benefits to low-income communities • Impacts and benefits to rural communities • Impacts of natural gas use in stoves on indoor air quality Indicators • Average annual energy expenditures compared to median household income • Jobs created • New sectors and industries stimulated • Premature deaths from air pollution

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Natural (Fossil) Gas	• In-state production of natural gas fuel continues to be zero through 2050 • Existing 4,144 MW capacity of natural gas baseload and peaking plants continues to serve Washington load until 2030, only up to 20% of demand • Plants go offline during currently scheduled outages and planned retirements	• Import all fossil natural gas to meet fuel demand until 2050. Primarily imported from Canada.	• Strategies for addressing the costs of unused infrastructure that is no longer useful (stranded assets)	Considerations • Impacts of natural gas use in stoves on indoor air quality • Impacts of natural gas power plants on rural communities, low-income communities and Tribal communities • Impacts of natural gas power plants on communities of color Indicators • Average annual energy expenditures compared to median household income • Jobs lost or maintained • Opportunities for economic and social innovation • Premature deaths from air pollution

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Coal	• Centralia plant closes by 2025, production shifts to producing 40,000 tons of green hydrogen per year	• Colstrip (Montana) no longer serving Washington customers by 2025	• No new coal development in-state, likely very limited and phasing out in other parts of the Western Interconnection	Considerations • Impacts on outdoor air quality • Impacts on rural communities, low-income communities and Tribal communities Indicators • Jobs lost • Opportunities for economic and social innovation (eg., plant conversion, "steel for fuel") • Premature deaths from air pollution

Resource	Scenario 1 In-state Production and exports	Scenario 2 Out-of-state production and imports	Siting and distribution implementation considerations	Equity, co-benefits and co-harms
Nuclear	• Additional 320 MW capacity added in 2027 (Hanford Nuclear Reservation Site) • Existing supply of 1,200 MW from existing Columbia River Generation site continues • Exports of nuclear power are essentially zero • New small modular reactors could come online in future years, based on progress of Hanford site	• Imports of nuclear are essentially zero • No additional nuclear planned in the region • Closure of Diablo Canyon nuclear power generating facility (California) by 2025	• Siting and permitting is contentious and lengthy process • Public opposition to new and existing nuclear	Considerations • Impacts on water quality • Impacts on rural communities, low-income communities and Tribal communities Indicators • Jobs generated or maintained • Opportunities for economic and social innovation

Feedback on Draft Supply-Side Assumptions

Participants of both meetings providing feedback on each scenario in response to six questions:

1. What do you like about these assumptions?
2. What assumptions are missing?
3. What policy opportunities exist to implement these assumptions?
4. What are barriers to implementation?
5. What equity, co-benefit and co-harm considerations are important?
6. Which equity, co-benefit and co-harm considerations are important?

Key themes from the input are summarized below.

Renewable Scenarios

Likes

Multiple comments said they liked that the renewable scenarios incorporated energy sources that minimize greenhouse gas emissions. One comment said they liked that the assumptions help "manage peak loads." One participant said they liked the assumption in the first renewable scenario that "in-state solar capacity continues to grow."

Missing Assumptions

Participants highlighted the following points related to missing assumptions.

- Scenarios are missing bioenergy with carbon capture and storage: Two comments suggested bioenergy with carbon capture and storage be added to the scenarios. Both comments pointed to agricultural and forest waste as potential feedstocks in Washington, as well as the state's basalt formations, which can be used for sequestration.
- Scenarios are missing considerations related to distribution and transmission: Another comment said the assumptions didn't clarify the "ways in which the UTC could potentially require distribution planning from utilities to help meet increased need." Similarly, another participant said the assumptions included insufficient detail about inter-state, in-state and in-city transmission lines, and that these could be difficult to site or permit. The UTC's distribution planning and modeling transmission requirements are out of the scope of this study.

- **Consider incorporating virtual power plants and vehicle-to-grid technologies (V2G):** One comment advised deploying vehicle-to-grid technologies. Another advised considering virtual power plants within the energy supply assumptions. VPPs are "comprised of hundreds or thousands of households and businesses that offer the latent potential of thermostats, electric vehicles (EV), appliances, batteries, and solar arrays to support the grid," explains an article from the Rocky Mountain Institute that the commenter shared. VPPs help improve the reliability of the grid and prevent blackouts by coordinating these small-scale energy resources with grid operations.
- **Draw on in-state and out-of-state storage in Renewable Scenario 1:** One comment suggested that, in addition to growing in-state storage, Renewable Scenario 1 include "out-of-state storage as needed."
- **Incorporate tidal energy:** One comment suggested incorporating tidal energy in the scenarios.

Policy Opportunities

Participants highlighted the following policy opportunities for the renewable scenarios.

- **Second Substitute House Bill 1814 (2022):** The bill provides funding for solar projects that directly benefit low-income individuals. A participant suggested this funding could go to community solar — to provide "solar access to those who would otherwise not be in a position to harness the resource that is the sun."
- **Smart grids:** One comment said smart grids could help manage loads in a distributed energy system.
- **Amount of new electric capacity required:** One participant mentioned that the Puget Sound Energy Clean Energy Implementation Plan demonstrates a need for 369 MW of new electric capacity resources in 2026, followed by 527 MW in 2027, which "is not a lot."

Barriers to Implementation

Participants highlighted the following challenges in relation to solar energy development.

- **Impact of net metering policy on solar uptake:** One comment pointed to the risk that changes in the net metering policy could reduce the return on investment for rooftop solar. Another suggested that net metering could be used to incentivize solar uptake, including for large public and commercial buildings.
- **Local codes and regulations:** Two comments said it would be important to address local permitting issues to enable solar uptake; otherwise, these could become a barrier

to solar uptake. Another comment said local codes and regulations might not address geothermal requirements, such as vertical easements in refrigerant in ground pipes, posing a barrier to geothermal development.

- Opposition to solar farms in agricultural areas: One comment said opposition to solar farms in agricultural areas is a barrier to solar energy development.
- Varying levels of solar radiation: One comment said high levels of cloud cover in western Washington, as well as thick fog in eastern Washington could hinder solar generation in the winter.

Siting and Distribution Considerations

The siting and distribution considerations for hydro noted the potential removal of Lower Snake River Dams, which could lead to a loss of 3,033 MW hydro capacity. One comment suggested that this lost capacity could be replaced with small modular nuclear power.

Equity, Co-benefit and Co-harm Considerations

Participants highlighted the following equity considerations.

- Ensure equitable access to community solar: One comment said access to solar in multi-family housing and those living in shading areas is an important equity consideration for solar energy development. Additionally, another comment suggested rooftop solar be sited on top of all schools.
- Provide redundancy of heating types: One comment suggested backup heating be handed at a system level, rather than by individual buildings. Another comment said it is important to consider redundancy of heating types to ensure low-income elders have access to sufficient heating.
- Consider impact of climate change on hydro availability: One comment said the impact of climate change on hydro availability could be incorporated into equity, co-benefit and co-harm considerations.
- Redeploying gas workers in the geothermal sector: One comment said the considerations did not capture the benefit of redeploying gas workers in the geothermal sector, where similar skills are required.

Fossil and Alternative Fuels Scenarios

Likes

One comment said they liked that nuclear energy creates minimal greenhouse gas emissions.

Missing Assumptions

Participants raised the following issues related to assumptions.

- **Consider increasing use cases for hydrogen:** One comment said the "report seems to contemplate only hydrogen for natural gas blending, while there are significant market opportunities for SAF [sustainable aviation fuel], peak generation and long-haul truck transport."
- **Consider potential increases in hydrogen supply:** One comment in response to the assumptions on in-state hydrogen production said the assumptions did not account for potential increases in the hydrogen supply. "It is very unlikely that Douglas County PUD will remain the sole producer of hydrogen in the state. Due to the Bipartisan Infrastructure Law and the Inflation Reduction Act, Washington will likely see production of at least 75,000 tonnes annually by 2030, for a combined energy output of 8,700 billion BTU," the comment said.
- **Increase hydrogen capacity:** One comment suggested increasing "hydrogen capacity that can use excess hydro."
- **Scenarios are missing considerations related to transmission, distribution and storage:** One comment explained: "Green hydrogen is likely going to reach cost parity with natural gas in the early 2030s due to the combined impacts of the IRA, economies of scale and the CCA. However, costs for transmission and storage infrastructure should be added." Another comment said out-of-state production for hydrogen in the second fossil and alternative fuels scenario would only be "practical with an intra-state transmissions pipeline" that is likely to be built by 2045.
- **Scenarios are missing bioenergy with carbon capture and storage:** One comment suggested bioenergy with carbon capture and storage be added to the scenarios. The comment pointed to agricultural and forest waste as potential feedstocks in Washington, as well as the state's basalt formations, which can be used for sequestration.
- **Thermal gasification is not yet a viable technology:** One comment said this issue would be a barrier to RNG and synthetic methane development.

Policy Opportunities

A participant highlighted the following policy opportunity related to natural gas.

- Give gas companies opportunities to use renewable energy: One comment said, "You could give gas companies new business opportunities to provide heat as a service (regulated) using renewable electricity as [a] heating source."

Barriers to Implementation

Participants highlighted the following barriers to implementation.

- Cost of updating natural gas infrastructure to incorporate hydrogen: One comment said the cost of updating natural gas infrastructure to incorporate hydrogen would be expensive.
- Updating customer equipment to incorporate hydrogen: One comment said that customer equipment is "the limiting factor to accepting a higher blend of hydrogen in pipelines. [...] Each customer's equipment would have to be retrofitted or upgraded and, given the cost and complexity involved, it is difficult to see how that is possible."
- Cost of nuclear energy: One comment said high costs are a barrier to development of nuclear energy.
- Public opposition to new and existing nuclear energy: One comment said the "contentious and lengthy" siting and permitting process could pose a barrier to nuclear energy, particularly new developments.

Equity, Co-Benefit and Co-harm Considerations

Participants highlighted the following equity, co-benefit and co-harm considerations.

- Safety considerations related to natural gas, RNG and synthetic methane: A comment said the draft assumptions were missing considerations related to "leaks and safety risks of transmission" of natural gas, RNG and synthetic methane.
- Pollution created by natural gas production: One comment said, "Fracking is energy and water intensive, releases methane GHGs and pollutes waterways."
- Impact of natural gas prices on customers: One comment said that reduced availability of natural gas "will negatively impact consumers [including renters] who are least able to afford to convert to electric appliances."
- Transitioning workers in the coal sector: One comment indicated it is important to consider how to transition workers in the coal sector.

- **RNG production could create co-harms:** One comment said that increasing RNG production could create "perverse incentives to expand factory farming or decrease waste diversion [to provide feedstock]."
- **Consider cost of alternative fuels versus electrification:** One comment suggested adding an indicator related to the costs of alternative fuels versus electrification options to evaluate the impacts of the scenarios equity, co-benefits and co-harms.

Siting and Distribution Implementation Considerations

Participants highlighted the following issues related to siting and implementation.

- **Economics of out-of-state hydrogen production:** One comment said, "Economical out-of-state production is only practical with an intra-state transmission pipeline. It is likely that such infrastructure will be built by 2045."
- **Producing hydrogen may require less water in the long-term:** One comment said: "Water used for producing hydrogen will be less than what is consumed today in combined cycle power plants (coal and natural gas). The adoption of renewables is likely to result in less overall water consumption by the power sector."

DAG and Technical Meetings 4

Overview

During the fourth round of meetings, the consulting team delivered a presentation on equity considerations and co-benefits related to the decarbonization scenarios. The presentation included an overview of definitions of key concepts, including "environmental justice," "just transition," "low-income households," "highly impacted communities," and "vulnerable populations." (Refer to Chapter 6 of the Energy Decarbonization Pathways Examination for an overview of these definitions.) The consulting team also described potential co-benefits and co-harms of climate action that could be incorporated into the analysis. Participants' responses shaped the equity and implementation considerations described in the Energy Decarbonization Pathways Examination.

What a Just Transition Looks Like

Participants of both meetings provided feedback via two Miro board activities. In the first activity, participants responded to the question, "What does a 'just transition' look like for natural gas decarbonization?" They were asked to place sticky notes with their responses on top of a map of Washington. This gave them an opportunity to mark geographic considerations as well.

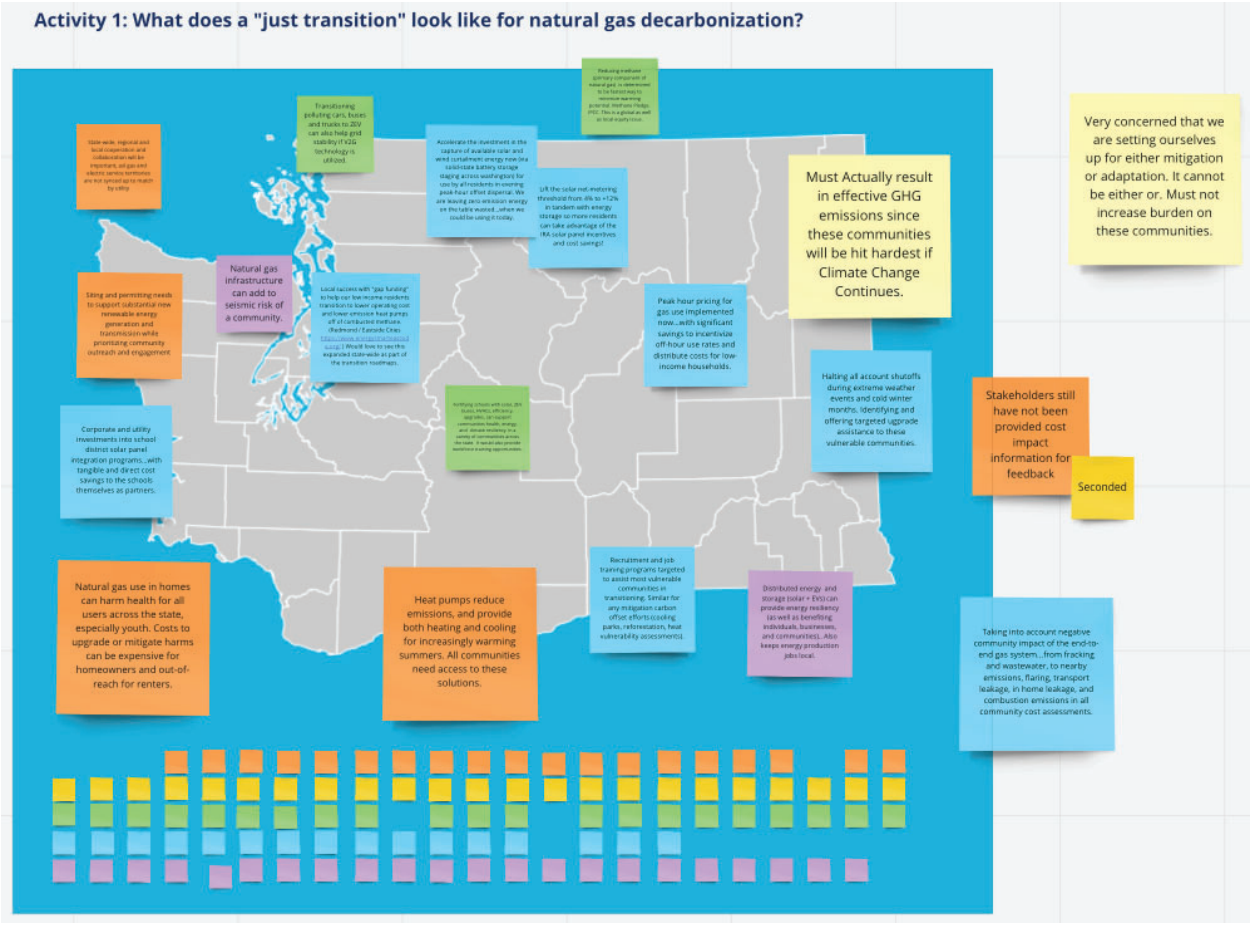


Figure 1. Screenshot of responses to Activity 1 on the Miro board for Technical Meeting 4.

The key themes that emerged from these responses are summarized below.

1. **Grid stability needs to be improved:** Some comments indicated that a "reliable" and "stable" grid is important for ensuring a just transition.
2. **Rural areas need a source of back-up power:** Some comments said there is a need to improve grid reliability and provide backup power, especially in rural areas. For example, one response summarized: "Need for generators or other redundant power for housing in rural communities where power goes out for long periods of time in extreme weather. Another comment suggested "offering targeted upgrade assistance to these vulnerable communities."

   The regions of concern participants identified were Okanogan County, Chelan County, Douglas County, Spokane County and Whitman County.

3. **Distributed renewable energy and energy storage can benefit everyone**: One comment suggested distributed solar energy and storage could be a source of energy

resilience while keeping energy production jobs local. Another suggested accelerating investment in wind and solar, as well as battery storage, "for use by all residents in evening peak-hour offset dispersal." Two comments suggested installing solar energy on schools. Another comment said a just transition involves clean energy for all communities and should not include hydrogen due to its "extreme inefficiency."

4. Some are concerned about risks posed by natural gas infrastructure: Respondents highlighted risks of natural gas, including that it can "harm health for all users across the state, especially youth" and natural gas infrastructure can "add to seismic risk." One respondent said that it is important to account for "the negative community impact" of the natural gas system "from fracking and wastewater, to nearby emissions, flaring, transport leakage, in-home leakage and combustion emissions." One comment noted, "Reducing methane (primary component of natural gas) is determined to be the fastest way to minimize warming potential."
5. Renewable energy siting must involve consideration of local communities: Three comments focused on renewable ensuring siting. One noted it is important to ensure low-income populations are not economically impacted by the location of utility-scale solar. Another said a just transition involves "not taking away local control of communities that are being considered for renewable siting." A third said community outreach and engagement need to be part of the siting and permitting process.
6. EV chargers must be accessible: Three comments said the just transition involves accessible EV chargers. They focus on accessibility in terms of location ("everywhere" and in "community gathering places") and rates being accessible for low-income people.
7. Climate resilience is part of the just transition: Several comments focused on climate resilience and adaptation. "Very concerned that we are setting ourselves up for either mitigation or adaptation. IT is not an either or. Must not increase burden on these communities," one comment said.
8. A just transition involves support for low-income and other marginalized groups to participate in decarbonization: Several comments focused on the need for incentives and financial support to enable low-income populations, highly impacted communities and vulnerable populations.
9. Funding is necessary to make the just transition a success: Several comments focused on the need for funding to help households and organizations undertake the necessary retrofits to achieve decarbonization. For example, one commenter mentioned a non-profit childcare center with a boiler over 70 years old; they would like to upgrade to heat pumps, but cannot afford it. "This isn't a unique situation — how do

we get the work going, and fast!" said the comment. Several comments pointed to the need for financial support for low-income and other marginalized communities.

