2023 Biennial Energy Report

Washington State Department of Commerce

Required per RCW 43.21F.045(2)(h)

ENERGY DIVISION

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Report to the Legislature

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Executive summary

The 2021 State Energy Strategy (SES) was developed and published by the State Energy Office at the Washington State Department of Commerce, in collaboration with stakeholders and members of the public.[1] Designed to provide a roadmap for meeting the state's need for affordable and reliable energy supplies and its greenhouse gas emission limits,[2] the strategy outlines the path to a clean, inclusive energy economy by 2050.

After the publication of each SES, Commerce develops an update as required by RCW 43.21F.045(2)(h). This **2023 Biennial Energy Report** provides the governor and Legislature an analysis of energy issues affecting Washington residents and businesses, along with an update on recommendations made in the 2021 SES.

Legislative mandate

The State Energy Office, as established in RCW 23.21F, is required to submit a biennial report updating the Legislature on state energy strategy per RCW 43.21F.045(2)(h), which directs the Department of Commerce to:

> "… prepare and transmit to the governor and the appropriate committees of the legislature a report on the implementation of the state energy strategy and other important energy issues, as appropriate."

How to read this report

From the 2021 SES, Commerce provides updates and analysis in the following areas:

- Build an equitable and inclusive clean energy economy
- Energy in rural Washington
- Delivering emergency management and cybersecurity
- Transforming Washington's electricity supply
- Decarbonize transportation and use energy more efficiently
- Buildings and natural gas
- Industry and clean fuels

Each subject area contains tables that provide updates on a subset of SES recommendations, or amended recommendations, which reflect the changing nature of the energy landscape in the state. These assessments appear throughout the report in an attempt to show Washington's progress against the 2021 recommended actions. All tables appear in Appendix A.

[1] 2021 State Energy Strategy - Washington State Department of Commerce

[2] Enacted in 2020, the law commits Washington to limits of 45% below 1990 greenhouse gas emission levels by 2030, 70% below 1990 levels by 2040, and 95% below 1990 levels with net zero emissions by 2050.

Example of a progress assessment

2021 SES recommendation	2023 update
Expand the scope of the building performance standard to include buildings with less than 50,000 square feet with a stepped path to low energy and zero carbon by 2050.	Chapter 177, Laws of 2022 (SB 5722) established a new tier of covered buildings under the Clean Buildings Act (2019), which includes non-residential buildings between 20,000 and 50,000 square feet, and multifamily residential buildings over 20,000 square feet.[3][4] Managers and owners at these buildings will be responsible for benchmarking, operations and maintenance, and developing an energy management plan.

While this biennial update is primarily organized by how energy is used in the economy (that is, end-use sectors), several cross cutting issues arise in more than one sector. The report features **four crosscutting areas**, which are highlighted throughout this report in color-coded boxes corresponding to the following areas:

State agencies leading by example	**Workforce and clean energy jobs**
Energy resilience	**Environmental justice**

Legislative accomplishments

Significant change has occurred in Washington over the past two years. In the past two legislative sessions, transformative, first-in-the-nation policies have passed across multiple sectors, which prepares the state to reduce greenhouse gas emissions and make our communities more resilient to climate impacts.

Those accomplishments include:

- The passage of the **Healthy Environment for All (HEAL) Act**[5] is a historic step toward eliminating environmental and health disparities among communities of color and low-income households.
- The **Climate Commitment Act**[6] established a bold economy-wide cap-and-invest program to ensure emissions decline over time, as well as measures to improve air quality in overburdened communities highly impacted by air pollution. It also commits Washington to investing in clean energy and transportation, communities' climate resilience, natural climate solutions, and clean energy jobs.
- For the first time in its history, the Legislature passed a transformative **$16.9 billion transportation budget** centering climate objectives and low-carbon investments in historically underfunded communities.[7]
- Expanding the capacity of **Washington's Energy Resilience and Emergency Response Office** (EREMO) in response to evolving emergency response management concerns of longer and increasingly intense wildfire seasons.

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[3] 1257-S3.SL.pdf (wa.gov)
[4] 5722-S.SL.pdf (wa.gov)
[5] Chapter 314, Laws of 2021
[6] Chapter 316, Laws of 2021
[7] Move Ahead Washington Transportation Budget, including Move Ahead Washington, set to be approved — Washington Public Ports Association (washingtonports.org)

- Expanding the first statewide **building performance standard** in the nation,[8] meaning greater energy efficiency for hundreds of thousands of existing commercial and multifamily buildings.
- On top of this, Washington passed several of the county's most **energy-efficient standards for household appliances** (Chapter 19, Laws of 2022).

These are important, foundational policy actions, but there remains much work to meet the deep decarbonization pathway modeled in the 2021 SES. The strategy's deep decarbonization pathway analysis searches for the lowest cost path to reduce emissions based on what we know today about technologies, costs, and markets. Washington is grappling with the opportunities of green hydrogen, the difficulties of ensuring everyone benefits from this transition, and the opportunities and challenges around other clean, local fuels. The Department of Ecology's rulemaking requiring all new cars purchased in Washington after 2035 be zero-emission means the state requires an additional dramatic market transformation in the next decade.[9]

Our state and local governments frequently lack the resources to decarbonize fleets and retrofit buildings at the pace required by statute and executive order. All of this electrification must be underpinned by resource adequacy across the region's generation and transmission systems, which necessitates time, investment, and reorganization.

This biennial update acts as a gap analysis that looks ahead and prioritizes strategic recommendations for the next biennium and beyond. The scope of this report reflects the constantly changing and evolving landscape of energy decarbonization.

[8] Clean Buildings Performance Standard
[9] Department of Ecology Rulemaking

Successes and further work

As we look ahead to continue implementing the 2021 SES, Washington stakeholders must focus on the following areas in order to achieve net zero emissions by 2050.

Serving communities

Climate change will inflict the greatest harm on already marginalized communities, including people of color, tribes, rural areas, and low-income households. Absent deliberate and committed efforts, the anticipated clean energy transformation could leave these communities worse off.

Successes	Next steps
○ Enactment and implementation of HEAL Act	○ Examine clean energy policies for equity impacts in development and during implementation ○ Provide funding for communities to participate in the clean energy transformation ○ Support workers to ensure they have the skills for clean energy jobs and adopt policies to protect workers in transition

Electricity

Washington is on the way to eliminating greenhouse gas emissions from electricity with the implementation of the Clean Energy Transformation Act (CETA). Structural changes are needed to ensure the capacity to provide electricity to replace fossil fuels in transportation, buildings, and industry.

Successes	Next steps
○ Industry creation of Western Resource Adequacy Program[10] ○ CETA rulemaking and initial implementation plans	○ Invest in new transmission capacity and renewable generation, and coordinate with other states ○ Develop distributed energy resources with smart grid capabilities to unlock additional value to the grid and for customers ○ Strengthen market mechanisms to ensure resource adequacy and efficient electricity markets

[10] WPP (westernpowerpool.org)

Transportation

According to the 2021 State Energy Strategy, no sector is as important as transportation to achieving decarbonization, nor is any as complex in its operation and governance.

Successes	Next steps
Clean Fuel Standard and 2035 ZEV mandate Move Ahead Washington transportation funding Electric vehicle charging programs and funding Adoption of Advanced Clean Trucks	Establish equitable grant programs for EV purchase incentives Establish accountability measures for meeting EV sales targets Develop EV charging infrastructure strategy and roadmap Develop strategy to reduce vehicle miles traveled with specific targets and measures for mode shifting

Buildings

While Washington's codes and first-in-the-nation building performance standard have set up the state to reduce emissions in new buildings and existing large commercial buildings, there is great potential to reduce and eventually eliminate the use of fossil fuels to heat and power Washington's residences, offices, warehouses, shops, and other buildings.

Successes	Next steps
Building performance standards and incentives Nation-leading state energy codes	Comprehensive transition planning to reduce and eliminate GHG emissions from fossil fuels Expand weatherization and fuel conversion for low-income households Ensure state and local governments have the resources to decarbonize their buildings Strengthen and deepen energy efficiency programs and standards to focus on avoiding and reducing emissions

Industry and clean fuels

Successful industrial transformation will require more attention to industrial policy including better information about how industry uses energy, coordination of climate policy with other jurisdictions, and deliberate efforts to develop the skills of the state's workforce.

Successes	Next steps
Climate Commitment Act cap-and-invest program Green hydrogen incentives and the establishment of the Office of Renewable Fuels	Develop industrial policy to advance decarbonization consistent with the state's requirement for net-zero emissions by 2050 Build workforce for a clean energy economy

Build an equitable, inclusive, and resilient clean energy economy

The 2021 State Energy Strategy (SES) was the first Washington state energy strategy to specifically address equity. The Build an Equitable, Inclusive, Resilient Clean Energy Economy chapter created a space within the state's energy strategy to discuss the importance of recognizing the many definitions of equity and called on governments and the private sector to break from historical patterns and tropes about equitable outcomes. It specifically recognized that:

- Equity must consider the price of energy, as well as energy sufficiency and the health and economic impacts from energy production.
- The voices of vulnerable populations and overburdened communities must be intentionally sought out, respected, empowered, and privileged.
- The clean energy transition will not be equitable if it benefits only a few or if the costs are not fairly distributed across communities.

The chapter recognized that community participation must be incorporated as a part of the design, adoption, and implementation of policies across all levels of government. This ensures the availability of financial, technical, and human resources necessary for the meaningful involvement of historically underrepresented communities. It also highlighted the importance of energy resilience as part of energy policy and planning, and the importance of embedding equity in the design of clean energy policies and programs.

Environmental justice

The Healthy Environment for All (HEAL) Act defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, rules, and policies."

Environmental justice includes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm.

Embracing equity requires us to identify, name, and dismantle institutional racism, economic injustice, and oppression

Washington State Office of Equity

The 2021 SES's emphasis on equity and its impact on subsequent legislation received national recognition. A panel of independent judges affiliated with the Energy Foundation, Union of Concerned Scientists, Vote Solar, and World Resources Institute selected the strategy for one of six 2022 State Leadership in Clean Energy Awards, presented by the Clean Energy States Alliance. In selecting Washington for the award, the panel of judges said, "Washington (state) demonstrated a deep commitment to meaningful engagement and centering equity concerns."

The selection of the 2021 SES for a State Leadership in Clean Energy Award recognizes the leadership and commitment of Gov. Jay Inslee, former Commerce Director Lisa Brown, the Legislature, and members of the public who have championed equity. This leadership and commitment to equity will continue to be of utmost importance as the state implements its clean energy policies and addresses systemic inequities.

The cornerstones of Washington's equitable clean energy future

This equity update reflects the passage of monumental climate protection and environmental justice laws and the complex and often uncertain nature of policy and program implementation. It is not comprehensive, but rather calls attention to key regulatory and policy areas in need of strengthening and policy and regulatory gaps.

The Healthy Environment for All (HEAL) Act

The HEAL Act, an historic environmental justice law, aims to reduce environmental health disparities by requiring seven state agencies to incorporate environmental justice principles into operations and service delivery.

Along with other cabinet agencies, the Department of Commerce is responsible for implementing the HEAL Act. Per the Act's requirements, covered state agencies recently adopted provisional environmental justice community engagement plans. Implementing the HEAL Act will require agencies to incorporate environmental justice principles into their strategic plans, prioritize environmental justice in budget and funding decisions, and conduct environmental justice assessments on programs and policies. The Environmental Justice Council will oversee this work. The Council is a newly formed, 16-member body appointed by the governor. Council membership includes seats for community representatives, a youth community representative, environmental justice practitioners, tribes, labor, and business.

Figure 1: HEAL Act timeline

Next steps

Commerce will raise awareness about the agency's provisional community engagement plan and will use the plan to support all programs to increase meaningful engagement and inform agency work. Implementation of the HEAL Act will continue to evolve as agencies receive further guidance from the Environmental Justice Council and feedback from communities. The development of environmental justice (EJ) assessments and their use in planning major new projects, grants, and policies will shape Commerce's work and increase our ability to contribute to equitable outcomes.

- Incorporate EJ principles in strategic plans
- Prioritize EJ in budget and funding decisions
- Complete EJ assessments of programs and policies

Clean Fuel Standard and transportation investments

The Washington Clean Fuel Standard, which the Legislature passed in 2021, requires fuel producers sell a product with a lower carbon intensity or invest in low-carbon fuel choices (such as electricity or local,

sustainable biofuels) to power transportation. By requiring fuel suppliers to reduce the carbon intensity of transportation fuels, the Clean Fuel Standard will cut statewide greenhouse gas emissions by 4.3 million metric tons a year by 2038, and will stimulate economic development in low carbon fuel production.

The Clean Fuel Standard also requires electric utilities to use a portion of the credit revenue generated under the program from selling electricity to charge electric vehicles to benefit disproportionately impacted communities.[11] This will help ensure that communities bearing the greatest burden from air pollution today can participate in the transition to electric or fuel cell vehicles. For further discussion of the Clean Fuel standard, see the Transportation chapter.

Clean Energy Transformation Act

Washington's 100% clean electricity law, the Clean Energy Transformation Act (CETA), requires Washington electric utilities ensure an affordable, reliable, and equitable transition to an electricity supply free of greenhouse gas emissions. This includes an equitable distribution of the benefits of clean energy and reductions in burdens of vulnerable populations and highly impacted communities. In addition, the law requires utilities demonstrate progress in making energy assistance available to low-income households.

Washington's electric utilities passed two milestones since the 2021 SES: Submission of their first clean energy implementation plans (CEIPs) and energy assistance assessments. Utilities submitted these items in early 2022. Commerce, the UTC, and the Office of the State Auditor continue to review these documents with utilities and the public. Their reviews are set to be completed in 2023.

Some initial successes from CETA implementation include:

- Electric utilities selecting increasingly clean resource portfolios, which will reduce greenhouse gas emissions and local air pollution
- For the first time, electric utilities identifying communities highly impacted by climate change and actions to mitigate economic, environmental, and health impacts to vulnerable populations and overburdened communities
- To varying degrees, investor-owned utilities and some consumer-owned utilities expanded public participation beyond public meetings, with greater levels of public involvement and collaboration needed from all utilities
- Electric utilities submitting their first energy assistance assessments to Commerce with the first statewide report on electric utility energy assistance programs to be published in January 2023
- To varying degrees, utilities, regulators, and the public are engaging with one another on the importance of equity and environmental justice

Preliminary findings of the challenges implementing CETA's equity mandates include:

- Inconsistent use of equity indicators and metrics across utilities, reflecting the absence of a shared understanding of equity terms and measures
- Many consumer-owned utility public input processes remaining limited to governing board hearings with limited opportunity for input from low-income households, vulnerable populations, and highly impacted communities

[11] Department of Ecology Focus on: Clean Fuel Standard (wa.gov) (PDF)

- Ensuring that the newly formed investor-owned utility equity advisory group represents vulnerable populations and highly impacted communities, and that their input informs equitable decision-making and outcomes
- While the Legislature authorized funding for representation of customer interests in proceedings at the UTC, the funds may be accessed by industrial and commercial customer groups in addition to representatives of low-income customers, vulnerable populations, and highly impacted communities.
- Most utility funded direct bill assistance programs offered by consumer-owned utilities are not universally available to low-income households statewide
- Small and rural utilities face a number of hurdles when implementing the equity portions of CETA that larger utilities can more easily overcome
- CETA is an ambitious law and its clean energy and equity requirements remain a work in progress. Utilities, state agencies, and the public must realize equitable outcomes for low-income households, highly impacted communities, and vulnerable populations.

Next steps

- Utilities, state agencies, and the public should work together to identify best practices and lessons learned from the first round of clean energy implementation plans and energy assistance reports.
- The Legislature should assess the potential benefit of a larger role, with sufficient funding, for Commerce to support consumer owned utilities in meeting the equity-related CETA obligations. The existing model is one in which utilities work to meet these requirements with minimal guidance or support. An expanded state role would have Commerce, in collaboration with utilities and the public, conduct a comprehensive assessment of equity indicators, specific actions, potential risks, and public engagement and outreach opportunities to assist utilities in CETA implementation.
- Commerce's first biennial energy assistance report will inform legislators and stakeholders on possible changes and additions to energy assistance programs to reduce energy burden for low-income households.

Hydrogen hubs and environmental justice

Washington is helping lead a proposal to the Regional Clean Hydrogen Hubs (H2Hubs) program, which is a new federal Department of Energy funding program aimed at advancing deployment of clean hydrogen for strategic end uses in targeted regions across the U.S. This program is part of the federal Justice40 Initiative, meaning that 40% of benefits from the program should flow to overburdened (or "disadvantaged") communities. While the equity and environmental justice impacts of this program are yet to be seen, DOE's emphasis on Justice40 priorities is encouraging and aligns well with the HEAL Act, focusing on decreased energy burden, increased energy resilience, and access to jobs for people from disadvantaged communities, among other priorities.

To date, one of the most significant contributions Commerce has made was encouraging a diverse array of stakeholder feedback regarding how an H2Hub proposal will be developed in Washington.

The Pacific Northwest Hydrogen Association, a public-private entity, was formed in summer 2022. Commerce, drawing from guidance in Chapter 292, Laws of 2022 (SB 5910), helped ensure that the board and advisory councils included tribes, unions, and environmental non-profits to share diverse perspectives on this work. Environmental justice-focused groups in the state are not yet formally at the table. The intent is to hold space for a representative on the board. Additionally, the hub proposal includes a robust Community Benefits Plan that meaningfully engages communities and contributes to fulfilling expectations that this program, covered by the Justice40 Initiative, will deliver equitable benefits from hydrogen projects and activities in the state.

Communities in and near the fence line of proposed projects must have the opportunity to engage with and help shape projects and define equitable distribution of benefits.

Next steps:

- Provide ongoing opportunities for meaningful community engagement during H2Hub proposal planning and all phases of planning and reviewing proposed hydrogen projects.
- Continue to hold space for EJ and community organizations on the Pacific Northwest H2 board and advisory committees, since it is critical to have community input.
- Develop and implement a Community Benefits Plan that, among other things, defines expected benefits and minimizes or eliminates burdens to overburdened communities, so that a Pacific Northwest H2Hub delivers Justice40 benefits to communities.

The Climate Commitment Act (2021)

The Climate Commitment Act (CCA), Washington's economy-wide cap-and-invest program, sets the most ambitious limit on greenhouse gas emissions in the nation and invests revenues from the program into GHG emission reduction, climate resiliency, and equity-related projects and activities. The CCA requires investing no less than 35%, with a goal of 40%, of program revenues to benefit vulnerable populations in overburdened communities, along with a minimum of 10% for projects supported by tribes. Expenditures of CCA revenues need to undergo environmental justice assessments and will be reviewed by the Environmental Justice Council.

The law includes additional pollution protections for overburdened communities highly impacted by air pollution. It requires the Department of Ecology to expand air monitoring networks in these communities. Then, Ecology is tasked with setting air quality targets for these areas and adopting additional standards and regulations to improve air quality.

The program has a gap in its GHG emissions coverage: emissions-intensive, trade-exposed (EITE) businesses. EITE facilities face a particular challenge in that their emissions intensity correlates to a need to acquire a higher number of allowances under the CCA, while their trade exposure means that paying for their emissions could contribute to making their products more expensive than comparable products produced in other states or countries without such costs. The risk of the CCA causing EITE facilities to move their production – and emissions – to other jurisdictions (known as leakage) led to provisions in the bill that provide no cost allowances with a low reduction curve in the program's early years.

As written, EITEs receive no-cost allowances covering 94% of their mass-based emissions baseline through the compliance period beginning 2031; then, the trajectory is undefined. Gov. Inslee, members of the Washington State Legislature, Ecology and other state agencies, along with environmental justice and climate advocates, continue to raise concerns about the law’s provisions for EITE businesses. If left unaddressed, these provisions will not reduce emissions in line with state’s statutory 2040 and 2050 greenhouse gas emissions limits.

Ecology will convene an EITE work group to advise on next steps that will enable these industries to comply while supporting clean manufacturing. This process is expected to begin in 2023, and must conclude in 2026. These efforts to tackle industrial GHG reductions, alongside additional progress on local air quality improvements, will contribute to implementation of the CCA in ways that do not leave pollution “hotspots” that fail to address disproportionate environmental health impacts.

Next steps

- Next steps related to EITEs include measures to support lower-carbon manufacturing, such as through addressing embodied carbon, fuel switching opportunities for industrial facilities, and more. These are discussed in the Industry and renewable fuels chapter.

Energy and rural Washington

Climate change, the costs of energy services, and the opportunities of clean energy transformation affect rural areas in multiple ways. All communities need a strong economy that provides good jobs, better internet broadband services, easier access to energy efficiency services and clean energy sources, affordable and reliable transportation services, and resilient energy systems.

Rural communities play a vital role in the state's clean energy transition. An equitable transition will reflect the diverse experiences and needs of rural communities as consumers and producers of clean energy. Commerce applies an equity lens to existing programs and funds, guided by the 2021 SES to ensure cross-cutting issues are addressed. Programs will be modified and adapted, funding priorities may change, and quantifying equity and economic benefits will be required.

State agencies are engaged in multiple efforts to improve the process of siting, permitting, and hosting rural renewable energy projects, clean technology manufacturing, electricity transmission lines, forest and agricultural bioenergy facilities. For further discussion of siting, see the Electricity section of this report.

Commerce is also implementing a Clean Energy Fund grant program that will provide $4.6 million for grants related to rural clean energy innovation, dairy digesters, and tribes. To ensure greater equity in this grant program, Commerce is increasing its outreach to stakeholders through direct contact and planned public meetings, in addition to traditional outreach methods and related site visits. This approach is guided by recommendations in the 2022 Rural Clean Energy legislative report, which called for greater technical assistance, sustainable funding, and equitable access.

Commerce is also engaged in two project siting efforts: A joint Commerce and Ecology Low-Carbon Energy Project Siting Study and the recently undertaken Least-Conflict Solar Siting on the Columbia Plateau project, which is led by the Washington State University Energy Program. Both efforts enlisted a range of stakeholders from cities, counties, ports, tribes and NGOs from or active in rural areas.

Next steps

The Legislature should fund Commerce to increase its engagement with rural communities and conduct economic analysis of clean energy opportunities, costs, benefits, disparities, realities and perceptions of energy project siting and permitting under county, Energy Facility Site Evaluation Council (EFSEC), CETA, HEAL, and related laws.

This effort is needed to ensure local input is gathered, overburdened communities are not overlooked, and a wide array of stakeholders are engaged. The economic analysis will aid in quantifying CETA's incremental steps and its effects across rural Washington. As an initial step, Commerce conducted a stakeholder engagement exercise in seven rural counties in June 2022 and compiled the results to guide future rural engagement work through the identification of issues related to the siting and permitting of energy projects and the implementation of CETA.

Clean Energy Fund (CEF)

The Clean Energy Fund (CEF) was created in 2013 by the Legislature to fund projects that provide a public benefit to the people of Washington through the development and deployment of clean energy technologies. CEF projects save energy and lower energy costs, reduce harmful air emissions, or otherwise increase energy independence for the state.

The Legislature has provided $231 million in biennial appropriations to the CEF. This catalyzed matching investments from numerous diverse entities, unlocking millions of dollars. These public-private partnerships accelerated innovations in energy storage and renewable energy generation, grid modernization, decarbonization of the transportation sector, and electrification of buildings, which have helped Washington make progress toward the state's clean energy goals.

In 2020, Commerce convened the Energy and Climate Policy Advisory Committee (ECPAC) pursuant to the Clean Energy Transformation Act (CETA). The report sent to the Legislature in December 2020 provided recommendations for how to best deploy the Clean Energy Fund equitably and fairly to meet the state's climate goals and support the recovery and competitiveness of the Washington economy.

Over the past two years, Commerce has worked to implement these recommendations, particularly around supporting innovation, encouraging collaboration, and increasing equitable access to funds. CEF programs like Research, Development and Demonstration (RD&D), Grid Modernization, and Electrification of Transportation, among others, have incentivized the research and development of new and emerging technologies needed to transform economic sectors and reduce emissions from the state's key industries. Since 2021, these programs have also leveraged recommendations from ECPAC and the 2021 State Energy Strategy by prioritizing and incentivizing partnerships among the private, public, and non-profit sectors.

In an effort to foster innovation and learning, reduce barriers faced by smaller applicants and reach more beneficiaries, the most recent rounds of CEF programs prioritize collaborations among small and large research institutions, tribes, utilities, businesses, and local governments through scoring criteria. This has resulted in job growth and creative partnerships across sectors to develop new technologies, and improve grid resilience and transportation systems.

Lowering barriers to entry

CEF is also attempting to achieve the equity goals of the 2021 State Energy Strategy by increasing stakeholder engagement to inform the grant program design, reserving funding for tribes, incorporating equity criteria into scoring considerations, and implementing actions to dismantle the most common barriers faced by rural, tribal and vulnerable communities in applying to grants.

One approach has been to attempt to increase public participation of historically marginalized voices by sharing grant program information and incorporating community feedback on program design. The CEF team has also made an effort to build relationships with tribes through information and listening sessions dedicated to tribal representatives. Other strategies including developing advisory committees. For example, in the 2021-23 capital budget, the Legislature provided funds to convene a work group representing the priorities of rural communities that was tasked with providing recommendations on investments, programs, and policy changes to increase access to clean energy opportunities in rural communities. The recommendations and a strategic plan to implement them were included in a legislative report that will inform the development of the subsequent rural clean energy grants program.

Another barrier to new entrants to CEF has been the level of required match funding. In response, the CEF program introduced new scoring mechanisms and lower match requirements for tribes, highly impacted communities, vulnerable populations, and other targeted groups.

Organizational capacity is another barrier to participating in CEF. Many communities and organizations have a high opportunity cost for the time and resources it takes to apply for a CEF grant and often lack full-time grant writers. One option utilized in CEF to alleviate some of the administrative burden on applicants is a two-phase application process. This enables applicants to submit limited information and receive a response on whether their project has a good chance of receiving funding before spending time and effort on a full application.

Both of these strategies for reducing barriers to entry have resulted in increased participation from tribes in programs like the Electrification of Transportation Systems, and positive feedback from applicants. However, more work remains to support equitable access to the Clean Energy Fund.

The ECPAC legislative report also found that in the coming years, the 100% clean electricity goal of CETA, combined with the state's greenhouse gas reduction mandates, will require fundamental shifts in Washington's energy landscape and infrastructure needs. Many technologies that can contribute to Washington's clean energy future, such as hydrogen, heat pumps and demand response, are still relatively nascent in Washington and require continued investment.

Further, public investments are needed to achieve an equitable clean energy transition, particularly within highly impacted populations, rural and tribal communities. As a result, the 2021 State Energy Strategy urged the state to continue to invest in the Clean Energy Fund. State funding of the CEF is as vital as ever. Successful CEF projects that demonstrate what is possible and the additional technology innovations that are still needed are highlighted in each of the following chapters.

Ensuring the longevity of CEF

2023 marks the tenth year of the CEF. Codifying the program can demonstrate the Legislature's enduring commitment to partner with communities to achieve a clean, affordable, resilient and just energy future. Now is also the time to clarify eligible uses of CEF as unprecedented levels of federal funding for clean energy technologies and infrastructure are becoming available. It is critical to ensure that the CEF program aligns with new federal programs and can be used as match to secure federal investment in Washington. For example, the Infrastructure Investment and Jobs Act (IIJA) provides $550 billion for infrastructure projects over the next decade. Of that new money, $74 billion is for energy and grid-related programs.[12]

There is also an urgent need to restructure CEF. The fund's strategic goals have not been fully updated to align with several recent climate and environmental justice laws. A restructured CEF will allow more flexibility and provide resources to expand the benefits of the clean energy economy to communities that have not yet benefited.

To date, CEF has been funded through the capital budget, which has artificially limited the potential of the program. It is time to ensure that both capital dollars and operating dollars are appropriated to the CEF to provide technical assistance and support innovative projects from concept through commissioning. Operating dollars can support project planning, feasibility studies, outreach, education, community engagement and

[12] "The Infrastructure Investment and Jobs Act will Deliver for Washington" https://www.whitehouse.gov/wp-content/uploads/2021/08/WASHINGTON_Infrastructure-Investment-and-Jobs-Act-State-Fact-Sheet.pdf and "The Inflation Reduction Act Delivers Affordable Clean Energy for Washington" https://www.whitehouse.gov/wp-content/uploads/2022/08/Washington.pdf

grant writing. This capacity support is critical to ensure that vulnerable and frontline communities can access federal and state clean energy funds and shape their own energy future. This type of community-led project design is discussed further in the Electricity chapter.

Next steps

- The Legislature should codify the Clean Energy Fund program in statute to provide flexibility so CEF can adapt to changing market conditions, leverage federal funding available under the Inflation Reduction Act and IIJA, and better align with recent environmental justice legislation such as the HEAL Act.
- The Legislature should appropriate both capital and operating funds to CEF. Capital dollars fund installation and construction of clean energy projects, and operating dollars are needed to enable communities to access federal and state funds. Without capacity support to design projects and apply for funding, the communities that can benefit most from federal and state investments will likely be left behind.
- Reliably robust funding is needed to build upon the Clean Energy Fund's proven record of accomplishment of developing and demonstrating innovative clean energy technologies and to evolve the program so that it can support an equitable, community-led energy transformation.

Emergency management and cybersecurity

To support Washington's transition to a clean, resilient and just energy future, the 2021 SES recommends expanding the state's energy infrastructure security and emergency management capability.

The 2021 SES identifies "enhancing resilience in rural Washington by strengthening the electric grid to deliver clean energy" as key to addressing inequities in communities across the state (Executive Summary). To achieve that goal, the SES recommends expanding the energy emergency program (Chapter F, Electricity), which will directly affect the energy resilience in Washington, especially for vulnerable and rural populations.

To address these recommendations, the emergency management function within the State Energy Office submitted its first funding request to the Legislature in 2021, which was successful. This funding was directed to support the demand for growth of this critical function of state government. With this initial state funding, the Energy Resilience & Emergency Management Office (EREMO) grew from one federally funded, full-time employee to two state-funded full-time employees for all energy resilience, emergency management and energy cybersecurity planning, response, and mitigation.

The EREMO is a critical function of state government that ensures the public safety of Washington communities, which face increasing threats from hazards such as wildland fire, supply disruptions and cybersecurity attacks. EREMO's statutory role is to prepare and execute contingency plans to address energy emergencies and shortages.[13] Energy security and resilience is a critical concern, as Washington has experienced increased intensity of natural hazards and more significant cybersecurity attacks in recent years. The introduction of new approaches, such as microgrids, the transition to more alternate fuels such as hydrogen, and the need to power electric vehicles during emergencies adds to EREMO's responsibilities.

The EREMO responded to 11 significant energy supply disruptions since 2020, including a central role in COVID-19 response. This is a significant increase, as in the 10 years prior it only responded to one significant energy supply disruption. Given the increased severity and frequency of energy supply disruptions, it is critical for the state to document needed energy supply disruption processes and to support and review local and tribal jurisdictions' documentation. The states response heavily depends on how local and tribal jurisdictions choose to implement local mitigation measures.

The EREMO continues to address the 2021 SES recommendations with continued limited employee capacity to complete the development of many critical emergency plans that are necessary to effectively coordinate emergency response. Washington's energy landscape is complex, involving both public- and investor-owned electric and gas utilities and significant petroleum refinery capacity, against a background of groundbreaking, transformative laws.

EREMO has taken on new authority and responsibility due to the expanded requirements of state energy offices under the Infrastructure Investment and Jobs Act (IIJA). Under new requirements, each state must draft an Energy Security Plan with six required elements that:

- Describe the state's energy landscape
- Detail how the state works with energy partners
- Detail how the state can secure their energy infrastructure against all physical and cybersecurity threats

[13] RCW 43.21F.045

- Mitigate the risk of energy supply disruptions to the state
- Enhance the response to, and recovery from, energy disruptions
- Ensure the state has secure, reliable, and resilient energy infrastructure

Next steps

Commerce and the EREMO continue to seek additional funding through multiple means to meet the new federal requirements. This work requires additional staff that can support all aspects of energy resilience, cybersecurity and emergency management in the state, including close coordination with multiple sectors, different levels of government and the private sector.

If additional funding for EREMO is successful, we will be able to meet the new federal requirements and the existing statutory role, which includes:

- Create state-level energy emergency plans
- Provide direct technical support to local and tribal jurisdictions to develop their energy emergency plans, which will be implemented when the state has an energy supply disruption
- Begin to develop an energy resilience framework for the state to meet our energy resilience goals
- Implement the energy resilience framework by providing technical assistance through community engagement, conducting energy profiles for critical operations, and conducting assessments

This effort will focus on rural communities to build and enhance relationships between Commerce and local and tribal communities, provide a structured process and points of contact for the energy resilience scoping plan, and provide a connection to funding opportunities for energy resilience capital investments.

Highlights from response activities

Natural gas disruption — December 2021

On Dec. 21, 2021, a vehicle accident caused damage to natural gas equipment on the Williams Pipeline near White Salmon, Wash., and Hood River, Oregon, in the Columbia River Gorge. Skyline Hospital was among the 5,000 customers impacted. Necessary COVID-19 safety measures delayed restoration by limiting access to customers' homes to relight equipment. The EREMO coordinated with NW Natural, the pipeline owner and operator, and ESF-12[14] teams in Oregon to monitor impacts to critical infrastructure and coordinate unmet needs for vulnerable populations by providing public information.

Wildland fire season — 2021

On July 16, 2021, FEMA activated Washington's ESF-12 to help respond to delivery delays for Jet A fuel, which the state needed to respond to multiple wildfires. This petroleum fuel is also used in civilian aircrafts, including farming equipment. By July 26, the fuel distribution delays were starting to affect the agricultural sector. Firefighting aircraft were using the supply needed by crop dusting aircraft. Throughout August, demand for Jet A fuel far outstripped supply. Fire response shifted to prevention and containment, as flying long distances to large fires became unfeasible. By August 18, the market began to produce more supply, but a simultaneous rise in COVID-19 exposures caused additional staffing shortages for fuel haulers and airports. Finally, fire activity began decreasing in September. The EREMO supported successful resolution of this incident by depending on non-traditional intra-state partnerships between Commerce and the state departments of Natural Resources, Transportation and Aviation, and the U.S. Forest Service (USFS).

[14] ESF-12 (Emergency Support Function #12) is a FEMA designation. The EREMO is Washington's support function.

Transforming Washington's electricity supply

Key electricity sector actions from the 2021 State Energy Strategy

A. Accelerate investment in renewable generating resources and transmission
The clean electricity supply must grow to replace fossil fuels in transportation and buildings. Transmission capacity and market mechanisms enable better access to diverse clean resources across the West. Strengthen resource adequacy through an explicit program.

B. Build a smart and flexible grid
Grid modernization is necessary to increase energy resilience and assure reliable service. Expand advanced metering infrastructure with safeguards for privacy and security. Pursue universal, statewide deployment of broadband access.

C. Facilitate community deployment of renewable generation resources and grid services
Increase opportunities for communities to control their own energy supplies. Develop tools for equitable energy distribution and deployment.

State agency key action

Expand the state's energy infrastructure security and emergency management capabilities. Increase state agency engagement in interstate and federal transmission and market development initiatives.

An electricity supply free of GHG emissions is key to meeting Washington's statutory GHG reduction limits. Clean electricity will allow residents to power their cars and buildings with renewable and non-emitting resources, displace fossil fuels in the industrial sector, and enable Washington to manufacture synthetic fuels and green hydrogen. The 2021 SES found that clean electricity will lower overall energy costs, increase overall energy efficiency, and increase Washington's national and international economic competitiveness, boosting the standard of living for all Washington residents.[15]

Washington is well positioned to electrify its economy. Washington's abundant hydropower and ambitious 100% clean electricity law, the Clean Energy Transformation Act (CETA), provide the foundation and architecture for a decarbonized grid that ensures clean, affordable and reliable electricity for customers. The Climate Commitment Act (CCA), Washington's economy-wide cap-and-invest program, provides additional assurance of GHG reductions from in-state electricity generators and electricity imports.

A combination of electrification and energy efficiency is the most cost-effective way to meet the state's clean energy and environmental protection objectives.[16] This requires Washington to double its clean electricity supply by 2050.[17] Building these resources in the state is not necessary. A more reliable and productive resource portfolio includes wind from the Rocky Mountains and solar from the Southwest. These resources are complementary and will ensure affordable and reliable power. Electricity imports are projected to continue to increase to 43% of Washington's electricity supply by 2050.[18] Washington utilities and planners will continue

[15] 2021 State Energy Strategy (PDF)
[16] Ibid.
[17] Ibid.
[18] Washington State Energy Strategy Decarbonization Modeling: Final Report (Excel)

to explore other resources options that do not yet appear cost effective, such as geothermal, offshore wind and nuclear.

Constraints in the bulk power transmission system pose one of the greatest challenges to Washington's energy and climate goals. Transmission constraints reduce access to cheap and abundant wind and solar and increase the likelihood that resource supply is inadequate at critical times. An inability to access these resources will increase costs of the clean energy transition and limit Washington's ability to produce hydrogen and synthetic fuels.[19] Washington must take deliberate action in coordination with its neighbors to expand transmission capacity to ensure it can affordably and reliable meet its clean electricity goals.

Removing barriers to regional electricity markets offers another opportunity to improve access to clean energy resources. The benefits of regional trade increase as emissions limits become tighter and electricity loads grow through the electrification of Washington's economy. Well-designed, climate-aware electricity markets support the state's climate goals and economy. However, market structures that treat fossil-fired energy and clean energy as equivalent are a significant obstacle. The Western Power Pool's Western Resource Adequacy Program (WRAP), while not an actual power market, is a good first step toward regional integration. Utilities, regulators and the State Energy Office should continue to participate in developing this program.

Washington also needs to build renewable generating resources within the state. Siting challenges must be addressed for in-state expansion of clean energy to occur. This requires engaging with communities to better understand land use considerations, including protection of natural resources, support for work in rural areas, and preservation of tribes' cultural resources.

A. Transmission

There is a broad consensus across utilities and planning agencies that additional transmission development and greater market access to clean energy resources are needed to maintain resource adequacy and meet the state's long-term climate objectives. The Bonneville Power Administration's (BPA) lengthy interconnection request queue demonstrates both the significant project investment that is occurring and the resulting transmission congestion.

Building new transmission lines is a time-intensive process that requires significant investment. A recent two-year study by the Department of Energy confirmed the potential cost savings and resource adequacy benefits of a Western regional transmission organization (RTO).[20] In light of these findings, discussions of an RTO are ongoing in the West.

Federal funding opportunities

Transmission upgrades and expansion have been a top priority of the Biden administration and 117th Congress. The significant amount of funding for transmission projects made available under the bipartisan Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) can help Washington implement the projects needed to access new sources of clean energy required to decarbonize the state's electricity. The IIJA also expanded the Bonneville Power Administration's borrowing authority by $10 billion to help retrofit transmission along the federal Columbia River Power System, which includes Washington, Idaho,

[19] Washington State Energy Strategy – Hydrogen Usage

[20] Regional transmission organizations (RTOs) are independent, non-profit electric power systems operators that exist in seven different geographic areas across the United States today (for example, PJM). RTOs play an important role in the coordination, monitoring, and control of a multi-state electric grid.

Oregon, western Montana and small parts of eastern Montana, and parts of California, Nevada, Utah, and Wyoming.

Projects eligible for IRA funding must be in a National Interest Electric Transmission Corridor (NIETC), a DOE-designated region where electricity transmission limitations are adversely affecting citizens. Among other things, the NIETC must promote national energy security and development of intermittent resources, or energy resources that vary in output by their nature such as wind, solar, run of river hydroelectric power and other renewable resources.[21] Roughly $760 million of IRA funds for transmission are grants aimed at facilitating the siting of certain onshore and offshore transmission lines. The funds may be used by states and local governments to conduct transmission project studies, examine alternative siting corridors, host negotiations between stakeholders, participate in federal and state regulatory proceedings, and promote economic development in impacted communities. These funds will remain available through Sept. 30, 2029.[22]

One hundred million dollars of the remaining IRA funds will be available until Sept. 30, 2031, for convening stakeholders and conducting analyses related to interregional transmission development and development of transmission for offshore wind energy. Other provisions in the IRA, such as those related to loan programs administered by the U.S. Department of Agriculture, could potentially incentivize transmission development, but their potential impact is uncertain at this time. In addition to IIJA and IRA funds, the Biden administration made an **additional $3.25 billion** available to the Western Area Power Administration (WAPA) to support the development and expansion the transmission system in the areas bordering Washington, Oregon and eastern Montana.[23] These actions strengthen regional electric transmission and increase the potential benefits of regional integration.

Transmission Corridors Work Group

The Washington State Legislature recognized transmission need when it passed CETA in 2019. The law required the Energy Facility Site Evaluation Council (EFSEC) to convene the Transmission Corridors Work Group (TCWG) to examine and report on transmission needs, environmental review options, and ways to expedite the review of transmission projects without compromising environmental protection.[24]

The TCWG report identifies transmission capacity as crucial to achieving the state's climate protection laws. Additional capacity along existing electric transmission corridors and new transmission builds is needed to meet CETA goals and decarbonize buildings, transportation, and industry. The report recognizes transmission is expensive and controversial, but also necessary. It recommends proactive, longer-term transmission planning by the electric power industry, and calls for the executive branch of Washington's state government to take a more active role in transmission planning and development of a regional transmission organization.

Advocacy for federal transmission reform

Gov. Inslee is a national leader in advocating for transmission reform, championing a more robust and efficient transmission system in his comments on FERC's Advanced Notice of Proposed Rulemaking RM21-17-000. Commerce and the UTC, joined by the Oregon Public Utilities Commission and Oregon Department of Energy, followed Gov. Inslee's lead and filed comments on the notice of proposed rulemaking to reform electric

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[21] The IIJA amended the NIETC designation to allow the Federal Energy Regulatory Commission (FERC) to supersede traditional state permitting of transmission facilities and issue permits for the construction and operation of some interstate facilities under certain circumstances.
[22] Congressional Research Services, Electricity Transmission Provisions in the Inflation Reduction Act of 2022
[23] White House Fact sheet: Biden-Harris Administration Races to Deploy Clean Energy that Creates Jobs and Lowers Costs
[24] RCW 19.405.150, Transmission corridors work group

regional transmission planning and cost allocation. The proposed rules would require transmission providers plan for longer timelines and a decarbonized grid. It would also give states a greater role in the allocation of regional transmission costs.

Progress assessment: Transmission

2021 SES recommendation	2023 update
Encourage federal investments and transmission reforms.	The IIJA and IRA include significant federal funding for transmission. The IIJA provides $65 billion for: • Constructing new transmission lines • Increasing capacity on existing lines • Furthering the research, development and deployment of innovative grid enhancing technologies The IRA appropriates an additional $2.9 billion for transmission infrastructure. A $2 billion direct loan program for transmission development will be available through Sept. 30, 2030.
The Executive Office of the Governor, the UTC and Commerce should pursue opportunities for enhanced transmission planning and integration across the western grid and advocate for joint development where feasible.	The Transmission Corridors Work Group convened by EFSEC will release a report in December 2022 that identifies strategies for enhancing transmission planning Washington and beyond.
Utilities and planning agencies should evaluate the need for a joint development of new and upgraded transmission capacity and consider the viability of a regional transmission organization.	Exploration of a regional transmission organization is ongoing.

Areas for action

Secure federal funding for transmission projects

Utilities, transmission owners and investors should pursue opportunities to leverage federal funds to build onshore and offshore transmission. Commerce should continue to raise awareness and coordinate statewide efforts to direct federal funds to Washington. Commerce will continue to raise awareness and coordinate statewide efforts to support communities and eligible entities in securing federal funds for Washington's benefit.

Staffing and technical study needs

Commerce and the UTC continue to participate in RTO discussions and track federal regulatory developments and funding opportunities. Both agencies represent Washington in the NorthernGrid regional transmission planning organization. The Legislature should fund additional staff at the UTC and Commerce to advocate for Washington interests at FERC and other national and regional forums, consistent with the recommendation of the TCWG. The dedicated staff would also work to build a better understanding of the concerns and interests of overburdened communities in the development of clean energy resources, and the role of power transmission systems in addressing those concerns. In addition, the Legislature should provide funding for technical studies to evaluate transmission opportunities.

Study and engage in transmission planning

As Washington utilities and planning agencies engage in discussions of a western RTO, they should pursue independent means of building transmission capacity within or outside of the state. If needed, the state should consider taking a more direct role in the development and even operation of critical transmission facilities. The Legislature should commission an independent assessment of the potential benefits of creating a new entity, with powers and duties comparable to those of a joint operating agency under RCW 43.52.300, to finance, construct, or operate facilities for the transmission of electricity within or outside the state of Washington. The study could explore the establishment of a stakeholder steering committee and offer tribal consultation, and consider the experiences of comparable entities in New Mexico, Colorado, and other jurisdictions.

B. Deployment of Clean Energy Resources

Accelerate investment in clean generating resources

Most consumer owned utilities (COU) in Washington have sufficiently clean or non-emitting resource portfolios to comply with CETA until at least 2030, and many are in compliance until 2045. As a result, COU pursuit of new clean energy resources has been limited over the past two years but could increase before the 2030 CETA compliance date due to load growth. For example, Grant County Public Utility District anticipates having insufficient energy capacity in 2026, largely due to the county's recruitment of electricity-intensive industries such as data centers. In its 2022 Integrated Resource Plan, Grant County proposes adding 550 MW of new capacity through 2025 (of which about 34% is natural gas fired reciprocating internal combustion engines and the remainder is solar and wind generation).

In contrast to many consumer owned utilities, Washington's three electric investor-owned utilities are working to procure additional clean energy resources in the near term. For example, Puget Sound Energy's (PSE) demand forecast predicts a capacity need for 369 MW of new electric resources in 2026, increasing to 527 MW in 2027. However, a request for new generating resources that PSE issued in 2021 sought up to 1,506 MW of capacity resources due to PSE's desire to reduce reliance on the market for procuring short term energy contracts. A total of 95 proposals were submitted in response to PSE's request for proposals with a capacity of 21,006 MW. The proposed projects would be in Washington, Oregon, Idaho, Montana and Wyoming. Selected projects had not yet been announced when this report was drafted.

As demonstrated by the geographic diversity of the projects submitted to PSE's RFP, there are tradeoffs in siting new generating resources. Out-of-state sites often enable higher capacity factors for renewable generation (such as wind in the Rocky Mountains and solar in the Southwest) but have greater transmission requirements. In-state projects offer opportunities for economic development, including job creation, workforce development, and capital investment. These projects must also adhere to the state's commitments to respect and uphold tribal sovereignty, protect natural resources, and create direct benefits in the communities where these projects occur. Understanding competing land uses and being aware of culturally significant areas and areas where tribes have rights to resources can help the state better target areas that have high production potential for solar, wind and other sources of renewable energy, and better protect conservation and agricultural lands and tribal resources.

In 2021, the Legislature directed the Department of Ecology (Ecology), in consultation with Commerce, to develop recommendations to improve the permitting of clean energy projects while maintaining the state's environmental standards and preserving tribal consultation and treaty rights. The Low-Carbon Energy Project Siting Improvement Study was released in November 2022. Commerce and Ecology engaged interagency partners, a diverse advisory group, and tribes to develop recommendations for improving siting and permitting processes. In 2022, recognizing the need to bolster development of new clean energy facilities, the Legislature

passed Chapter 183, Laws of 2022 (House Bill 1812) to expand the authority of the Energy Facility Site Evaluation Council (EFSEC), including allowing additional types of energy facilities to elect to be permitted through EFSEC. Some initial work is underway to identify potential locations for clean energy resources that may reduce conflict with agriculture, tribal resources, places of tribal significance, critical habitat, and other uses. A few relevant mapping projects are described in the table below.

Project	Lead Agency	Description
DNR Solar Mapping Project	Department of Natural Resources (DNR)	Map identifies potential lease sites on DNR trust lands that may avoid conflicts with competing uses and concerns about ecosystem and cultural impacts.
Compatible Energy Siting Assessment (CESA) Map	Commerce	Prototype map provides examples of site specific consultation guidance to support civilian-military coordination for compatible siting of clean energy.
Least-Conflict Solar Siting	Washington State University (WSU)	WSU is engaging solar developers, farmers, ranchers, conservation groups, and tribes to map land uses where solar development may occur in the Columbia Plateau. Interested parties will work together to develop mapping layers that will be available by June 2023.
Marine Spatial Planning Map	Department of Ecology	This interagency map provides information on various resources, infrastructure, and habitats off of the Pacific coast of Washington to inform marine planning and new potential uses of the offshore environment.

Progress assessment: Deployment of clean energy resources

2021 SES recommendation	2023 update
Washington utilities, resource owners, and developers advance plans to build clean resources.	New electricity generation continues to expand in Washington. In particular, there has been a proliferation of new large-scale solar projects currently under development, based on the project queue before the Energy Facility Site Evaluation Council (EFSEC).
Funding should be made available to Commerce and electric utilities to conduct a statewide clean energy potential assessment to identify clean energy development zones.	Funding has not been provided for a statewide clean energy potential assessment. Some siting studies are in progress and the state is pursuing opportunities to support more efficient and effective siting of renewable energy generation and energy storage technologies.

Areas for action

Washington must continue to encourage energy efficiency across all sectors of the economy as the first step and lowest-cost action. Utilities should work with their regulators to undertake proactive resource planning and make strategic investments in new resources that both decarbonize the grid and benefit their customers, particularly overburdened communities and vulnerable populations. Ultimately, market prices and transmission capacity will largely determine whether new generating resources are located in- or out-of-state. The actual outcome will almost certainly be a combination of diverse resources sited both in state and beyond Washington's borders.

Fund dual-use solar demonstration projects

The Legislature should provide funding for a grant program at Commerce for dual use solar demonstration projects. This grants program can provide a proof of concept and identify best practices for productive co-use of sites for renewable energy generation and an additional economic use, such as:

- Using land for both a farm crop and solar energy generation, through a practice called agrivoltaics.[25]
- Installing solar over irrigation canals to make use of existing impervious surface, keep water cool, and reduce evaporation.