10. Roll out demand management programs: Two comments said it is important to roll out demand management programs. It's "less expensive than creating large-scale generation," said one comment.
11. Education and communications is important: Three comments pointed to a need to educate people on and promote low-carbon actions. One suggested support to help organizations "navigate grant applications and other funding sources," along with technical support for developing plans.
12. The just transition offers economic opportunities: Six comments point to economic opportunities that could arise from the just transition. For example, two comments pointed to economic opportunities for tribes in the decarbonization and renewable energy sector as a part of a just transition while one said local energy production could "keep energy production jobs local." Another said, "greenhouse gas removal [...] presents a trillion dollar opportunity that Washington can be a player in." Another recommended "recruitment and job training programs targeted to assist most vulnerable communities in transition."
13. Heat pumps are part of the just transition. Eight comments referenced heat pumps as part of the just transition. One comment indicated heat pumps could play a role in ending energy poverty.

Policy Considerations for Scenario Actions

During the second part of the fourth set of meetings, participants provided input on policy considerations related to the decarbonization actions in the decarbonization pathways in the report. For each actions, participants had an opportunity to respond to the following questions:

1. What existing policies can support this action?
2. Which new policies could support this action?
3. How might this action affect highly impacted and vulnerable communities?

Participants also responded to these same questions with respect to the supply of solar, wind, hydro, geothermal, hydrogen, RNG and nuclear energy, as well as energy storage. Key points are summarized by action in the tables below.

Common Actions

Table 7. Summary of input gathered on common scenario actions in the fourth DAG and Technical Meetings.

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Deep retrofits in the building stock: *Retrofit 95% of existing buildings by 2040 to achieve a 50% reduction in space heating/cooling and a 40% reduction of non-water heating energy use.*	• Inflation Reduction Act • Climate Commitment Act • Weatherization programs • Technology and workforce training hubs • Public community resilience hubs for emergencies and	• State funding to offset cost of retrofits not covered fully by the Inflation Reduction Act • Policies that considered embodied carbon in building materials • A dashboard to help businesses and homeowners find contractors and funding opportunities for retrofits • Policies to ensure renters, homeowners associations and multi-purpose buildings have access to solar energy, heat pumps and charging infrastructure	• Retrofits could increase the cost of rentals and home prices • Green buildings offer healthier and more comfortable environments • Heat pumps provide energy efficient heating and cooling • Reduction of indoor and outdoor air pollution from methane • Local jobs • Smart panels can help owners of older homes access newer

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
	natural disasters identified by the Federal Emergency Management Agency • The Energy Smart Eastside program that helps people install heat pumps in Bellevue, Kirkland and Redmond	• Building code specifications for wiring for solar, induction stoves, bi-directional EV charging and heat pumps • Energy scores for buildings like the Energy Star ratings for appliances • Apprenticeship and training programs for green building practices and technologies • State-wide funding to help low-income residents transition to heat pumps. • Adoption of low Global Warming Potential refrigerant standards. • Research on smart panels and smart grid-technologies • Net metering for solar energy and vehicle-to-grid EVs • Support for public solar and EV battery sites at community resiliency hubs, such as at schools	technologies without having to run additional amps • Smart and distributed energy systems (e.g., involving solar and EV batteries) can improve grid stability and stabilize cost fluctuations
Efficiency improvements in industry: *Improve the energy efficiency of industrial facilities to achieve a 50% reduction in energy use by 2050.*	• Hydrofluorocarbon reduction law • Clean air and water laws	• Focus on renewable natural gas and green hydrogen since some energy-intensive industries are hard to electrify • Low-GWP (global warming potential) refrigerant standards • Improve clean air and water laws	• Clean air and water is fundamental to health • Fossil fuels and related industries are harmful to communities. Cleaner alternatives such as RNG and green hydrogen would improve outcomes for all.

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Mode shift to cycling: *Transfer 10% of personal use vehicle trips to electric micro-mobility (e.g., e-bike/e-scooter) in urban counties by 2035*	• Move Ahead Washington transportation package	• Design safe bike paths, especially near affordable housing and transit hubs • Provide safe bike storage at transportation hubs • Design walkable, "10-minute" cities • Standardize charging for e-bikes to avoid fires	• Better access to cycling infrastructure • Better access to safe and affordable modes of transportation
Increase density of urban development zones: *Fraction of single new builds to be reduced to 25% of new buildings in counties with high urban density by 2040*	• Growth Management Act	• Policies like the City of Bellevue's Micro-Apartments Land Use Code Amendment • Improvements to legislation and policies to reduce sprawl and increase local access to housing, amenities and transportation	• Transit-oriented development to reduce need for vehicles and increase walkability • Consider effects of gentrification that may arise from this action • High-density is not always the best solution. For example, density can reduce quality of life for people with medical conditions that make them sensitive to noise and air pollution. • Reduced pollution and travel expenses
Decrease freight vehicle miles traveled: *Decrease vehicle miles traveled by 15% by 2050.*	No comment.	• Encourage waste reduction and a circular economy • Utilize trains where possible and safe • Support local farms and businesses • Build more electric trains • Minimize cost, size and weight of packaging • Design centralize delivery hubs	• Could increase costs for all Washington residents • Reduced risk of community exposure to toxic freight • Reduced pollution • Buying local supports local jobs and business.

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Marine passenger electrification: *Passenger ferries 100% electric by 2040.*	• 2022 Transportation package	• Decarbonize cruising and shipping vessels	• Reduce air pollution from shipping
Carbon storage and sequestration: *Deploy sufficient carbon storage and sequestration to offset remaining emissions in excess of GHG target.*	• Protection of ecosystems (on land and marine)	• Cheaper carbon capture is on the way • Continue to invest in basic science research at all levels of government and industry • Shouldn't be used to justify continued pollution of dirty/inefficient options when cleaner options are available	• Could be used as an excuse to keep polluting • More expensive than reducing emissions with renewables

Electrification Actions

Table 8. Summary of input gathered on Electrification scenario actions in the fourth DAG and technical meetings.

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Heat pumps for space and water heating in residential and commercial buildings: *95% of new sales for existing buildings are electric heat pumps by 2040.*	• SBCC building code updates • Inflation Reduction Act (federal) • Defence Production Act for Heat Pumps (federal)	• Policies to ensure access • Business/homeowner dashboard to find contractors and funding opportunities • Research smart panels and smart grid technologies to balance the load • Apprenticeships and training programs for green building practices and technologies • Energy scores for buildings on listings, like Energy Star ratings for appliances • Building code changes • Policies to ensure access to renters, homeowners' associations and multi-purpose buildings	• Could lead to higher rental costs for those living in new apartments • Green buildings are healthier and more energy efficient • Heat pumps provide energy-efficient heating and cooling • Reduction of indoor air pollution from natural gas • Cost-effective way to reduce GHG emissions • Local apprenticeship and job opportunities • Smart panels can help homeowners in older homes access newer technologies without having to run additional amps
Zero-emission commercial-use vehicles: *100% of Classes 2b–3 trucks (vans, medium pickup trucks), 90% of Classes 4–8 trucks (delivery trucks, delivery/service vans, lighter truck tractors, bucket trucks) and 80% of Class 8 truck tractors sold are electric by 2035.*	• Department of Ecology Clean Air Rule for zero-emissions vehicles after 2035	• Bi-directional charging technology • Standard and accessible charging/refueling infrastructure • Smart panels/grids to help balance the load for EVs	• Reduced air pollution

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Electrification of some industrial processes: *Deploy electricity in industries – replace 55% of fossil fuel use in industry with electricity by 2050.*	No comment.	• Electrify all that is possible and use RNG and green hydrogen for the rest • Prioritize efforts on high-emitting industries and areas where communities are disproportionately harmed • Incorporate requirements for a just and equitable transition for the current workforce that already works in the fuel industry through Infrastructure Investment and Jobs Act, Inflation Reduction Act (federal) and CHIPS and Science Act (federal)	• Costs could increase for consumers if cost of production increases, which could negatively impact lower-income people • Reduces need for limited supply of RNG • Reduces pollution
Enable distributed energy resources: *20 TWh of rooftop solar PV generation by 2035.*	• Inflation Reduction Act (federal) • Net-metering policy • Community solar initiatives	• Smart panels and grids • Vehicle-to-grid charging technology and standardized chargers • Something similar to net metering for EVs	• High upfront cost of rooftop solar and maintenance cost • Community solar via Puget Sound Energy seems expensive at $9 per month for 1.2kW of solar. Low-income families will struggle without subsidies. • Local energy jobs • Improvement of grid stability • Energy cost stabilization
Enhance energy storage: *Add storage capability to 25% of residential non-apartment building stock by 2035, assume each storage unit is specified to 14 kWh.*	• Anticipated improvements to and development of batteries and energy storage in EVs	• Vehicle-to-grid charging technology and standardized chargers • Something similar to net metering for EVs • Creating a grant for entities to prioritize advancements in energy storages	• Costs of technologies • Net-metering-type payments from utilities for onsite or EV battery storage could help defray purchasing costs while supporting grid resiliency. It could support communities to access Evs. • Vehicle-to-grid technologies can support grid resiliency and reduce costs and strains on battery supply chains

Alternative Fuels Scenario Actions

Table 9. Summary of input gathered on Alternative Fuels scenario actions in the fourth DAG and technical meetings.

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Heat pumps for space and water heating in residential and commercial buildings: *Residential: 95% of new sales for existing buildings are electric and natural gas heat pumps by 2040.* *Commercial space heating: 95% of new sales for existing buildings are electric and natural gas heat pumps by 2040.* *Commercial water heating: 50% of new sales for existing buildings are electric and natural gas heat pumps by 2040.*	• Inflation Reduction Act (federal)	• More contractor training and support. Many HVAC contractors have inadequate knowledge of these systems and how to install correctly, which can create challenges for property owners.	• Cost of technology, which would have a disproportionate impact on lower-income people

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Adoption of hydrogen in homes: *5% of homes will have hydrogen fuel cells by 2030.*	No comment.	• Expand energy code to enable this action • Workforce training program that isn't an apprenticeship. Apprenticeships have to be approved by the apprenticeship board, which poses challenges for unionized opportunities.	• Impractical solution because current gas appliances can't work with hydrogen. Not necessary because there are electric alternatives. • Could be costly and potentially dangerous
Zero-emission commercial-use vehicles: *Percentage of new sales by 2035* • *100% Classes 2b–3 trucks – 80% EV, 20% ZEV (vans, medium pickup trucks)* • *90% Classes 4–8 trucks – 50% EV, 50% ZEV (delivery trucks, delivery/service vans, lighter truck tractors, bucket trucks)* • *80% Class 8 truck tractors – 20% EV, 80% ZEV*	• Department of Ecology Clean Air Rule for zero-emissions vehicles after 2035	• Bi-drectional charging technology • Smart panels and grids to help balance the load for EVs • Accessible, standardized charging and refueling infrastructure	• Reduces pollution • Vehicle-to-grid technologies can support grid resilience and reduce costs and strains on battery supply chains

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
Hydrogen and RNG in industrial processes: *Deploy green hydrogen and RNG in industries – 70% hydrogen/RNG adoption by 2050.*	No comment.	No comment other than: "This is where RNG and green hydrogen belong — in these hard-to-decarbonize sectors."	No comment.
Clean hydrogen in the natural gas grid: *New round of standards for appliances and equipment beyond those codified in 2021 – 15% hydrogen injected into the natural gas distribution system by 2035.*	No comment other than: "Wrong direction. Focus on industry for hydrogen and RNG."	No comment.	• Impractical because current gas appliances can't work with hydrogen • Costly and potentially dangerous
RNG in the natural gas grid: *Use full RNG potential of 87.5 tBTU by 2050.*	No comment other than: "Best for local industry use."	No comment.	• High cost of RNG • Inefficient use of limited RNG
In-state production of RNG: *Produce sufficient RNG to provide 6% of RNG demand within the state by 2050.*	No comment.	• Draw RNG from anaerobic digestion and enteric fermentation. Productive farmland should not be used for RNG.	• Great action as long as it's used for industry and as close to the site as possible to prevent leaks
In-state production of	No comment other than:	No comment.	• Great action as long as it's green

Action	Which existing policies can support this action?	Which new policies could support this action?	How might this action affect highly impacted and vulnerable communities?
clean hydrogen: *Produce sufficient hydrogen to provide 50% of hydrogen demand within the state.*	"Best for local industry use."		hydrogen from renewables, safely stored and transported and used primarily for hard-to-electrify sectors

Hybrid Scenario Actions

All hybrid scenario actions are captured in earlier scenarios, so the consulting team did not request feedback on the scenario.

Appendix C

Decarbonization Actions Survey
Feedback Summary

Public Decarbonization Actions Survey

Prepared for Washington State Utilities and Transportation Commission

January 2023

Overview

The first public survey for the Energy Decarbonization Pathways Examination focused on gathering input on concerns about potential decarbonization actions, as well as opportunities and challenges for reducing emissions.

The survey ran from December 2022 to January 2023 and received 639 responses from people across Washington. However, relative to Washington's population as a whole, Black, Indigenous and People of Color, as well as women, are underrepresented, while people with bachelor's degrees or higher-level qualifications are overrepresented. Additionally, respondents tended to be older, wealthier and more urban than Washington's population as a whole.

Key insights from the survey are listed below.

- **Support for climate action is high.** The majority of respondents expressed an interest in climate action in Washington state, with 76% (487) answering that they are either very interested or interested in climate action in the state (52% and 24%, respectively). However, 9% said they are not interested in climate action and 14% said they are not at all interested.
- **More respondents support electrification actions than alternative fuels actions.** Over a quarter of respondents expressed support for the electrification actions as a whole — over double the proportion that expressed support for the package of alternative fuels actions. Additionally, in most cases, about 30% of respondents supported specific electrification actions — double the amount that supported comparable fossil fuel actions.

  At the same time, more respondents expressed concerns about electrification actions than alternative fuels actions, with many concerns driven by questions about the reliability of the electric grid, how energy will be generated to create demand and the risks of relying on electricity for all energy needs. In contrast, energy diversification was one of the main benefits highlighted by those who supported the package of alternative fuels actions.
- **Many are concerned about grid capacity and resilience, affordability, a lack of energy diversification and loss of energy choice.** Respondents — include those who did and didn't support electrification actions — had serious concerns about the viability and potential negative impacts of electrification. Four main concerns emerged during the analysis of the data sample: concern about grid capacity and resilience, concern

about electricity supply, concern about affordability, concern about a lack of energy diversification and concern about a loss of personal choice.

- Affordability and cost are key considerations: Respondent's biggest concern about both scenarios is affordability. Respondents are concerned about how decarbonization might increase energy rates and other costs, leading to lower quality of life and hampering the economy.

  Their concerns also relate to the cost of decarbonization actions like undertaking retrofits and purchasing EVs, as well as the cost of decarbonization for the government and businesses. Several respondents suggested the decarbonization plan include grants and financial incentives targeted towards diverse groups, ranging from businesses to seniors to low-income households

- Alternative fuels have a critical, but limited, role to play in decarbonization. Though only 12% of respondents supported the Alternative Fuels scenario as a whole, over half supported elements of the alternative fuels action package. Energy diversification is one of the main reasons respondents supported alternative fuels actions.

  Some respondents suggested limiting the use of alternative fuels to hard-to-electrify sectors, including industry, heavy-duty vehicles, aviation and maritime transportation. Two key themes emerged from their comments. First, respondents expressed that, due to the limited supply and relatively high cost of RNG and clean hydrogen, these fuels should be reserved for the sectors in which they are needed most. Second, respondents suggested that electrification is a more affordable and climate-friendly solution than alternative fuels for most sectors and, therefore, alternative fuels should be used only for purposes that are difficult to electrify.

- Respondents are concerned about the environmental impact, viability and safety of alternative fuels actions. Some respondents expressed concerns that alternative fuels actions might lead to greenhouse gas emissions or delay decarbonization. Respondents also raised questions about the viability of alternative fuels actions. They commented that technologies needed to implement the alternative fuels actions do not exist at scale. Respondents also worried that deploying alternative fuels could lead to safety hazards.

- Respondents are concerned about the scalability and supply of alternative fuels. Respondents expressed concerns about the scalability of RNG and green hydrogen.

They noted that these fuels are available in relatively limited amounts today and are relatively expensive. Some respondents worried that creating large amounts of RNG and hydrogen could have negative environmental impacts.

- One-tenth of respondents are concerned about government overreach and loss of energy choice: Some respondents expressed concerns that decarbonization will lead to excessive government mandates or overreach into their lives and/or limit their personal choice to use the energy and technology they prefer.
- Some are mistrustful of utilities: A few respondents raised concerns that local utilities might put up roadblocks to decarbonization or take advantage of the circumstances to increase rates.

Method

The first public survey focused on sharing information about the project and the current state of Washington's emissions and gathering input on concerns about decarbonization, as well as opportunities and challenges for reducing emissions. The survey solicited feedback on the draft Electrification and Alternative Fuels scenarios, including what respondents liked and disliked about the scenarios, as well as their concerns and suggestions for actions. The survey was hosted online by the UTC.

Note: This survey sought to obtain the perspectives of diverse interested and affected parties. It provides a window into key concerns and perspectives of people across Washington but cannot be considered to be representative of Washington as a whole.

Questions

The survey asked respondents about:

- Their level of support for the Energy Decarbonization Pathways Examination,
- Their level of interested in climate action in Washington state,
- What they liked about the draft electrification actions,
- What concerned them about the draft electrification actions,
- What they liked about the draft alternative fuels actions,
- What concerned them about the draft alternative fuels actions,
- How the actions in the survey could affect them or others in there community and
- Anything else they wanted to share.

Additionally, the survey gathered basic demographic information about the respondents, as well as whether or not they were representing an organization.

The complete survey is included in Appendix A.

Recruiting Respondents

During the pre-engagement phase of the Energy Decarbonization Pathways Examination, SSG worked with the UTC to develop a list of organizations for community outreach. The UTC reached out to these groups and asked them to help spread the word about the survey. The UTC also advertised the survey in its newsletter, via its social media channels and via Facebook ads.

Analysis

The survey was analyzed through a mix of quantitative and qualitative analysis. Demographic questions, as well as multiple choice questions about respondents' support for the project and climate action in Washington, were analyzed quantitatively. The answers to the remainder of the questions, which were open-ended, were coded and analyzed for common themes using a qualitative analysis software (QDAMinerlite). The content of the answers was analyzed qualitatively and quantitatively to explore perceptions of themes, as well as how many respondents expressed them.

Survey Sample

In total, 639 people responded to the survey. A majority of survey respondents identified as white and male, reside in urban counties, hold a bachelor's degree or higher-level qualification, are 55 or older and have a median household income of $100,000-$149,000

Relative to Washington's population as a whole, Black, Indigenous and People of Color are underrepresented, while people with bachelor's degrees or higher-level qualifications are overrepresented. Additionally, respondents tended to be older, wealthier and more urban than Washington's population as a whole.

Demographic Data

Gender

Fifty-seven percent of the 549 respondents who responded to the question on gender identified as male, while 11% identified as female and 1% identified as non-binary. The rested prefer not to disclose their gender. Fourteen percent of survey respondents did not answer the question.

Age

Over half of respondents who disclosed their age bracket said they are 55 or older. Those aged 55 to 64 made up 22% of respondents, while those aged 65 to 74 made up 25% of respondents and those 75 or older accounted for 9% of respondents. Just over thirty respondents fell between the ages of 35 and 54, with 17% identifying with both the 35-44 and 45-54 age brackets.

In contrast, relatively few youth and young adults responded to the survey. Noone 17 or under responded to the question on age; those between 18 and 24 made up just 1% of respondents, while those between 25 and 34 made up 9% of respondents.

The median age category of respondents is between 55 and 64 — notably higher than Washington's median age of 37.3 years.[1]

[1] Washington Office of Financial Management. (2022). Population by age, mapped by county. https://ofm.wa.gov/washington-data-research/statewide-data/washington-trends/population-changes/population-age-mapped-county

Table 1. Respondents by age. Percentages are based on the 503 respondents who disclosed their age range.

Age	Number of respondents	Percent of respondents
<17	0	0.0%
18-24	5	1.0%
25-34	45	9.0%
35-44	83	16.5%
45-54	87	17.3%
55-64	111	22.1%
65-74	126	25.0%
75-84	44	8.7%
85+	2	0.0%

Race and Ethnicity

Over half of respondents (61%) identified as white. Just 7% identified as Black, Indigenous or People of Color. Twenty-eight percent answered they preferred not to disclose their race or ethnicity or skipped the question. The remaining 3% chose "other or prefer to self-describe."

White people made up 61% of survey respondents who self-identified with a race or ethnicity — a bit low relative to the percentage of white people in Washington (66%). However, all other racial and ethnic groups were highly underrepresented. Additionally, 71% of those who responded to the question (551) identified as white. Refer to Table 2 for more details.

Table 2. Survey respondents by self-identified race and ethnicity.

Race/ethnicity	Number of Respondents	Percent of respondents	Percent of state population (2020 Census)
White	392	61.3%	66.0%
Multiracial or Multiethnic	15	2.3%	5.2%
Hispanic	11	1.7%	13.7%
American Indian or Native American (including Alaska Native)	4	0.6%	2.0%
Black	4	0.6%	4.5%
Asian	11	1.7%	10.0%
Native Hawaiian or Other Pacific Islander	1	0.2%	0.8%
Other or prefer to self-describe	20	3.1%	N/A
Preferred not to disclose	93	14.5%	N/A
Skipped question	89	13.9%	N/A

Geographic Representation

Five-hundred forty-two respondents answered whether they lived in Washington. Of these 96% said they live in the state. Respondents hailed from across the state, with 514 indicating the county in which they live.

Thirty-one of Washington's 39 counties are represented among the respondents. The counties represented are summarized in Table 3. Eighty percent of respondents who indicated the county in which they live hail from one of Washington's nine urban counties. The remaining are from rural ones. Additionally, 75% of respondents are from Western Washington, while 25% are from Eastern Washington.

Table 3. Counties represented in the survey sample. Percentages in this table are based on the 514 respondents who answered this question.

County	Urban or rural[2]	Eastern or Western	Number of respondents	Percent of respondents
Adams County	2	Eastern	Rural	0.4%
Benton County	10	Eastern	Urban	1.9%
Clallam County	2	Western	Rural	0.4%
Clark County	38	Western	Urban	7.4%
Columbia County	1	Eastern	Rural	0.2%
Cowlitz County	5	Western	Rural	1.0%
Franklin county	2	Eastern	Rural	0.4%
Grant County	1	Eastern	Rural	0.2%
Grays Harbor County	7	Western	Rural	1.4%
Island County	10	Western	Rural	1.9%
Jefferson County	1	Western	Rural	0.2%
King County	152	Western	Urban	29.6%
Kitsap County	19	Western	Urban	3.7%
Kittitas County	5	Eastern	Rural	1.0%
Lewis County	5	Western	Rural	1.0%
Lincoln County	1	Eastern	Rural	0.2%
Mason County	3	Western	Rural	0.6%
Okanogan County	2	Eastern	Rural	0.4%
Pacific County	5	Western	Rural	1.0%
Pierce County	47	Western	Urban	9.1%
San Juan County	2	Western	Rural	0.4%

[2] As defined by the Washington State Department of Health: https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//609003.pdf

County	Urban or rural[2]	Eastern or Western	Number of respondents	Percent of respondents
Skagit County	3	Western	Rural	0.6%
Snohomish County	43	Western	Urban	8.4%
Spokane County	64	Eastern	Urban	12.5%
Stevens County	2	Eastern	Rural	0.4%
Thurston County	27	Western	Urban	5.3%
Wahkiakum County	1	Western	Rural	0.2%
Walla Walla County	19	Eastern	Rural	3.7%
Whatcom County	15	Western	Urban	2.9%
Whitman County	4	Eastern	Rural	0.8%
Yakima County	16	Eastern	Rural	3.1%
		Total urban	415	80.7%
		Total rural	99	19.3%
		Total Eastern Washington	129	25.1%
		Total Western Washington	385	74.9%

Education

Eighty-five percent of respondents (543) answered a question on their highest level of education completed. Of these, 95% reported having a high school diploma or higher level of education and 66% reported holding a bachelor's degree or higher-level qualification. The survey respondents reported an overall higher level of education than Washington's population as a whole. According to the 2020 Census, 92% of Washington's population are high school graduates or higher and 37% have a bachelor's degree or higher.

Income and Employment

Seventy-eight percent of respondents (500) disclosed their employment status. Of these, half (53%) are employed full-time, 5% are employed part-time, 7% are self-employed and 30% are retired. A small number (4) reported being unemployed or students.

Sixty-nine percent of respondents (441) reported their household income bracket. (The remainder either answered "prefer no to disclose" or skipped the question.) Over half of survey respondents (52%) reported an income of $75,000 or higher. The median household income category of those who responded to the question is $100,000-$149,999. This is significantly higher than Washington's 2020 median household income of $80,319.[3]

Organizational Representation

Eighty-nine respondents (14%) said they were representing an organization. The organizations they represented included utilities, energy sector companies, steel companies, building and construction companies, environmental advocacy groups and more. All the organizations respondents provided are listed in Table 4.

Table 4. Organizations represented among survey respondents.

Sector	Organization
Educational	Eastern Washington University
Environmental or climate-related non-profit organization	350 Spokane Burien People for Climate Action Clean Energy Transition Institute Climate Action of Southwest Washington Climate Solutions Keystone Church UCC Green Team Natural Resources Defense Council New Buildings Institute Northwest Energy Coalition People for Climate Action Sierra Club Union of Concerned Scientists Washington Clean Energy Coalition
Businesses and Industry Groups	Food • Brown & Haley • Milne Fruit Products Construction • Landmark Homes • Spokane Home Builders Association Hearth, Barbecue and HVAC

[3] Washington Office of Financial Management. (n.d.) Median Household Income Data Sets. Retrieved April 2023. https://ofm.wa.gov/washington-data-research/economy-and-labor-force/median-household-income-estimates

Sector	Organization
	● Hearth Patio and Barbecue Association ● Falcos Inc Industry ● Nucor Steel Seattle ● Wolf Steel USA Inc Public Relations ● Camp Creative
Energy sector	Avista Customer Group Avista Utilities Big Bend Electric Cooperative Cascade Natural Gas Northwest Energy Efficiency Council Puget Sound Solar Renewable Hydrogen Alliance Streamline Natural Gas Services Sustainable Energy Ventures
Government	City of Spokane Division of Public Works City of Spokane Wastewater Treatment Plant
Community and Citizens Groups	Asia Pacific Islander Coalition of Yakima Citizens' Alliance for Property Rights People for People
Union	Laborers International Union of North America LIUNA Northwest Region UA Local 32

Summary of Survey Responses and Analysis

Understanding of the Project

After reviewing the preamble to the survey, respondents were asked about their current understanding of the project. A majority (67%, or 431 respondents) indicated they understood the purpose of the project while 4% (23) indicated they did not understand the project. At the same time, 14% indicated they needed more information about the pathways, 13% indicated they needed more information about the benefits and 32% indicated they needed more information about the impacts on them and their household. Ten respondents skipped the question.

Interest in Climate Action

Most respondents expressed an interest in climate action in Washington state, with 76% (487) answering that they are either very interested or interested in climate action in the state (52% and 24%, respectively). Nine percent said they are not interested in climate action and 14% said they are not at all interested.

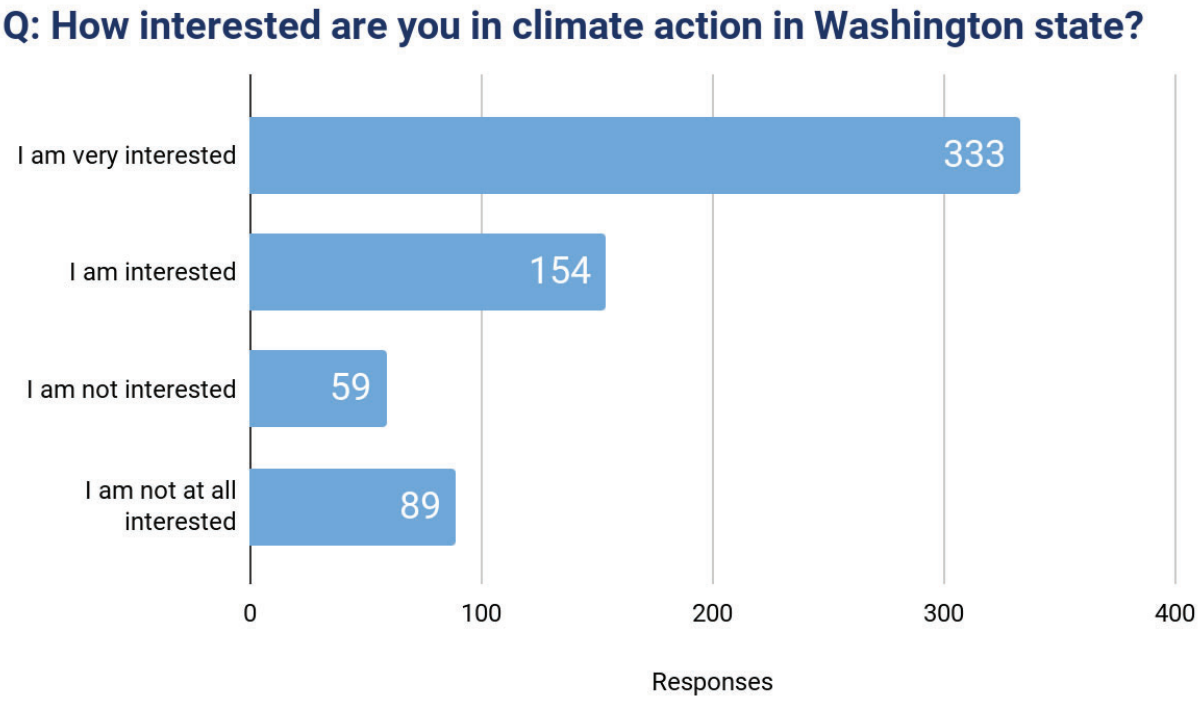


Figure 1. Respondents' level of interest in climate action in Washington.

Perspectives on Electrification

Over a quarter of respondents support the bundle of electrification actions and half like at least one element of the scenario.

One in four respondents (27.2%, 174) expressed support for the package of electrification actions presented in the survey, with half — 48.2%, or 308 respondents — liking some element of the Electrification scenario.

> *"It is comprehensive and doable."*[4]
>
> *"Electrification is the most cost-effective pathway to meet our climate goals and does not pollute our indoor spaces."*
>
> *"As a retired RN, I like that the above list provides actions that will help to meet our climate goals while at the same time reducing indoor and outdoor air pollution which will improve health. There should be a focus on electrifying vulnerable communities as quickly as possible."*

[4] Quotes from the survey have been edited for grammar, punctuation and spelling.

"I like that electrification has many pathways that range from the building sector to transportation and the grid. It seems to be holistic."

Respondents cited three main reasons for supporting the electrification actions.

- Electrification reduces greenhouse gas emissions and enables Washington to meet its greenhouse gas reduction goals (assuming the deployment of renewable energy.
- Electrification reduces dependency on fossil fuels and related air pollution.
- The package of electrification actions is comprehensive (targets multiple sectors).

At the same time, 27.4% of respondents (175) expressed dislike for the package of electrification actions. This is higher than the percentage who expressed dislike for the package of alternative fuels actions; however, support for electrification is also higher, including at the level of individual actions.

About 30% of respondents indicated support for each electrification action (see Table 5) — roughly double the percent of respondents who supported most alternative fuels actions. (See section on alternative fuels actions below for additional details). The three actions with the most support were:

1. Rapidly electrifying all heating systems of existing buildings,
2. Ensuring the majority of vehicles purchased by new businesses are electric and
3. Adding solar panels and energy storage to buildings to supply them with energy.

Table 5. Respondents who expressed support and concerns for specific electrification actions.[5]

Action	Respondents who expressed support		Respondents who expressed concerns	
	Percentage	Number	Percentage	Number
Rapidly electrify all heating systems in existing buildings.	32.7%	209	31.1%	199
Electrify new appliances in residential and commercial buildings.	27.4%	175	29.3%	187
Ensure the majority of new vehicles purchased by businesses are electric.	31.1%	199	30.2%	193
Electrify the majority of industrial processes.	27.7%	177	28.5%	182
Add solar panels and energy storage to buildings to supply them with energy.	29.7%	190	27.4%	175
Import renewable electricity.	28.0%	179	30.2%	193
Increase the capacity of utilities to store renewable energy.	29.6%	189	27.4%	175

Table 5 also highlights that about 30% of respondents also expressed concerns about each individual action. Over 90% of those who expressed concerns about actions said they disliked the Electrification scenario overall.

By and large, the concerns relate to the same concerns respondents have about electrification more generally: the capacity of the grid to enable the actions, how electricity will be generated to support the actions, affordability and a lack of energy diversification. These concerns are detailed below.

[5] The level of support was calculated by summing the number of respondents who expressed support for a specific action with those who liked the package of electrification actions as a whole. The level of concern was calculated by summing the number of respondents who expressed concern about a specific action with those who disliked the package of electrification actions as a whole.

Respondents are concerned about grid capacity and resilience, energy generation, affordability and over-reliance on a single energy source.

While more respondents supported electrification actions than alternative fuels actions, respondents had serious concerns about the viability and potential negative impacts of electrification. Four main concerns emerged during the analysis of the data sample: concern about grid capacity and resilience, concern about electricity generation, concern about affordability and concern about a lack of energy diversification. These concerns spanned those who supported electrification actions and those who did not. One in 10 respondents (10.6%) said they support the use of at least some natural gas with many of them attributing their support for natural gas to these challenges.

Respondents' biggest concern about electrification is affordability.

Affordability was the respondents' biggest concern about the electrification actions. Over half (26.8% or 171) brought up considerations related to cost. They worried that electrification could lead to increased rates for households and businesses, which could lower quality of life and harm the economy. Additionally, they expressed concerns about the cost of upgrading the grid and other elements of the electricity system, as well as how households and homes would afford required upgrades (retrofits, electric appliances, etc.)

> *"Cost of conversion will be a big obstacle for many home and building owners. Given the political atmosphere in America today, there will probably be pushback from skeptics."*
>
> *"We're wasting taxpayer money for unrealistic and unreasonable cost of living expenses."*
>
> *"It sounds like it's going to be expensive! This area... Washington state as a whole, is already very expensive to live here! Being on a fixed income, this really concerns me!"*

Many are worried about whether Washington's grid can handle decarbonization.

The respondents' second most prominent concern about electrification was grid capacity and resilience, with 23.3% of respondents (149) mentioning the issue, including respondents who support and do not support the Electrification scenario. Several respondents recommended upgrading the grid before undertaking electrification actions.

> *"All electric vehicles should be ruled out until the grid and new sources of energy are in place. [...] Cannot electrify industry until electrical energy is available."*

"I need to hear about funding for the grid and how the electrical grid will be improved while at the same time government spending will not outpace revenues and will not be wasted."

"What about improving electrical capacity to get this needed electricity to the consumers. The cart is before the horse here."

Respondents indicated that Washington's grid lacks resilience and is prone to blackouts, which could worsen with electrification, with negative consequences for residents and businesses. Some said that rural and low-income people are particularly affected.

"Our electrical generation and distribution systems in Washington state are fragile, susceptible to outages and are organized in a haphazard fashion. Improvements are happening, but not a statewide coordinated effort."

"Increasing the load on the power infrastructure that it can't handle is going to lead to rates skyrocketing."

"[W]e haven't shored up our grids to meet that rapidly increasing demand. The unintended consequences (increased rates, outages, no access to water/power/sewer, etc.) on residents and businesses is deeply concerning."

"Living in an area that often loses power in stormy weather, I can't imagine not having a backup source for heating."

Respondents are concerned about how electricity will be generated.

A tenth of respondents (10.6%, or 65) raised questions and concerns about how Washington can generate sufficient renewable energy to meet any increase in electricity demand related to the electrification actions. Many of them commented that wind and solar energy may be too intermittent to ensure a steady energy supply.

"Peak use is winter when solar energy is weak. Can we store summer solar for winter use? What will happen to the grid when temperatures plummet for a week?"

"[It's] not always windy and sunny."

Additionally, almost 6% of respondents (38) expressed concerns about the use of fossil fuels to generate electricity. They worried that fossil fuels are still used to produce electricity consumed in Washington and that continued use of electricity from fossil fuels could set back efforts to reduce emissions. Some said that, under widespread electrification, they expected electricity demand to outpace renewable electricity supply; they worried that the gap would be filled by electricity from fossil fuels.

"[Electrification is] only meaningful if the electricity is produced by renewable resources."

"When you still burn coal to produce any percentage of electricity [electrification is] not worth it."

"This is a good list — includes a variety of approaches, which is crucial to actually getting emissions down. What is missing is ensuring that the electric utilities are using renewable energy — and get off of fossil fuels as rapidly as possible."

" Forcing this pathway will lead to unintended consequences and may actually create more emissions as utilities cannot supply the energy needed without the use of fossil fuels at an affordable price."

Some respondents are worried about over-reliance on a single energy source.

Another common concern — raised by 8.3% of respondents (53) — had to do with over-reliance on a single energy source. Respondents commented that fuel switching to electricity could reduce resilience and decrease energy security because of the issues related to resource adequacy discussed above.

"Electrification is fine, diversification is better, natural gas is not the enemy, with the state facing blackouts due to an overtaxed electric grid, natural gas helps keep homes warm."

"Electrification as a sole method puts 'all our eggs in one basket'. Electrical shortages such as what we have witnessed in California and other places during times of high demand could compromise transportation and our ability to heat or cool buildings."

"Relying solely on electricity creates a giant national security risk."

"We are eliminating crucial energy sources in exchange for electrification which is extremely concerning, especially when thinking about communities that will be impacted the most in the process when it comes to utility costs, project impacts on communities and blackouts during peak days."

Additionally, 4.2% of respondents (27) highlighted a need for energy sources other than electricity for hard-to-decarbonize activities, such as some industrial processes.

"Ultimately we need to get to full electrification, but currently, electrification is not realistic or technically feasible for certain sectors like high-heat industrial processes and long-haul transportation. We should have a hybrid pathway that allows alternative fuels to be used for these purposes."