The overarching goal of these projects is demonstrating that solar production and current land uses do not need to be in conflict, and that clean energy production can be sited harmoniously with the rural character of communities and support existing livelihoods.

Center community-led project design

Ultimately, Washington must find additional pathways beyond current developer-driven siting approaches and toward community-centered project design. **The state should encourage a process that engages communities before project conception to understand community preferences and goals.** This includes empowering communities with timely and accessible data and prioritizing community values through community benefit agreements. The community energy visioning process can enable communities to coalesce around shared priorities for clean energy expansion.

C. Prepare for widespread deployment of distributed energy resources and advance grid modernization

Distributed energy resources (DERs) are distinct from large scale energy generating facilities like hydroelectric plants and large wind and solar farms. DERs generate electricity locally and reduce or shift demand at the site where it is used. Certain conditions in Washington have slowed adoption of DERs relative to national trends. These conditions limit the value that DERs can provide to the electric grid and as a result, the economic value that customers can receive. They include:

- Low electric rates, which lead to longer payback periods for customer-owned energy resources like rooftop solar
- Relatively slow deployment of Advanced Metering Infrastructure (AMI) and Distributed Energy Resource Management Systems (DERMS), which utilities can use to better integrate DERs
- Low levels of utilization of time of use rates and demand response, which can increase the benefits that DERs provide to the electric grid

Expanded federal tax incentives and federal grant funding for rooftop and community solar may help utilities and customers overcome these barriers. Increased deployment of DERs, such as installing solar in the built environment, could play an important role in transitioning to a clean energy grid under CETA while sidestepping some of the siting challenges faced by large-scale utility projects.[26]

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[25] This includes growing plants such as carrots, turnips, and squash under solar panels. The crops chosen should be suited to local growing conditions and soil nutrients. See for example: https://www.jackssolargarden.com/

[26] For example, HB 1814 (2022) included the following definition of preferred sites for community solar: rooftops, structures, existing impervious surfaces, landfills, brownfields, previously developed sites, irrigation canals and ponds, stormwater collection ponds, industrial areas, dual-use solar projects that ensure ongoing agricultural operations, and other sites that do not displace critical habitat or productive farmland as defined by state and county planning processes.

The first Clean Energy Implementation Plans (CEIPs), submitted in late 2021 by Washington's investor-owned electric utilities, emphasized DER deployment as a strategy for achieving the equitable distribution of benefits required under CETA. Customer interest in DERs is nascent in Washington, particularly in rural and remote areas. This is evident from the addition of energy storage to a growing number of customer-owned solar installations, even though there is no economic signal for these customers to shift their usage or put power onto the grid during times of peak usage.

Unfortunately, under current conditions, it is likely that many of these systems, particularly behind-the-meter storage, will sit idle waiting to provide backup power during relatively infrequent outage events. Better integration of DERs, as envisioned in the 2021 SES,[27] can provide additional value to both the distribution grid and to customers. With the need for clean energy ramping up in the next decade under CETA, it is a good time for the state and individual utilities to take steps to actualize the full value that DERs can provide to customers and the electric grid.

To derive the full benefits of DERs, utilities need to develop new economic signals to send to customers and deploy additional grid integration technologies in the next two years. This includes targeting locations where the benefits of DERs are the greatest and the costs of interconnecting them are the lowest. Most utilities in Washington have yet to conduct and publish hosting capacity analyses that can provide insights on particularly beneficial locations for DERs. While early examples of publicly available hosting capacity analysis (HCA) should be commended (see table below), even these early adopters should take additional steps to increase the transparency and the usefulness of the data. As more utilities develop HCAs, these best practices should be utilized.[28] In particular, the analyses should be updated regularly and should address both the ability of the distribution grid to support increased loads and additional distributed generation. The results should be displayed on a publicly accessible, interactive map.

Examples of Washington utilities developing hosting capacity analyses

Utility	Analysis	Opportunities for improvement	More information
Puget Sound Energy	Published a HCA for its entire service territory as part of its 2022 DER Request for Proposals.	Update HCA maps regularly, ideally as close to in real time as possible. It is important to indicate the date of last update on the map.	Hosting Capacity Heat Map
Seattle City Light	Developed a grid capacity analysis and published the results in its 2022 Technical Report.	SCL's analysis was intentionally focused on the ability of the distribution grid to host additional load. A full HCA would also address the distribution grid's ability to support additional generation. It is beneficial to convert HCA into a map to enable users to interact with the data and identify optimal locations for DERs.	Electrification Assessment Report

[27] 2021 State Energy Strategy, page 126.
[28] "Key Decisions for Hosting Capacity Analyses." IREC. September 16, 2021. https://irecusa.org/wp-content/uploads/2021/10/IREC-Key-Decisions-for-HCA.pdf

Utility	Analysis	Opportunities for improvement	More information
Avista Utilities	Recently published a DER Hosting Capacity map that provides information on the ability to interconnect DERs.	Update HCA maps regularly, ideally as close to in real time as possible. Indicate the date of last update on the map.	DER Hosting Capacity Map

Washington is advancing innovative approaches to renewable energy integration and flexible load management, and demonstrating technologies that increase grid resilience through state investments. In 2022, the legislature created a $100 million incentive program for low-income community solar[29] and appropriated $37 million to the Department of Commerce to launch a new solar plus storage program focused on enhancing community resiliency.[30] The Grid Modernization Program funded by the Clean Energy Fund continues to demonstrate how novel integration of DERs can provide increased benefits to the electric grid. For example, the EcoDistrict in Spokane is a first-of-its-kind project in Washington. This CEF round three project includes onsite solar, batteries, thermal energy storage, and sensors to granularly control demand across a set of interconnected buildings. This project and others funded by CEF demonstrate what is possible and offer a proof of concept that these technologies will work in and for Washington. In fact, a new Department of Energy-funded project is building on the EcoDistrict model to explore how distributed energy resources can be managed across 50 to 75 existing single family and multi-family residential homes and 25 to 50 commercial buildings in Spokane to avoid expensive distribution grid upgrades. Seattle City Light is also undertaking a project under DOE's Connected Communities program that will deploy battery storage systems, electric vehicle charging infrastructure and rooftop PV, thus enabling flexible loads in multifamily affordable housing to defer distribution upgrades, saving ratepayers money while providing new services. These projects should be a model to other utilities in the state of what is possible with effective DER integration enabled by investment in smart grid technologies.

[29] The Community Solar Expansion Program is being implemented by WSU's Energy Program.
[30] The initial grant application period for the Solar Plus Storage for Resilient Communities closed March 23, 2023.

Progress assessment: Prepare for widespread deployment of distributed energy resources and advance grid modernization

2021 SES recommendation	2023 update
Request support from the U.S. Department of Energy and Pacific Northwest National Laboratory (PNNL) to convene a DER workgroup to identify and resolve grid architecture barriers to DER deployment.	The DER workgroup with DOE and PNNL has not been created and might not be necessary, as work already underway fulfills this recommendation. The Advanced Grid Institute, formed by PNNL and WSU, is already doing important work in this space and is fostering crucial conversations on DER deployment; for example, during the annual Advanced Grid Institute Day. In addition, the CEF Grid Modernization program and DOE's Connected Communities programs are leading the way in demonstrating what is possible.
Utilities should incorporate comprehensive assessments of the value of DERs in the specific context of individual distribution grids by performing and publishing hosting capacity and critical load studies.	Most utilities have yet to conduct and publish hosting capacity analyses. Early examples of publically available hosting capacity analysis should be commended, but more is needed to increase transparency and the usefulness of the data produced. As more utilities develop hosting capacity analysis maps, these best practices should be utilized.
The Legislature should assess whether voluntary distributed energy resources planning is the appropriate policy approach given the requirements of CETA.	While WAC 480-100-620 requires electric investor-owned utilities regulated by the UTC to assess "the effect of distributed energy resources on the utility's load and operations", the UTC only "strongly encourages utilities to engage in a distributed energy resource planning process." As a result, utility distributed energy resource planning efforts, particularly at consumer-owned utilities, have been variable and relatively limited. Given the anticipated proliferation of DERs under CETA and the limited voluntary work that is occurring on hosting capacity analysis and DER integration, the Legislature should evaluate whether distributed energy resources planning should be voluntary.
Provide state support for flexible and resilient planning and project development by creating a new cluster within Commerce's Office of Economic Development and Competitiveness to focus on utility grid optimization and DER deployment.	This cluster has not been created. Through the Clean Energy Fund, Commerce is developing and demonstrating technologies and processes that can better integrate renewable energy and DERs to achieve grid optimization. The legislature should continue to invest in the crucial innovation and market transformation enabled by CEF. In addition, state, local governments, utilities, and private entities should secure Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) funding to support further utility grid optimization and enable the full benefits of DER deployment to be harnessed.
Target CEF funding to projects that enable flexible load management and increase grid resilience.	Commerce has funded several grid modernization projects that demonstrate flexible load management and increase grid resilience.

Areas for action

Comprehensive distribution system planning can unlock additional value from DERs. In particular, utility use of DERs to avoid or postpone distribution grid upgrades and capital investments, known as "non-wires alternatives," can provide beneficial cost saving opportunities. The Legislature should incentivize utilities to proactively plan and innovate for a future distribution grid that effectively integrates increased electric loads and widespread DERs including rooftop solar, behind the meter batteries, electric vehicles, and grid-responsive heat pump water heaters. **The Legislature should evaluate whether to require a process under RCW 19.280.100 or if there are other opportunities to incentivize this work, given the limited voluntary work occurring on distribution planning.**

Currently, only about 60% of utility customers in Washington use smart meters. While several utilities are actively working to deploy smart meters soon, smaller utilities might need support in exploring and deploying advanced metering infrastructure (AMI). This is an important first step for greater DER deployment due to the improved communications that AMI enables. Funding opportunities should also support utilities in developing the capacity to dispatch DERs when additional capacity, voltage, or other services are needed on the grid. This could include funding and/or technical assistance for obtaining Distributed Energy Resource Management Systems (DERMS). An important prerequisite for deploying these technologies will be adopting and mandating robust cybersecurity protocols to ensure consumer protection.

Finally, interconnection rules and timelines vary by utility in Washington, meaning that installers might navigate distinct processes for very similar projects even a few miles apart. In addition, interconnection standards that enable the full value of customer site battery energy storage systems are largely nascent in the state.[31] A DER workgroup among all Washington utilities and industry could improve interconnection processes and move towards consistent interconnection standards statewide. This would streamline interconnection applications so projects follow similar processes and timelines regardless of which utility a project is interconnecting with. **The Legislature should provide funding for a consultant with interconnection expertise to facilitate these processes.**

D. Resource adequacy program development

Resource adequacy guides utility decisions to make sure they have sufficient power generation to meet demand under a range of operating conditions. Reliable service is a core element of CETA and utilities are required to adopt a resource adequacy standard to comply with law.

An industry-led, region-wide resource adequacy effort is also underway in the west. In August 2022, The Western Power Pool (WPP), formerly the Northwest Power Pool (NWPP), submitted to FERC an application to establish the Western Resource Adequacy Program (WRAP). The WRAP will establish a common resource adequacy standard, which will help participating utilities forecast and acquire resources based on their electricity needs and available generating resources. This will reduce costs and improve resource adequacy across the region.

The WRAP is now in an initial non-binding phase of implementation. This phase allows utilities to submit data and identify their resource obligations under the program, but it does not require utilities to make any changes

[31] For example IREC's BATRIES project is working to address common interconnection challenges experience by energy storage systems nationally.

to their operations. Utilities that opt into the program's binding phase will be required to meet resource obligations starting in summer 2025, as approved by WRAP in February 2023.

The current WRAP proposal makes a number of key governance changes. The WRAP board must be independent of financial interests and other potential biases. A proposed committee of state representatives would enable state regulators of participating utilities to have influence and oversight over WRAP's direction. Participating utilities would have individual committees. A program review committee will engage the public and review and administer suggested changes to the program. Together, these committees provide checks and balances and have the potential to enhance resource adequacy governance across the West.

Progress assessment: Resource adequacy program development

2021 SES recommendation	2023 update
Utilities, resource owners, developers and other stakeholders should continue to engage in developing a consistent and non-discriminatory resource adequacy program through the Western Power Pool.	Most of the utilities serving Washington customers have participated in the non-binding phase. Some consumer owned utilities have opted not to participate.
Commerce and the UTC should review the progress and outcomes of the WRAP initiative and evaluate the need for additional state action to ensure CETA's resource adequacy requirements are fulfilled.	Utilities have the opportunity to sign up for the binding phase of the program.[32] The UTC and Commerce will continue to monitor the involvement of Washington utilities in the WRAP initiative.

Areas for action

- Utilities, resource owners, developers and other stakeholders should support the development of WRAP through FERC approval process.
- Utilities should continue to participate in the non-binding phase of the program and prepare to join the binding phase in 2025. The UTC and Commerce should evaluate whether additional actions should be taken to require utility participation in the WRAP, if utilities do not participate in the program.

E. Reform and expand wholesale electricity markets

The 2021 SES found that expanding access to regional renewable, clean energy resources is important to ensure Washington can meet its growing electricity needs with clean, affordable, and reliable power. RCW 19.405.130 (Sec. 130) requires Commerce and the UTC adopt rules to ensure that utilities comply with CETA's clean electricity requirements when they buy and trade power in wholesale electricity markets. The statute convenes a stakeholder workgroup to assist the agencies.

Commerce and the UTC convened a 20-member Carbon and Electricity Markets Workgroup to inform the agencies' work under Sec. 130. The workgroup included a broad set of stakeholders, including environmental and public interest organizations, public and privately owned electric utilities, wholesale generators and electricity market participants, labor groups, and residential and business customers.

The workgroup hosted four workshops on energy markets, greenhouse gas policies and other related topics to inform its examination of the issues. After this series of workshops, the workgroup developed an issues list for consideration in the CETA rulemaking process. The group held three public work sessions to discuss the

[32] FERC approval of WRAP

issues list and a set of alternative approaches for resolving the issues. It was unable to come to an agreed upon approach and filed a summary report to the agencies in April 2021.

Commerce and the UTC encouraged stakeholders to continue working together to develop proposals for the agencies to consider. The agencies held a workshop in August 2021, when stakeholders presented two proposals. Neither proved viable, and the workshop concluded with stakeholders jointly asking Commerce and the UTC to break the impasse. Commerce and the UTC subsequently proposed multiple rule drafts, held two more stakeholder workshops, and offered three more comment periods before settling on rule language.

The rules clarified that:

- Utilities must use renewable or non-emitting electricity sources in an amount equal to 100% of the utility's retail electric load under the 2030 greenhouse gas neutral standard. To comply with this standard, utilities need to develop a portfolio of resources that could reasonably meet 80% of their load with clean energy resources on an hourly basis, since the standard allows for 20% of load to be met using fossil resources combined with renewable energy certificates.
- Utilities must supply 100% of their electricity from clean energy resources under the 2045 standard. The Commerce rules clarify how utilities may count wholesale power purchases and sales under this requirement. The UTC is completing its rules regarding this requirement and expects them to be finalized in 2023.

Commerce and the UTC also developed rules to clarify the effect of energy storage under CETA. The agencies initiated the discussion of potential rules because of concerns that storage transactions would distort or confuse the accounting of clean electricity in CETA compliance. Some stakeholders were concerned that electricity might lose its renewable attribute when stored and used later, while others wanted to ensure that the storage transaction did not cause fossil-fired generation to appear to be clean.

The rules adopted by the UTC and Commerce take a neutral approach to these concerns. The rules clarify that utilities may use energy storage systems, such as batteries and pumped hydro storage plants, to manage renewable energy supply and demand. The rules apply to all storage resources, whether they are collocated with renewable generated resources or located separately in the transmission or distribution system. Electricity used by storage resources behind the customer meter are part of retail load, consistent with the statutory definition in CETA.

Organized markets

Discussion around the expansion of organized markets includes three forums:

- California's Western Energy Imbalance Market
- California's Extended Day Ahead Market
- The Southwest Power Pool's Markets+ offering

The Bonneville Power Administration (BPA) and Western Area Power Administration recently joined the Western Energy Imbalance Market, and BPA announced it would be an active participant in developing other markets.[33] Electric utilities continue to engage with the California Independent System Operator (CAISO) to find an equitable governance structure and effective market mechanisms for an extended day-ahead market.

[33] BPA to Join Western EIM, Eyeing Other Developing Markets in West | Supply & Demand | newsdata.com

Avista, Chelan County PUD, Grant County PUD, Puget Sound Energy and Tacoma Power have all indicated an interest in the Southwest Power Pool's Markets+.

Utilities are also discussing the development of a comprehensive Western regional electricity market. Large electric utilities within the Western Interconnection, including PacifiCorp, Puget Sound Energy and Seattle City Light, created the informal Western Markets Exploratory Group to discuss forming a regional electricity market. PNGC Power, an Oregon-based electric generation and transmission cooperative owned by 15 cooperative utilities from across the Northwest, also held discussions with utilities, regulators and energy offices about a regional market.

Progress assessment: Reform and expand wholesale electricity markets

2021 SES recommendation	2023 update
The UTC and Commerce, with input from the Carbon and Electricity Markets Workgroup, should adopt rules to allow for the trade-in electricity from sources verified to comply with CETA's clean energy requirements.	These rules were published.
Electric utilities should pursue the long-term development of a fully integrated Western regional electricity market, beginning with expansion of organized markets to trade day-ahead and then longer term resources.	Utilities are exploring options to establishing regional markets, starting with the expansion of organized markets.
Commerce's 2024 CETA evaluation under RCW 19.405.080 should include an assessment of industry progress in developing efficient and resource-specified electricity markets.	Commerce plans to begin the 2024 CETA evaluation in 2023. Per statute, the review will focus on technologies, forecasts and existing transmission, as well as an evaluation of environmental and public safety protection, affordability, and system reliability.
Commerce and the UTC should ensure that CETA's energy accounting methods accommodate the charging and discharging of storage resources within the electricity grid.	Commerce and the UTC adopted rules on accounting for energy storage under CETA in 2022.

Areas for action

Electric utilities should continue to explore options for further regional integration through CAISO and Markets+. Utilities should also continue to support the development of market and governance structures through WRAP.

There will be ongoing need to ensure that electricity markets operate to support both the efficient economic operation of the power system and the state's requirements to reduce greenhouse gas emissions and reduce impacts on overburdened communities. Commerce and the UTC must work closely with other states, federal officials and affected communities in this effort.

Decarbonize transportation and use energy more efficiently

Key transportation sector actions from the 2021 State Energy Strategy

A. Decarbonize transportation energy through electrification and renewable fuels
Eliminate tailpipe emissions by using zero-emission fuel.

B. Use transportation fuels efficiently and thoughtfully
Reduce the number and distance of trips requiring powered vehicles for goods and people. Encourage use of more efficient modes, such as public transit.

C. Make it easier to learn about, acquire and charge clean vehicles of all kinds
Address impediments to electric vehicle acquisition and transform the marketplace into a robust economic development generator.

State agency key action

Enable state agencies to develop plans and act on electrification
The Department of Enterprise Services (DES), with support from the Legislature and other state agencies, should continue efforts to convert state-owned vehicle fleets to EVs and expand the current goal beyond 50% of new state passenger vehicle purchases.

According to the 2021 SES, no sector is as important as transportation to achieving decarbonization, nor is any as complex in its operation and governance.

Research since the strategy's release reinforces this understanding. For example, the annual Inventory of U.S. Greenhouse Gas (GHG) Emissions and Sinks reports from 1990 to 2020 show that the transportation sector accounted for the largest portion (27%) of total U.S. GHG emissions in 2020.[34] Of that total:

- 83%: Vehicles, including passenger cars, light-duty vehicles like SUVs and minivans, and light-, medium- and heavy-duty trucks
- 8%: Aircraft
- 5%: Other transportation — sources such as buses, motorcycles, pipelines and lubricants
- 2%: Rail
- 2%: Maritime

Due partially to reduced reliance on coal-sourced power and greater use of renewable sources like hydropower to generate energy generally, mobile sources in Washington account for a much higher percentage than the national averages stated above. Transportation sector emissions are responsible for 31% of all emissions in the state as opposed to 27% nationally.[35]

Pollution from transportation creates multiple harms, in addition to climate damage. Vehicle emissions contribute to the formation of ground level ozone (smog), which can cause or worsen health problems such as

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[34] EPA, U.S. (2022). US transportation sector greenhouse gas emissions: 1990–2020. *Office of Transportation and Air Quality EPA-420-F-22-018*. P. 1
[35] Washington State Department of Ecology. (2021). Washington State Greenhouse Gas Emissions Inventory: 1990-2018. Air Quality Program. P. 16. , citing EPA (U.S.). (2020). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.

aggravated asthma, reduced lung capacity, reduced cognition, and increased susceptibility to respiratory illnesses, including pneumonia and bronchitis.[36]

Long-term exposure to diesel particulate matter – an aspect of traffic-related air pollution that is higher near heavily used roadways – is likely to cause lung cancer, according to the Occupational Health and Safety Administration (OSHA). Pollutants from internal combustion engine vehicle tailpipe emissions contribute to heart disease, stroke and cancer. Air pollution is particularly hazardous to people with pre-existing conditions. Of the 7.7 million Washington residents, 800,000 have pediatric or adult asthma, 320,000 have COPD, 82,000 are pregnant, and 1.25 million are older than 65 when this report was written.

From 1990 to 2020, GHG emissions increased nationally. Across the country, vehicle miles traveled (VMT) increased by 30% in that time.[37] Despite gains in technology, average fuel economy actually decreased from 1990 to 2004 due to more sales of light-duty trucks. Average vehicle fuel economy began to increase in 2005 and has improved regularly since then. Light-duty vehicles, such as SUVs and trucks, continue to dominate the U.S. market and reached 56% of new vehicles sold in model year 2020, and their fuel economy still lags that of passenger cars. During pandemic-related restrictions from 2019 to 2020, transportation-related GHG emissions decreased by 11%, but rural VMT has now exceeded pre-pandemic levels, with urban levels rising.

To address these needs, the 2021 SES identified key actions for GHG reduction and decarbonization:

- Establish specific targets for vehicle sales, transportation demand and emissions
- Create accountability measures for meeting those targets
- Adopt a low-carbon fuel standard to incentivize clean fuel production, accelerate adoption of electric vehicles and low-carbon fuels across all transportation segments, and replace fossil fuels with electricity, hydrogen and clean synthetic or biogenic fuels

The Legislature passed landmark legislation addressing many of issues. It also affirmed a commitment to a healthy, prosperous Washington through equitable processes to achieve ambitious goals. The next sections of this report will identify how we are meeting those goals.

Transportation federal funding priorities

Recent legislative action enabled the Department of Commerce to lead or participate in efforts to secure federal funding for transportation electrification, greenhouse gas reduction and decarbonization in the transportation sphere (see Federal Funding Opportunities for Clean Transportation).

[36] Weir, Kirsten. Smog in our brains. American Psychological Association (2012, July 1). Monitor on Psychology, 43(7).
[37] U.S. Vehicle-Miles | Bureau of Transportation Statistics (bts.gov)

A. Decarbonize transportation through electrification and renewable fuels

Transportation electrification contributes to cleaner air by substituting clean energy for fossil fuel-based onboard combustion, removing mobile pollution sources, and concentrating power generation at fixed sites where pollutants can be controlled. From 1990 to 2020, mobile source greenhouse gas emissions increased nationally 6.6%, but emissions from electricity generation decreased 21.2%.

Federal funding opportunities for clean transportation

A. National Electric Vehicle Infrastructure (NEVI) Program

The Bipartisan Infrastructure Law (BIL), enacted as the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58 (Nov. 15, 2021) makes the most transformative investment in EV charging in U.S. history. It will put us on a path to a nationwide network of 500,000 EV chargers by 2030, ensuring a convenient, affordable, reliable, and equitable charging experience for all users. The $5 billion **National Electric Vehicle Infrastructure (NEVI) Formula Program** will provide dedicated funding to states to strategically deploy EV charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability. Initially, funding under this program is directed to designated alternative fuel corridors, particularly along the interstate highway system. When the national network is built out, funding can be used on any public road or in other publicly accessible locations.

B. Electric Vehicle Purchase Tax Credits

People could qualify for a credit up to $7,500 under Internal Revenue Code Section 30D if they buy a new, qualified plug-in EV or fuel cell electric vehicle (FCV). The Inflation Reduction Act of 2022 changed the rules for this credit for vehicles purchased from 2023 to 2032.The credit is available to individuals and their businesses.

C. Domestic Battery Manufacturing and Supply Chain Expansion

The Biden administration, through the Department of Energy (DOE), is funding projects through the Bipartisan Infrastructure Law to expand domestic manufacturing of batteries for electric vehicles, and the electrical grid and for materials and components currently imported from other countries. The program will provide $7 billion to strengthen the domestic battery supply chain by supporting upstream materials processing to create the precursor materials for batteries.