Input on Alternative Fuels Actions

A minority supports the Alternative Fuels scenario as a whole, but over half of respondents support elements of the alternative fuels action package.

Twelve percent of respondents (78) made statements indicating they support the entire list of alternative fuels actions presented — less than half the number of respondents who expressed support for electrification actions as a whole. Respondents cited a variety of reasons for liking the package of alternative fuels actions, including:

- They incorporate diverse energy sources beyond electricity and would put less strain on the electrical grid.
- They make use of existing infrastructure.
- They incorporate natural gas.
- They expect the actions to lead to lower energy prices.

> *"I love the thought of keeping fuel sources diversified while still focusing on decarbonization."*
>
> *"This is the best option on the table. It will give us multiple avenues for power, heat, etc. while not relying only on electric grid. A hybrid model like this will help the environment while we research to develop a long-term plan."*
>
> *"This would be the most effective method of reducing emissions and diversifying our energy resources and potential. This is the way to go without question."*
>
> *"The alternative fuels pathway addresses many if not all of the concerns expressed about the electrification pathway. Having more fuel choices — rather than only electricity — provides flexibility, redundancy and dependability. Flexibility has been identified as critical by the Northwest Power and Conservation Council for meeting our energy needs while addressing the climate imperative. This approach leverages existing energy infrastructure, putting less pressure on the electrical grid. It also is less disruptive to existing building infrastructure — sounds more economical and incremental."*

At the same time, 20% of respondents (125) expressed dislike for the package of actions and 8% (78) said they prefer electrification to alternative fuels actions. Even so, over half of respondents (59%, 374) liked at least one action or aspect of the alternative fuels action package. Energy diversification is one of the central reasons many expressed support for

alternative fuels actions with 6.7% of respondents (43) describing it as a positive feature of the scenario.

> *"A strategy involving only electric power is too limiting and represents challenges to regional resilience."*
>
> *"Let's do it all. A diversified energy mix, [an] all-of-the-above approach is required. Not just electrify all to our peril. The grid can't take it. Be thoughtful!"*
>
> *"We need choices for energy."*
>
> *"Using alternative fuels makes sense as we can use the existing natural gas infrastructure, thereby avoiding any stranded assets and not putting upward pressure on electric rates or jeopardizing electric reliability."*

Additionally, 4% of respondents said they believed the alternative fuels actions would have a positive environmental impact, primarily via reducing greenhouse gas emissions. Four percent of respondents (25) also said they liked how the actions involved using existing infrastructure and technology.

> *"These plans would utilize an infrastructure already set up and also allow for some consumer choice in the future."*
>
> *"Anything that reduces carbon emissions is worth considering."*
>
> *"Sounds wonderful, let's do it. I believe in getting away from fossil fuels and doing as much as possible to help our planet and community."*
>
> *"A blend of alternative fuels actions best supports our transition in a manner that produces the least cost and strain on budgets and our electrical grid."*
>
> *"Energy choice is secured. More competition makes for overall lower energy prices."*

The most popular alternative fuels action was incorporating electric and natural gas heat pumps into existing buildings with 22% (142) respondents indicating support for the action; however, 8% (51) of respondents indicated they preferred electric heat pumps to natural gas ones.

> *"Heat pumps are key to building decarbonization. Even natural gas heat pumps are more efficient than alternative heating methods. [...] Electric heat pumps should be prioritized, and there may also be applications for dual-fuel residential HVAC systems."*
>
> *"Heat pumps would help us a lot in the summer."*

"Now you are on the right track! Yes, hydrogen fuel cells, and electric heat pump systems that can be incorporated into new and existing infrastructure is great!"

About 15% of respondents expressed support for each of the other alternative fuels actions; however, more respondents expressed concerns about the actions. Table 6 breaks down the percentage and number of respondents who expressed support for and concerns about each alternative fuels action presented in the survey.

Table 6. Respondents who expressed support for and concerns about specific alternative fuels actions.[6]

Action	Respondents who expressed support		Respondents who expressed concerns	
	Percentage	Number	Percentage	Number
Incorporate electric and natural gas heat pumps into all existing buildings to reduce energy required for heating and cooling.	22.2%	142	26.6%	170
Produce renewable natural gas to replace natural gas in the energy system.	14.2%	91	23.5%	150
Produce clean hydrogen to replace natural gas in the energy system.	15.0%	96	25.0%	150
Deploy hydrogen fuel cells to power homes.	14.7%	94	24.6%	157
Use clean hydrogen and renewable natural gas (compressed) to power commercial vehicle.s	14.7%	94	21.9%	140
Use clean hydrogen and renewable natural gas to power most industrial processes.	15.7%	100	19.9%	127

[6] The level of support was calculated by summing the number of respondents who expressed support for a specific action with those who liked the package of alternative fuels actions as a whole. The level of concern was calculated by summing the number of respondents who expressed concern about a specific action with those who disliked the package of alternative fuels actions as a whole.

In addition to indicating support for specific actions, 10.5% of respondents (67) indicated they liked the incorporation of clean hydrogen in general and 6.6% (42) indicated they liked the incorporation of RNG in general. However, even more respondents expressed concerns about deploying these fuels. A quarter of respondents (25.2%, 161) raised concerns about hydrogen, while 18.5% (118) raised concerns about RNG. The respondents' concerns about alternative fuels are detailed below.

Respondents are concerned about the environmental impact, viability and safety of alternative fuels actions.

As noted above, more respondents expressed dislike for the package of alternative fuels actions than support for them. Additionally, more respondents expressed concerns about each action, rather than support for it (see Table 6).

Respondents' concerns about the package of actions included that they could generate greenhouse gas emissions and that they would be hindered by a lack of technology and limited alternative fuel supply. Additionally, some respondents said they preferred to keep using natural gas.

> *"Only the part about electrical heat pumps makes any sense to me at all, where in our region electrical heat pumps can increase efficiency several-fold. All the rest of the ideas above are extremely horrible ways to waste natural gas or electricity in extremely inefficient ways."*
>
> *"I like nothing about this. It is trying to take away from what has been working forever. We are not running out of natural gas and the carbon footprint left by natural gas is nowhere close to the footprint left by our government flying all over in their personal jets."*
>
> *"We object to the broad use of RNG and hydrogen identified in this pathway, particularly using RNG and hydrogen to power homes and buildings. For homes and buildings, electric heat pumps and other electric appliances are a cost-effective solution for all of Washington's climate zones, taking advantage of our increasingly clean electricity under the Clean Energy Transformation Act. We cannot achieve our climate goals without electrifying as much of our gas system and transportation as technically feasible."*
>
> *"Most of this list is just greenwashing: renewable natural gas is too scarce; 96% of hydrogen is made from fossil fuels and the rest is so inefficient as to be useful only in industrial thermal processes. Please do not allow either of these to be blended with fossil gas, nor should fossil gas infrastructure be allowed to expand in any way."*

Twelve percent of respondents raised questions about the viability of alternative fuels actions. They commented that technologies needed to implement the alternative fuels actions do not exist at scale. These respondents also worried the supply of hydrogen and renewable natural gas is insufficient for the package of actions, as well as that these fuels are less affordable than other energy. Finally, 3.2% of respondents (21) raised concerns about the safety of deploying alternative fuels, particularly hydrogen, which is explosive.

> *"It relies on technologies that don't really exist yet at the scale needed — RNG and clean hydrogen."*
>
> *"Some of these alternatives may develop to become viable, but right now they are not."*
>
> *"The actions described do not provide a cost-effective or feasible pathway to clean buildings. The true emissions intensity of biomethane varies widely by feedstock. Both biomethane and green hydrogen are expensive and limited resources."*
>
> *"Where can hydrogen vehicles be fueled today? Almost nowhere! Who will convert manufacturing equipment and furnaces from NG to hydrogen and how will businesses be able to obtain the hydrogen? How much more expensive will these be?"*
>
> *"Why not just electrify and rely on renewables like solar and wind that we know and trust already? I am concerned that if we wait around for clean hydrogen technology/deployment, we will fall behind on achieving our clean energy goals."*
>
> *"I am very concerned about the availability of renewable gas. I think we should use what is a byproduct of existing systems, but this is not a huge resource. I am also concerned about the safety and climate impacts of potential gas leaks or explosions and do not think it makes sense in most cases to have gas in homes or multi-family buildings."*
>
> *"Additionally, piping hydrogen to homes is not only dangerous, but would require costly infrastructure and upgrades that make no sense to do."*

Respondents are concerned about the scalability and supply of alternative fuels.

Respondents expressed concerns about the scalability of RNG and hydrogen, with 7% (45) making comments related to the limited supply of these fuels. Respondents expressed concerns about the cost-effectiveness and viability of using these fuels at the scale that would be necessary to support the actions on the list. Some respondents also worried that creating large amounts of RNG and hydrogen could have negative environmental impacts.

> *"These actions rely too heavily on alternative fuels, which are limited and costly."*

"Actual quantities of RNG from waste sources are very very small, so any substantial quantities of RNG would come from large-scale agricultural biomass which has unacceptable land-use impacts, including to food production and to biodiversity."

"RNG and Hydrogen are complicated and not even available at this time, therefore should not be considered while solar and wind are cheap and readily available."

"GREEN hydrogen has promise but I have yet to see anything about [it] being brought to scale efficiently."

Alternative fuels should be reserved for hard-to-decarbonize sectors.

Six percent of respondents (38) suggested limiting the use of alternative fuels to hard-to-electrify sectors, including industry, heavy-duty vehicles, aviation and maritime transportation. Two key themes emerged from their comments. First, respondents expressed that, due to the limited supply and relatively high cost of RNG and clean hydrogen, these fuels should be reserved for the sectors in which they are needed most. Second, respondents suggested that electrification is a more affordable and climate-friendly solution than alternative fuels for most sectors and, therefore, these fuels should be used only for purposes that are difficult to electrify.

"Hydrogen has limits and should be targeted to its highest best uses."

"The amount of RNG that can be produced is inadequate to serve the needs of existing customers — it's better suited for hard-to-decarbonize sectors."

"We only have limited quantities of these alternative fuels, so we should save them for these specific uses. We can't meet our climate goals and reduce air pollution through a pathway that relies solely on alternative fuels."

"Hydrogen is too expensive and inefficient — the amount of electricity needed to make renewable hydrogen to heat a house would heat four houses if used in heat pumps to heat houses instead."

"We cannot meet our climate goals simply by relying on alternative fuels: we must electrify as much as possible and use alternate fuels to bridge the gap for the sectors that still need better technological solutions."

"The choice between clean electricity and 'alternative fuels' is a false dichotomy. Countless decarbonization studies have found that RNG and hydrogen are likely to have niche

applications in the coming years at best — long-haul shipping, aviation, localized energy storage, perhaps displacing fracked gas in a few gas plants."

Cross-Cutting Themes

Two key themes cut across the electrification and alternative fuels actions: concerns about government overreach, the costs of decarbonization and the potential role utilities might play in delaying decarbonization.

One-tenth of respondents are concerned about government overreach and loss of energy choice.

One out of 10 respondents (10.3%, or 65) expressed concerns that the decarbonization would lead to excessive government mandates or overreach into their lives and/or limit their personal choice to use the energy and technology they prefer. Many of these respondents did not support decarbonization and/or expressed support for natural gas.

"[I] have concerns that government/political conclusions would be forced/implemented without due serious analysis and scientific rigor."

"Moving strictly to electricity for heat is a poor strategy. The electric grid can't support that shift as well as the increase in EVs. Natural gas, renewable natural gas and hydrogen must play a significant role. Energy choice must also remain in place for businesses and residents of Washington state."

"I don't like anything about it. There is too much government regulation."

"Stop trying to force the marketplace to take expensive, unnecessary actions. The free market will and always has provided what the country needs and wants,"

"I believe that electrification should be voluntary. Citizens should have a right to choose how to heat their homes and water."

Cost and affordability are the most prominent concerns about decarbonization.

Cost and affordability are the most prominent concerns about decarbonization expressed in the survey. Half of respondents (52.1% or 339) expressed concerns about cost related to electrification actions, alternative fuels actions, or both. Their concerns related to the following three themes:

- Decarbonization actions could lead to higher rates and increase cost of living.
- Decarbonization actions like undertaking retrofits, purchasing EVs and even paying electricity bills may be too much for many Washingtonians to afford.
- Decarbonization will be expensive for households, governments and businesses, with low-income and other equity-denied groups among the worst affected.

Comments about cost came from diverse respondents who did and did not support the decarbonization actions presented in the survey. Several respondents suggested the decarbonization plan include grants and financial incentives targeted towards diverse groups, ranging from businesses to seniors to low-income households.

Some are concerned that utilities could delay decarbonization.

Some respondents (2.0%, or 12 respondents) expressed distrust of utilities. They raised concerns that local utilities might put up roadblocks to decarbonization or take advantage of the circumstances to increase rates.

> *"I do not trust utility companies to implement changes equitably, in ways that benefit the general public."*
>
> *"I worry that utilities will want to implement [actions] via inefficient conversion of electricity to hydrogen, which is then inefficiently burned as a portion of natural gas consumption."*
>
> *"Allowing gas utilities to sell expensive clean fuels and rate base the associated infrastructure will hurt utility customers. It will also come at the opportunity cost of the true climate action that would be achieved by the electrification pathway."*

Appendix C1: Survey Text

Preamble

Welcome to the Washington Natural Gas Decarbonization Survey!

The Washington State Utilities and Transportation Commission is exploring approaches for decarbonizing, or reducing greenhouse gas emissions, in Washington's energy system.

Why should people in Washington respond to this survey?

How utilities decarbonize will affect all people in Washington. Decarbonizing the energy system will impact the economy, energy costs, public health, and the environment. We want to understand public concerns and gather the public's ideas to create workable decarbonization pathways.

Why are we doing this survey? Who's involved?

The **mission** of the Washington State Utilities and Transportation Commission is to **protect the people of Washington by ensuring that investor-owned utility and transportation services are safe, equitable, reliable, and fairly priced**. We have hired the SSG (Sustainability Solutions Group), a climate planning consultancy, to conduct this survey as one important piece of the pathways examination.

The SSG study will examine how investor-owned electric and natural gas utilities can reduce their greenhouse gas emissions.

It will explore how decarbonization actions may impact the environment, public health, equity, jobs, energy costs, and more. SSG will present its findings to the Utilities and Transportation Commission in a report called the *Energy Decarbonization Pathways Examination.*

By June 1, 2023, the Utilities and Transportation Commission will use SSG's analysis to report to the Washington State Legislature on "feasible and practical pathways" for utilities to reduce greenhouse gas emissions.

The Legislature will use the information to help develop greenhouse gas reduction targets and policies for utilities.

What can respondents expect in this survey?

This guided feedback form is organized into five (5) sections. The first three (3) sections share **information** to help you respond to **questions** in sections four and five (4, 5). Here is the outline:

1. Introduction to decarbonization pathways
2. Overview of how Washington's emissions are expected to grow by 2050.
3. Overview of decarbonization.
4. Survey on proposed greenhouse gas reduction actions (**your chance for input*).*
5. Some information about you/your organization so we understand who is providing feedback and who we haven't heard from.

Estimated time: 20 minutes

Ready to begin? Let's go!

–

Section 1: Decarbonization Pathways 101

Let's start by talking about key ideas related to decarbonization pathways and how these pathways are created.

What is "decarbonization" of an energy system?

"Decarbonization" of an energy system means providing energy while reducing greenhouse gas emissions into the atmosphere.

What is a "decarbonization pathway"?

A **decarbonization pathway** is a set of actions to reduce greenhouse gas emissions and a schedule for implementing those actions. It includes information on the costs and benefits of those actions, such as how much they will help Washingtonians save on energy costs.

Each decarbonization pathway created in this project will offer a set of options for investor-owned electric and natural gas utilities to decarbonize.

How are decarbonization pathways successfully completed?

Decarbonization pathways are successfully completed when all pathway actions are fully implemented to hit the low-carbon target.

Can a decarbonization pathway be completed if some actions are left out?

No. All actions must be completed to achieve the low-carbon target of the pathway.

Will this study select or recommend specific actions?

No. That is up to the Washington State Legislature.

SSG is developing potential decarbonization pathways by combining **technical analysis** with **input from the public.** (To learn more about the process, check out the recording of the introductory public meeting.)

The final actions in the decarbonization pathways will be informed by concerns, opportunities and challenges identified by the public. This survey is one way SSG is gathering feedback.

~~

Next, this survey will outline what emissions look like if business continues as usual, as well as what emissions look like if all existing plans and policies are implemented.

Then, **we'll ask for your input on potential decarbonization actions**.

Next →

—

Section 2: How Washington's emissions will grow

If emissions are left unchecked....

Washington is on track to release 105 million metric tons of greenhouse emissions (MTCo2e) into the atmosphere in 2050. That's enough energy to run over 22.6 million gasoline-powered cars for a year[7]—and almost three times the number of vehicles (8.1 million) registered in Washington state![8]

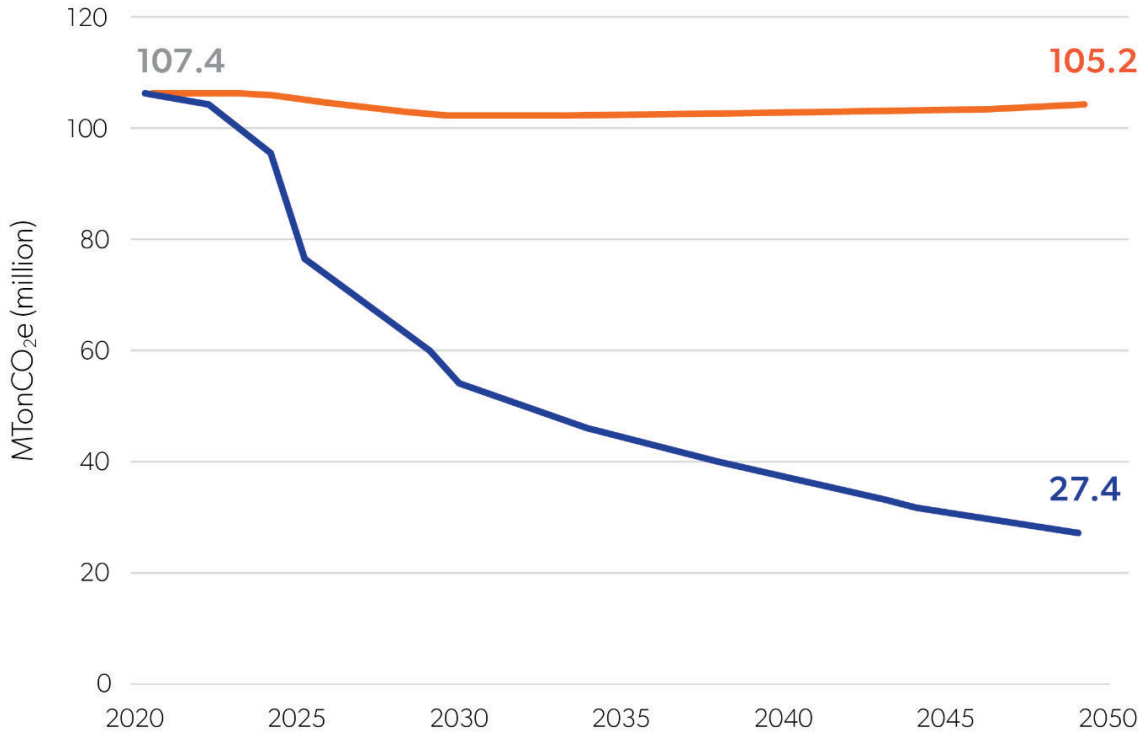
This project focuses on the following sources of emissions:

1. Emissions from in-state electricity consumption, which account for 17% of Washington's emissions. 51% of these emissions come from coal-fired electricity generation, and 43% of these emissions are produced by burning natural gas to generate electricity. Electricity consumed within Washington is provided from generating plants within the state and electricity imports from outside of the state.
2. Emissions from burning natural gas for purposes other than electricity generation, which account for 14% of Washington's emissions. These emissions arise from space heating and water heating in homes and commercial buildings, and generating heat for industrial processes.

In recent years, the Washington State Legislature has passed dozens of bills focused on reducing greenhouse gas emissions. If all of these plans, policies, and programs are implemented, emissions could drop to 27.4 million metric tons of greenhouse gas emissions in 2050.

[7] For 105 million metric tons, it would be 22,624,269 gas powered cars for a year. Using EPA calculator: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results

[8] Data from Washington State Department of Licensing. https://www.dol.wa.gov/about/docs/2021-CY-stats-at-a-glance.pdf. Number of vehicles registered at the end of 2021.



In the graph above, the orange line represents business-as-usual emissions, while the blue line represents business-as-planned emissions.

The difference between the two lines is the result of Washington's climate policies. Once fully implemented, these policies could reduce emissions by 74%.

These policies include:

- The Clean Energy Transformation Act;
- The Climate Commitment Act;
- The Clean Buildings Act;
- Move Ahead Washington and Advancing Green Transportation;
- and many more!

These laws and policies are a great start, but it's not always clear how Washingtonians will *actually* implement them. Washington also has to figure out what more needs to be done to achieve its goal to reduce greenhouse gas emissions by 95% by 2050.

That's where this study comes in.

SSG will develop decarbonization pathways that represent **options** for how investor-owned electric and natural gas utilities and their customers can reduce their greenhouse gas emissions.

Your input will help shape these pathways.

Next →

–

Section 3: How can Washington's energy system decarbonize?

Two key things are required to decarbonize our transportation system.

1. Energy efficiency is critical. If people in Washington reduce how much energy they use, there will be less pressure on the electrical grid and less need for fuels like clean hydrogen and renewable natural gas.

   Washington also won't have to build as much infrastructure to supply additional clean energy to meet energy demands as the population grows.

2. Moving to energy sources that release no or minimal greenhouse gasses into the air is also key.

   These energy sources may include solar energy, wind energy, hydro energy, renewable natural gas, hydrogen produced with renewable energy sources, and more.

   Most decarbonization plans include a significant shift towards electricity produced with renewable sources like solar, wind, and hydro.

So, how exactly can Washington decarbonize?

Here are some common actions SSG expects to include in the decarbonization pathways it develops for this project:

- Retrofit buildings to make them more energy efficient.
- Improve the energy efficiency of industrial facilities.
- Reduce trips in personal cars in Washington's cities while increasing trips taken by public transit, cycling, and walking.
- Focus on higher-density development, rather than spreading out buildings, so less energy is required to transfer energy from place-to-place.
- Set higher standards for energy efficiency in new buildings.

The pathways SSG develops will differ in terms of how much of the demand for energy is met by electricity compared with alternative fuels like green hydrogen or renewable natural gas.

—

Screen 4: What are your thoughts on decarbonization?

Now we'd like your thoughts.

1. After reviewing the prior information presented, how supportive are you of the Washington Utilities Commission Decarbonization Pathways Project? Please select all that apply.
    a. I am fully in support of the project
    b. I may support the project if I had more information about the pathways
    c. I may support the project if I had more information about the benefits
    d. I may support the project if I had more information about the financial impacts on me and my household
    e. I do not support the project

2. How interested are you in climate action in Washington State? Please select one answer:
    a. I am very interested in climate action in Washington state
    b. I am interested in climate action in Washington state
    c. I am not interested in climate action in Washington state
    d. I am not at all interested in climate action in Washington state

An example set of actions for a pathway: Electrification

The following list describes potential electrification actions for an electrification pathway.

- Rapidly electrify all heating systems in existing buildings.
- Electrify new appliances in residential and commercial buildings.
- Ensure the majority of new vehicles purchased by businesses are electric.
- Electrify the majority of industrial processes.
- Add solar panels and energy storage to buildings to supply them with energy.
- Import renewable electricity.

- Increase the capacity of utilities to store renewable energy.

Question 1 (open-ended): What do you like about the electrification actions in the list above? (max. 125 words)

Question 2 (open-ended): What concerns you about the electrification actions in the list above? (max. 125 words)

An example set of actions for a pathway: Alternative Fuels

The following list includes actions that make use of alternative fuels.

- Incorporate electric and natural gas heat pumps into all existing buildings to reduce energy required for heating and cooling.
- Produce renewable natural gas to replace natural gas in the energy system.
- Produce clean hydrogen to replace natural gas in the energy system.
- Deploy hydrogen fuel cells to power homes.
- Use clean hydrogen and renewable natural gas (compressed) to power commercial vehicles.
- Use clean hydrogen and renewable natural gas to power most industrial processes.

Question 3 (open-ended): What do you like about the alternative fuel actions in the list above? (max. 125 words)

Question 4 (open-ended): What concerns you about the alternative fuel actions in the list above? (max. 125 words)

Question 5 (open-ended): How do you think the actions described in this survey could affect you and others in your community? (max. 125 words)

Question 6 (open-ended): Is there anything else you would like to share? (max. 250 words)

Section 5: Tell us about yourself.

Gathering demographic information helps us to understand if we are hearing from a variety of community members. These questions help us to understand broad trends in answers based on demographic data.

Your responses enable us to identify opportunities, barriers, and constraints that may impact potential actions for certain residents. If you do not wish to disclose information, you can choose “prefer not to disclose” for these questions.

Are you representing an organization? [Choose one]

- Yes [trigger name and sector question]
- No, just myself.

Could you please share the name of your organization and/or the sector you work in?

[short answer box]

Do you live in Washington State? (Select all that apply): [Checkboxes]

- Yes [trigger zipcode question]
- No

Please provide your zipcode.

[short answer box]

What gender do you identify with? [Checkboxes]

- Woman
- Man
- Non-binary
- Prefer to self-describe: [provide text box]
- Prefer not to disclose

Age group: [Choose one]

- <17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75-84
- 85+
- Prefer not to disclose

Please indicate which race(s)/ethnicit(y/ies) you most closely identify with?

- White
- Black - African Diaspora (e.g., African-American, Afro-Caribbean, Afro-Latin, African-American, Black British etc.)
- Black - African (e.g., East African, Southern African, Central African, Western African)
- Hispanic
- Asian - Caribbean (e.g., Indo-Caribbean, Caribbean-Chinese etc.)
- Asian - Central Asian (i.e., Kyrgyzstan, Uzbekistan etc.)
- Asian - East Asian (e.g., China, Japan, Korean etc.)
- Asian - Southeast Asian (e.g., Philippines, Thailand, Vietnam etc.)
- Asian - South Asian (e.g., India, Pakistan, Bangladesh etc.)
- American Indian or Native American
- Alaska Native
- Native Hawaiian or Other Pacific Islander
- Middle Eastern or North African
- Multiracial or Multiethnic
- Other or prefer to self-describe: [provide text box]
- Prefer not to disclose

Please indicate if you self-identify with any of the groups below. Please select all that apply. [Select all that apply]

- A person with a disability
- A newcomer or recent immigrant (moved to Washington within the last 5 years)
- An international student
- A member of the 2SLGBTQIA+ community
- A person who is a migrant worker
- A person experiencing poverty
- A person experiencing homelessness
- Other or prefer to self-describe: [provide text box]
- Prefer not to disclose

Highest level of education completed: [Choose one]

- No high school diploma
- High school diploma or GED
- Some college
- Associate's degree, occupational
- Associate degree, academic
- Bachelor's degree
- Master's degree
- Professional degree
- Doctoral degree
- Other: [provide text box]

Gross annual family/household income: [Choose one]

- Less than $15,000
- $15,000-$24,999
- $25,000-$34,999
- $35,000-$49,999
- $50,000-$74,999
- $75,000-$99,999
- $100,000-$149,999
- $150,000-$199,999
- $200,000 or more
- Prefer not to disclose

What is your employment status? [Choose one]

- Employed, full-time
- Employed, part-time
- Self-employed
- Unemployed, looking for work
- Unemployed, not looking for work
- Homemaker, full-time
- Student
- Retired

- Other: [provide text box]
- Prefer not to disclose

All done! What's next?

Thank you for providing your valuable time and insights. SSG will collect and review all responses, and incorporate feedback into the decarbonization pathways. A summary of the results will be published on the project website.

To stay up to date on progress with the Energy Decarbonization Pathways Examination, visit the project website. Any questions or concerns about this survey can be submitted to Samantha Doyle at samantha.doyle@utc.wa.gov.

Appendix D

Public Co-Benefits Survey
Feedback Summary

Public Co-Benefits Survey

Energy Decarbonization Pathways Examination

April 2023

Overview

The second public survey for the Energy Decarbonization Pathways Examination shared information about the actions in the potential decarbonization pathways and gathered input on economic, social and environmental considerations for evaluating decarbonization pathways.

The survey received 453 responses from diverse people from across Washington. However, relative to Washington's population as a whole, Black, Indigenous and People of Color, as well as women, are underrepresented, while people with bachelor's degrees or higher-level qualifications are overrepresented. Additionally, respondents tended to be older, wealthier and more urban than Washington's population as a whole.

Key insights from the survey are listed below.

- Support for climate action is high. The majority of respondents are interested in climate action (66%) and supportive of climate action in Washington (55%). Some respondents suggested the speed of action is an important consideration for assessing the pathways due to the urgency of the climate crisis.
- A minority of respondents were not interested in or supportive of climate action. Additionally, 9% of respondents to the open-ended question do not support the Energy Decarbonization Pathways Examination and/or climate action. Many of those against climate action are concerned about government overreach and freedom of choice in relation to energy sources.
- Energy costs and affordability are a top priority. Considerations related to energy costs per household and the level of energy burden, especially among low-income populations, ranked as the most important considerations for respondents, on average. The importance of affordability is also underscored by the open-ended responses with many respondents saying cost is one of their top concerns and expressing concerns about affordability in relation to themselves and others. Some worried decarbonization would increase the cost of energy.
- The reliability and availability of electricity is a critical concern. The reliability and availability of electricity was the second most common consideration mentioned by respondents when they answered a question related to what considerations were missing from the survey. Respondents who support decarbonization said improving the grid would be critical. Those who oppose it cited the lack of reliability of electricity as a

key concern. Additionally, several respondents expressed concerns that they or others would not be able to heat their homes in a power outage.

- **Some respondents (8%) support natural gas because they consider it to be more affordable and reliable than electricity.** Some also considered it to be "clean" and more efficient than electricity.
- **The cost of climate action is an important consideration.** The cost of climate action was the most common consideration mentioned by respondents as missing from the survey. Respondents said they are concerned about the cost for households to participate in decarbonization actions (e.g., retrofit homes, install solar panels, etc.) and the cost of the overall investment required to decarbonize, as well as potentially higher energy costs as a result of decarbonization. Some respondents expressed concern that low-income communities might not be able to afford to participate in decarbonization actions, such as retrofits, or will be burdened by higher energy costs. Respondents made several suggestions about how to finance climate action.
- **Public health impacts are somewhat important to respondents.** Half of survey respondents consider improvements in public health to be a very or somewhat important consideration for assessing the pathways.
- **Air pollution is a major concern.** The survey respondents had a high level of concern about air pollution. A majority (60%) indicated air pollution (indoor and outdoor) is a very or somewhat important consideration.
- **Economic considerations are important to respondents, but not as important as considerations related to energy cost and public health.** When it came to ranking economic considerations relative to other considerations, the growth of the green sector placed fourth — behind how much an average household saves on energy bills, decreasing the level of energy burden among low-income households and decreasing outdoor air pollution. Creation of net new employment and growth of the alternative fuels sector ranked sixth and seventh, respectively. Just under half of respondents — 49% — ranked considerations related to economic development as very or somewhat important. Similarly, the number of net jobs created was very or somewhat important to almost half of respondents (47%).
- **The social cost of carbon is important to respondents, but lower priority than other considerations.** The social cost of carbon is important to over 60% of respondents; however, the metric placed last in a ranking of ten considerations. This may be due to the fact that it is less concrete than the other considerations listed.
- **Diverse equity considerations are relevant to the pathways.** Ten percent of responses to the open-ended question highlighted considerations related to equity,

including regional differences between rural and urban areas, income inequality, racial justice, environmental justice and intergenerational justice. Additionally, a common theme throughout the open-ended responses is the affordability of the decarbonization for low-income households in terms of energy costs, as well as participating in decarbonization actions, such as retrofits.

Method

The second public survey focused on understanding the public's perception of the importance of social, economic and environmental considerations related to decarbonization pathways. The survey gathered respondents' perspectives through questions about the importance of specific considerations and an open-ended question for additional input. Additionally, the survey gathered some basic demographic information and information about the respondents' perceptions of the project and climate action. The full survey text is provided in Appendix A.

Note: This survey sought to obtain the perspectives of diverse interested and affected parties. It provides a window into key concerns and perspectives of people across Washington. The survey was not designed to be statistically significant or representative of the demographic makeup of Washington state as a whole.

Question on Considerations

The respondents answered three kinds of questions on social, economic and environmental considerations.

First, respondents ranked the following considerations on a scale from "Very Important" to "Totally Unimportant" (Questions 3-10):

- Average energy cost per household
- General level of energy burden
- Level of energy burden among low-income households
- Net jobs created
- Economic development
- Improvements in public health
- Air pollution
- Social cost of carbon

Second, respondents ranked the following considerations in order of perceived importance from 1 to 10 (Question 11):

- How much an average household saves on energy bills
- Decrease in the level of energy burden among low-income households
- Decrease in outdoor air pollution
- Decrease in indoor air pollution
- Creation of net new employment
- Growth of the green energy sector (e.g., wind, renewable, solar)
- Growth of the alternative fuels sector (e.g., hydrogen, renewable natural gas)
- Capital investment required
- Savings created by the pathway (in terms of avoided energy costs)
- Social cost of carbon

Third, respondents answered an open-ended question about missing considerations: What other considerations are important to you that have not been addressed by this survey? (Question 12)

Recruiting Respondents

During the pre-engagement phase of the Energy Decarbonization Pathways Examination, SSG worked with the UTC to develop a list of organizations for community outreach. The UTC reached out to these groups and asked them to help spread the word about the survey. The UTC also advertised the survey in its newsletter and via its social media channels.

Analysis

The survey was analyzed through a mix of quantitative and qualitative analysis. Demographic questions, as well as multiple choice questions about respondents' perceptions of the project and climate action, were analyzed quantitatively.

The answers to questions 3-10, which asked respondents about their perception of the importance of specific considerations, were on a sliding scale from “very important” (0) to “totally unimportant” (100). These responses were tabulated and grouped into 5 categories:

1. Very important: Ranking of 1-20.
2. Somewhat important: Ranking of 21-40.
3. Neutral: 41-60.
4. Somewhat unimportant: Ranking of 61-80.
5. Totally unimportant: Ranking of 81-100.

Additionally, an average score was calculated for each consideration.

The answers to question 11, which asked respondents about the relative importance of 10 considerations, were used to calculate an average score and ranking for each consideration.

The answers to question 12 (open-ended) were coded and analyzed for common themes using a qualitative analysis software (QDAMinerlite). Over half of respondents — 268 or 59% — responded to the survey's open-ended questions on additional considerations that were not addressed by the survey.

Survey Sample

In total, 453 people from across Washington State responded to the survey. A majority of survey respondents identified as white and male, reside in urban counties, hold a bachelor's degree or higher-level qualification, are between the ages of 55 and 64 and have a median household income of $100,000-$149,000

Relative to Washington's population as a whole, Black, Indigenous and People of Color are underrepresented, while people with bachelor's degrees or higher-level qualifications are overrepresented. Additionally, respondents tended to be older, wealthier and more urban than Washington's population as a whole.

Demographic Data

Gender

Fifty percent of the 371 survey respondents who answered this question identified as men, 37% identified as women and 3% identified as non-binary. The rest preferred not to disclose their gender. Eighteen percent of survey respondents did not answer the question.

Age

Half of respondents who disclosed their age are between the ages of 45 and 74. Those 75 and older account for 9% of respondents who disclosed their age, while those between the ages of 18 and 34 account for 11% of respondents and those between the ages of 35 and 44 make up

15% of respondents. The median age category of respondents is between 55 and 64. In contrast, the median age in Washington is 37.3 years.[1]

Table 1. Respondents by age. Percentages are based on the 348 respondents who disclosed their age.

Age	Number of respondents	Percent of respondents
<17	0	0.0%
18-24	10	2.9%
25-34	29	8.3%
35-44	51	14.7%
45-54	68	19.5%
55-64	81	23.3%
65-74	77	22.1%
75-84	31	8.9%
85+	1	0.3%

Race and Ethnicity

Over half of respondents (60%) identified as white. Just 7% identified as Black, Indigenous or People of Color. Thirty-one per cent said they preferred not to disclose their race or ethnicity or skipped the question. The remaining 2% chose "other or prefer to self-describe."

White people made up 60% of survey respondents who self-identified with a race or ethnicity—a bit low relative to the percentage of white people in Washington (66%). However, all other racial and ethnic groups were highly underrepresented. Additionally, 73% of those who responded to the question (372) identified as white. Refer to Table 2 for more details.

[1] Washington Office of Financial Management. (2022). Population by age, mapped by county. https://ofm.wa.gov/washington-data-research/statewide-data/washington-trends/population-changes/population-age-mapped-county

Table 2. Survey respondents by self-identified race and ethnicity.

Race/ethnicity	Number of Respondents	Percent of respondents	Percent of state population (2020 Census)
White	271	59.8%	66.0%
Multiracial or Multiethnic	14	3.1%	5.2%
Hispanic	6	1.3%	13.7%
American Indian or Native American	4	0.9%	2.0%
Black	3	0.7%	4.5%
Asian	4	0.9%	10.0%
Native Hawaiian or Other Pacific Islander	0	0.0%	0.8%
Other or prefer to self-describe	11	2.4%	N/A
Preferred not to disclose	59	13.0%	N/A
Skipped question	81	17.9%	N/A

Geographic Representation

Of the 453 survey respondents, 352 said they are residents of Washington, while 11 said they are non-residents of Washington. Ninety respondents skipped the question. Respondents hailed from across the state, with 358 indicating the county in which they live.