D. RAISE grants to fund transit-oriented development and land use, housing, zero-emission transit, and multimodal planning

The U.S. Department of Transportation announced $1.5 billion in grant funding through the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) discretionary grant program for 2023. The program helps communities around the country complete projects with significant local or regional impact. RAISE discretionary grants help project sponsors at the state and local levels, including municipalities, tribal governments and counties, complete critical freight and passenger transportation infrastructure projects. RAISE's eligibility requirements allow project sponsors to obtain funding for projects that are harder to support through other U.S. DOT grant programs.

D. Clean School Bus Program

With funding from the Bipartisan Infrastructure Law, EPA's new Clean School Bus Program provides $5 billion from 2022 to 2026 to replace existing school buses with zero-emission and low-emission models. EPA solicited rebate applications for $500 million through the 2022 Clean School Bus Rebates for zero-emission and low-emission school bus rebates as the first funding opportunity.

Efforts to electrify transportation are paying off: There are now over 100,000 electric cars on Washington roads. Washington has the second largest electric vehicle market share in the country, and electric vehicles made up 9.4% of new vehicles registered in the Seattle-Tacoma metro area from April 2021 to March 2022. That's a higher percentage than cities such as Austin, Denver, Minneapolis-St. Paul, Chicago, Phoenix and Washington D.C.[38] **Combined with the Clean Fuel Standard and other transportation initiatives, Washington residents will realize a reduction in air pollution that provides an estimated $1.8 billion in economic benefit from better health.**[39]

Policymakers are recognizing the benefits and are moving to clean transportation. In 2021 and again in 2022, Gov. Inslee and the state Legislature, with considerable public input, developed landmark legislation and funding to address transportation's role in greenhouse gas emissions. Chapter 182, Laws of 2022 (SB 5974) sets a statewide target of having all publicly and privately owned passenger and light-duty vehicles of model year 2030 or later that are sold, purchased, or registered in the state be electric vehicles. The bill also creates an interagency electric vehicle coordinating council that will develop a plan to achieve the target.

The Clean Vehicles Program sets enforceable mandates for transition to clean vehicle, with Advanced Clean Cars II sales mandates taking effect in model year 2026 requiring 35% of new passenger vehicles sales to be zero-emission vehicles. That percent will increase 6% to 9% per year until zero-emission vehicles make up 100% of new sales starting in model year 2035. It will also require light and medium duty vehicles to meet stronger emission standards. Gov. Inslee's Executive Order 21-04 builds on EO 20-01 (State Efficiency and Environmental Performance) to establish targets, processes and systems for the electrification of Washington State's fleet vehicles. The State Efficiency and Environmental Performance Office (SEEP) and the Department of Enterprise Services (DES) are tasked with leading this transition.

In 2022, the Legislature passed a 16-year, $17 billion transportation package known as Move Ahead Washington (Chapter 297, Laws of 2022), with six times the amount of funding for climate and clean transportation than its 2015 predecessor. Legislators appropriated $69 million for electric vehicle charging infrastructure development in the 2022 supplemental operating budget (Chapter 297, Laws of 2022),[40] and $25 million to promote the purchase of or conversion to alternative fuel vehicles.[41] Other legislative actions that will reduce transportation emission include creating a renewable fuels office and a hydrogen hub program, authorization for clean transportation for students, and protections for community-based electric vehicle charging infrastructure. These efforts will result in improved public health, economic development and equity.

Many of Washington's initiatives are informed by actions in California. A February 2022 report found that California reduced transportation-related particulates and toxins from heavy duty vehicles by 75% since 2000.[42] By combining cap-and-trade with government rules, regulations, incentives, and zoning, the state has reduced premature pollution-related deaths, with the greatest benefits accruing in communities of color and disadvantaged communities. California projects avoiding 3,800 premature deaths over 25 years, two-thirds of those being people of color.

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[38] Kamb, Lewis and Santos, Melissa. Electric vehicles are on the rise in Seattle. Axios Seattle. July 5, 2022.
[39] Woodward, Susan and Boyte-White, Claire. Independent studies show new climate change initiatives deliver significant benefits at minimal costs. Department of Ecology, State of Washington. July 1, 2022.
[40] Section 128, 226
[41] Section 128, 198(a)
[42] California Environmental Protection Agency. Impacts of Greenhouse Gas Emission Limits Within Disadvantaged Communities: Progress Toward reducing Inequities. February 2022. Zeise et al, Office of Environmental Health Hazard Assessment.

Progress assessment: Decarbonize transportation through electrification and renewable fuels

2021 SES recommendation	2023 update
Set clear and ambitious targets for moving people and goods more efficiently and equitably. Set clear and ambitious statewide targets for electrification and switching to low-carbon fuels.	Key actions include: • Adoption of Advanced Clean Cars II (100% ZEV requirement for new car sales starting 2035); • Adoption of Advanced Clean Trucks (setting minimum ZEV percentages for truck sales); and • EO 21-04 to fully electrify state fleets The 2022 supplemental operating budget establishes a target for the state that all publicly and privately owned passenger and light duty vehicles that are sold, purchased, or registered in Washington of model year 2030 or later be electric vehicles.
Expand and align transportation funding with emissions and equity goals.	The Move Ahead Washington program contains historic investments in highway construction and maintenance, transit, active transportation environmental justice, and new local funding options. The supplemental operating budget creates the Interagency Electric Vehicle Coordinating Council to create a plan for achieving the 2030 target. The Legislature created two new grant programs: • $69 million for electric vehicle supply equipment (EVSE) with focus on community charging (multi-family buildings, office buildings, rural communities, state and local government buildings). • $25 million for alternative fuel vehicle incentives with prioritization given to overburdened communities, low-income communities, and communities of color.

Areas for action

Expand programs for medium- and heavy-duty trucks

The SES holds that vehicle replacement targets should be especially aggressive for diesel-fueled, short haul vehicle classes (such as school and transit buses, utility and service vehicles, local freight delivery, drayage and off-road vehicles) that disproportionately contribute to local air pollution, especially in frontline communities. Frontline communities are those that experience the “first and worst” consequences of local air pollution from trucking.

Policymakers could consider expanding programs to address medium- and heavy-duty trucks, including those in use at ports.

Crosscutting area: State agencies leading by example

Transition and support government fleets and services

Government fleets are transitioning to electrified transportation as envisioned in Washington state law, with support from such entities as the state Department of Enterprise Services, the State Efficiency and Environmental Performance office, and the Green Transportation Program at Washington State University. However, current law does not contain enforceable timelines regarding that transition.

Transportation electrification presents a series of challenges for fleets at all levels of government. One example is that about 90% of state facilities are leased, and many property owners resist installing charging infrastructure. One potential solution is "right to charge" legislation, which authorizes installation with the property owner held harmless.

Other issues include:

- Continued implementation of Executive Order 21-04
- Grid connectivity generally and especially in remote areas like state parks
- Upgrading facilities such as buildings and parking capacity
- Application of ADA guidelines
- Payment system compatibility
- Electrification of non-surface modes including maritime and aviation
- Addressing micromobility, including electric bicycles of various types
  - Planning for electric bicycles should include high-priority locations (co-location with electric vehicle charging, transit centers, government buildings, libraries, parks and trailheads)
  - Sufficient outlets
  - Security of the bicycle and rider
  - Room for large cargo bikes
  - Weather protection
  - Appropriate signage

Electrify Washington's school buses

There are over 10,000 school buses in Washington, of which only 28 are electric. The SES calls for especially aggressive vehicle replacement targets for diesel-fueled, short-haul vehicle classes, such as school buses, which contribute disproportionately to local air pollution. In 2022, Washington passed new legislation enhancing the ability of school districts to electrify their fleets, and four Washington school districts have received funding from the U.S. Department of Energy to purchase electric school buses.[43]

School bus electrification provides significant benefits, especially considering their use serving schoolchildren across economic sectors throughout the entire state. A California utility and school district deployed technology that allows electric school buses to supply the grid in case of acute power need.[44] Colorado's Clean Truck Strategy includes a specific commitment to support the adoption of 2,000 electric school buses by 2027

[43] Gutman, David and Brunner, Jim. Vice President Kamala Harris, in Seattle, touts electric school buses, infrastructure bill. The Seattle Times. October 26, 2022. Last accessed November 16, 2022.
[44] Walford, Lynn. San Diego G&E Electric School Buses with V2G from Nuvve. Auto connected car news. July 31, 2022. Last accessed July 31, 2022.

and 100% zero emission school buses by 2035, focusing on school districts in disproportionately impacted communities.

The U.S. Environmental Protection Agency has made significant funding available through a school bus electrification rebate program. Washington state agencies, led by the Office of the Superintendent of Public Instruction (OSPI), have assisted school districts in accessing this program but found barriers to participation. These barriers include the technical and labor-intensive aspects of applying for grants, timing issues related to school bus duty life, uncertainty about maintenance, supply and charging facilities, and battery efficiency with auxiliary loads and consumption rates.

For some districts, using this grant requires a commitment to charging infrastructure, energy arrangements, maintenance facilities and equipment, routing and availability schedules, and new rules and practices. They say they would like to see the technology mature further before taking those steps.[45]

The Legislature could consider enabling a program of technical and grant support for electrification of pupil transportation and related fleets and infrastructure.

A deeper look into workforce barriers

Workforce issues may be an impediment, as electrified transportation requires skilled service technicians to service the vehicles as well as to install and maintain electric vehicle charging facilities. More research is needed to identify aspects requiring advanced knowledge or certification for job training. The Legislature might wish to invest in training programs, which could be eligible for funding under the American Rescue Plan Act.

Establishing the supply chain in Washington

Battery electric vehicles have far fewer parts compared to vehicles powered by fossil fuels. The Chevrolet Bolt's electric motor has three moving parts, while a four-cylinder internal combustion engine has over 100. As electric vehicles have fewer parts, there are fewer supply chain risks that could slow manufacturing.

However, electric vehicle batteries might be unable to keep up with demand, and costs are increasing for needed materials, such as nickel and cobalt.[46] In some areas, the lead time for ordering transformers exceeds 12 months.[47]

The Legislature might wish to encourage suppliers and manufacturers to locate new facilities in Washington, as some other states are doing by offering economic development incentives,[48] payroll rebates, sales tax exemptions, and investment tax credits.[49]

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[45] A 2020 study by Atlas Public Policy found "Grant funding along with other incentives will remain a critical component for the electrification of school buses in the near future." Satterfield, Charles et al. Electrification Assessment of Public Vehicles in Washington. Atlas Public Policy. November 2020. Last accessed August 4, 2022.
[46] Rosevaar, John. Ford CEO offers more clues about automaker's ambitious electric vehicle plans. CNBC. July 31, 2022.
[47] Nguyen, Ruby, Severson, Mike, Zhang, Bo, Vaagensmith, Bjorn, Rahman, Md Manunur, Toba, Ange-Lionel, Price, Paige, Davis, Ryan, & Williams, Sophie. Electric Grid Supply Chain Review: Large Power Transformers and High Voltage Direct Current Systems. United States.
[48] Vock, Daniel. In the Race to Win Electric Vehicle Factories, States are Handing Out Big Incentives at Lightning Speed. Route Fifty. February 5, 2022.
[49] Vock, Daniel. The Latest State to Notch a Win in the Race to Attract EV Factories. Route Fifty. July 14, 2022.

Traffic safety

In addition to reducing greenhouse gas emissions, transportation electrification should be leveraged to address other governmental imperatives such as safety. Fatalities from crashes involving a motor vehicle in Washington have reached a 20-year high, increasing every year since 2019, and rising from 538 deaths in 2019 to 574 in 2020 and 663 in 2021.

High-visibility communications and outreach are essential parts of successful programs combating speeding and aggressive driving. Paid advertising has proven effective in seat belt use campaigns. Traffic safety messages could be integrated into charging facilities as a practice or as a funding requirement.

Pedestrian fatalities in Washington increased 24% from 2019 to 2021, faster than the national increase of 17%, which is projected to reach the highest level nationally in the last 40 years. Black, Indigenous, and people of color are over-represented in pedestrian crashes considering their share of the population. The Governors Highway Safety Association stated “And most astonishingly, American Indians represented 0.7% of the population but accounted for 2.4% of deaths – more than triple what would be expected if pedestrian deaths were distributed equally among race and ethnicity categories.”

Nationally, passenger sedans are the striking vehicle in 40% of pedestrian fatalities and SUVs are the striking vehicle in 20%. Newer vehicles have better crash avoidance technology and might have pedestrian detection compared to older vehicles. However, larger vehicles are inherently more dangerous to pedestrians as they have greater body weight, larger profile, and limited ability to see nearby people or objects, in addition to their effects on parking and traffic congestion. Light trucks including sport utility vehicles, minivans, large vans, and pickups are more likely to be involved in certain pedestrian crash types than sedans, and are “substantially more likely than cars to hit pedestrians when making turns …”

Policymakers might want to explore mitigating measures if considering incentives that favor larger passenger vehicles over sedans. Policymakers also might want to consider other ways electric vehicle facilities can contribute to public safety and security such as the inclusion of threat detection sensors.

Crosscutting area: Environmental justice

Centering equity and justice

Extending charging solutions is critical for the widespread adoption of vehicle electrification. However, traditional planning and processes for fossil-fueled vehicles are not optimal for electrified transportation. One major difference is that very few gasoline vehicles are refilled at home, while 80% of electric cars are charged at home or while parked at the workplace. All mass-produced electric vehicles have the necessary equipment and software to charge from a standard household outlet (Level 1) and many homeowners are installing or using heavy-appliance standard 220 volt outlets (Level 2). Those numbers could change as publicly available stations come online.

Planners should be aware of unintended consequences of residential improvements, such as green gentrification — that is, displacement of lower income residents. A diverse representation of community members should be involved in charging and related infrastructure project planning. There is a considerable body of applicable research on equitable transportation electrification that should be reviewed and employed in infrastructure development.

Address particulate matter

Non-exhaust related particulates are an increasing proportion of vehicle emissions. This category includes tire, brake and roadway particles. The expanded use of battery electric vehicles is not expected to have a significant effect on non-exhaust related particulates, but these vehicles should be included in overall strategies that might involve engineering controls, improved materials and dust suppression.[50] The industry has recognized and is taking steps to address the problem, such as developing more sustainable tires.

[50] Harrison, R.M., Allan, J., Carruthers, D., Heal, M.R., Lewis, A.C., Marner, B., Murrells, T. and Williams, A., 2021. Non-exhaust vehicle emissions of particulate matter and VOC from road traffic: A review. Atmospheric Environment, 262, p.118592.

B. Use energy efficiently and thoughtfully

Public transportation is an effective tool in greenhouse gas reduction.[51] Traveling by public transportation uses less energy and produces less pollution than comparable travel in personal vehicles — reducing annual CO2 emissions for a single commuter by more than 4,800 pounds per year — and provides household cost savings. Transit fleet electrification provides further savings and is progressing in Washington, as electric transit buses are often cost-competitive with diesel buses and state support is available through programs like the CEF and the Green Transportation Capital Grants Program.[52]

One outcome of the COVID-19 pandemic was a brief but significant reduction of personal vehicle miles traveled (VMT), resulting in a net national decrease in CO2 emissions. However, travel has resumed and vehicle miles traveled now exceed pre-pandemic levels. Public transit ridership also declined during the pandemic, and total ridership nationally is still only at about 55% of pre-pandemic levels.[53] This is in part due to more riders now working from home.

Progress assessment: Use energy efficiently and thoughtfully

2021 SES recommendation	2023 update
Improve transportation system planning and coordination, prioritizing VMT reduction. Support measures to optimize freight VMT.	The 2022 supplemental operating budget includes funding for guidelines for local governments to reduce GHG emission and per capita VMT.
Remove barriers to transit, walking and cycling.	The Legislature created a climate transit programs account, funded grants for cleaner public transit, and appropriated funds from the carbon emissions reduction account for programs including active transportation and transit. Further, Move Ahead Washington provisions provide grants to transit agencies that adopt a fare-free policy for youth 18 years and younger.

Areas for action

Increase public transportation ridership rates

Public transportation ridership declined by up to 15% nationally from 2012-2018. Researchers attribute the decline to higher incomes, increased work from home, increased bus and rail fares, decreased gasoline prices, and competition from new modes such as ride hailing. Possible approaches to increase ridership include giving transit priority, strategic fare setting, first mile/last mile partnerships and network redesign. Other approaches include expanding capacity and geographic coverage of existing services and supporting system quality and reliability.

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[51] McGraw, Jen et. al. An Update on Public Transportation's Impacts on Greenhouse Gas Emissions. Transit Cooperative Research Program Research Report 226. 2021.
[52] Smith, Conner. EV Hub. Public Fleet Electrification on the Horizon in Washington. Atlas Public Policy. November 16, 2020.
[53] Plotch, Phil. Transit Ridership: Not Expected to Return to Pre-Pandemic Levels This Decade. ENO Center for Transportation. July 1, 2022.

Long-distance passenger transportation is also an important facet of mobility. Amtrak Cascades ridership increased by 12.1% from 672,000 passengers in 2015 to 753,000 passengers in 2019, but decreased significantly during the pandemic, dropping by 79%. Ridership has begun rising again, increasing 46% to 251,000 riders from 2020 to 2021. The Legislature could consider addressing the electrification of long-distance passenger transportation by bus and rail.

Decrease vehicle miles traveled

Statute recognizes the imperative of reducing VMT as a strategy for greenhouse gas reduction. In spite of efforts at the federal, state, and local levels, VMT in Washington actually increased 18% from 2019 to 2020. State law assigns target setting for VMT to the Department of Transportation and comprehensive plan guidance for local jurisdictions to the Department of Commerce, and the agencies work together closely on these tasks. In its most recent report, the WSDOT implemented the recommendations of the 2021 SES regarding baseline benchmarks and tracking VMT for all vehicles.[54]

Policymakers could consider innovative ways to reduce VMT. Potential approaches include piloting greenhouse gas budgets for public employee travel, consideration of VMT implications in land use and affordable housing efforts, sensitivity to VMT concerns in rural areas, and development of innovative new strategies and incentives.

Design our built environment for active transportation

Evolving the built environment to encourage active transportation, such as walking and bicycling, will supplement motorized vehicle trips and improve safety. Examples include traffic calming measures, protected lanes for bicycles and scooters, as well as crosswalk improvements. The built environment can contribute to greenhouse gas reduction by reducing heat island effects through measures such as urban tree canopies and shade. Other examples include car-free streets, greenscapes and parklets. The pandemic-era repurposing of parking spaces to outdoor restaurant seating was particularly popular, with 84% of adults in a National Restaurant Association survey favoring allowing this practice on a permanent basis.[55]

[54] Woehler, Kerri. Vehicle Miles of Travel (VMT) Targets – Interim Report. Washington State Department of Transportation. June 2022.
[55] Consumers want to keep 'streeteries' in place beyond the pandemic. National Restaurant Association. March 17, 2021.

C. Make it easier to learn about, acquire and charge clean vehicles

According to a Consumer Reports survey, interest in electric vehicles tripled over the past two years, with 14% of Americans saying they would "definitely buy" an electric vehicle and 71% of survey respondents indicating interest in getting an electric vehicle.[56] The survey also found that 28% of Americans will not consider buying an electric vehicle. Some of this opposition results from lack of awareness regarding electric vehicle benefits and incentives. The same survey found that 46% of Americans are not aware of incentives for electric vehicle purchase and ownership.[57]

Progress assessment:

2021 SES recommendation	2023 update
Improve planning and oversight of battery electric vehicle (BEV) charging and fuel cell vehicle (FCV) fueling infrastructure	The Washington EV Council is creating a statewide Transportation Electrification Strategy (TES) and ensuring that electric vehicle incentives and infrastructure are accessible and available to all Washingtonians. The Council is gathering input from a wide range of Washington residents—drivers and non-drivers, members of communities large and small—who represent the diversity of backgrounds and perspectives that make up our evergreen state. Agency activities furthering these goals include WSDOT's successful shepherding of the federal National Electric Vehicle Infrastructure Formula Program grant, the upcoming EV mapping and forecasting tool, and the Department of Ecology's adoption of clean fuel standards.
Accelerate the market for BEVs and FCVs	

Areas for action

Alleviate attitudinal barriers to adoption

Research in California shows that the top concern of low- to moderate-income consumers is the cost of electric vehicles.[58] Technology advancements and an increase in manufacturers and models are addressing this gap. Consumer Reports found that electric vehicles are competitive with or surpass internal combustion engine vehicles for total cost of ownership, with an electric vehicle saving $6,000 to $10,000 over the life of the vehicle compared to an internal combustion engine vehicle.[59] About half of the vehicle owners surveyed in California reported electric vehicle costs to be less than they expected, and 88% of respondents who owned electric vehicles for about one year would definitely or probably recommend their vehicle to a friend.[60] **Legislatively authorized incentive programs will bring more electric vehicles within purchase reach of these consumers and address concerns about availability of charging stations.**

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[56] Valdes-Dapena, Peter. You're much more likely to buy an EV if you've ever had a ride in one. CNN Business. July 8, 2022.
[57] Trop, J. 28% of Americans still won't consider buying an EV. TechCrunch. July 6, 2022.
[58] Gartner, J., Cain, N. J., MacNeille, B., & McCormack, R. (2021). Analysis of LMI CVRP Participation. Center for Sustainable Energy.
[59] Harto, C. Electric Vehicle Ownership Costs: Today's Electric Vehicles Offer Big Savings for Consumers. 2020.
[60] Lastuka, Amy. EV Owners Didn't Expect to Save So Much on Operations and Maintenance. Center for Sustainable Energy. Nov. 15, 2021.

A general concern is whether a vehicle can retain a charge long enough to complete the planned travel, sometimes referred to as range anxiety. The range on electric vehicles is increasing rapidly. Passenger vehicles currently on the market can travel up to 405 miles on a single charge, with a median range of 234 miles for electric vehicles sold in the U.S. These distances far exceed typical use in Washington, where an average urban day involves five trips totaling 38 miles, and a rural resident averages six trips and 46 miles.

Adding vehicles to the grid does have challenges. One is increased pollution from stationary sources; however, even when manufacturing emissions are considered, electric vehicles are preferable. According to the Union of Concerned Scientists, a gasoline-powered vehicle would need to get 91 miles to the gallon to compete with electric vehicles on emission reduction.[61]

It is a crucial time for the interagency electric vehicle coordinating council and its mission. Nationally, 5% of new cars sold are powered only by electricity. The technology industry generally recognizes 5% as a "tipping point" for adoption, signaling the end of a fad and the beginning of widespread use, demonstrated by technologies such as mobile phones, the internet, LED lightbulbs, and electricity itself. If the experience of other countries is a guide, then 25% of new car sales in the U.S. will be electric by the end of 2025.[62]

The experience of other countries shows that attitudinal barriers such as range anxiety, charging time, and consumer awareness can be overcome through policy commitment and support measures.[63]

Address market forces to increase EV access

While the quantity and availability of electric vehicles is improving, consumers in Washington do not have the model availability or choices found in some other states. This disparity appears to be a result of vehicle manufacturers perceiving more favorable markets elsewhere, particularly in California. This result is counterintuitive, as California is generally considered to have the country's most stringent regulations, but might be attributed to incentive programs and structures such as the Clean Vehicle Assistance Program, which enabled 90% of purchasers responding to a survey to purchase their vehicles.

California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project, including the Innovative Small e-Fleet set aside, Zero-Emission Vehicle Market Development Strategy and nonprofit entities such as CALSTART are examples of successful transition-facilitating structures. Policymakers might wish to evaluate establishing such structures and programs in Washington. In particular, vehicle purchase incentives, along with public charging infrastructure expansion, could alter market dynamics in Washington's favor while addressing equity issues.

Battery technology needs to advance sufficiently to address the issue of battery fires. As reported by Electrek,[64] electric car fires are no more common than gasoline car fires, but they get more attention and can start without an external cause. Electrek attributes this to faulty battery modules. Many auto manufacturers have provided emergency response guides designed for fire departments and first responders. Policy makers might wish to study the question of battery safety regulation and requirements.

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[61] Reichmuth, David. What are the Benefits of Switching from Gasoline-Powered Cars and Trucks to Electric? Union of Concerned Scientists. July 25, 2022.
[62] Randall, Tom. US Crosses the Electric-Car Tipping Point for Mass Adoption. Bloomberg Hyperdrive U.S. Edition. July 9, 2022.
[63] Dimanchev, E., Qorbani, D. and Korpås, M. (2022). Electric Vehicle Adoption Dynamics on the Road to Deep Decarbonization. In The 4Ds of Energy Transition, M. Asif (Ed.).
[64] Lambert, Fred. Jaguar I-Pace catches on fire again – is this another Bolt EV battery fire situation? Electrek. August 1, 2022. Last accessed August 1, 2022.

Looking ahead and prioritization

The Interagency Electric Vehicle Coordinating Council is responsible for charting the path to zero emissions. Commerce and the Department of Transportation are co-leading the development of the state's Transportation Electrification Strategy, in collaboration with other agencies and participants. That goal must equitable, just, and include economic development and benefits for all communities.

The policy and economic environment around electric vehicles is rapidly shifting. More companies are participating in the expansion of electric vehicles and infrastructure. GM, Pilot Flying J and EVgo announced plans for a national DC fast-charging network with 2,000 charging stalls open to all brands of electric vehicles to be operational in 2023. Rivian delivered 4,467 electric vehicles in the second quarter of 2022, on track for 25,000 vehicles total in 2022.[65] Technologies like inductive charging, innovative concepts like hiding chargers under sidewalks, combined effects from autonomous, electric, and shared vehicles, blurring distinctions between modes especially in last-mile freight delivery, and other ideas we cannot yet imagine are arriving regularly with great potential.

Emerging technologies will alter the transportation energy trajectory. The state must prepare its governmental structures to accommodate and respond to advances in computing, engineering materials, manufacturing, artificial intelligence, automation and robotics, communication, human-machine interfaces, sensors, and renewable energy generation and storage. The White House has also recognized these areas as particularly significant to national security.

These gains do not come without potential issues. Emerging technologies will serve both to accelerate the ability to reduce emissions and jeopardize the emission reduction mission. For example, a new home charger connector purports to eliminate the need to modify a home's electrical panel. On the other hand, connected and automated vehicle technologies could increase emissions by 10% by increasing vehicle miles traveled and worsen travel equity across income groups if alternative transportation methods altogether are not employed.

[65] Trop, Jaclyn. Rivian says it's on track to deliver 25,000 vehicles this year. TechCrunch. July 6, 2022.

Buildings and natural gas

Key building sector actions from the 2021 State Energy Strategy

A. Establish a building decarbonization policy framework
Develop a state decarbonization plan for buildings covering each part of the buildings sector in every region of the state.

B. Maximize energy efficiency and electrification in buildings
Develop and implement a high-efficiency electrification program to incentivize adoption of heat pump technology in existing residential and nonresidential buildings, including marketing, workforce development, and certification and equitable distribution of incentives.

C. Meet the low income need in buildings
Expand funding for the state's successful Weatherization Plus Health program as part of a broader strategy to reduce energy burden and improve health outcomes for low-income households.

D. Develop plans for the long-term transition of the natural gas distribution system
Natural gas distribution companies should work with regulators and stakeholders to develop comprehensive and equitable plans to transition from the use of fossil natural gas.

State agency key action

Invest in projects that help state agencies comply with the Clean Buildings Act (2019) and its expansion.

The 2021 SES deep decarbonization modeling analysis for the buildings sector identified a combination of energy efficiency and electrification as the least-cost strategy to meet the state's greenhouse gas emissions limits. Over the past two years, Commerce and the state have worked to advance the recommended policies and actions required to implement an electrification strategy in Washington buildings.

Buildings represent approximately 20% of Washington's greenhouse gas emissions, including emissions related to electricity generation.[66] The building sector is the fastest growing source of statewide emissions. The greatest portion of the sector's emissions come from the direct combustion of natural gas and other fossil fuels in buildings for space heating, water heating and cooking. In addition to energy use, buildings contribute to greenhouse gas emissions through the manufacturing of construction materials and carbon embedded in refrigerants used in heat pumps and cooling systems.

Decarbonizing the building sector requires the state to:

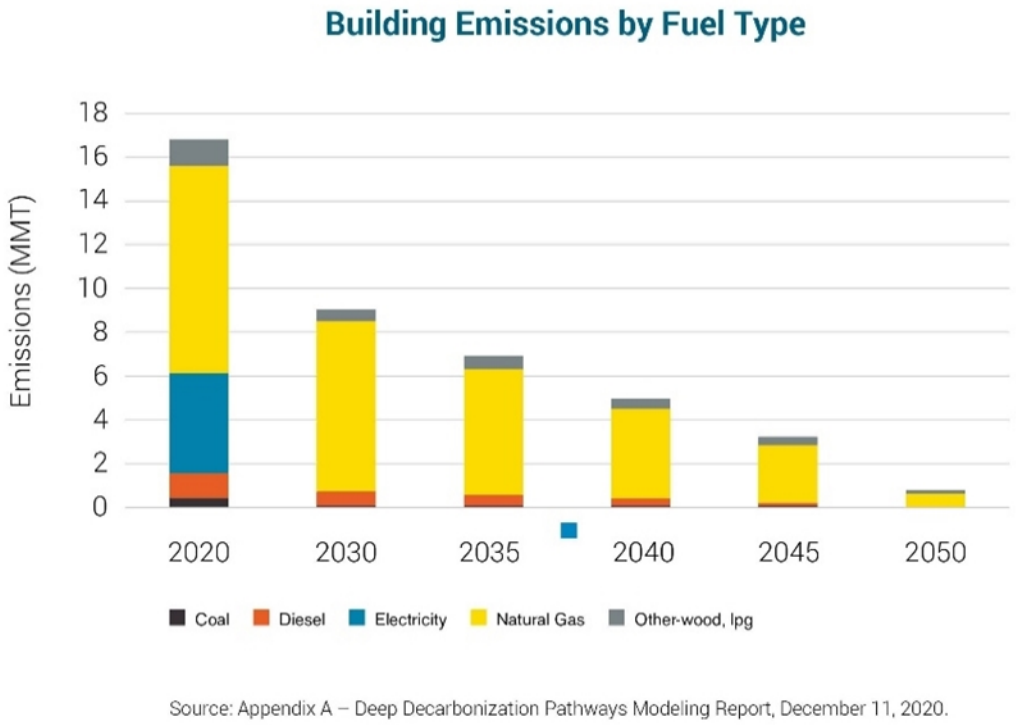
- Maximize energy efficiency
- Maximize electrification
- Optimize buildings as grid resources
- Minimize embodied carbon and refrigerant emissions

Over the past biennium, Washington has seen significant changes in the buildings sector, both in practice and policy from the Legislature. The passage of Chapter 117, Laws of 2022 (SB 5722) expands the building performance standard opportunity established by the Clean Buildings Act (Chapter 285, Laws of 2019) by

[66] Washington 2021 State Energy Strategy

requiring energy benchmarking, operations and maintenance and energy management planning for multifamily and smaller commercial buildings. This would become a performance standard in 2031.

Additional legislative efforts from the 2021 and 2022 sessions brought improvements to the buildings sector, including consideration of all-electric systems in new capital projects, regulation of hydrofluorocarbons (HFCs) used in buildings, and the minimum energy efficiency of household and commercial appliances. The Washington Legislature and Gov. Inslee approved operating budgets including more than $150 million for building decarbonization, $10 million for building electrification through the CEF, and $20 million in the 2021-2023 capital budget for low-income weatherization.



2021 State Energy Strategy Electrification Scenario: This graph shows Washington building sector emissions by fuel type.

In 2022, the Washington State Building Code Council approved a package of residential and commercial energy codes that would significantly shift newly constructed buildings towards electric end uses. The UTC continues work on the decarbonization pathways for natural gas utilities, which will provide meaningful direction to the approaching transition to a decarbonized future.

Despite this progress, continued impacts from the COVID-19 pandemic have stymied global supply chains, limiting the availability of critical building decarbonization technologies, such as heat pumps and silicon microchips. Economy-wide labor shortages mean Washington has fewer contractors than required to meet the retrofits and weatherization work that must occur in the next decade. Furthermore, building decarbonization has largely occurred in buildings that are well resourced. Current statewide efforts to maximize energy efficiency and savings in low-income households are not achieving the SES's stated goal of meeting 10% of low income need.

Looking to the future: The pace and scale required to meet emissions limits

Recent analysis by the Clean Energy Transition Institute (CETI) based on 2021 SES decarbonization modeling found that Washington's emissions have slowed over the past 30 years, but have not reduced emissions from

1990 levels.[67] The slowed increase of energy use is attributable to Washington's mix of energy codes, appliance standards, regional and state energy planning, utility programs, market transformation efforts, and other building-related policies.

Washington state agencies and higher education institutions have emissions limits and developed strategies to achieve these limits, which are in the seventh biennial Reducing Greenhouse Gas Emissions in Washington State Government report. Implementing these strategies will require collaborative efforts and sustained investment. State and local policymakers, market actors, advocates, and implementers must take critical action to achieve the scale of building decarbonization at the pace required to meet the state's emissions limits.

A. Establish a building decarbonization policy framework

Over the past two years, Washington developed much of the building decarbonization policy and the programs needed to implement policies that will help building owners reduce their energy use and electrify. The passage of Chapter 177, Laws of 2022 (SB 5722) lays the groundwork for Washington's existing nonresidential buildings to transform into high-performing buildings that use less energy. Over the next nine years, covered buildings (or "Tier 2" buildings) will be required to benchmark their energy use using Energy Star Portfolio Manager and create operations and maintenance plans for lowering their energy use. These activities will inform a building performance standard for smaller commercial and multifamily buildings beginning in 2031.

Buildings covered by the Clean Buildings Act have program support to make energy efficiency improvements. The Legislature appropriated an additional $150 million in Chapter 177, Laws of 2022 for early adopter incentive funding to help Tier 2 building owners measure and evaluate energy use and plan for improvements.

Progress assessment: Building decarbonization

2021 SES recommendation	2023 update
Expand the scope of the building performance standard to include buildings with less than 50,000 square feet with a stepped path to low energy and zero carbon by 2050.	Chapter 177, Laws of 2022 (SB 5722) established a new tier of covered buildings under the Clean Buildings Act (2019), which includes non-residential buildings between 20,000 and 50,000 square feet, and multifamily residential buildings over 20,000 square feet. Managers and owners at these buildings will be responsible for benchmarking, operations and maintenance, and developing an energy management plan.

[67] Operation 2030

Dissemination of [building performance standard] information should be operationalized at the state level through training programs.	In 2021, Commerce staff conducted about 45 trainings and presentations, as well as four live Q&A sessions to increase awareness, solicit feedback, and support stakeholders in pursuing compliance with the Standard.[68] Commerce produced educational materials and collaborated with utilities, nonprofit organizations and the WSU Energy Program to develop training workshops for consultants and energy professionals. The Commerce SEEP office conducted additional training for state agency facility managers.
Develop a residential sector building decarbonization implementation plan.	Commerce, working through and with a selected contractor, is developing a detailed residential sector building decarbonization implementation plan. The development of this plan will include extensive stakeholder involvement, community engagement and public input. This plan will be published June 30, 2023.

Areas for action

Maximize the potential of building performance standards

Over the next four years, the buildings sector must mobilize to prepare covered buildings for compliance with the Clean Buildings Act, which begins in 2026 for the state's largest buildings. Ensuring that there is robust technical and financial support for the state's most under-resourced building owners is critical to successfully transforming existing commercial buildings in Washington. Furthermore, as rulemaking for the Tier 2 expansion of the Clean Buildings Act gets underway in 2023 and multifamily residential buildings become subject to benchmarking and operations and maintenance requirements, protecting tenants and maintaining affordable housing will be critical. The Clean Buildings Expansion Timeline is shown in the figure below.

Clean Buildings Expansion Timeline (SB 5722)

Public buildings, including buildings owned by state agencies, are also subject to the Clean Buildings Act. State agencies and local governments need supportive steps and pathways to comply with state decarbonization policies. State agencies are already required to develop and submit strategies for meeting greenhouse gas limits under RCW 70A.45.050. The passage of Chapter 178, Laws of 2022 (HB 1280) requires agencies to

[68] Department of Commerce, 2022 Clean Buildings Legislative Report

consider an all-electric option when conducting a lifecycle cost assessment (LCA) for capital projects, and incorporate the social cost of carbon into lifecycle analysis tools. This will give state buildings project decision-makers the discretion, but not the requirement, of considering higher performance, lower emissions options for building construction.

B. Maximize energy efficiency and electrification in buildings

Newly constructed buildings

Building energy codes specify minimum energy efficiency standards and characteristics for newly constructed residential and commercial buildings. Decarbonization modeling from the 2021 SES found that investment in energy efficiency and building electrification is the most cost-efficient way to meet the state's greenhouse gas emissions limits.

The 2021 Washington state energy code cycle resulted in necessary progress for Washington's new buildings and aligned with required efficiency improvements in statute (RCW 19.27A). The State Building Code Council passed residential and non-residential codes which would require high-efficiency electric space and water heating in new construction statewide, with few exceptions. Local governments are also taking action to electrify their buildings through codes, standards, and other building decarbonization tools, as outlined in the following table. The availability of federal funding for buildings over the past two years has risen to meet this critical moment (see the "Inflation Reduction Act" section in this chapter).

Local governments decarbonizing new construction (2021 to 2023)

Jurisdiction	Action
City of Bellingham	Passed an ordinance prohibiting the use of natural gas in space and water heating in newly constructed commercial buildings and multifamily buildings above three stories.
City of Tacoma	Adopted a resolution to strengthen the city's commitment to decarbonization, which bans the use of natural gas in newly constructed city-owned buildings.
City of Seattle	Adopted local codes that restrict fossil fuel-powered space and water heating beginning in 2022, in addition to providing electrical receptacles and circuits where gas-fired appliances exist, in order to accommodate future electric appliances. These changes apply to commercial buildings and multifamily buildings greater than three stories.
City of Shoreline	Passed an ordinance that limits natural gas in newly constructed commercial and large multifamily buildings.

Existing buildings

A study on the financial impact of fuel conversion on consumer-owned utilities and customers, contracted by Commerce and conducted by Energy and Environment Economics, Inc., found that while electrifying new buildings is cost-effective in Washington, there are significant opportunities and financial barriers to electrifying existing buildings (see Section D. of this chapter). Through Commerce initiatives such as Energy Retrofits for Public Buildings grants and the Weatherization Plus Health program, existing public buildings and low-income households can be retrofitted for energy efficiency, health, safety, and decarbonization benefits. While these programs successfully reach some public buildings and low-income households, they alone do not meet the need or demand for safe, healthy, and energy-efficient buildings. Significant opportunities remain in improving existing buildings not covered by the Clean Buildings Act, which are commercial, multifamily and single-family residential buildings under 20,000 square feet.

Progress assessment: Maximizing building energy efficiency and electrification

2021 SES recommendation	2023 update
The Legislature should revise the energy code to require the state Building Code Council adopt zero-carbon and all-electric construction and efficiency mandates no later than the 2027 code, fully achieving incremental improvements each code cycle from 2021 to 2027. Consider additional energy code provisions to expand deployment of DER technologies, such as on-site generation and utility-integrated load control.	The Washington State Building Code Council approved updated commercial and residential energy codes requiring electric space and water heating in new construction, with some exceptions. These updates fully achieve the incremental efficiency improvements required of the 2021 code, as prescribed in statute. The 2021 Washington State Energy Code for Commercial Buildings also includes a provision that would require large commercial buildings be solar-ready.
Update Office of Financial Management (OFM) requirements for capital budget requests to include electrification in all applicable projects.	Since 2021, OFM has developed revised language around greenhouse gas emissions and clean buildings, and asks capital projects to consider an electric alternative when analyzing building end uses. OFM instructed state agencies to label budget submittals for the 2023-25 biennium with a "CBPS" code to better understand the resources required to comply with clean buildings standards. These actions provide better information for decision-makers, allows state agencies and project stakeholders to understand which capital projects are addressing these three critical areas, and asks the state to prioritize projects that reduce emissions.
The State Energy Office should develop and implement a high-efficiency electrification program to incentivize adoption of heat pump technology in existing residential and nonresidential buildings, including marketing, workforce development and certification, and equitable distribution of incentives.	In the 2021-23 capital budget, the Legislature appropriated $10 million to Commerce's CEF for building electrification and high efficiency electric equipment projects grants. The Building Electrification Program provides grants to multifamily residential and commercial building owners and tenants to deploy and demonstrate grid-enabled, high-efficiency, all-electric buildings that reduce greenhouse gas emissions and accelerate the path to zero energy. Applications for projects opened in 2022.

Areas for action

Increase the number of homes with high efficiency electric equipment

The SES recommends that the State Energy Office "develop and implement a high-efficiency electrification program to incentivize adoption of heat pump technology in existing residential and nonresidential buildings …" While the CEF received $10 million for grants to innovative building electrification projects, this amount is small compared to the scale of funding required to incentivize electric technologies. Providing funding for a high-efficiency electric equipment or heat pump programs for low- to moderate-income households is one way the Legislature can deliver on equitable residential building decarbonization.

Crosscutting area: State agencies leading by example

Support other state agencies in their efforts

The State Efficiency and Environmental Performance (SEEP) Office coordinates with partners across state government to reduce greenhouse gas emissions, reduce energy costs, and eliminate solid waste and toxic materials from state agency operations. State agencies must comply with many of the same statutes as non-residential buildings, but face challenges in resource planning to meet energy mandates. To comply with the Clean Buildings Act, which includes benchmarking energy use and meeting energy use intensity (EUI) targets, agencies require funding for specific building technologies (such as sub meters), energy audits, and additional staff or consultant resources to make energy efficiency improvements. SEEP maintains an inventory of state buildings subject to this act and works closely across state government to identify and support resource needs.

Implement state building codes

With effective implementation, building energy codes can support energy cost savings and complementary benefits associated with electricity reliability, air quality improvement, greenhouse gas emission reduction, increased comfort, and economic and social development. Ensuring that the workforce understands energy and building codes is foundational to meeting the state's energy and emissions goals. With Washington on the precipice of adopting energy efficient, electrified energy codes, there is a clear need to ensure code stakeholders are equipped to deliver compliant buildings. Commerce will pursue funding opportunities for energy code implementation, auditor training, and technical assistance for local governments.

Energy retrofits for public buildings

The State Energy Strategy recommends the state lead by example through investments in public capital projects, especially for schools, hospitals, and rural public buildings. The Energy Retrofits for Public Buildings program provides a pathway for public agencies to substantially improve building performance, reduce operating costs, and reduce GHG emissions.

Many public facilities were constructed before the adoption of new energy codes and do not address the growing need to provide efficient cooling. Public entities are often resource-constrained and face significant barriers to accessing clean energy improvements, including shortages in staff time, limited grant writing experience, and challenges in obtaining match funds.

This program helps public agencies build sustainable facilities, reduce deferred maintenance backlogs, save on utility bills by installing solar power, create living wage jobs, and contribute to our state's climate goals.

Next steps

To scale this program, leverage federal funding opportunities, and meet climate and environmental justice goals for public facilities, this grant program requires additional funding through the 2023-25 biennium.

C. Meeting the low-income need in buildings

Low-income households are an important consideration to decarbonize the residential sector, as they bear a disproportionate housing and energy cost burden relative to other households. The state has several important tools that help low-income households access buildings improvements to live safely, healthily and affordably.

Commerce, in partnership with the WSU Energy Program, administers multiple weatherization programs serving low- and moderate-income households throughout Washington. The Weatherization Plus Health program is a statewide investment in Washington's clean energy future that delivers affordable housing preservation and efficiency upgrades by providing repairs, health and safety improvements, and installation of energy efficiency measures in low- income communities. The improved health conditions and reduced energy and health costs resulting from this program have a positive effect on the state by reducing energy assistance needs, Medicaid costs, carbon emissions, and energy arrearages. Conservatively, these efforts are estimated to have a three-fold benefit; that is, for every $1 invested in weatherization programs, there is a $3 gain to residents and the greater state climate efforts.[69]

Additional Washington weatherization programs include:

- The Community Energy Efficiency Partnership (CEEP) is a complimentary program to low-income weatherization, focused on providing energy efficiency upgrades for moderate-income households and small businesses. The WSU Energy Program administers CEEP, which the state has funded state since 2012.
- The Home Rehabilitation Loan Program (also referred to as the Rural Rehabilitation Loan Program) is a revolving, deferred loan program that provides up to $40,000 to eligible low-income homeowners to address health, safety and durability issues in primary residences in rural areas of the state. As a result, these homes can now access weatherization services.
- Today, weatherization delivers affordable housing preservation and efficiency upgrades in single and multi-family homes in every county and for seven Native American tribes. Commerce partners with 27 local community action agencies, municipalities, housing authorities and tribal agencies to deliver services. Household measures are installed by a combination of agency-based crews and more than 140 weatherization, HVAC, plumbing, and electrical contractors across the state.

Progress assessment: Meeting the low-income need in buildings

2021 SES recommendation	2023 update
Prioritize decarbonization of public buildings in low-income communities, specifically public schools and hospitals.	The Energy Retrofits for Public Buildings program prioritizes projects in rural, lower-income, overburdened and tribal communities. In 2022, 91% of grant funds were directed to these communities. Projects provide benefits to these communities by reducing the costs of providing public services, improving the comfort, health and safety of communities, building local workforces, and reducing local air pollution.

[69] About the Weatherization Assistance Program | Department of Energy

Expand funding for the state's successful Weatherization Plus Health program as part of a broader strategy to reduce energy burden and improve health outcomes for low-income households impacted by the COVID-19 pandemic.	The Weatherization Plus Health program was funded in the capital budget for the 2021-23 biennium, but needs continued funding in the 2023-25 biennium to meet the low-income household need and to leverage federal IIJA funding.
The Legislature should provide universal access to high quality broadband to enable grid integration of appliances and equipment, optimizing buildings and managing load.	In 2019, the Legislature enacted the Washington Broadband Act, which established access, download, and upload speed goals for residences, businesses, and communities. Under RCW 43.330.536, the entire state must have access to broadband that operates at 25/3 megabits per second (Mbps) scalable by 2024.

Areas for action

Develop a Weatherization Plus Health strategy

The 2021 SES noted that only a fraction of roughly 750,000 income-eligible households receive weatherization services each year due in part to funding, regulatory and system capacity constraints. **Funding this program, and the broader set of programs that support and enhance weatherization, provides critical, direct support for vulnerable populations. Expanding the suite of weatherization services statewide, as well as prioritizing multifamily housing, fossil-fuel heated housing, and high-energy burden communities, requires an appropriation of funding in the 2023-25 capital budget.**

Commerce commissioned a study to better understand the building energy efficiency needs of low-income and overburdened communities, and how to improve service delivery. This study will provide Commerce, WSU and the Legislature with a roadmap for scaling up residential energy efficiency programs, such as the Rural Rehabilitation Loan program, which has been difficult to implement due to a variety of challenges. This study will help identify service gaps and marketplace need for a tailored loan product, which will inform how this program will change in the future. The low-income needs assessment is under development and will be finalized in 2023.

Transform the market for low-carbon equipment

Market transformation to sales of mostly high-efficiency electric equipment and deep energy retrofits must be achieved by 2030 to decarbonize the building stock by 2050.[70] The 2021 State Energy Strategy recommends that the state develop a market transformation team within the State Energy Office. The office will be charged with guiding the collaborations required to implement a market transformation intervention. This team will ensure market transformation programs have carve outs and direct funding for low- and moderate-income households and tribal nations. This recommendation will be central to the State Energy Office's implementation of the Inflation Reduction Act. Program design that centers an inclusive public process will inform how these unprecedented funds are distributed.

[70] Operation 2030

D. Natural gas

A key finding from the 2021 SES is that meeting the state's greenhouse gas reduction limits requires immediate and significant reductions in natural gas emissions. Natural gas appliances leak methane into our homes and communities, triggering asthma and other respiratory diseases for children and other vulnerable people in homes served by natural gas. **Addressing the natural gas system is both a climate and public health imperative.** Additionally, this system and its supply chain employ a significant number of people, and impacts to the current workforce must be addressed and planned for with input from these workers.

There is currently no required plan for natural gas utilities to meet the state's greenhouse gas emissions targets. Utilities should be required to develop plans with a mix of emissions reduction strategies such as electrification and renewable natural gas in the near term. Implementation of clean heat plans would result in energy cost savings and air quality benefits for people who switch from fossil natural gas to electricity and clean fuels. Natural gas utilities should be required to provide an equitable distribution of benefits to households and businesses as they transition to clean heat.

The UTC and the Legislature need to address the existing natural gas system, as well as its continued expansion. This is especially important now that the CCA has been enacted. The CCA will require that gas companies surrender allowances to cover greenhouse gas emissions from the use of their product, and expanded use of fossil natural gas will increase the allowance requirements on gas companies. The program provides no-cost allowances to cushion existing customers from rate shock, but most new customers are excluded from that cost protection mechanism. The credit mechanism for existing customers must be designed to ensure that the per unit price of natural gas[71] reflects the cost of allowances, so it is reasonable to expect that the volumetric charges will increase for all natural gas customers.

The tendency for line extensions to lock in customers creates further cause for concern. Once a household is connected to the gas distribution system, it is difficult and expensive to transition to another fuel source, leaving customers at risk of higher costs in the future. If customers discontinue gas service anyway, the investment costs associated with their original connection will likely result in some combination of stranded costs borne by company investors and increased rates for remaining customers. To support gas utilities and their workers in the transition to clean heat, gas utilities should be allowed to recover decarbonization efforts through customer rates.

In 2021, the Legislature funded the UTC to examine feasible and practical pathways for investor-owned electric and natural gas utilities to contribute their share to greenhouse gas emissions reductions. The study will also analyze the impacts of energy decarbonization on residential and commercial customers and the natural gas and electric utilities that serve them. This study, and its findings, are expected in 2023.

Next steps

- The Legislature should require the natural gas industry develop plans for an equitable transition to clean heat.
- The UTC and Legislature should review results of the 2023 natural gas examination and consider if further measures are needed to reduce natural gas emissions and secure protections for low-income households and overburdened communities.

[71] In the United States, natural gas can be priced in units of dollars per therm, dollars per MMBtu, or dollars per cubic feet.