Twenty-seven of Washington's 39 counties are represented among the sample. The counties represented, as well as the number of responses from each, are summarized in Table 3. Eighty-three percent of those who responded to the question live in one of Washington's nine urban counties (Benton, Clark, King, Kitsap, Pierce, Snohomish, Spokane, Thurston, Whatcom). The remaining are from rural ones. Additionally, 70% of those who responded to the question hail from a county in Western Washington, while 30% are from Eastern Washington.

Table 3. Counties represented in the survey sample. Percentages in this table are based on the 359 respondents who answered this question.

County	Urban or rural[2]	Eastern or Western	Number of respondents	Percent of respondents
Benton County	Urban	Eastern	5	1.4%
Clark County	Urban	Western	17	4.8%
Cowlitz County	Rural	Western	2	0.7%
Douglas County	Rural	Eastern	1	0.3%
Franklin County	Rural	Eastern	3	0.8%
Island County	Rural	Western	8	2.2%
Jefferson County	Rural	Western	1	0.3%
King County	Urban	Western	82	22.9%
Kitsap County	Urban	Western	14	3.9%
Kittitas County	Rural	Eastern	2	0.6%
Klickitat County	Rural	Eastern	1	0.3%
Lewis County	Rural	Western	4	1.1%
Lincoln County	Rural	Eastern	1	0.3%
Mason County	Rural	Western	4	1.1%
Okanogan County	Rural	Eastern	2	0.6%
Pierce County	Urban	Western	25	7.0%
San Juan County	Rural	Western	3	0.8%
Skagit County	Rural	Western	12	3.3%
Skamania County	Rural	Western	2	0.6%
Snohomish County	Urban	Western	34	9.5%
Spokane County	Urban	Eastern	78	21.8%

[2] As defined by the Washington State Department of Health: https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//609003.pdf

Stevens County	Rural	Eastern	3	0.8%
Thurston County	Urban	Western	34	9.2%
Walla Walla County	Rural	Eastern	3	0.8%
Whatcom County	Urban	Western	9	2.5%
Whitman County	Rural	Eastern	1	0.3%
Yakima County	Rural	Eastern	8	2.2%
		Total urban	298	83.0%
		Total rural	61	17.0%
		Total Eastern Washington	108	30.0%
		Total Western Washington	251	70.0%

Education

Eighty-two percent of respondents (373) answered a question on their highest level of education completed. Of these, 97% reported having a high school diploma or higher level of education and 72% reported holding a bachelor's degree or higher-level qualification. The survey respondents reported an overall higher level of education than Washington's population as a whole. According to the 2020 Census, 92% of Washington's population are high school graduates or higher and 37% have a bachelor's degree or higher.

Income and Employment

Seventy-nine percent of respondents (356) indicated their employment status. Of these, half (53.4%) are employed full-time, 3.9% are employed part-time, 15.7% are self-employed and 21.4% are retired. A small number (3 respondents) reported being unemployed and looking for work or students (3 and 4 respondents, respectively).

Sixty-six percent of respondents (298) reported their household income bracket. (The remainder either answered "prefer no to disclose" or skipped the question.) Most of these reported an income of $75,000 or higher. The median household income category of those who responded to the question is $100,000-$149,999. This is significantly higher than Washington's 2020 median household income of $80,319.[3]

[3] Washington Office of Financial Management. (n.d.) Median Household Income Data Sets. Retrieved April 2023. https://ofm.wa.gov/washington-data-research/economy-and-labor-force/median-household-income-estimates

Table 4. Household income of respondents. Percentages in this table are based on the 298 respondents who indicated their household income.

Income	Number of respondents	Percent of respondents
Under $15,000	1	0.3%
Between $15,000 - $24,999	7	2.3%
Between $25,000 and $34,999	10	3.3%
Between $35,000 and $49,999	11	3.7%
Between $50,000 and $74,999	31	10.4%
Between $75,000 and $99,999	59	19.7%
Between $100,000 and $149,999	88	29.4%
Between $150,000 and $199,999	49	16.4%
$200,000 or more	42	14.1%

Organizational Representation

Twenty-two respondents indicated they were representing an organization. The organizations they represented included utilities, energy sector companies, other businesses, and environmental and social non-profit and advocacy groups. Some respondents did not identify the organization they represented. All the organizations respondents provided are listed in Table 5.

Table 5. Organizations represented among survey respondents.

Sector	Organization
Environmental and social non-profit organization	350.org Green Buildings Now People for Climate Action Sierra Club Spark Northwest Spokane Neighborhood Action Partners The Energy Project
Businesses and industry groups	Plumbing-Heating-Cooling Contractors of Washington Realtor State Association Realty One Group Wing Sales
Energy sector	CMS Energy Advisors eFormative Options Fire Mountain Solar LLC Four Day Fireplace Home Heating Orca's Power and Light Cooperative

Summary and Analysis of Responses

Insights from the survey are summarized below by the following themes:

- Perceptions of climate action
- Relative Importance of considerations
- Energy affordability
- Resource adequacy
- Support for natural gas
- The cost of action
- Public health
- Air pollution and the environment
- Economic development
- Social cost of carbon and equity

Perceptions of Climate Action

Support for climate action is high. The majority of respondents are interested in climate action in Washington state. Almost seven out of 10 respondents (66%) answered they are either very interested or interested in climate action in Washington state. The remainder answered they are not interested or not at all interested, or skipped the question.

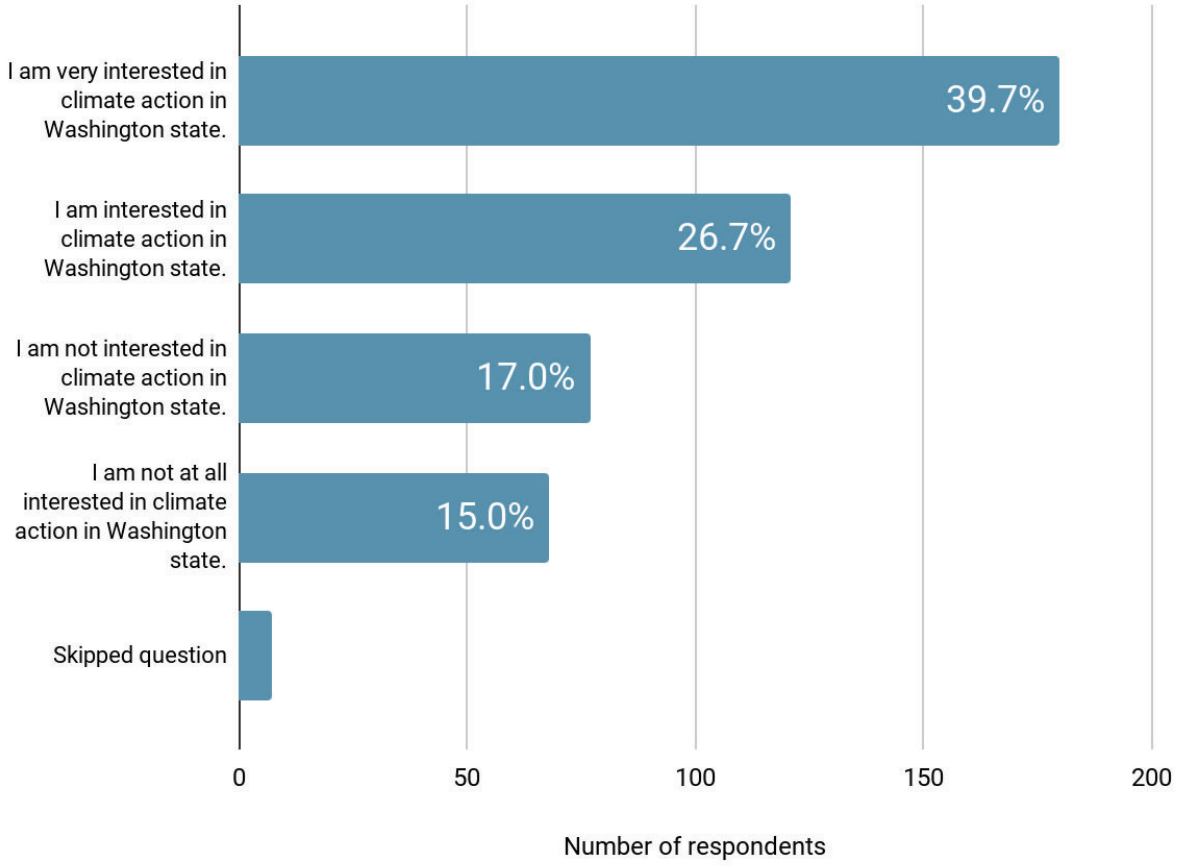


Figure 1. Respondents' level of interest in climate action in Washington state.

Additionally, just over half (55%) of respondents indicated they are supportive or very supportive of climate action in Washington state. The remainder said they are not supportive or not at all supportive of climate action in Washington state, or skipped the question.

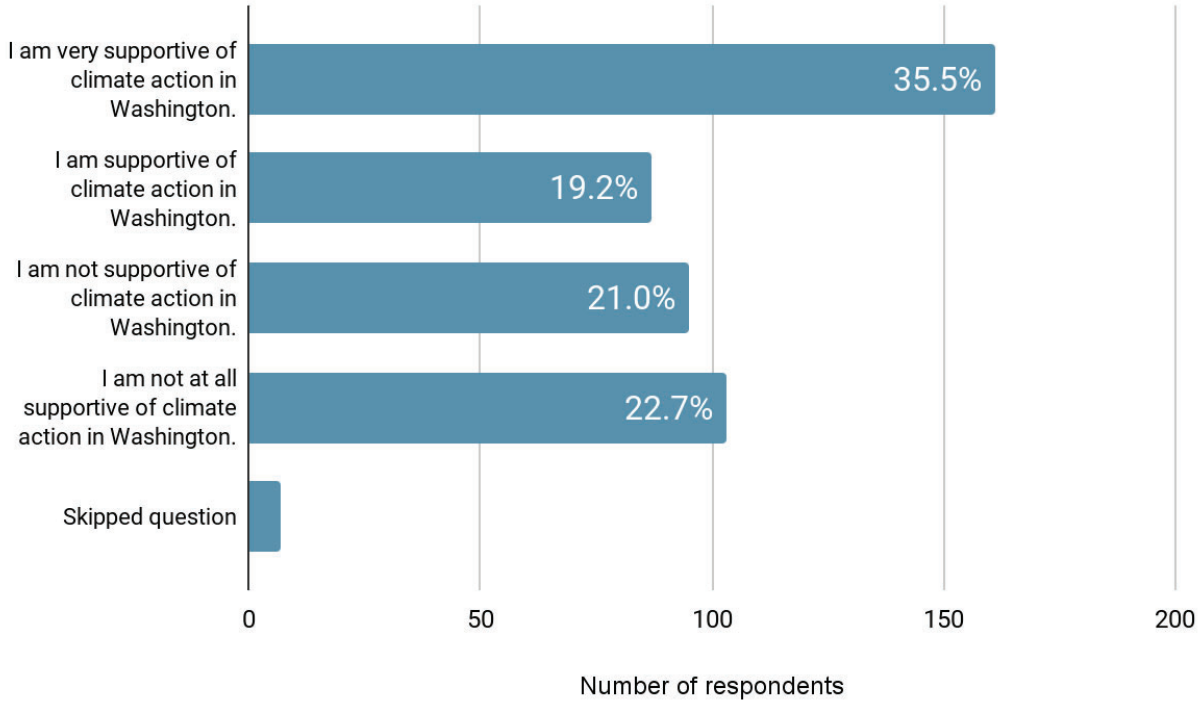


Figure 2. Respondents' level of support for climate action in Washington state.

Additionally, in their responses to the open-ended question, thirteen respondents (5% of those who answered the question) recommended quick action and said the pace of action is an important consideration. "We don't have much time. Number one concern has to be rapidly cutting greenhouse gas emissions across all communities. The health, security and happiness of future generations will be severely and irreparably damaged if we don't," one comment explained.[4]

At the same time, 9% of respondents to the open-ended question (25) indicated they did not support the Energy Decarbonization Pathways Examination and/or climate action. Additionally, some respondents said they consider climate action to be an imposition on personal freedom with 10% of survey respondents who answered the open-ended question (27) referring to concerns related to government overreach or freedom of choice.

One explained: "I appreciate attempts to ensure a healthy environment but forcing restrictions and encouraging more urban-style living on people who are citizens in a country with unalienable rights is absurd. To see the continued overreach of Washington state legislatures

[4] Note: Quotations from the survey have been edited for spelling, grammar, and punctuation.

to force Washingtonians to select cars, homes, lifestyle choices and so forth [...] is quite mind boggling."

"STOP putting unnecessary limitations on people who are already under stress between inflation, gas prices and taxes," another respondent said. Others expressed concerns about losing their personal choice to select energy sources, such as for heating their homes. "I feel my rights are being violated," one respondent wrote.

Most respondents concerned about government overreach said they opposed decarbonization. Additionally, 5% (12) of respondents to the open-ended question said they did not support taking action because of a lack of action in other countries. A handful (7) doubted climate change.

Relative Importance of Considerations

In questions 3-10, respondents ranked their perception of the importance of eight specific considerations on a scale from "Very Important" (0) to "Totally Unimportant" (100). The responses were used to calculate an average score that was grouped into five categories: very important, somewhat important, neutral, somewhat unimportant, totally unimportant. The lower the score, the higher the ranking. Table 6 displays the average scores from low (most important) to high (least important).

All considerations received a "somewhat important" or "neutral" ranking leaning towards important. The three most important considerations are related to energy costs and affordability (level of energy burden for low-income population, average energy cost per household and level of energy burden for the entire population) while the least important considerations are related to the economy (economic development, net jobs created). Air pollution, public health and the social cost of carbon fell in the middle.

Table 6. Average scores of question ranking importance of specific considerations.

Consideration	Average Score
Energy burden low-income	26 (somewhat important)
Average energy cost per household	27 (somewhat important)
Energy burden general	28 (somewhat important)
Air pollution	38 (somewhat important)
Social Cost of Carbon	42 (neutral, leaning towards important)
Improvements in public health	43 (neutral, leaning towards important)
Economic development	44 (neutral, leaning towards important)
Net jobs created	47 (neutral, leaning towards important)

Next, respondents ranked the relative importance of 10 considerations. The considerations are listed from highest to lowest importance in the table below. As with the average rankings from questions 3 to 10, the top considerations related to energy costs: how much an average household saves on energy bills and the level of energy burden among low-income households. The third most important consideration was a decrease in outdoor air pollution. The economic considerations—growth of the green energy sector, creation of net new employment capital investment required and savings created by the pathway—fell in the middle, along with a decrease in indoor air pollution. The least important consideration was the social cost of carbon.

Table 7. Relative importance of considerations.

Consideration	Ranking	Average score
How much an average household saves on energy bills	1	3.55
Decrease in the level of energy burden among low-income households	2	4.02
Decrease in outdoor air pollution	3	4.10
Growth of the green energy sector	4	5.62
Decrease in indoor air pollution	5	5.66
Creation of net new employment	6	5.99
Growth of the alternative fuels sector	7	6.04
Capital investment required	8	6.07
Savings created by the pathway (avoided energy costs)	9	6.81
Social cost of carbon	10	7.14

These results indicate that energy costs and affordability are a top priority for respondents. At the same time, all other considerations presented are also important to respondents.

Energy Affordability

Energy costs and the level of energy burden are the most important consideration for survey respondents, with about seven out of 10 respondents selecting "very important" or "somewhat important" for metrics related to energy cost.

Seventy percent of respondents indicated that average energy costs per household are a very important or somewhat important consideration (56% and 14% respectively) — this is one of the highest rankings of a specific consideration. When considering neutral responses leaning positive, the number of respondents who consider average energy costs per household to be important grows to 74%.

Even more respondents — 72% — considered the overall level of energy burden to be very or somewhat important (55% and 17% respectively). When considering neutral responses leaning positive, the number of respondents who consider overall energy burden to be important rises to 75%.

Similarly, 71% of respondents considered the level of energy burden among low-income households to be a very or somewhat important consideration (60% and 11%, respectively). When considering neutral responses leaning positive, this number grows to 76% — the highest of any consideration.

Additionally, the top two priorities identified by respondents when directly comparing considerations are average household savings on energy bills and a decrease in the level of energy burden among low-income households.

The importance of affordability is underscored by the open-ended responses. Ten percent of those who responded to the open-ended question (26) made comments related to the cost of energy and affordability. Many of them said it was one of their top concerns. Respondents asked whether they and others would have higher power bills and raised issues related to affordability.

For example, one respondent described the "reliability of the grid to meet variable load all hours at cost affordable to the average or below average rate payer" as an additional consideration not mentioned in the survey. "How will families be able to afford their needed changes?" another asked. A third recommended "keeping the cost of our electricity bills as low as possible [because] paying for green energy hurts our underserved communities the most."

Additionally, a few respondents said they believed decarbonization would lead to higher energy prices. Most of these respondents do not support decarbonization.

Resource Adequacy

The reliability and availability of electricity is the second most common consideration mentioned by respondents who answered the open-ended question. Sixteen percent of them (43) said the reliability, stability, or capacity of the grid, as well as power outages, are important considerations in addition to those mentioned by the survey.

Many of the respondents who said they support natural gas or opposed decarbonization cited a lack of grid stability as a concern. "Natural gas removal is a terrible idea and most power grids do not have the capacity to solely carry the load," said one respondent concerned about "rolling blackouts."

Another explained: "I don't agree with any of the above B.S. Our transmission and distribution electrical systems will not be able to withstand the amount of new electrical load put on the system when we all go electric. It was proven in Spokane during Covid when we received record heat and had to strategically shut down the substation transformer to keep from overheating/overloading and blowing up."[5]

Grid reliability and stability is also an important consideration among those who support the project. "Improve the power grid should be step #1," one response said. Another commented that "grid resiliency and demonstrating reliability into the future [...] will steer public opinion and keep progress possible."

Several respondents expressed concerns that they or others would not be able to heat their homes in a power outage. A few respondents said they would like to see considerations related to the climate resilience of the grid.

Support for Natural Gas

Eight percent of respondents (21) expressed support for natural gas. As noted in the resource adequacy section, many respondents said they considered natural gas to be more reliable than electricity. Many also said it is more affordable. Additionally, some described natural gas as "clean" or said it was more efficient than electricity.

One respondent explained, "I love natural gas in my home and electricity has proven to be less reliable and more expensive year over year." Another said: "It gets cold on our side of the state and using natural gas keeps my bill down. I have heard electric only would make our bills skyrocket — I can't afford that!"

Another answered: "Natural gas is MORE efficient and cost effective for the average household [...] We cannot afford a massive conversion to electrical power in Washington State due to the cost of electricity and the need for heat for 9 months out of the year. People will go back to wood stove heat which produces MORE carbon in order to keep their homes warm and save on electrical bills."

[5] This comment has been edited for grammar, punctuation and spelling.

The Cost of Action

The cost of climate action is the most common theme from the open-ended responses, with 17% of responses (46) related to the topic. Respondents are concerned about the cost for households to participate in decarbonization actions (e.g., retrofit homes, install solar panels, etc.) and the cost of the overall investment required to decarbonize, as well as potentially higher energy costs as a result of decarbonization. (For discussion on energy costs, see above section on energy affordability.)