The Inflation Reduction Act

The Inflation Reduction Act (IRA) (2022) represents a $370 billion investment in the U.S. economy over the next 10 years. Some of this will reach Washington as formula funding, including the State Energy Office and federally recognized tribes.

The IRA will directly affect Washington's building decarbonization efforts in the following ways:

High efficiency electric equipment
The IRA includes scaled point-of-sale rebates for electric home equipment (such as heat pump space heaters, dryers and water heaters) purchased by low and moderate income households. It also includes a residential energy efficiency tax credit, which will have tax rebates of up to $2,000 for heat pumps and heat pump water heaters, and additional rebates for exterior doors, home energy audits, and other home efficiency measures.

Whole-home retrofits
In addition to tax credits for highly efficient new homes, the IRA will provide state energy offices with funding to implement performance-based, whole-home rebates. This provides low- to moderate-income single and multifamily households scaled rebates depending on income and energy efficiency savings.

Investment in the electrification workforce
The IRA awards $200 million nationally for the development of home energy efficiency contractor training grants. The energy efficient commercial buildings tax credit also offers tiered incentives based on living wage and apprenticeship requirements.

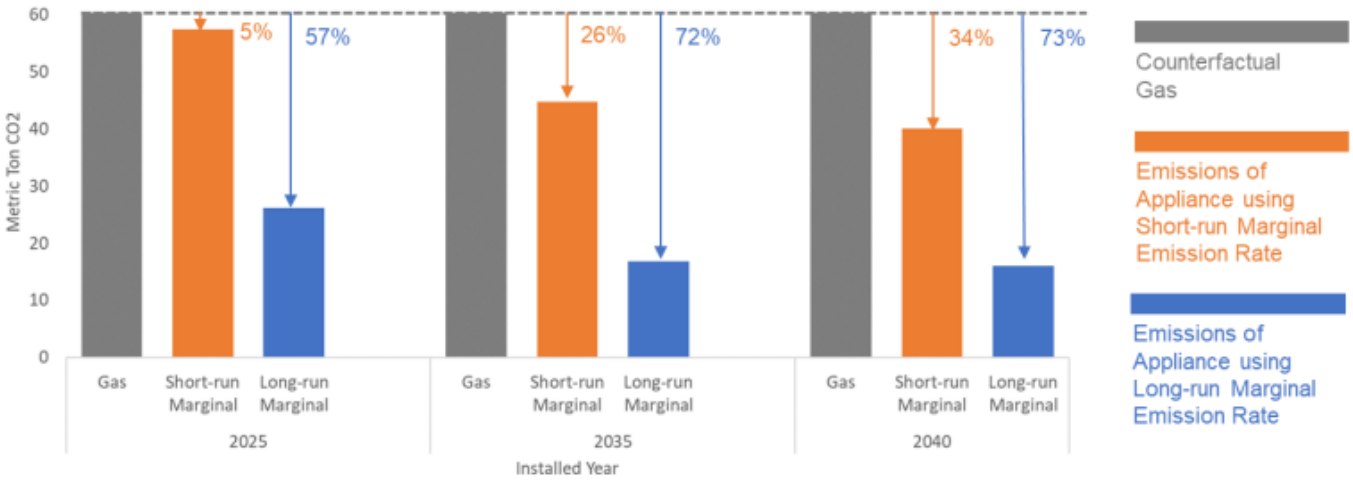
Develop plans for the long-term transition of the natural gas distribution system

The 2021 SES recognized that the state must eventually address emissions from fossil natural gas to meet its climate and energy goals, but noted that an immediate end fossil natural gas use to buildings was neither feasible nor desirable. It called instead for developing a well-planned transition to carbon-free energy sources such as electricity over two to three decade.

The natural gas distribution system in Washington currently provides energy to 1.2 million residential and 107,000 commercial customers. As Figure 1 shows, the SES expects the fuel mix in buildings to shift dramatically as Washington pursues building electrification and decarbonization.

We understand more about the opportunity to transition from natural gas to electricity than ever before. Directed by the Legislature, Commerce consulted with Energy and Environment Economics, Inc., to analyze the financial impact of fuel conversion on consumer owned utilities and customers in Washington.[72] The research found that electrification reduces total greenhouse gas emissions across all the building segments and regions studied.

[72] Financial Impact of Fuel Conversion on Consumer Owned Utilities and Customers in Washington



Lifetime emissions of a gas furnace vs. a standard heat pump HVAC system in a single-family home in Richland Energy Services' service area

The report identified several near-term opportunities where electrification can deliver cost savings for consumer owned utility customers and challenges to building electrification. It made the following recommendations:

- Incentivize all-electric new construction
- Target heat pump HVAC at customers that need new air conditioners and those currently relying on fuel oil or propane for heating
- Provide subsidies to lower the incremental consumer costs of electrification
- Ensure efficient price signals are conveyed in electric and natural gas rates
- Implement measures to alleviate peak load impact from electrification
- Carefully design policies to support the large infrastructure needs for building electrification and potential high-capital investments

However, of the natural gas recommendations in the 2021 SES, Commerce finds that little progress has been made to decarbonize the natural gas distribution system.

Progress assessment: Develop plans for the long-term transition of the natural gas distribution system

2021 SES recommendation	2023 update
Natural gas distribution companies should increase energy efficiency and use of hydrogen and renewable natural gas to achieve near-term reductions in GHG emissions from natural gas.	Washington natural gas utilities have taken limited steps to advance energy efficiency and hydrogen and renewable natural gas (RNG) to reduce GHG emissions from natural gas: • Puget Sound Energy (PSE) aims to grow the percentage of RNG in its mix from 0.5% of its annual gas volume to nearly 3.5% of 2024 sales. The utility already offers a voluntary RNG program for customers and is running two hydrogen pilots to test blending impacts on the natural gas distribution system, among other things. • In 2021, Avista Corp. announced goals to reduce natural gas emissions 30% by 2030 and to be carbon neutral in its natural gas operations by 2045. Avista also offers a voluntary RNG program and continues to analyze how it will invest in RNG, hydrogen, and other renewable biofuels. • Cascade Natural Gas continues to rely solely on energy efficiency programs with no apparent plans to incorporate renewable natural gas or hydrogen into its distribution system.
The Legislature and the UTC should ensure that the state's climate policy and emissions limits are reflected in the regulation of natural gas companies and explore legislative and regulatory actions to restrict growth of the natural gas system and the use of fossil natural gas where zero-emission options are available.	Initial actions to limit growth of fossil natural gas consumption in Washington include: • The UTC's decision in 2021 to reverse a line extension policy that encouraged expansion of the natural gas distribution system. • The State Building Code Council's passage of revised energy codes, which require electric heat pumps for most space and water heating applications in most new or commercial and residential buildings beginning in July 2023. • In the 2021 state operating budget (Chapter 334, Laws of 2021), the Legislature funded two analyses to support plans for an equitable transition to clean heat, which would reduce carbon emissions and bring positive health benefits to households. The first analysis was of the financial impact of fuel conversion on consumer owned utilities and customers in Washington. In the second, the UTC must 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, and the impacts of energy decarbonization on residential and commercial customers and the electrical and natural gas utilities that serve them.

Ground source heat pumps

Ground source heat pumps (GSHP) are a technology in use since the 1940s. They heat buildings more efficiently and cleanly than traditional gas furnaces.

Massachusetts is piloting two projects to harness geothermal heat-to-heat and cool buildings. As the U.S. Department of Energy explains:

"Relative to air-source heat pumps, GSHP are quieter, last longer, need little maintenance, and do not depend on the temperature of the outside air. System life is estimated at 25 years for the inside components and more than 50 years for the ground loop."

The long-term transition to clean heat requires Washington utilities to begin harnessing new technologies now. Networked GSHP systems, also called "geogrids," form a shared loop by connecting multiple individual GSHPs, creating systems that can move waste heat between buildings.

Perhaps the most compelling feature of these systems is the ability to utilize existing natural gas infrastructure in the ground. Furthermore, as Washington transitions from fossil gas, there is an existing workforce trained in installing natural gas pipes and operating networks. Geogrid systems have the potential to create jobs for these skilled, local workers.

The New York State Energy Research and Development Authority is funding networked GSHP projects as part of its Community Heat Pump Pilots program.

Areas for action

Pursue opportunities for near-term emissions reductions

Natural gas utilities have taken limited steps in pursuing RNG and natural gas alternatives (see the 2023 update). In light of this, the Legislature should consider directing the UTC to require that every gas company offer a voluntary natural gas program and continue to push natural gas companies to expand their energy efficiency program funding levels. The Legislature, UTC, and State Energy Emergency Management Office should continue to monitor hydrogen pilots for adverse impacts on the natural gas distribution system and overburdened communities.

Plan for the long-term transition to clean heat

Over the past two years, the UTC reevaluated the practice of subsidizing line extensions and required utilities to better align their methodologies for calculating line extension subsidies with the true costs of line extensions. Despite this, natural gas companies do not yet have any UTC-approved plans for an equitable transition to clean heat, and there are no rate protections for low-income customers or regulations that require that the expansion of the natural gas system not increase greenhouse gas emissions.

Recognizing that the long-term transition to clean heat would lead to cost savings and improved environmental and health outcomes, the Legislature should require natural gas companies transition to clean heat and provide an equitable distribution of benefits to households and businesses. Transition plans should address potential impacts on low-income customers, overburdened communities and gas company workers, evaluate any need to accelerate the cost recovery of gas company investments, and ensure that the state's emissions reduction limits are achieved.

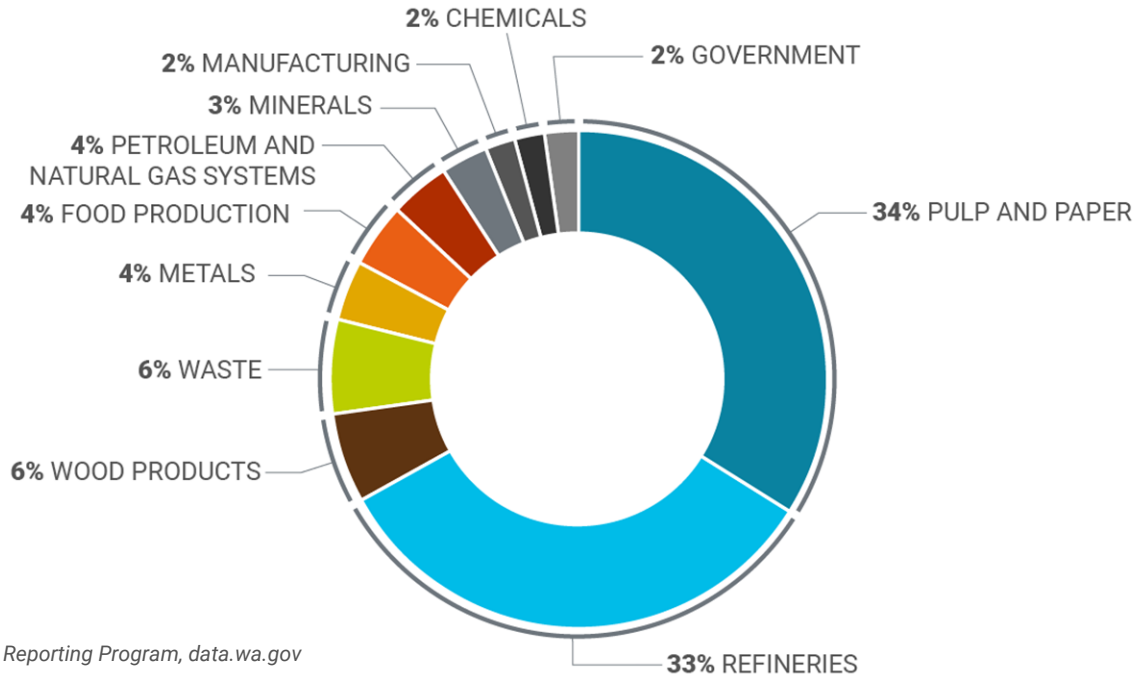
The Legislature, UTC, State Building Code Council and Commerce should implement the recommendations in Financial Impact of Fuel Conversion on Consumer Owned Utilities and Customers in Washington Report. In addition, the UTC should end line extension subsidies. Natural gas companies should be required to submit evaluations of the potential of ground source heat pumps in their service areas (see sidebar) to the UTC. **Furthermore, the Legislature should consider funding for pilot projects that test new clean heat technologies, such as networked ground source heat pumps.**

Industry and renewable fuels

The 2021 SES made many recommendations for addressing Washington's industrial operations emissions and energy use. These recommendations also address the role of renewable fuels like green electrolytic and renewable hydrogen, and the jobs and workforce implication of industrial decarbonization. Decarbonizing industrial operations, including refining and production of end products like pulp and paper, is a challenge.

Washington must reduce greenhouse gas (GHG) emissions from industrial facilities to meet its overall emissions limits. In doing so, we must balance support for retaining and reducing emissions from existing industries that provide critical materials, developing industries whose products contribute to a clean energy economy (such as batteries), and achieving a statutory of doubling our manufacturing base. As we develop policies and programs to decarbonize our economy, we must design strategies that retain our industrial and manufacturing businesses, avoiding unintended consequences of moving GHG emissions and jobs to other states or countries. This alignment of industrial activities and GHG reductions is achievable and a critical priority for the state.

Percent of total emissions by sector, 2021



Source: GHG Reporting Program, data.wa.gov

Most emissions from the pulp and paper, wood products, and livestock subsectors are biogenic. The metals subsector reflects the reductions of the Alcoa Ferndale aluminum smelter. The government subsector consists almost entirely of steam plants operated by the federal government and state institutions of higher education. Subsectors transportation fuel supplier, power plants and waste are excluded.

When considering 2021 data (the most recent available), industrial emissions remain at similar levels to 2018 SES data. However, numerous significant policy changes have occurred since the 2021 SES that provide significant reduction opportunities in the years to come. **Recommendations regarding the establishment of a technology-neutral regulatory framework are worth highlighting as significant progress in the past two years.** The Washington State Legislature passed several relevant bills, including the Clean Fuel Standard (CFS) (Chapter 317, Laws of 2021), and the Climate Commitment Act (CCA) (Chapter 316, Laws of 2021). Critically, the Healthy Environment for All (HEAL) Act (Chapter 314, Laws of 2021) also passed, which will ensure that

environmental justice is centered as state agencies implement environmental laws and programs, contributing to more equitable outcomes as we reach our emissions reduction goals.

Additionally, the state passed significant bills related to and incentivizing clean industry and manufacturing (Chapter 185, Laws of 2022), and accelerating the production and use of green electrolytic hydrogen and renewable fuels (Chapter 292, Laws of 2022). The Building Economic Strength through Manufacturing (BEST) Act (Chapter 64, Laws of 2021) establishes a goal of doubling the state's manufacturing base, which will be pursued alongside implementation of these other bills. Concurrent with recent state laws, new federal bills, including the Infrastructure Investment and Jobs Act (IIJA), the Inflation Reduction Act of 2022 (IRA), and the CHIPS and Science Act (CHIPS) contain components and funding that may contribute to advancing SES recommendations supporting industrial decarbonization and deployment of renewable fuels.

Other recommendations require further focus and action in the coming years. Washington needs to develop an industrial policy that reflects our climate and environmental justice values. This policy should be guided by analysis of emissions, including the pollution emitted elsewhere during production of materials used in this state, and a focus on specific point-source emissions in Washington. It will require thoughtful work to align important goals to double manufacturing in Washington – as directed in the BEST Act – with the SES, potentially as part of a comprehensive industrial planning effort.

Complementary policies and systems need to be in place at the state level to support these goals. Policies that track and address the embodied carbon in materials are one of the critical tools that can help us learn more about the GHGs required to produce the goods we use today, and can incentivize the procurement of goods with a lower carbon footprint. Numerous states, including California and Oregon, have enacted Buy Clean laws. Buy Clean policies are also gaining traction at the federal level, with the Biden administration's announcement in September 2022 regarding new Buy Clean actions in federal procurement and federally-funded projects. Related Commerce-request Buy Clean, Buy Fair (BCBF) legislation is under consideration in the Washington State Legislature, and passage of a bill like this will be a critical part of the work. Significantly, Washington's proposed policy's "buy fair" components would add important considerations regarding materials manufacturing standards, including labor standards data.

The ability for industry and manufacturing to adapt as part of a clean energy transition is critical in getting to economy-wide, net-zero emissions. Numerous companies have already invested in cleaner and more efficient operations, which should be celebrated as foundational first steps. New federal funding opportunities are expected to provide significant resources to help advance these goals. Accessing and utilizing the funds will require leadership from Washington's Legislature, agencies, private industry, labor unions, environmental justice organizations, and others. Fossil fuel-dependent industries and communities, such as those connected to Washington's refineries and remaining coal-fired power plant, will face significant adjustments as a result of pollution reduction policies. Robust conversations and solutions related to equity and human impacts are essential.

All these issues require investments of time, planning, and community engagement. To realize our goals, the state will need to conduct a comprehensive and collaborative planning effort to advance a strategic industrial policy.

A. Build a dataset and assess strategies to inform our industrial decarbonization strategy

To determine the best ways to reduce industrial emissions, we need to understand our current baseline. The SES determined that there are data gaps that are critical to fill if we are to engage strategically and effectively in this area.

Important initial steps have occurred since the SES was published. The Greenhouse Gas Reporting Program (GHGRP) has collected mandatory emissions reports for industrial facilities with more than 10,000 tons of CO2 equivalent (co2e) emissions per year; with the passage of the CCA, the GHGRP will be used to track compliance of those industries whose emissions are covered by the new program. A number of supplemental outputs were created in support of the SES that provide key reference points, including the Washington Industrial Emissions Analysis, Washington Industrial Emissions Analysis Green Cement Case Study, and development of Washington Industrial Emissions Characterization Tables (Excel), which includes an overview of emissions data needed from the top nine emitting industries in Washington. Other valuable tools include the Northwest Clean Energy Atlas developed by the Clean Energy Transition Institute, which draws on the same GHGRP data, along with data from the Environmental Protection Agency (EPA) and the U.S. Energy Information Administration (EIA). The Atlas provides visualizations and the ability to compare Washington data with data from Oregon, Idaho, and Montana.

Additionally, new tools are being developed to capture and communicate embodied carbon data; this is discussed in the Buy Clean, Buy Fair and consumption-based emissions section.

Progress assessment: Build a dataset and assess strategies to inform our industrial decarbonization strategy

2021 SES recommendation	2023 update
The Department of Ecology should increase the subsector breakdown in its industrial sector GHG inventory. Both combustion and process emissions need to be broken down with the same taxonomy, so that data can be parsed meaningfully for policymaking.	Progress is underway, though funding is required to implement. This work is part of an Ecology budget request to fund more data analytics and sector expertise allowing connections to be made between climate program reporting and the GHG inventory, as well as to add emissions forecasting and modeling capacity.
The Department of Commerce should develop and publish detailed industrial sector energy data using federal Energy Information Administration forms data, or any new state reporting requirements.	This is still a gap. It will be possible to implement once Ecology is able to publish sub-sector breakdowns as described above.
Continue support for research in Washington's geological storage potential for CO2.	The Washington Geological Survey (WGS) at the Department of Natural Resources is engaged in applied research and data analysis to create feasibility maps of potential subsurface basalt and other CO2 storage reservoirs. WGS participates in the Carbon Utilization and Storage Partnership and coordinates with industries, other agencies, university faculty, and academic institutes.

Areas for action

Critical next steps include the subsector breakdown and taxonomy data described above. Funding will be needed for Ecology to conduct this work, which will enable other planning and future policy work such as comprehensive industrial policy planning efforts.

Analysis is also needed to determine what types of data and metrics are most important to achieve specific intended aims. For example, work is needed to determine when facility-level emissions (such as emissions from a particular steel mill) data are needed, versus the emissions data associated with a particular product (such as steel). Ecology staff are in the early stages of developing a consumption-based inventory, which should help clarify these points.

Developing a centralized database with embodied carbon data and related labor data, which would be compiled as part of the BCBF policy platform, is also extremely important; further description of this tool is in the Buy Clean, Buy Fair and consumption-based emissions sub-section. Additionally, the state should consider whether other chemicals of concern might be tracked alongside embodied carbon, which could provide other important pathways to reducing environmental health disparities connected to industrial operations. One effort that could inform this expansion includes the Chemical Footprint Project.

Additionally, industrial decarbonization will likely require carbon capture and storage activities as part of reaching statewide net-zero limits by 2050, and research and planning now is valuable. The Washington Geological Survey is currently assessing potential geological storage sites, including basalt deposits. However, significant work remains to identify what sequestration opportunities are recommended in Washington. Analysis of pipeline safety for transportation of captured carbon, as well as environmental justice considerations, are among the topics where research and community engagement are needed.

B. Establish a technology-neutral regulatory framework

An important condition for clean industrial operations and production and use of renewable fuels is a technology-neutral regulatory framework. Significant policy advances have occurred in this area since publishing the 2021 SES. These changes support industrial decarbonization in several key ways. Notably, a Clean Fuel Standard (CFS) passed during the 2021 legislative session (Chapter 317, Laws of 2021). This significant policy, which was recommended in the SES, requires fuel suppliers to gradually reduce the carbon intensity of transportation fuels to 20% below 2017 levels by 2038. In addition to reductions in transportation fuel carbon intensity (discussed in the Transportation chapter), the policy provides strong incentives to reduce the GHG emissions in producing or refining fuels used for a variety of purposes, including in the industrial sector.

Other important bills include the Climate Commitment Act (CCA) (Chapter 316, Laws of 2021). The CCA caps and reduces GHG emissions from Washington's largest emitting sources and industries, allowing businesses to find the most efficient path to lower emissions. This program works alongside other critical climate policies to help Washington achieve its commitment to reducing GHG emissions by 95% by 2050. Additionally, the HEAL Act addresses environmental health disparities and promotes environmental justice by requiring several state agencies to incorporate environmental justice in the development and implementation of environmental laws, policies, and programs. The HEAL Act will work in coordination with policies like the CCA to make sure that the communities that bear the greatest burdens from air pollution today see cleaner air as the state cuts GHGs.

Progress assessment: Establish a technology-neutral regulatory framework

2021 SES recommendation	2023 update
Enact and implement a low-carbon fuel standard to establish a market and funding mechanism for clean fuels production.	This was achieved through the passage of Chapter 317, Laws of 2021. The new program went into effect in January 2023.
Washington should continue to explore regulatory mechanisms to measure, mitigate and reduce GHG emissions from the operation and siting of significant in-state stationary sources, petroleum product producers, importers and distributors of natural gas.	This is supported by the passage of Chapter 316, Laws of 2021, the CCA.
Increase incentives and support for industrial efficiency, emission control and clean technology upgrades, including consideration of an industrial transformation bank, incorporating strong labor and equity standards to fund the retooling and upgrading of Washington's emissions-intensive, trade-exposed (EITE) industries and low-carbon fuel pilot projects.	This is in progress. Ecology will facilitate an EITE advisory group to inform future GHG reduction pathways as part of CCA implementation. This work can be done in coordination with consideration of incentives, equity standards, and other tools that support EITEs while they reduce GHGs. Commerce, Ecology and others can work with EITEs to identify and secure relevant IIJA, IRA, and CHIPS funding that will support these efforts.

Crosscutting area: Environmental justice

Improving health benefits for surrounding communities

Regulations for industrial decarbonization must reduce negative environmental health impacts on surrounding communities, especially for those facilities located within overburdened communities. The CCA seeks to support both GHG reductions and improve local air quality for covered facilities. Significant equity-focused provisions were included in the CCA, such as a requirement that covered facilities including energy-intensive, trade-exposed industries that receive free allowances in the early years of the program reduce criteria air pollutants (like particulate matter and ozone), especially in overburdened communities. However, concerns remain about whether and how quickly local pollution reduction and health benefits will occur. Community input and recommendations from the Environmental Justice Council will provide critical guidance.

Key areas for action

Rulemaking processes related to these new regulations were completed in late 2022, and the final rules provide key details about how these new programs will affect Washington's energy landscape and communities. Ecology's CFS rules set carbon intensity (CI) standards for transportation fuels, compliance obligations for fuels that exceed the CI standard, and establishing methods to assign credits to fuels that have a lower CI. Additionally, Ecology established an Agriculture and Forestry Carbon Capture and Sequestration Advisory Panel, which will provide recommendations about how to best provide incentives and allocate credits for the sequestration of GHGs through activities on agricultural and forest lands.

Rulemaking for the CCA was also completed in late 2022, including rules related to how the CCA auctions and credit trading platform can be used. Additional rulemaking is forthcoming which will address how criteria air pollutants will be reduced alongside GHGs. Input from overburdened communities and the Environmental Justice Council will provide essential guidance.

A key area for action will be finalizing rules and a reduction pathway for EITEs, which are provided allowances at no cost until 2034, with gradual reductions in no-cost allowances provided. Clarity for EITEs must be provided by or before 2027. Further details regarding how allowances will be allocated and the emissions reduction pathway for EITEs will be finalized in coming rulemaking processes, with input from an EITE advisory group expected to begin in 2023. The state must set a clear, timely process to finalize the future EITE emissions reduction pathway. Another important area for action is setting a clear, timely process for advancing policies and investments--including opportunities to access federal tax credits--that help EITEs prosper and be competitive globally while reducing emissions and air pollutants. Commerce and partners will track these processes and many stakeholders will likely provide feedback to ensure strong, effective, and equitable final rules, policies, and investments.