Respondents also expressed concern that low-income communities might not be able to participate or would be burdened by higher energy costs. For example, one respondent said, "Income inequality makes decarbonizing much much harder because some people don't have funds for it and other people may not be willing to help them." Another commented: "It's going to take investments and people will need to pay more for energy. We'll need to lessen this burden on low-income families."

Another respondent explained: "I think the questions being asked are not acknowledging the rising cost associated with building/purchasing the new lower emission equipment. Saving on energy after installation doesn't mean it's not more expensive to install in the first place."

Respondents made several suggestions about how to finance climate action, including drawing on federal funds like those from the Inflation Reduction Act, capitalizing on private investment, financial support and loans for retrofits, funding for low-income households to undertake retrofits, implementing a carbon tax, taxing big greenhouse gas emitters (e.g., big companies, fossil fuel companies) and charging households different power rates based on income.

Public Health

Over half of survey respondents — 52% — consider improvements in public health to be a very or somewhat important consideration (38% and 15%, respectively). When considering the number of neutral responses leaning towards important, the percentage of respondents who consider public health improvements to be important rises to 58%.

Air Pollution and the Environment

The survey respondents had a high level of concern about air pollution. A majority (60%) of respondents indicated air pollution (indoor and outdoor) is a very or somewhat important consideration, while almost a third (27%) indicated it is somewhat or totally unimportant and 13% gave a neutral ranking. Respondents are more concerned about outdoor air pollution than indoor air pollution, according to the ranking in question 10.

In addition, 18 respondents commented on environmental considerations in response to the open-ended question. Five recommended the government take environmental conservation measures, such as protecting old-growth forest, waterways and other ecosystems, as well as wildlife. Ten respondents indicated the negative environmental impact of producing batteries and other components of renewable energy installations should be a consideration, along with the impact of renewable energy on wildlife. For example, one raised concerns about birds killed by wind turbines.

Economic Development

Economic considerations are important to respondents, but not as important as considerations related to energy cost and public health. When it came to ranking economic considerations relative to other considerations, the growth of the green sector placed fourth — behind how much an average household saves on energy bills, decreasing the level of energy burden among low-income households and decreasing outdoor air pollution. Creation of net new employment and growth of the alternative fuels sector ranked sixth and seventh, respectively.

Almost half of respondents — 49% — ranked considerations related to economic development as very or somewhat important. Another 22% of respondents gave a score in the neutral zone, while almost a third (29%) indicated that economic development considerations are somewhat or totally unimportant.

The number of net jobs created was very or somewhat important to almost half of respondents (47%). One-fifth of respondents (21%) gave it a neutral ranking, while almost a third (32%) indicated it was not important.

In the open-ended section of the survey, 10 respondents commented on specific considerations related to jobs, including job training to prepare workers, a lack of skilled workers to implement the transition and a perceived loss of jobs as a result of decarbonization. One respondent said they would like to see locals, rather than those from outside Washington, employed for implementation of the decarbonization actions. Another respondent said they would like to see a metric that touches on the quality of jobs, rather than a metric simply looking at the number (net new jobs).

Social Cost of Carbon and Equity

The social cost of carbon is important to over 60% of respondents; however, a third of respondents indicated that it is somewhat or totally unimportant and 13% gave the metric a neutral ranking. The metric placed last in a ranking of ten considerations. The lower ranking of the social cost of carbon may be due, in part, to the abstract nature of the concept. All the other considerations mentioned in the survey are more tangible and immediate.

At the same time, 10% of responses to the open-ended question (26) highlighted considerations related to equity that relate to the social cost of carbon, including regional differences between rural and urban areas, income inequality, racial justice, environmental justice and intergenerational justice. For example, one respondent said "upstream emissions and environmental justice/health/safety risks associated with alternative fuels" are a missing consideration. The same respondent said, "Policies [are] needed for a successful, equitable, affordable electrification transition and gas system winddown (including policies within UTC jurisdiction)."

Another comment recommended "incorporating environmental justice and equity in all aspects." A different respondent suggested "involving low-income people and people of color, most affected by climate change and air pollution" as an important consideration.

A common theme throughout the open-ended responses is the affordability of the decarbonization for low-income households in terms of energy costs, as well as participating in decarbonization actions, such as retrofits. (See the sections on energy affordability, resource adequacy and the cost of action for more details.)

For example, one respondent said: "Insisting everyone must change over to electric will have a huge impact on low-income households. Low-income cannot afford to switch. There must be programs to help." Another commented, "Low-income families will bear the brunt of this change as natural gas heating and cooking is far more efficient than electricity and there is not enough generation to support all these goals."

Some respondents also pointed out regional differences between urban and rural communities. They noted that rural communities face different issues related to decarbonization of transportation and electrification. For example, these communities may be more prone to blackouts than those in cities.

Finally, a few respondents cited considerations related to intergenerational equity. For example, one said "the shape of the world we leave our children" is an important consideration.

Appendix D1: Survey 2 Text

Preamble

Welcome to the 2nd Washington Natural Gas Decarbonization Survey!

The Washington State Utilities and Transportation Commission is exploring approaches for decarbonizing, or reducing greenhouse gas emissions, in Washington's energy system.

Why should you respond to this survey?

How utilities decarbonize will affect all people in Washington. Decarbonizing the energy system will impact the economy, energy costs, public health and the environment. We want to understand public concerns and priorities to explore workable decarbonization pathways.

Why are we doing this survey? Who's involved?

The **mission** of the Washington State Utilities and Transportation Commission is to **protect the people of Washington by ensuring that investor-owned utility and transportation services are safe, equitable, reliable and fairly priced**. We have hired SSG (Sustainability Solutions Group), a climate planning consultancy, to conduct this survey as one important piece of a study SSG is conducting for the pathways examination.

The study (mandated by Senate Bill 5092, section 143) will examine how investor-owned electric and natural gas utilities can reduce their greenhouse gas emissions.

Among other things, the study will explore how decarbonization actions may impact the environment, public health, equity, jobs, energy costs and more. SSG will present its findings to the Utilities and Transportation Commission in a report called the *Energy Decarbonization Pathways Examination.*

By June 1, 2023, the Utilities and Transportation Commission will use SSG's analysis to report to the Washington State Legislature on "feasible and practical pathways" for utilities to reduce greenhouse gas emissions.

What can respondents expect in this survey?

This guided feedback form is organized into five (5) sections. The first three (3) sections share **information** to help you respond to **questions** in sections four and five (4, 5). Here is the outline:

1. Introduction to decarbonization pathways
2. Overview of how Washington's emissions are expected to grow by 2050.

3. Overview of decarbonization.
4. Survey on social and economic considerations related to decarbonization.
5. Some information about you/your organization so we understand who is providing feedback and who we haven't heard from.

Estimated time: 20 minutes

Ready to begin? Let's go!

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Section 1: Decarbonization Pathways 101

To fill out this survey, you'll need to understand what decarbonizing the energy system involves. *(If you're already familiar with the project, you might want to skim or skip the first three sections.)*

What is "decarbonization" of an energy system?

"Decarbonization" of an energy system means providing energy while reducing greenhouse gas emissions into the atmosphere.

What is a "decarbonization pathway"?

A **decarbonization pathway** is a set of actions to reduce greenhouse gas emissions and a schedule for implementing those actions. It includes information on the costs and benefits of those actions, such as how much they will help Washingtonians save on energy costs.

Each decarbonization pathway created in this project will offer a set of options for investor-owned electric and natural gas utilities to decarbonize.

Decarbonization pathways are successfully completed when all pathway actions are fully implemented to hit the low-carbon target.

All actions must be completed to achieve the low-carbon target of the pathway.

Will this study select or recommend specific actions?

No. That is up to the Washington State Legislature.

SSG is developing potential decarbonization pathways **for examination (not picking a winner)** by combining **technical analysis** with **input from the public.** (To learn more about the process, check out the recording of the introductory public meeting.)

The final actions in the decarbonization pathways will be informed by concerns, opportunities and challenges identified by the public. This survey is one way SSG is gathering feedback.

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Section 2: How Washington's emissions will grow

If emissions are left unchecked....

Washington is on track to release 105 million metric tons of greenhouse emissions (MTCo2e) into the atmosphere in 2050. That's enough energy to run over 22.6 million gasoline-powered cars for a year[6]—and almost three times the number of vehicles (8.1 million) registered in Washington state![7]

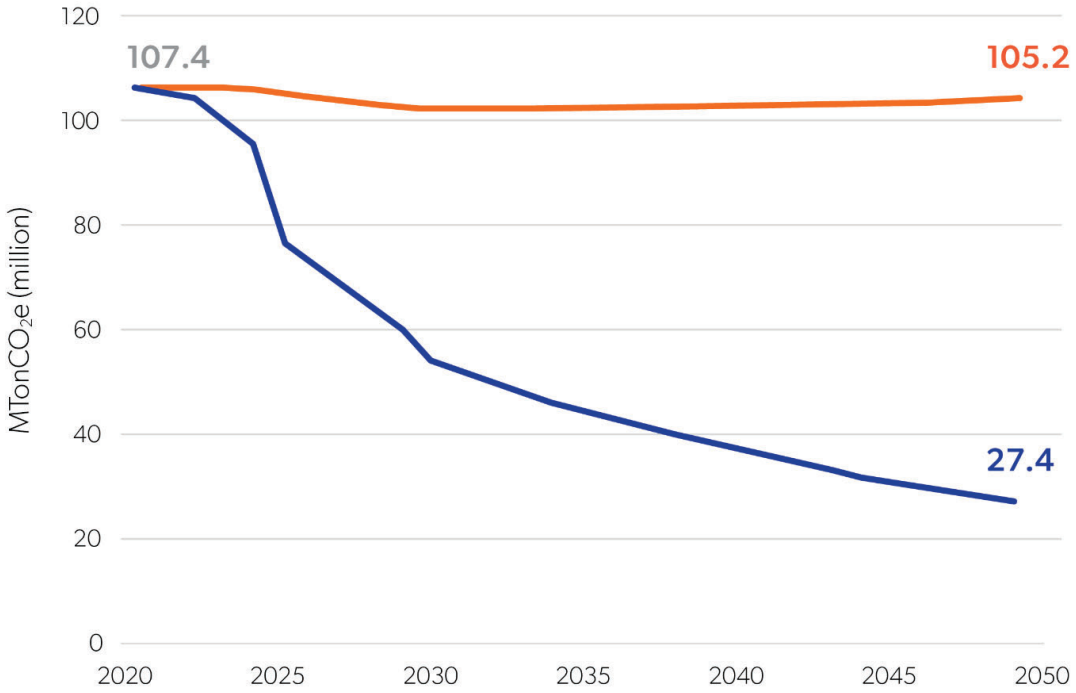
This project focuses on the following sources of emissions:

1. Emissions from in-state electricity consumption, which account for 17% of Washington's emissions. 51% of these emissions come from coal-fired electricity generation and 43% of these emissions are produced by burning natural gas to generate electricity. Electricity consumed within Washington is provided from generating plants within the state and electricity imports from outside of the state.
2. Emissions from burning natural gas for purposes other than electricity generation, which account for 14% of Washington's emissions. These emissions arise from space heating and water heating in homes and commercial buildings and generating heat for industrial processes.

In recent years, the Washington State Legislature has passed several laws focused on reducing greenhouse gas emissions. If all the plans, policies and programs required by law are implemented, emissions could drop to 27.4 million metric tons of greenhouse gas emissions in 2050.

[6] For 105 million metric tons, it would be 22,624,269 gas powered cars for a year. Using EPA calculator: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results

[7] Data from Washington State Department of Licensing. https://www.dol.wa.gov/about/docs/2021-CY-stats-at-a-glance.pdf. Number of vehicles registered at the end of 2021.



Alt text for image: A graph showing how emissions change between 2020 and 2050 under the business-as-usual scenario (BAU) and the business-as planned (BAP) scenario. In both cases, emissions start at 107.4 million metric tons. In the BAU scenario they drop to 105.2 tons and in the BAP scenario they drop to 27.4 million metric tons.

In the graph above, the orange line represents business-as-usual emissions, while the blue line represents business-as-planned (goals set by current legislation) emissions.

The difference between the two lines is the result of Washington's climate laws and policies. Once fully implemented, these laws and policies could reduce emissions by 74%.

These policies include:

- The Clean Energy Transformation Act;
- The Climate Commitment Act;
- The Clean Buildings Act; and
- Move Ahead Washington.

These laws and policies are a great start, but it's not always clear how Washingtonians will *actually* implement them. Washington also must figure out what more needs to be done to achieve its goal to reduce greenhouse gas emissions by 95% by 2050.

That's where this study comes in.

SSG is developing decarbonization pathways that represent options for how investor-owned electric and natural gas utilities and their customers can reduce their greenhouse gas emissions.

Your input will help shape these pathways.

Next →

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Section 3: How can Washington's energy system decarbonize?

Two key things are required to decarbonize our energy system.

1. Energy efficiency is critical. If people in Washington reduce how much energy they use, there will be less pressure on the electrical grid and less need for fuels like green hydrogen and renewable natural gas to replace natural gas.

   Washington also won't have to build as much infrastructure to supply additional clean energy to meet energy demands as the population grows.

2. Moving to energy sources that release no or minimal greenhouse gasses into the air is also key.

   These energy sources may include solar energy, wind energy, hydro energy, renewable natural gas, hydrogen produced with renewable energy sources and more.

So, how exactly can Washington decarbonize?

Here are some common actions SSG has included in the decarbonization pathways it has developed for this project:

- Retrofit buildings to make them more energy efficient.
- Improve the energy efficiency of industrial facilities.
- Reduce trips in personal cars in Washington's cities while increasing trips taken by public transit, cycling and walking.

- Focus on higher-density development, rather than spreading out buildings, so less energy is required to transfer energy from place-to-place.
- Set higher standards for energy efficiency in new buildings.

The pathways SSG is developing differ in terms of how much of the demand for energy is met by electricity compared with alternative fuels like green hydrogen or renewable natural gas.

SSG is analyzing three potential decarbonization pathways for Washington State—a pathway leading to full electrification of natural gas systems, a pathway involving more alternative fuels and a pathway that mixes actions from both the electrification pathway and the alternative fuel pathway.

In addition to reducing greenhouse gas emissions, the actions in these pathways will affect society and the economy as they impact public health, the environment and energy costs.

We'd like your input on how important specific societal and economic considerations should be when evaluating the pathways.

Ready? Let's go!

Next →

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Section 4: Survey

Screen 1: What are your thoughts on decarbonization?

Now we'd like your thoughts.

Question 1: After reviewing the background information, how supportive are you of decarbonization in Washington state? Please select one answer. [Choose one]

a) I am very supportive of climate action in Washington.
b) I am supportive of climate action in Washington.
c) I am not supportive of climate action in Washington.
d) I am not at all supportive of climate action in Washington.

Question 2: How interested are you in climate action in Washington state? Please select one answer. [Choose one]

a) I am very interested in climate action in Washington.
b) I am interested in climate action in Washington.

c) I am not interested in climate action in Washington.
d) I am not at all interested in climate action in Washington.

Next →

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Screen 2: Energy costs, energy burdens and the economy

Energy Costs

The analysis of the three pathways will identify average energy cost per household at the county level, as well as the cost of different forms of energy under each pathway, from the present to 2050.

Question 3: In your opinion, how important are considerations related to average energy cost per household when evaluating decarbonization pathways for the energy system? Please select one answer. Please select one answer on a scale from "Very important" to "Totally unimportant". [Sliding scale]

Energy Burdens

Another major consideration for developing a decarbonization pathway is the impact it could have on the level of energy burden in Washington state. A household faces a high energy burden when it spends over 6% of its income on energy costs.

In 2018, 11% of low-income households across Washington faced a high or severe energy burden. The rate of high energy burden in low-income households varies across Washington. Largely rural counties in the eastern two-thirds of the state tend to face higher household energy burden levels; in many of them, the low-income household energy burden exceeds 20%.

Actions that improve energy efficiency (e.g., energy efficiency retrofits of existing homes) can decrease the level of energy burden by helping households reduce how much energy they use. Additionally, if the cost of energy decreases under a pathway, the level of energy burden would decrease as well.

Question 4: In your opinion, how important are considerations related to the level of energy burden for all Washingtonians when evaluating decarbonization pathways for the energy system? Please select one answer. [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Question 5: In your opinion, how important are considerations related to the level of energy burden among low-income households when evaluating decarbonization pathways for the energy system? Please select one answer. [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Decarbonization Jobs

Decarbonization of the energy system will create thousands of jobs, mostly in construction related to energy efficiency retrofits and the installation of new heating equipment. While some jobs, such as those related to the transportation sector may be lost, all three pathways are expected to create more jobs than would be eliminated.

The analysis in the study will provide data on how many person years of employment—or how many years of full-time work for one person—will be created by each pathway.

Question 6: In your opinion, how important are considerations related to the net number of jobs created when evaluating decarbonization pathways? Please select one answer. [Choose one]:

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Capital investments in decarbonization can contribute to innovation and economic growth by fostering the green construction sector and the renewable energy sector, as well as sectors related to alternative fuels like hydrogen and renewable natural gas.

The analysis in the study will provide data on expected capital expenditures by sector and by county under each decarbonization pathway.

Question 7: In your opinion, how important are considerations related to economic development when evaluating decarbonization pathways? Please select one answer. [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Screen 3: Health, Pollution and the Social Cost of Carbon

Health and Pollution

Decarbonization actions that lead to an increase in how much people walk and cycle (rather than take a car) can improve public health by increasing physical activity. Additionally, actions that reduce burning of fossil fuels decrease air pollution, leading to improvements in public health.

The analysis in the study will assess the increase in physical activity between now and 2050 as a result of the pathway actions. Additionally, it will estimate the financial value of the decrease in outdoor pollution in terms of the decrease in related health costs. It will also consider the benefits of a decrease in indoor air pollution.

Question 8: In your opinion, how important are considerations related to improvements in public health when evaluating decarbonization pathways for the energy system? Please select one answer. [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Question 9: In your opinion, how important are considerations related to air pollution when evaluating decarbonization pathways for the energy system? [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Social Cost of Carbon

The effects of climate change are costly. As temperatures rise and weather becomes more extreme:

- Infrastructure, homes, businesses and crops will be damaged;
- People will die during extreme weather events; and
- More people will suffer from and be hospitalized for health problems related to the changing climate.

The social cost of carbon is a metric that estimates the long-term costs of climate change in monetary terms by calculating the cost to society per additional ton of carbon dioxide emitted. Washington's clean energy legislation outlines the social cost of carbon that utilities are required to comply with until 2050.

For this project, we will calculate a social cost of carbon for each decarbonization pathway that describes the change of the long-term socio-economic costs associated with emitting less carbon dioxide.

Question 10: In your opinion, how important should the social cost of carbon be when evaluating decarbonization pathways? Please select one answer. [Choose one]

a) Very important
b) Somewhat important
c) Neutral
d) Somewhat unimportant
e) Totally unimportant

Screen 4: Other Considerations

Question 11: Please rank the following issues in terms of what you think is most to least important when evaluating decarbonization pathways.