Another area for action is identifying and advancing additional policies and activities to help address competitive issues as these programs are implemented. It is important to avoid negative competitive impacts on EITE facilities that might push them out of the state (known as leakage) because EITEs represent a significant source of emissions, jobs, and economic impacts. If they simply relocate to another region of the country, it does not reduce GHGs globally. Many recommendations within this chapter including strategic deployment of green electrolytic hydrogen and renewable fuels, and BCBF policies that increase the demand for low-carbon materials will be important components.

C. Develop and implement a coordinated clean energy industrial policy

There are significant differences amongst industries and amongst individual facilities within an industry; there is no one-size-fits-all approach to industrial decarbonization. In addition, the various policies in place or under development combine to have different impacts on industrial operations. **As such, the SES identified a coordinated industrial policy as a critical body of work for the state.** Federal legislation establishing new energy programs, grants, and incentives is helping advance this approach at a broader scale. The ways that climate, clean energy, and related workforce and Justice40 provisions are being established federally is a form of industrial policy that creates strong incentives and sends market signals toward high-road manufacturing, advanced industrial facilities, advanced energy and clean energy investment credits, and more. The inclusion of Justice40, labor standards incentives, use of domestically produced materials, and other provisions will increase the human benefits of this federal industrial guidance.

It will be challenging to create an industrial policy in Washington that supports growth of existing industries that have made decarbonization investments *and* doubling manufacturing jobs, while achieving the state's GHG limits and clean energy standards. However, with commitment, participation across state agencies, and guided by the perspectives of industry, unions, community organizations and others, it is possible. While this work should begin now, a multi-year effort is likely required.

At this stage, it is important to create a high-level framework for industrial policy that Commerce recommends be used to guide the work:

- **Align and affirm:** Develop an overall vision that affirms support for industries that should be retained, grown, or established as Washington reduces economy-wide emissions. This must align with the SES, statewide GHG limits, the HEAL Act, and related policies.
- **Commit to clean materials**: Ensure that GHG emissions are tracked and reduced both for commodities/core materials (such as metals, cement, chemicals and energy) and final products (complex manufactured goods that include a variety of materials, such as appliances, EV charging infrastructure, and much more). It is important to recognize the companies that maintain clean material commitments in the state's regulatory framework.
- **Preserve and transform**: Preserve existing manufacturing and industrial capacity that — through electrification, energy efficiency, fuel switching, consumption-based emissions policies and other mechanisms — can continue to operate in this state into the future in ways that align with and contribute to the SES and state net-zero requirements. This includes avoiding the leakage of these industries, associated emissions, and jobs to other jurisdictions.
- **Site and expand:** Support establishing new or expanded clean manufacturing of materials and products that contribute to a clean energy economy. Examples include EV charging infrastructure, hydrogen electrolyzers, wind turbine blades, and materials used in the production of end products, such as metals and cement. Working strategically to identify growth opportunities can create new jobs and contribute to achieving the objectives of the state BEST Act and support the expansion of eligible investment projects defined in Chapter 185, Laws of 2022, which created tax deferrals for clean technology manufacturing, clean alternative fuels production, and renewable energy storage.

While few of the specific SES recommended actions on this topic were implemented by the time of this update, the groundwork is being laid in several ways. Important examples of partnership development that will support industrial decarbonization planning include:

- Washington State Clean Materials Manufacturing Summit: In June 2022, this summit brought together industry, labor, state, and other partners to address issues related to clean materials manufacturing.
- Important partnerships are being developed relating to green electrolytic and renewable hydrogen, which can be a carbon-free fuel source for industry, transportation and other uses. These include the Consortium for Hydrogen and Renewably-Generated E-fuels (CHARGE) network, which is one of the industry cluster organizations provided funding by the Department of Commerce. Additionally, the Pacific Northwest Hydrogen Association was created in 2022 to bring multiple partners together to develop a competitive proposal for the federal Regional Clean Hydrogen Hubs (H2Hubs) program, described below.

Progress assessment: Develop and implement a coordinated clean energy industrial policy

2021 SES recommendation	2023 update
Develop a coordinated clean energy industrial policy framework that supports the ability of industry to help decarbonize the buildings, transportation and electricity sectors, and catalyzes regional decarbonization.	No formal framework has been agreed to yet. The framework discussed above should be used as a starting point. Alignment between industry energy needs and those of buildings, transportation, and other sectors should be developed.

2021 SES recommendation	2023 update
The Legislature should establish responsibility for clean energy industrial policy within state government, with robust data collection and regular planning for the industrial sector.	This is a gap. At present, the departments of Commerce and Ecology, along with the Governor's Office, have been holding regular meetings to advance planning in this space.

Key areas for action

Gather data needed to understand our baselines and clarify targets and pathways to decarbonization. These are described in other sections of this report, including Buy Clean Buy Fair and consumption-based emissions.

Intentionally leading a holistic conversation about industrial decarbonization is a critical next step. This is expected to begin with the EITE work group that Ecology will convene in 2023. Consider opportunities for how to combine this EITE advisory process, which is specific to CCA, with other industrial policy planning, including the implementation of the BEST Act and the Manufacturing Council, which began work in 2022.

Planning efforts also must align with the expected electricity and fuel needs of other sectors of the economy, so that there are sufficient resources available to support beneficial electrification of industrial processes, electrolysis to produce green electrolytic and renewable hydrogen for industrial use, and other needs. This is true for existing industrial operations and when considering new or expanded production where new electricity demands may arise, such as the proposed re-opening of the Alcoa facility. Comprehensive power planning that includes planning for potential new industrial users of electricity requires more work. In addition, identifying sufficient locations for new renewable projects remains a challenge, although work to improve these processes is ongoing, such as through the Low-Carbon Energy Siting Improvement Study process led by the Departments of Ecology and Commerce, and legislation under consideration in the 2023 legislative session.

Key next steps also include responding to the opportunities available through federal legislation, including IIJA, IRA, and CHIPS Act. For example, IRA provisions support electric vehicle deployment with tax credits increasing for vehicles which use higher levels of battery components manufactured or assembled in North America. Additionally, certain clean energy production credits are available specifically if tied to facilities in "energy communities" where significant portions of the population work in fossil fuel-related sectors or where closed coal plants and mines are located. There are significant resources available, but the ability to apply for and implement any funding through these programs will be time consuming. The state should take a coordinated approach to working with EITEs and other clean manufacturers to develop comprehensive, competitive proposals that help advance the SES recommendations. Commerce has allocated staff to help achieve these aims.

Regulations, incentives, research, and investments should be addressed in a strategic way that support an aligned vision for industrial decarbonization as part of achieving economy-wide net-zero limits.

Powering our manufacturing supply chain

Many stakeholders support the proposed reopening of the shuttered Alcoa aluminum manufacturing facility for the re-establishment of family-wage jobs and the production of lower-carbon aluminum through investments that reduce process emissions. Washington is viewed as an attractive state for clean materials manufacturing due to factors including a clean and affordable grid and a skilled workforce. The COVID-19 pandemic and supply chain challenges reinforced the importance of considering where critical materials are produced.

As of this publication, the company has been unable to negotiate a low-cost power agreement (known as a Power Purchase Agreement, or PPA) with the Bonneville Power Administration. Favorable PPAs were more common in past decades, when there was industrial policy supporting manufacturing in the United States. At present, absent a state or federal industrial policy providing similar signals and in the context of significant increases in demand for clean power, such agreements remain more elusive, and the end of this negotiation is unknown. Going forward, it will be important for Washington leaders to think critically about how much new renewable and low-carbon energy is sited and produced in Washington, how much is imported via transmission lines, and whether prioritization of access for certain end uses might be advisable.

D. Support renewable and green electrolytic hydrogen and other innovative clean energy opportunities

Industrial emissions are considered among the most difficult to mitigate for a variety of reasons, including energy-intensive processes and high volumes of production, such as cement and aluminum, that are inputs into building projects and other infrastructure. Research, innovation, and deployment of new tools and methods is critical. In particular, opportunities related to green electrolytic hydrogen and renewable fuels is emerging as a key opportunity that could support industrial decarbonization.

The 2021 SES called out a number of areas where green electrolytic and renewable hydrogen can play a key role in helping to reach net-zero emissions. The three main opportunities identified include:

- Flexible load for the power system, including storage for renewable power
- Replacement for transportation fuels: marine, aviation, and heavy-duty trucking
- Industrial processes, including replacing fossil-derived hydrogen, and replacing fossil fuels for high-temperature processes

Several significant bills passed the Legislature in recent years that support these aims. These include the CFS in relation to transportation fuels. Additionally, bills related to green electrolytic hydrogen (Chapter 292, Laws of 2022), clean energy and clean technology manufacturing (Chapter 185, Laws of 2022), and clean energy siting (Chapter 183, Laws of 2022) passed in 2022. Chapter 292, Laws of 2022 addressed green electrolytic hydrogen directly, adding authorities and tax incentives to those that are available for renewable hydrogen, which has the effect of expanding the types of eligible hydrogen projects likely to advance in the state to include all electrolytic hydrogen production using electricity compliant with CETA.

Chapter 292, Laws of 2022 also requires Commerce to:

- Establish a new Office of Renewable Fuels
- Issue a report and recommendations related to green electrolytic hydrogen and renewable fuel deployment in Washington by December 2023
- Coordinate the development of a competitive and equitable proposal for the federal Regional Clean Hydrogen Hubs (H2Hubs) program funding opportunity

The bill also requires gas utilities interested in blending hydrogen in natural gas pipelines to submit notice to the UTC for consideration of these plans and proposed new tariffs. The UTC will evaluate existing integrated resource plans, safety data, and how a blending proposal aligns with the Commerce report and recommendations on hydrogen deployment described above. This is an important stipulation to ensure that hydrogen use is directed to the hardest to decarbonize sectors of the economy.

Through the CEF, Commerce is providing funding to several hydrogen projects. Through CEF 5, projects include a grant to Twin Transit to fund a renewable hydrogen fueling station in Chehalis. Previously, CEF 4 funded Applied Ocean Energy for an engineering development project to assess the potential for an on-barge hydrogen project using tidal energy.

Commerce published updated modeling related to hydrogen production and end uses in July 2022, as an addition to the analyses contributing to the 2021 SES. The updates provide some additional information about hydrogen demand for use in the production of synthetic fuels, among other end uses. The results show green electrolytic and renewable hydrogen deployment growing significantly by 2050 in the 2021 State Energy Strategy Electrification Scenario, with multiple end uses including industrial heat, heavy-duty trucking, international shipping and more.

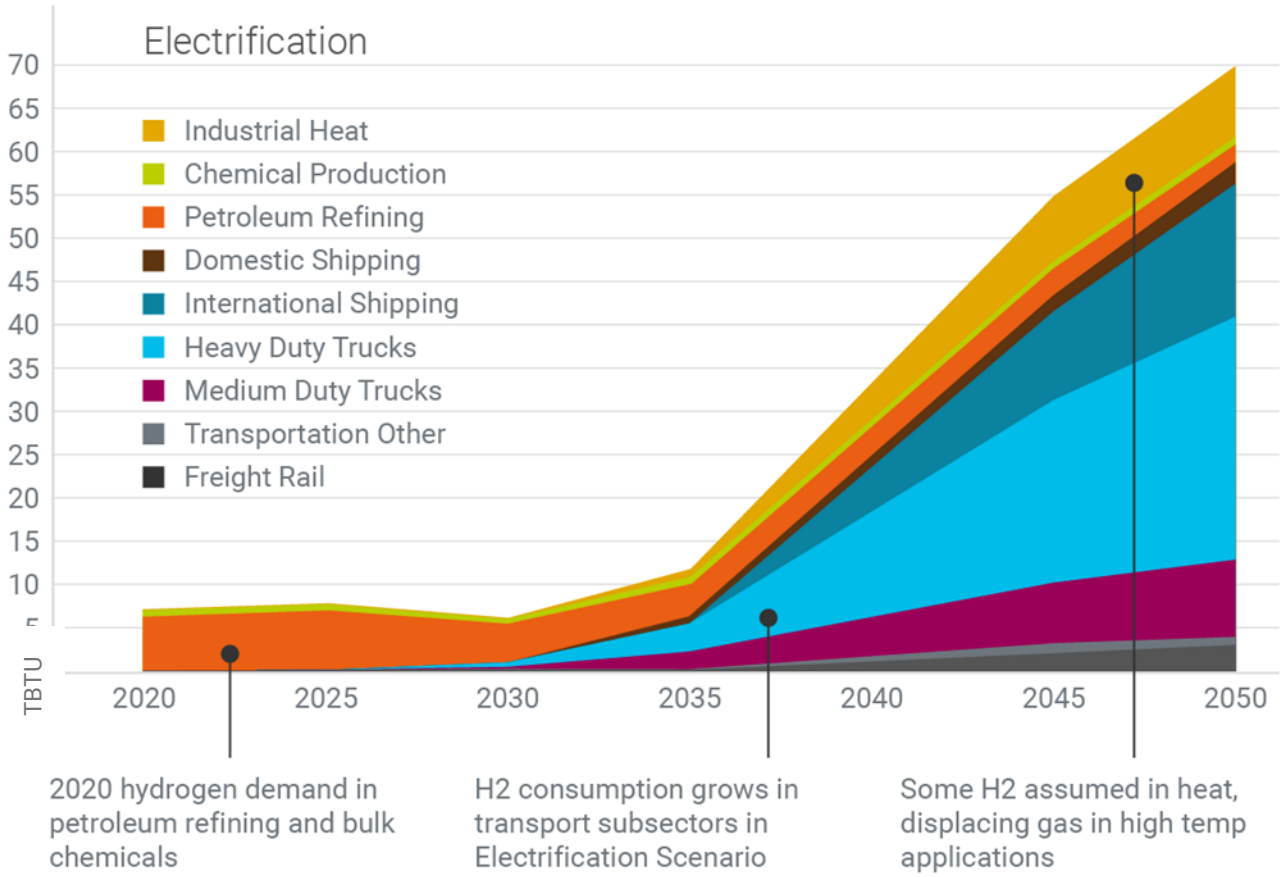
Crosscutting area: Energy resilience

Hydrogen's role in energy resilience

Energy resilience, including the ability to store energy to be used during a power outage or natural disaster, is a critical topic in the face of challenges such as extreme weather. It is especially important when considering communities at the end of the line for regular energy transmission, or for those who depend on critical facilities being available.

Hydrogen is one of the potential solutions that should be studied to understand its role in energy resilience. The Pacific Northwest National Lab (PNNL) developed an Energy Storage Cost and Performance database that can help identify when certain storage opportunities are appropriate, including evaluation of total installed cost per kilowatt hour. Commerce's CEF has invested in hydrogen backup power projects, such as a demonstration project for Klickitat Valley Health. Other opportunities that should be explored include the potential for hydrogen to replace diesel generators to benefit remote and rural communities and as backup power for data centers, hospitals, and other critical service providers.

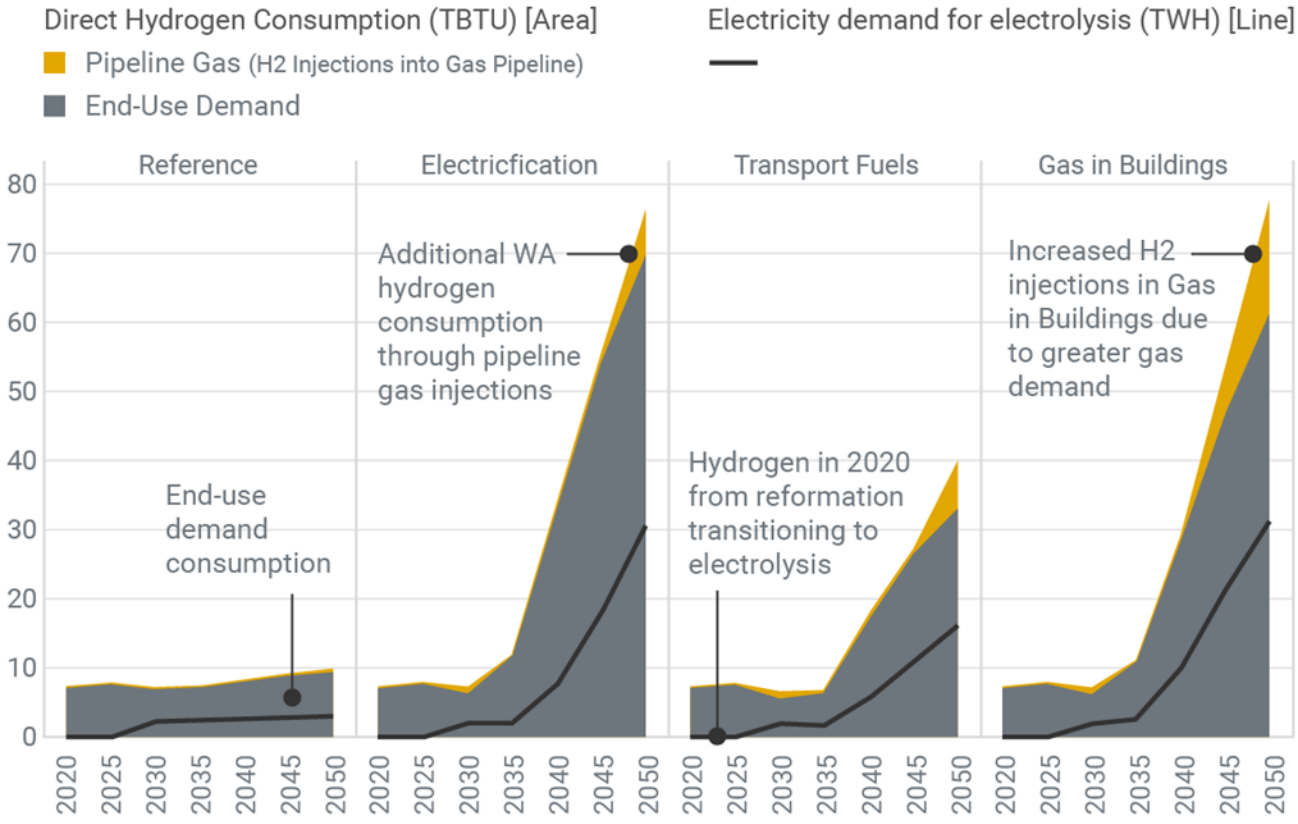
Hydrogen consumption and electricity demands - electrification scenario



The hydrogen graphic above shows hydrogen consumption and electricity demand in the electrification scenario as explained in the 2021 State Energy Strategy. It shows the amount of power that would be needed for electrolysis to produce the corresponding amounts of hydrogen and how this would increase over time. It is important for hydrogen strategy and project planning to be aware of the demands for clean power, especially in the context of industrial users expected to increasingly turn to electrification of industrial processes. The data supplement also models hydrogen use for blending into pipeline gas systems versus all other end-uses, across different SES modeled scenarios. This data indicates hydrogen is unlikely to be used for significant levels of pipeline blending, although this varies somewhat across scenarios.

Crosscutting area: Workforce and clean energy jobs

Transition from coal-fired power to green electrolytic hydrogen
Fortescue Future Industries is evaluating a green electrolytic hydrogen production project in Centralia. The company announced its interest in this project, including the opportunity to hire workers who are currently employed at the TransAlta coal-fired power plant slated to shut down in 2025. If the project moves forward, these workers could transition to producing green hydrogen in the same community. If this proposal occurs and is guided by meaningful community engagement including the current workforce, it could be a positive transition case study that other clean energy projects could use as a model.



This section focused on green electrolytic hydrogen as an important emerging topic in the state. Additional progress related to this SES section has occurred and is detailed in the table below.

Progress assessment: Support renewable and green electrolytic hydrogen and other innovative clean energy opportunities

2021 SES recommendation	2023 update
Continue to invest in the CEF.	The CEF continues to provide critical investments in projects that support the SES. One of the many ways it helps achieve the recommendations in this section is through the Research, Demonstration and Deployment (RD&D) program, which helps advance fuels and technologies critical to long-term decarbonization.
Cluster around centers of research, development and entrepreneurship.	Commerce has invested in numerous cluster programs, including the Consortium for Hydrogen and Renewably-Generated E-fuels (CHARGE) network, Pacific Northwest Aerospace Cluster, led by Pacific Northwest Aerospace Alliance, and Sustainable Aerospace Technologies and Energies (SATE) Cluster, led by Aerospace Futures Alliance (AFA).

2021 SES recommendation	2023 update
Expand programs to incentivize research and market development for commercial low-carbon fuels, heat pumps, low-embodied carbon materials, direct air capture (DAC), carbon capture, utilization and storage (CCUS), electrification technologies, grid modernization, artificial intelligence and machine learning, and circular economy processes.	In addition to CEF funding, Commerce provided funding through an Industrial Symbiosis RFP in May 2022. Grants will support projects that connect underutilized resources from one company for use by another company. Opportunities include biomass, biochar, waste heat reuse, and more.
Continue to assess biogenic feedstocks as a foundational resource.	Commerce continues to fund this important work through Dairy Digester CEF funding. The next round of funding will also include funding for rural clean energy projects, with a set-aside for projects led by tribes. Funding and further actions will reflect recommendations captured in Commerce's Rural Clean Energy Report (2022) to the Legislature.

State agency leadership: Each year, the Department of Enterprise Services produces the State Biodiesel Use Report, which reports on use of biodiesel by Washington state agencies. The most recent report found that during 2021, state agencies, including universities, purchased more than 1.7 million gallons of biodiesel, representing 9.1% of the fuel purchased to power diesel vehicles, vessels and equipment, and to fire boilers to heat and power facilities. This report allows state agencies to publicize how they use biodiesel and highlights any opportunities to advance clean fuel use at the state level.

Key areas for action

Commerce will work to clarify the roles of the new Office of Renewable Fuels, which will include the writing and publication of the aforementioned report and recommendations regarding hydrogen and renewable fuel deployment, due to the Legislature by December 2023. The report will include additional analysis based on recent modeling that describes the most strategic approaches to the production and end uses of hydrogen. The UTC is also analyzing the potential for use of hydrogen in decarbonizing the natural gas sector; its report is planned to be published in 2023.

Commerce will continue to participate in the work of the Pacific Northwest Hydrogen Association (PNWH2), which is currently chaired by Commerce Assistant Director Chris Green. This association is developing a competitive proposal to DOE for H2Hubs funding as provided under the IIJA. This program is expected to provide up to $1.25 billion grants to regional hub applicants whose proposals present compelling projects that align production, storage, transportation and use of clean hydrogen, in alignment with a draft National Clean Hydrogen Strategy and Roadmap announced in September 2022. DOE has expressed a preference for proposals that reduce GHG emissions along the entire supply chain, create and sustain good jobs, use low-carbon and domestic materials, and promote equity and environmental justice. This program will be part of the federal Justice40 initiative, which is well aligned with the HEAL Act in Washington. Key next steps will be community engagement efforts related to proposed projects so communities can provide input and articulate how they can equitably benefit from green hydrogen projects.

E. Buy Clean Buy Fair and consumption-based emissions

It remains critical to address the emissions associated with the manufacture and transport of materials, often referred to as "embodied carbon," "embodied emissions," or "upstream emissions." Decarbonizing the industrial sector must extend beyond the direct emissions at particular facilities to account for the whole

lifecycle of materials. Policy approaches that incentivize low-carbon materials can recognize the efficient and low-carbon production of many Washington manufacturers. It is also important to consider the quality of jobs in manufacturing low-carbon materials.

As a Buy Clean Buy Fair policy has been developed and revised in recent years in Washington, efforts to bring stakeholders together created significant benefits. For example, input from a variety of industry partners identified support for provisions that address competitiveness and data issues. In addition, input from unions and workers articulated labor standard considerations that provide an important addition to this approach. All these efforts were informed by recent efforts coordinated by the State Efficiency and Environmental Performance Office (SEEP) to conduct pilot projects and develop a prototype database to evaluate the collection and use of embodied carbon data (environmental product declarations, or EPDs). SEEP completed a progress report on this work and submitted its final report to the Legislature in November 2022.

While many of the recommendations from this SES section have not yet been implemented, important groundwork has been laid that will support swift advancement of opportunities to reduce embodied carbon.

Progress assessment: Buy Clean Buy Fair and consumption-based emissions

2021 SES recommendation	2023 update
Conduct an inventory of the embodied carbon of goods and services purchased by Washingtonians.	This is beginning in Ecology's solid waste program. This work would benefit from additional coordination with climate policy teams.
State agencies, through the SEEP office, should explore the potential for EPDs to support environmentally aware procurement policies and establish a baseline for standardized accounting and reporting.	Executive Order 20-01 requires state agencies to "consider embodied carbon" in new construction projects. SEEP provided guidance to state agencies and project teams, and will continue to provide technical assistance on EPDs and the selection of low-carbon materials. SEEP also promotes the use of existing tools like the Embodied Carbon in Construction Calculator (EC3) tool. Further data will be available to inform state procurement if BCBF passes the state Legislature.