1. How much an average household saves on energy bills
2. Decrease in the level or energy burden among low-income households
3. Decrease in outdoor air pollution
4. Decrease in indoor air pollution
5. Creation of net new employment
6. Growth of the green energy sector (e.g., wind, renewable, solar)
7. Growth of the alternative fuels sector (e.g., hydrogen, renewable natural gas)
8. Capital investment required
9. Savings created by the pathway (in terms of avoided energy costs)
10. Social cost of carbon

Question 12: What other considerations are important to you that have not been addressed by this survey? [open-ended - short answer - 100 words maximum]

Section 5: Tell us about yourself.

Gathering demographic information helps us to understand if we are reaching a variety of community members. These questions help us to understand broad trends in answers based on demographic data.

Your responses help us identify opportunities, barriers and constraints that may impact potential actions for certain residents. If you do not wish to disclose information, you have the option to choose "prefer not to disclose" for these questions.

Are you representing an organization? [Choose one]

- Yes [trigger name and sector question]
- No, just myself.

Could you please share the name of your organization and/or the sector you work in?

[short answer box]

Do you live in Washington? (Select all that apply): [Checkboxes]

- Yes [trigger county question]
- No

Which county do you live in? [Choose one]

1. Adams County
2. Asotin County
3. Benton County
4. Chelan County
5. Clallam County
6. Clark County
7. Columbia County
8. Cowlitz County
9. Douglas County
10. Ferry County
11. Franklin County
12. Garfield County
13. Grant County

14. Grays Harbor County
15. Island County
16. Jefferson County
17. King County
18. Kitsap County
19. Kittitas County
20. Klickitat County
21. Lewis County
22. Lincoln County
23. Mason County
24. Okanogan County
25. Pacific County
26. Pend Oreille County
27. Pierce County
28. San Juan County
29. Skagit County
30. Skamania County
31. Snohomish County
32. Spokane County
33. Stevens County
34. Thurston County
35. Wahkiakum County
36. Walla Walla County
37. Whatcom County
38. Whitman County
39. Yakima County
40. Prefer not to disclose

What gender do you identify with? [Checkboxes]

- Woman
- Man
- Non-binary
- Prefer to self-describe: [provide text box]
- Prefer not to disclose

Age group: [Choose one]

- <17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75-84
- 85+
- Prefer not to disclose

Please indicate which race(s)/ethnicit(y/ies) you most closely identify with?

- White
- Black - African Diaspora (e.g., African-American, Afro-Caribbean, Afro-Latin, African-American, Black British etc.)
- Black - African (e.g., East African, Southern African, Central African, Western African)
- Hispanic
- Asian - Caribbean (e.g., Indo-Caribbean, Caribbean-Chinese etc.)
- Asian - Central Asian (i.e., Kyrgyzstan, Uzbekistan etc.)
- Asian - East Asian (e.g., China, Japan, Korean etc.)
- Asian - Southeast Asian (e.g., Philippines, Thailand, Vietnam etc.)
- Asian - South Asian (e.g., India, Pakistan, Bangladesh etc.)
- American Indian or Native American
- Alaska Native
- Native Hawaiian or Other Pacific Islander
- Middle Eastern or North African
- Multiracial or Multiethnic
- Other or prefer to self-describe: [provide text box]
- Prefer not to disclose

Please indicate if you self-identify with any of the groups below. Please select all that apply. [Select all that apply]

- A person with a disability
- A newcomer or recent immigrant (moved to Washington within the last 5 years)
- An international student
- A member of the 2SLGBTQIA+ community
- A person who is a migrant worker
- A person experiencing poverty
- A person experiencing homelessness
- Other or prefer to self-describe: [provide text box]
- Prefer not to disclose

Highest level of education completed: [Choose one]

- No high school diploma
- High school diploma or GED
- Some college
- Associate's degree, occupational
- Associate degree, academic
- Bachelor's degree
- Master's degree
- Professional degree
- Doctoral degree
- Other: [provide text box]

Gross annual family/household income: [Choose one]

- Less than $15,000
- $15,000-$24,999
- $25,000-$34,999
- $35,000-$49,999
- $50,000-$74,999
- $75,000-$99,999

- $100,000-$149,999
- $150,000-$199,999
- $200,000 or more
- Prefer not to disclose

What is your employment status? [Choose one]

- Employed, full-time
- Employed, part-time
- Self-employed
- Unemployed, looking for work
- Unemployed, not looking for work
- Homemaker, full-time
- Student
- Retired
- Other: [provide text box]
- Prefer not to disclose

All done! What's next?

Thank you for providing your valuable time and insights. SSG will collect and review all responses and incorporate feedback into the decarbonization pathways study. A summary of the results will be published on the project website.

To stay up to date on progress with the Energy Decarbonization Pathways Examination, visit the project website. Any questions or concerns about this survey can be submitted to Samantha Doyle at samantha.doyle@utc.wa.gov.

Appendix E

Energy Equity Focus Group
Feedback Summary

Washington Energy Equity Focus Group Summary

Energy Decarbonization Pathways Examination

April 2023

Overview

As a part of the development of the Energy Decarbonization Pathways Examination for the Washington Utilities and Transportation Commission, SSG delivered a focus group in March 2023 with a diverse cross-section of Washington residents who are:

- from or work with highly impacted communities.
- vulnerable communities.
- other populations subject to inequities related to the energy system.

The focus group gathered information about which groups are disproportionately burdened by Washington's energy system, as well as what actions should be taken to minimize unintentional negative impacts of decarbonization on these groups.

The following themes and recommendations emerged from the focus group analysis:

Equity-denied communities' faces significant challenges related to energy access and affordability.

- Highly impacted communities, people living next to freeways, BIPOC communities, low-income people, rural communities, Tribal communities, seniors and renters are disproportionately burdened by Washington's energy system.
- Tribal communities face unique challenges, including barriers to developing local renewable energy and unreliable electric connections with relatively long power outages.
- Engagement with communities burdened by the energy system during the development of decarbonization policies and programs is critical.

The cost of energy must be managed.

- Energy burdens must be considered in relation to the overall cost of living.
- Energy is cheap only in monetary terms. When negative environmental and other impacts are considered, the cost of energy is high.
- Financial support is necessary for low-income groups to participate in the transition.

An equitable distribution of the benefits of the energy transition is key.

- Invest in weatherization and backup energy, especially in rural and Tribal areas.
- Renewable energy must be sited and developed more equitably.

- Information about decarbonization needs to be more accessible.
- Decarbonization initiatives should be administered in partnership with groups and organizations already in communities.
- Consider who pays for and is penalized by decarbonization actions.

Methodology

Participants

Nine people participated in the focus group, including two individuals with Indigenous backgrounds, as well as at least one person who identified as a person of color. Participants hailed from:

- Two organizations focused on equitable access to clean energy
- One organization focused on racial and economic justice
- One organization that works on climate justice
- Two organizations advocating for and supporting low-income groups in urban and rural areas
- An organization focused on the regeneration of Indigenous communities

Additionally, the participants included a rural resident interested in providing input on the Energy Decarbonization Pathways Examination and an engineer with expertise in clean energy and experience working with Tribes. In addition to sharing their subject matter expertise, many participants shared their lived experiences as members of equity-seeking groups.

To recruit the participants, UTC and SSG staff contacted 39 organizations and individuals working on equity-related issues. This list was developed through input from pre-engagement, online resources, and an existing list created by the UTC.

Structure

SSG designed a 90-minute focus group and conducted it over Zoom. The focus group began with a presentation providing an overview of the Energy Decarbonization Pathways Examination and its objectives, an overview of the engagement process, an introduction to basic elements of climate action planning, an overview of co-benefits and co-harms, and examples of equity indicators and analysis that could be incorporated into the Examination. A questions-and-answer period followed the presentation.

This was followed by a roundtable discussion with two questions asked of all participants:

1. Who is disproportionately burdened by Washington's energy system? Why and how?
2. What actions should be taken to minimize unintentional negative impacts of decarbonization on the groups identified in Question 1?

Each participant took turns responding to the questions based on a speaker list created by the facilitator. Participants were encouraged to share their thoughts by building on what was said, taking things in a new direction or passing if they chose.

An SSG facilitator led the discussion while another SSG consultant took detailed notes. Notes were anonymized and coded for different themes, and a qualitative analysis of the responses was conducted.

Note: Focus group participant opinions are representative of their lived experience and cannot be extrapolated to a community sample size.

Focus Group Analysis

The following qualitative analysis of the focus group summarizes feedback by key themes.[1]

Highly impacted communities, people living next to freeways, BIPOC communities, low-income people, rural communities, Tribal communities, seniors and renters are disproportionately burdened by Washington's energy system.

Focus group participants said the following groups are disproportionately burdened by the energy system:

- Highly impacted communities
- People living next to freeways
- BIPOC communities
- Low-income groups
- Rural communities
- Tribal communities
- Seniors
- Renters

[1] Please note that all quotes are not verbatim, but based on detailed notes. Some quotes have been lightly edited for clarity.

Several participants described low-income groups as among the most vulnerable, particularly when low-income groups are at the intersection of multiple identities listed above (i.e., low-income and BIPOC, low-income and rural, low-income and renters, etc.).

> *"I think the communities that get most affected are marginalized and vulnerable communities below poverty. They're in survival mode all the time."*
>
> *"We hear this from our [network] every single day in the wintertime — people are either not hooked up to the electrical grid or, if they are, it's such an old electrical grid that they are losing power constantly. […] So they're still looking at the possibility of facing very cold days and nights for long stretches of time in the winter season. A lot of people have wood stoves in their homes. That's probably not the greatest thing to have, but to take that away entirely and electrify their home could mean certain death for people."*

Participants said housing tends to be less energy efficient in rural areas and the energy system tends to be less reliable. One participant said the needs of cities tend to be prioritized above those of rural areas. Two participants raised questions about how transportation could be decarbonized equitably in rural areas, noting that solutions like increasing walking, cycling and public transit use seem more appropriate for urban areas. One of them noted that access to public transit varies widely across the state, pointing to research on the topic by Front and Centered.

> *"I think electrifying transit, that's great in more urban areas, but we cannot leave out that rural voice. They don't have transit the way urban areas do. Consider walking paths and biking routes — that's not established or beneficial in a rural community."*
>
> *"If public transportation was seen like schools, access would be different. We need a model that provides everyone with access regardless of the size […] of their community."*

Participants added that low-income groups in rural areas are particularly vulnerable to outages, especially in the winter. People in rural areas "are either not hooked up to the electrical grid or, if they are, it's such an old electrical grid that they are losing power constantly," said one participant. Another participant said that Tribes tend to have less reliable power than surrounding communities, including in some urban areas.

Additionally, participants noted that many of the groups identified, including Tribal, low-income, and BIPOC groups, live in substandard or inefficient housing.

> *"A lot of the Tribal buildings are older and lower efficiency, but also may need new roofs or things like that to even incorporate renewables."*

"Often, low-income folks and people of color are living in housing with energy efficiency and weatherization issues."

"There's no protection against mold in substandard housing."

One participant said renters face inequities relative to owners when it comes to making improvements related to decarbonization. Another worried that the improvements could lead to increasing rents that could push low-income renters out of their homes.

"As an owner, can you afford to buy appliances or retrofit your house or buy certain equipment? If you're a renter, those decisions aren't even your own and you don't have access to financing to drive and improve the situation you're in. A lot of low-income people of color don't have access to ownership."

Tribal communities face unique challenges.

Participants highlighted ways in which Tribal communities face unique challenges. One explained that most Tribes do not own the utilities or substations serving them, which can make it difficult for them to install renewables on reservations.

"*By not having that ownership over their utilities or their substations, they are in a complex situation where they may want to do the right thing but not be able to because they don't own the equipment that serves them."*

Participants also highlighted systemic inequities and unique negative impacts facing Tribes. For example, one participant said that outages tend to be longer in Tribal areas compared to nearby non-Tribal ones. Additionally, a participant explained the negative impacts of the energy system on Tribes are layered on top of ongoing environmental degradations and pollution, as well as the cultural and health impacts of climate change.

"I come from a rural, Tribal community and we were next to the Department of Energy. They had a nuclear reservation. We had to deal with environmental degradation, pollution. Even with dams, just dealing with noise pollution. And then what comes with warm water: less salmon. It affects our health. We subsist on salmon and native fish."

"Also with Tribes, the outages tend to be much longer, even in urban areas, than neighboring folks who are not Tribal. Those outage durations can cause loss of medicine, lost wages, all kinds of things that are much more impactful to folks who are already low-income and impoverished. It's important to recognize those longer outages come with a lot of consequences for folks."

Energy burdens must be considered in relation to the cost of living.

Participants said the high housing costs in Washington negate the benefits of lower energy costs. "Washington has some of the lowest power prices, but we also have one of the highest costs of living. That can't be ignored," said one participant.

> *"Without shelter, people can't survive. We equate housing and security. […] Washington state has the most outrageous rent in the world, so it affects everything else."*

Others pointed out that low-income households may struggle to pay bills for basic needs. If their power is cut off because they can't pay their bill, reactivation fees are costly.

> *"It's not just the cost of energy but when you're a low-income person you're often juggling bills. So your power gets shut off in different ways. And there are fees associated with turning your energy back on."*
>
> *"It's incredible what these people are living in. It's not just, 'What can we do for our planet?'"*

One participant noted that their utility automatically charges $45 per month, regardless of whether the lights are turned on or not. "It's not always that we have cheaper power prices," said the participant.

Energy is cheap only in monetary terms.

One participant said energy is not cheap when considering the impact of the energy system on Washington overall, rather than simply looking at the price.

> "People keep mentioning our cheap power and it's important to remember, it's cheap in terms of dollars, but not in terms of devastation to salmon. Calling our power cheap is really problematic because then people think there's more of it and more access to it, and that doesn't decrease our dependence on those dams."

Engagement with communities burdened by the energy system during the development of decarbonization policies and programs is critical.

The need to engage communities burdened by the energy system during the development of decarbonization policies and programs came up again and again. Participants said vulnerable and impacted communities should be involved in shaping solutions for decarbonizing their communities. Participants also said that Tribes are not sufficiently engaged with respect to

renewable siting and developments. (See section on renewable energy development below for more details.)

> *"The communities that experience climate impacts and fossil pollution first and worst have the least ability to transition to a lower carbon economy [and should] be active participants in solutions that will work for them."*
>
> *"More voices need to be brought to the tables sooner so we can listen to lived experiences."*
>
> *"It's really important to engage Tribes and all the communities in these upfront planning conversations. Instead of people making decisions behind the curtains and implementing everything, engage those communities upfront in the conversations and talk about how this is going to impact [them]."*

One participant recommended "having stricter requirements for community-driven processes [...] giving more direct engagement and outreach to communities in advance, not after the fact." Participants also recommended that engagement be conducted in a culturally and linguistically appropriate manner for the community context.

Additionally, many participants expressed concerns that the focus group didn't fully represent the vulnerable groups they identified. One participant said the UTC could do a better job of incorporating marginalized voices more generally.

Financial support is necessary for low-income groups to participate in the transition.

Participants explained that the cost of decarbonization is expensive and low-income groups will need financial support and incentives to participate. Participants said existing rebate programs are not suited to the needs of low-income groups because they cannot afford to pay for required improvements, such as heat pumps and sealing their home, upfront. Additionally, participants said that low-income groups might not be receiving or understanding information about rebates.

> "If you're low-income, you can't afford to put out the money for the heat pump or whatever they are offering rebate on."
>
> "Rebates are great for installing things like heat pumps. But very often, the people who need those sorts of things the most don't get the information. They may not be looking for that. They may not be aware."

One participant suggested offsetting utility bills for people under a certain income. Another participant said, "financing has to work for low-income people, whether they are renters or

owners, so they can access weatherizing or changing out stoves, or refrigerators or whatever it is." Participants also said funding for weatherization would be critical. (See below for an overview of comments on weatherization.)

Invest in weatherization and backup energy, especially in rural and Tribal areas.

The groups identified by participants tend to have housing that uses energy inefficiently, particularly in rural and Tribal areas. Rural and Tribal areas are also affected by unreliable electricity connections. Participants said it is critical to find a way to finance energy-efficient upgrades to housing and to ensure reliability is improved. As described above, unreliable power in rural areas can negatively impact health, quality of life and stocks of valuable supplies like medication, among other challenges.

> *"The biggest thing is there are much older homes we can't even weatherize because they're not up to code or there is not enough money to fix these issues. The biggest concern with that is making sure we don't let those people living in much older homes slide into the cracks. We need to consider what that looks like and potentially funding weatherization to where we can make those repairs and not put a bandaid on the issue."*

> *"Even if they do come in and electrify some of the not-on-the-grid, they're still prone to extreme weather events in those more rural areas. So they're still looking at the possibility of facing very cold days and nights for long stretches of time in the winter season."*

Renewable energy must be sited and developed more equitably.

Participants said that rural communities and Tribes are not considered during the siting and development of renewable energy projects, which can result in problematic outcomes and exploitation.

> *"Tribes often aren't included in discussion around renewable energy siting. Sometimes people think they're doing something great with renewables, but they aren't having those discussions with the Tribes. That's super important because it's being placed in places it shouldn't, the same way the dams were."*

> *"More recently, more of the green energy coming in is big corporations that will come buy land. [...] There is exploitation of local land and people to create green energy."*

Information about decarbonization needs to be more accessible.

Participants said it can be difficult to communicate information related to decarbonization with low-income groups because it tends to be presented with inaccessible language and because these groups do not have capacity to consider it.

> *"What I've found with a lot of communications is that they are at a college level so the common person doesn't understand what's being talked about. There are a lot of acronyms that are not explained frequently enough."*

> *"We were trying to give them information about the Green New Deal. We were sharing with them information they didn't understand. When you are in survival mode, nothing really matters."*

One participant said that electrification could "increase the energy burden" based on related changes. For example, if a heat pump adds air conditioning, it could increase energy costs. "We need to be deliberate in identifying if the proposed program will increase costs to low-income customers and if costs will increase the need to [have] a clear notification and consent system set up," said the participant.

Administer decarbonization initiatives by working with groups already in the community.

Participants recommended administering decarbonization initiatives in partnership with groups working at the local level, as these groups have the trust of communities and understand the context. Participants said it could be particularly effective to partner with weatherization programs.

Consider who pays for and is penalized by decarbonization actions.

Participants recommended considering who pays for and is penalized by decarbonization actions in order to create more equitable outcomes. For example, one participant said that, if a sales tax is created to fund decarbonization actions, it could harm low-income communities by increasing costs.

> *"We need to figure out how to equitably pay for this such that those who can pay for it, the richest among us particularly, and those who have done the most harm in the past [pay]. Any solution that doesn't do that is going to have really big unintentional negative impacts."*

Another participant worried that the way the natural gas rate base is adjusted as natural gas infrastructure is decarbonized could increase costs. As areas of the natural gas distribution system are decommissioned, those areas "need to be removed from rate base," said the participant. "If we can remove that plant from the rate base, we can reduce costs to all customers, including the most vulnerable." In contrast, if decommissioned plants are not removed from the rate base, costs could increase, the participant said.