Key areas for action

The Department of Commerce brought forward a BCBF bill as agency request legislation in 2023. The bill requires reporting from new state agency building construction projects greater than 50,000 square feet. Project teams would provide EPDs for concrete, wood and steel, and report data related to working conditions at manufacturers. Washington lags other Western states where Buy Clean policies have already passed, including California, Oregon, and Colorado. Passing this bill in Washington will provide critical data, increase familiarity with and use of EPDs, and complement additional efforts to take a consumption-based approach to using lower-carbon materials and creating markets for such materials. The bill would also establish a stakeholder working group to review data and provide recommendations on future policy and program development.

Washington has an opportunity to lead by adding Buy Fair provisions, ensuring that data can be collected and analyzed about the workplace standards for manufacturing of materials, as well as the embodied carbon in these materials.

State agency leadership: The SEEP office has been a key advocate for embodied carbon work, along with the UW Carbon Leadership Forum and others. The BCBF policy asks state agencies to lead by example, as it is critical for the state to commit to growing the market for low-carbon materials as a complement to regulations around GHG reduction. BCBF will support these efforts and will allow the state to lead with inclusion of Buy Fair provisions that also address manufacturing workplace standards, incorporating a multiple-benefits approach in state and national conversations regarding embodied carbon.

The Department of Ecology is developing a consumption-based inventory with collaboration across agencies, which will provide valuable data about the GHGs that have been emitted for the consumption of goods to occur. This work is beginning in the solid waste program at Ecology and will likely expand.

It is important to identify certain key materials for which a carbon intensity (CI) metric can be assessed, which allows for comparisons to be made between products regardless of where they are made. The CFS program is developing CI scores for transportation fuels, which will help advance this work. Currently there is not a comprehensive assessment of when embodied carbon data assessed at the facility level (such as using an EPD) is the right approach, and when a CI analysis of materials is more appropriate. Currently there are policy proposals at the federal level around the carbon intensity of materials, which is seen as a policy approach that can help support U.S. manufacturing while remaining compliant with World Trade Organization rules.[73]

F. Create and support inclusive, living wage jobs

The transformation and decarbonization of the industrial sector are an important opportunity to create and support living wage and union jobs, which form a critical part of our economy's middle class. The jobs and workforce components include ensuring the state's environmental policies address the risk of leakage of jobs and emissions, consider opportunities to grow existing manufacturing with high labor standards when Washington produces materials with low embodied carbon, and how to approach the siting of new industries in the state that will form critical parts of a clean energy economy.

The BEST Act (Chapter 64, Laws of 2021) establishes a goal of doubling the state's manufacturing employment base, the number of small businesses, and the number of women- and minority-owned manufacturing businesses in the next 10 years. While broader than clean energy-related manufacturing, this law provides an opportunity to expand Washington's manufacturing workforce in ways that align with our greenhouse gas limits and clean energy goals.

[73] A synopsis of this concept and legislative proposals is provided by Resources for the Future (2022): RFF Live: Decarbonization Policy and International Competitiveness.

Progress assessment: Create and support inclusive, living wage jobs

2021 SES recommendation	2023 update
Continue to invest in green public infrastructure and consider expanding labor requirements for public projects.	Several new laws will advance this, including Chapter 183, Laws of 2022, which will support clean energy project siting, and Chapter 185, Laws of 2022, which incentivizes clean energy product manufacturing and expands incentives for high labor standards used in the construction phase of projects, already available to clean electricity projects through CETA.
Adopt "Buy Clean Buy Fair" requirements for public projects.	Buy Clean Buy Fair still needs to pass the Legislature to support related recommendations. The Buy Fair components will set an important model of connecting conversations around embodied carbon to include labor standards for workers in the manufacturing process.
Identify the industries that are likely to experience transition and make a transition plan for workers well in advance of closure. Engage industry leaders, community representatives, and labor unions from the outset in mapping the priorities of each group impacted by industrial transition.	This is still a gap. Adapting the current Green Economy Jobs Report produced by ESD to include forward-looking analyses regarding anticipated changes may help with identification of and planning related to expected transitions.

Key areas for action

As described in the section on a coordinated industrial policy, it is important to approach environmental regulations strategically to avoid the risk of leakage and ensure Washington is seen as a good place to expand and add new industries that are operating in accordance with state emissions limits. It is critical to identify additional training opportunities, which must be connected to an updated assessment of where job growth and contraction could occur in the current policy landscape and economy. Identifying ways to attract and retain younger workers (Generation Z) will likely require innovative approaches tailored to the differences between generations. It will be critical to seek ways to ensure greater diversity in the industrial sector including women and Black, Indigenous, and people of color (BIPOC) workers.

Washington has enacted important policies that support good-quality jobs in the construction phase. However, more remains to be done to address and improve permanent jobs, including in operations and maintenance as

Crosscutting area: Workforce and clean energy jobs

Machinists Institute supports highly skilled, clean energy jobs

Efforts are underway to expand benefits to workers in a clean energy economy in addition to the valuable policies that support good jobs for building and construction trades. One entity focused on providing new opportunities for workers is the Machinists Institute, which seeks to provide apprenticeships and connections to jobs in the manufacturing sector. The Machinists Institute supports the development of a highly skilled workforce in aerospace manufacturing and automotive machinist industries, including through registered apprenticeships for machinists, pre-apprenticeships, and efforts to attract and retain a diverse workforce.

well as manufacturing. The Buy Fair components of the BCBF policy framework represent one way of addressing this.

It is important to fully assess the state's current position related to clean energy and clean manufacturing jobs, where recently passed state policies and federal laws will take the state, and what workforce development programs and resources are needed. This includes considering what hydrogen workforce needs will arise in the state. Initial convening activities and analyses will occur with support from the Center of Excellence for Clean Energy and others. Commerce is also exploring opportunities to enhance support for tribes and tribal-led organizations to develop training programs and create jobs for tribal members in the clean energy economy.

Finally, it will be important, especially in the context of recent state and federal laws affecting the energy landscape, to have an updated understanding of projected workforce impacts and needs. An existing report published by the Employment Security Department (ESD) as articulated in RCW 43.330.310 could benefit from a refreshed approach, informed by a broad stakeholder group, and including forward-looking projections and identifying workforce development investments and other resources needed to ensure Washington's workers are able to meet these emerging needs.

Initial next steps include a clean energy workforce white paper under development by Washington State University Energy Extension, which will provide an overview of the current policy landscape and articulate a proposed longer-term stakeholder process and new green jobs reporting tools that are needed. This work may be led by the state Workforce Board, which has put forward a decision package for the governor's consideration for the 2023 budget process. Input from various stakeholders including Commerce will be helpful to ensure alignment with the SES and other relevant policies. These efforts must be informed by the workers, labor unions, and communities most impacted by these changes.

Appendix A: Combined Progress Assessment

Electricity

2021 SES recommendation	2023 update
Encourage federal investments and transmission reforms.	The IIJA and IRA include significant federal funding for transmission. The IIJA provides $65 billion for: • Constructing new transmission lines • Increasing capacity on existing lines • Furthering the research, development and deployment of innovative grid enhancing technologies The IRA appropriates an additional $2.9 billion for transmission infrastructure. A $2 billion direct loan program for transmission development will be available through Sept. 30, 2030.
The Executive Office of the Governor, the UTC and Commerce should pursue opportunities for enhanced transmission planning and integration across the western grid and advocate for joint development where feasible.	The Transmission Corridors Work Group convened by EFSEC will release a report in December 2022 that identifies strategies for enhancing transmission planning Washington and beyond.
Utilities and planning agencies should evaluate the need for a joint development of new and upgraded transmission capacity and consider the viability of a regional transmission organization.	Exploration of a regional transmission organization is ongoing.
Washington utilities, resource owners and developers advance plans to build clean resources.	New electricity generation continues to expand in Washington. In particular, there has been a proliferation of new large-scale solar projects currently under development, based on the project queue before the Energy Facility Site Evaluation Council (EFSEC).
Funding should be made available to Commerce and electric utilities to conduct a statewide clean energy potential assessment to identify clean energy development zones.	Funding has not been provided for a statewide clean energy potential assessment. Some siting studies are in progress.
Request support from the U.S. Department of Energy and Pacific Northwest National Laboratory (PNNL) to convene a DER workgroup to identify and resolve grid architecture barriers to DER deployment.	The DER workgroup with DOE and PNNL has not been created and might not be necessary, as work already underway fulfills this recommendation. The Advanced Grid Institute, formed by PNNL and WSU, is already doing important work in this space and is fostering crucial conversations on DER deployment; for example, during the annual Advanced Grid Institute Day. In addition, the CEF Grid Modernization program and DOE's Connected Communities programs are leading the way in demonstrating what is possible.

2021 SES recommendation	2023 update
Utilities should incorporate comprehensive assessments of the value of DERs in the specific context of individual distribution grids by performing and publishing hosting capacity and critical load studies.	Most utilities have yet to conduct and publish hosting capacity analyses. Early examples of publically available hosting capacity analysis should be commended, but more is needed to increase transparency and the usefulness of the data produced. As more utilities develop hosting capacity analysis maps, these best practices should be utilized.
The Legislature should assess whether voluntary distributed energy resources planning is the appropriate policy approach given the requirements of CETA.	While WAC 480-100-620 requires electric investor-owned utilities regulated by the UTC to assess "the effect of distributed energy resources on the utility's load and operations", the UTC only "strongly encourages utilities to engage in a distributed energy resource planning process." As a result, utility distributed energy resource planning efforts, particularly at consumer-owned utilities, have been variable and relatively limited. Given the anticipated proliferation of DERs under CETA and the limited voluntary work that is occurring on hosting capacity analysis and DER integration, the Legislature should evaluate whether distributed energy resources planning should be voluntary.
Provide state support for flexible and resilient planning and project development by creating a new cluster within Commerce's Office of Economic Development and Competitiveness to focus on utility grid optimization and DER deployment.	This cluster has not been created. Through the Clean Energy Fund, Commerce is developing and demonstrating technologies and processes that can better integrate renewable energy and DERs to achieve grid optimization. The legislature should continue to invest in the crucial innovation and market transformation enabled by CEF. In addition, state, local governments, utilities, and private entities should secure Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) funding to support further utility grid optimization and enable the full benefits of DER deployment to be harnessed.
Target CEF funding to projects that enable flexible load management and increase grid resilience.	Commerce has funded several grid modernization projects that demonstrate flexible load management and increase grid resilience.
Utilities, resource owners, developers and other stakeholders should continue to engage in developing a consistent and non-discriminatory resource adequacy program through the Western Power Pool.	Most of the utilities serving Washington customers have participated in the non-binding phase. Some consumer owned utilities have opted not to participate.
Commerce and the UTC should review the progress and outcomes of the WRAP initiative and evaluate the need for additional state action to ensure CETA's resource adequacy requirements are fulfilled.	Utilities will have the opportunity to sign up for the binding phase of the program following FERC approval of the WRAP tariff[74]. The UTC and Commerce will continue to monitor the involvement of Washington utilities in the WRAP initiative.

[74] Members of the WRAP approved a tariff outlining the program's independent governance structure and punitive charges if an entity falls short of the program's operational requirements, such as adequate planning reserve margins. The proposal awaits FERC approval.

2021 SES recommendation	2023 update
The UTC and Commerce, with input from the Carbon and Electricity Markets Workgroup, should adopt rules to allow for the trade-in electricity from sources verified to comply with CETA's clean energy requirements.	These rules were published.
Electric utilities should pursue the long-term development of a fully integrated Western regional electricity market, beginning with expansion of organized markets to trade day-ahead and then longer term resources.	Utilities are exploring options to establishing regional markets, starting with the expansion of organized markets.
Commerce's 2024 CETA evaluation under RCW 19.405.080 should include an assessment of industry progress in developing efficient and resource-specified electricity markets.	Commerce plans to begin the 2024 CETA evaluation in 2023. Per statute, the review will focus on technologies, forecasts and existing transmission, as well as an evaluation of environmental and public safety protection, affordability, and system reliability.
Commerce and the UTC should ensure that CETA's energy accounting methods accommodate the charging and discharging of storage resources within the electricity grid.	Commerce and the UTC adopted rules on accounting for energy storage under CETA in 2022.

Transportation

2021 SES recommendation	2023 update
Set clear and ambitious targets for moving people and goods more efficiently and equitably. Set clear and ambitious statewide targets for electrification and switching to low-carbon fuels.	Key actions include: • Adoption of Advanced Clean Cars II (100% ZEV requirement for new car sales starting 2035); • Adoption of Advanced Clean Trucks (setting minimum ZEV percentages for truck sales); and • EO 21-04 to fully electrify state fleets The 2022 supplemental operating budget establishes a target for the state that all publicly and privately owned passenger and light duty vehicles that are sold, purchased, or registered in Washington of model year 2030 or later be electric vehicles.

2021 SES recommendation	2023 update
Expand and align transportation funding with emissions and equity goals.	The Move Ahead Washington program contains historic investments in highway construction and maintenance, transit, active transportation environmental justice, and new local funding options. The supplemental operating budget creates the Interagency Electric Vehicle Coordinating Council to create a plan for achieving the 2030 target. The Legislature created two new grant programs: • $69 million for electric vehicle supply equipment (EVSE) with focus on community charging (multi-family buildings, office buildings, rural communities, state and local government buildings). • $25 million for alternative fuel vehicle incentives with prioritization given to overburdened communities, low-income communities, and communities of color.
Improve transportation system planning and coordination, prioritizing VMT reduction. Support measures to optimize freight VMT.	The 2022 supplemental operating budget includes funding for guidelines for local governments to reduce GHG emission and per capita VMT.
Remove barriers to transit, walking and cycling.	The Legislature created a climate transit programs account, funded grants for cleaner public transit, and appropriated funds from the carbon emissions reduction account for programs including active transportation and transit. Further, Move Ahead Washington provisions provide grants to transit agencies that adopt a fare-free policy for youth 18 years and younger.
Improve planning and oversight of battery electric vehicle (BEV) charging and fuel cell vehicle (FCV) fueling infrastructure	The Washington EV Council is creating a statewide Transportation Electrification Strategy (TES) and ensuring that electric vehicle incentives and infrastructure are accessible and available to all Washingtonians. The Council is gathering input from a wide range of Washington residents—drivers and non-drivers, members of communities large and small—who represent the diversity of backgrounds and perspectives that make up our evergreen state. Agency activities furthering these goals include WSDOT's successful shepherding of the federal National Electric Vehicle Infrastructure Formula Program grant, the upcoming EV mapping and forecasting tool, and the Department of Ecology's adoption of clean fuel standards.
Accelerate the market for BEVs and FCVs	

Buildings and Natural Gas

2021 SES recommendation	2023 update
Expand the scope of the building performance standard to include buildings with less than 50,000 square feet with a stepped path to low energy and zero carbon by 2050.	Chapter 177, Laws of 2022 (SB 5722) established a new tier of covered buildings under the Clean Buildings Act (2019), which includes non-residential buildings between 20,000 and 50,000 square feet, and multifamily residential buildings over 20,000 square feet. Managers and owners at these buildings will be responsible for benchmarking, operations and maintenance, and developing an energy management plan.
Dissemination of [building performance standard] information should be operationalized at the state level through training programs.	In 2021, Commerce staff conducted about 45 trainings and presentations, as well as four live Q&A sessions to increase awareness, solicit feedback, and support stakeholders in pursuing compliance with the Standard.[75] Commerce produced educational materials and collaborated with utilities, nonprofit organizations and the WSU Energy Program to develop training workshops for consultants and energy professionals. The Commerce SEEP office conducted additional training for state agency facility managers.
Develop a residential sector building decarbonization implementation plan.	Commerce, working through and with a selected contractor, is developing a detailed residential sector building decarbonization implementation plan. The development of this plan will include extensive stakeholder involvement, community engagement and public input. This plan will be published June 30, 2023.
The Legislature should revise the energy code to require the state Building Code Council adopt zero-carbon and all-electric construction and efficiency mandates no later than the 2027 code, fully achieving incremental improvements each code cycle from 2021 to 2027. Consider additional energy code provisions to expand deployment of DER technologies, such as on-site generation and utility-integrated load control.	The Washington State Building Code Council approved updated commercial and residential energy codes requiring electric space and water heating in new construction, with some exceptions. These updates fully achieve the incremental efficiency improvements required of the 2021 code, as prescribed in statute. The 2021 Washington State Energy Code for Commercial Buildings also includes a provision that would require large commercial buildings be solar-ready.
Update Office of Financial Management (OFM) requirements for capital budget requests to include electrification in all applicable projects.	Since 2021, OFM has developed revised language around greenhouse gas emissions and clean buildings, and asks capital projects to consider an electric alternative when analyzing building end uses. OFM instructed state agencies to label budget submittals for the 2023-25 biennium with a "CBPS" code to better understand the resources required to comply with clean buildings standards. These actions provide better information for decision-makers, allows state agencies and project stakeholders to understand which capital projects are addressing these three critical areas, and asks the state to prioritize projects that reduce emissions.

[75] Department of Commerce, 2022 Clean Buildings Legislative Report

2021 SES recommendation	2023 update
The State Energy Office should develop and implement a high-efficiency electrification program to incentivize adoption of heat pump technology in existing residential and nonresidential buildings, including marketing, workforce development and certification, and equitable distribution of incentives.	In the 2021-23 capital budget, the Legislature appropriated $10 million to Commerce's CEF for building electrification and high efficiency electric equipment projects grants. The Building Electrification Program provides grants to multifamily residential and commercial building owners and tenants to deploy and demonstrate grid-enabled, high-efficiency, all-electric buildings that reduce greenhouse gas emissions and accelerate the path to zero energy. Applications for projects opened in 2022.
Prioritize decarbonization of public buildings in low-income communities, specifically public schools and hospitals.	The Energy Retrofits for Public Buildings program prioritizes projects in rural, lower-income, overburdened and tribal communities. In 2022, 91% of grant funds were directed to these communities. Projects provide benefits to these communities by reducing the costs of providing public services, improving the comfort, health and safety of communities, building local workforces, and reducing local air pollution.
Expand funding for the state's successful Weatherization Plus Health program as part of a broader strategy to reduce energy burden and improve health outcomes for low-income households impacted by the COVID-19 pandemic.	The Weatherization Plus Health program was funded in the capital budget for the 2021-23 biennium, but needs continued funding in the 2023-25 biennium to meet the low-income household need and to leverage federal IIJA funding.
The Legislature should provide universal access to high quality broadband to enable grid integration of appliances and equipment, optimizing buildings and managing load.	In 2019, the Legislature enacted the Washington Broadband Act, which established access, download and upload speed goals for residences, businesses, and communities. Under RCW 43.330.536, the entire state must have access to broadband that operates at 25/3 megabits per second (Mbps) scalable by 2024.
Natural gas distribution companies should increase energy efficiency and use of hydrogen and renewable natural gas to achieve near-term reductions in GHG emissions from natural gas.	Washington natural gas utilities have taken limited steps to advance energy efficiency and hydrogen and renewable natural gas (RNG) to reduce GHG emissions from natural gas: • Puget Sound Energy (PSE) aims to grow the percentage of RNG in its mix from 0.5% of its annual gas volume to nearly 3.5% of 2024 sales. The utility already offers a voluntary RNG program for customers and is running two hydrogen pilots to test blending impacts on the natural gas distribution system, among other things. • In 2021, Avista Corp. announced goals to reduce natural gas emissions 30% by 2030 and to be carbon neutral in its natural gas operations by 2045. Avista also offers a voluntary RNG program and continues to analyze how it will invest in RNG, hydrogen, and other renewable biofuels. Cascade Natural Gas continues to rely solely on energy efficiency programs with no apparent plans to incorporate renewable natural gas or hydrogen into its distribution system.

2021 SES recommendation	2023 update
The Legislature and the UTC should ensure that the state's climate policy and emissions limits are reflected in the regulation of natural gas companies and explore legislative and regulatory actions to restrict growth of the natural gas system and the use of fossil natural gas where zero-emission options are available.	Initial actions to limit growth of fossil natural gas consumption in Washington include: • The UTC's decision in 2021 to reverse a line extension policy that encouraged expansion of the natural gas distribution system. • The State Building Code Council's passage of revised energy codes, which require electric heat pumps for most space and water heating applications in most new or commercial and residential buildings beginning in July 2023. • In the 2021 state operating budget (Chapter 334, Laws of 2021), the Legislature funded two analyses to support plans for an equitable transition to clean heat, which would reduce carbon emissions and bring positive health benefits to households. The first analysis was of the financial impact of fuel conversion on consumer owned utilities and customers in Washington. In the second, the UTC must 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, and the impacts of energy decarbonization on residential and commercial customers and the electrical and natural gas utilities that serve them.

Industry and Clean Fuels

2021 SES recommendation	2023 update
The Department of Ecology should increase the subsector breakdown in its industrial sector GHG inventory. Both combustion and process emissions need to be broken down with the same taxonomy, so that data can be parsed meaningfully for policymaking.	Progress is underway, though funding is required to implement. This work is part of an Ecology budget request to fund more data analytics and sector expertise allowing connections to be made between climate program reporting and the GHG inventory, as well as to add emissions forecasting and modeling capacity.
The Department of Commerce should develop and publish detailed industrial sector energy data using federal Energy Information Administration forms data, or any new state reporting requirements.	This is still a gap. It will be possible to implement once Ecology is able to publish sub-sector breakdowns as described above.
Continue support for research in Washington's geological storage potential for CO2.	The Washington Geological Survey (WGS) at the Department of Natural Resources is engaged in applied research and data analysis to create feasibility maps of potential subsurface basalt and other CO2 storage reservoirs. WGS participates in the Carbon Utilization and Storage Partnership and coordinates with industries, other agencies, university faculty, and academic institutes.

2021 SES recommendation	2023 update
Enact and implement a low-carbon fuel standard to establish a market and funding mechanism for clean fuels production.	This was achieved through the passage of Chapter 317, Laws of 2021. The new program will go into effect in January 2023.
Washington should continue to explore regulatory mechanisms to measure, mitigate and reduce GHG emissions from the operation and siting of significant in-state stationary sources, petroleum product producers, importers and distributors of natural gas.	This is supported by the passage of Chapter 316, Laws of 2021, the CCA.
Increase incentives and support for industrial efficiency, emission control and clean technology upgrades, including consideration of an industrial transformation bank, incorporating strong labor and equity standards to fund the retooling and upgrading of Washington's emissions-intensive, trade-exposed (EITE) and low-carbon fuel pilot projects.	This is in progress. Ecology will facilitate an EITE advisory group to inform future GHG reduction pathways as part of CCA implementation. This work can be done in coordination with consideration of incentives, equity standards, and other tools that support EITEs while they reduce GHGs. Commerce, Ecology and others can work with EITEs to identify and secure relevant IIJA, IRA, and CHIPS funding that will support these efforts.
Develop a coordinated clean energy industrial policy framework that supports the ability of industry to help decarbonize the buildings, transportation and electricity sectors, and catalyzes regional decarbonization.	No formal framework has been agreed to yet. The framework discussed previously should be used as a starting point. Alignment between industry energy needs and those of buildings, transportation, and other sectors should be developed.
The Legislature should establish responsibility for clean energy industrial policy within state government, with robust data collection and regular planning for the industrial sector.	This is a gap. At present, the departments of Commerce and Ecology, along with the Governor's Office, have been holding regular meetings to advance planning in this space.
Continue to invest in the CEF.	The CEF continues to provide critical investments in projects that support the SES. One of the many ways it helps achieve the recommendations in this section is through the Research, Demonstration and Deployment (RD&D) program, which helps advance fuels and technologies critical to long-term decarbonization.
Cluster around centers of research, development and entrepreneurship.	Commerce has invested in numerous cluster programs, including the Consortium for Hydrogen and Renewably-Generated E-fuels (CHARGE) network, Pacific Northwest Aerospace Cluster, led by Pacific Northwest Aerospace Alliance, and Sustainable Aerospace Technologies and Energies (SATE) Cluster, led by Aerospace Futures Alliance (AFA).

2021 SES recommendation	2023 update
Expand programs to incentivize research and market development for commercial low-carbon fuels, heat pumps, embodied carbon materials, direct air capture (DAC), carbon capture, utilization and storage (CCUS), electrification technologies, grid modernization, artificial intelligence and machine learning, and circular economy processes.	In addition to CEF funding, Commerce provided funding through an Industrial Symbiosis RFP in May 2022. Grants will support projects that connect underutilized resources from one company for use by another company. Opportunities include biomass, biochar, waste heat reuse and more.
Conduct an inventory of the embodied carbon of goods and services purchased by Washingtonians.	This is beginning in Ecology's solid waste program. This work would benefit from additional coordination with climate policy teams.
State agencies, through the SEEP office, should explore the potential for EPDs to support environmentally aware procurement policies and establish a baseline for standardized accounting and reporting.	Executive Order 20-01 requires state agencies to "consider embodied carbon" in new construction projects. SEEP provided guidance to state agencies and project teams, and will continue to provide technical assistance on EPDs and the selection of low-carbon materials. SEEP also promotes the use of existing tools like the Embodied Carbon in Construction Calendar (EC3) tool. Further data will be possible for state procurement if BCBF passes the state Legislature.