

Washington State 2021 Energy Strategy

Building Sector Framing Document

Introduction

The Washington Department of Commerce is developing the 2021 State Energy Strategy (SES) to support the state's ambitious goals to protect our climate while **ensuring an equitable transition to clean energy** and promoting the state's workforce and economy.

The development of the SES includes a sector-specific Technical Advisory Process (TAP) to evaluate policies and actions with both quantitative and qualitative analysis. The outcome will feed into a set of Advisory Committee recommendations to the Department of Commerce and, ultimately, a final report to the Governor and legislators. Please see the accompanying document for a full description of the description of WA State Energy Strategy TAP.

This document provides an overview of the key questions the SES must address for the **Building Sector TAP**, an initial assessment of policy considerations and options, and topics for further research and discussion.

1. Building Sector Focus and Framing Questions

The **Buildings Sector TAP** is focused on developing policies and actions to enable a transition to a highly efficient, carbon neutral building stock by 2050. Meeting Washington's long-term climate goals will require deep energy efficiency and decarbonization in the buildings sector. Policies and actions to achieve both will need to focus on building codes and standards, market development, utility programs, and using cleaner and more efficient equipment to provide space and water heating in new and existing buildings. The overarching question to address is:

- What are the most effective, efficient, and equitable ways to reduce the amount of fossil fuels required to heat, cool, light, power, and otherwise operate our buildings, addressing both rural and urban housing stock, rental and owned residences, and commercial and publicly owned property?

In addition to this baseline question, key buildings issues to consider in the SES are:

1. **Decarbonization:** What new mandates or policies for building decarbonization should the State adopt by 2030 to meet its long-term climate goals? What levels of efficiency improvements should the state implement by 2030 (new, existing, appliances) to meet its long-term climate goals? What are the best policy tools to support achieving these levels (codes, standards, incentives, voluntary programs, market development, investments, etc.)? What are their relative strengths? What key barriers to implementation need to be overcome? Specifically,
 - **Energy Code and Building Performance Standards:** How can we ensure that proven strategies, such as aggressive energy codes and building performance standards, drive

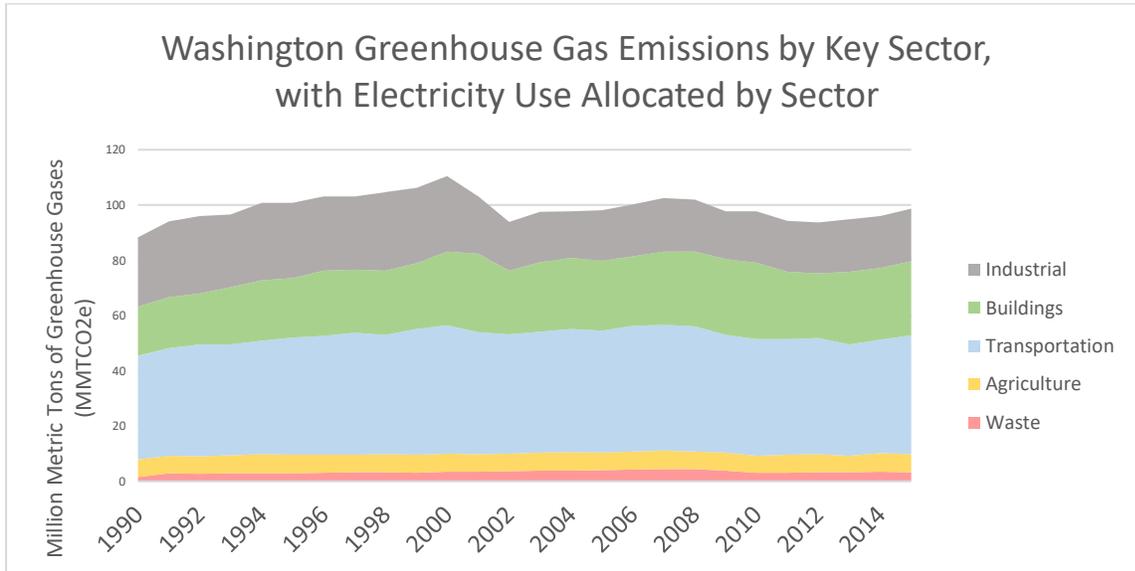
substantial and measurable reductions in energy and GHG reductions across all building sizes and vintages? What structural changes or complementary strategies are required?

- **Utilities:** How can we ensure that utility programs, policies, and rate structures operate most effectively to advance decarbonization of buildings? How far will existing efficiency mandates in CETA and natural gas regulation get us toward our objectives, and what is required to ensure compliance with these mandates? How can utilities and utility regulation support energy efficiency, electrification, demand response, and on-site renewables under a broader umbrella of deep decarbonization and energy optimization? How can the current gas system and corresponding infrastructure and operational investments be utilized to decarbonize the building sector?
2. **Embodied and Refrigerant Emissions:** What requirements, standards, and or incentives for reducing embodied carbon and refrigerant emissions should Washington State consider adopting?
 3. **Occupancy:** What requirements, standards, and or incentives should Washington State consider adopting that increase the efficiency of the built environment; for example, housing size, duplicative office and work from home spaces, and flex use, etc.?
 4. **Clean Fuels:** What policies and actions should the State pursue to convert practically and economically the fuels used for space heating, water heating, and cooking from fossil fuels to low- or zero-carbon fuels?
 5. **Tax Policy and Funding Mechanisms:** What are the opportunities for private and public sector entities to fund the research, planning, policies, programs, market development, coordination, and reporting required to sustain a highly effective building decarbonization policy framework? How can tax policy, utility regulation, and incentives best be aligned to accelerate energy efficiency and the use of electricity in new and existing buildings? What are the most effective financing options for the residential and commercial sectors?
 6. **Local Governments:** How can state policies and agencies best support, complement, and align with local government building sector climate policies? What new mandates or policies for building decarbonization should local governments consider adopting?
 7. **Equity and Economic Opportunity:** How can building strategies, including retrofit programs, energy efficiency, and codes support high labor standards, workforce readiness goals, and efforts to improve employment conditions for Washington workers? If we require that owners upgrade their rental building stock, will this increase or decrease affordability for low-income households? How can programs be designed to ensure they respond to the needs of low-income workers, communities, and neighborhoods? How can they improve indoor air quality, comfort, and health among residents most vulnerable and where conditions are the worst?

2. Current Situation and Key Trends

The building sector accounts for about 21% of the state’s GHG emissions, a fraction that has held fairly steady over time (**Figure 1**). However, building emissions overall have increased 50% since 1990, making the building sector a major target for the state’s energy and decarbonization strategies.

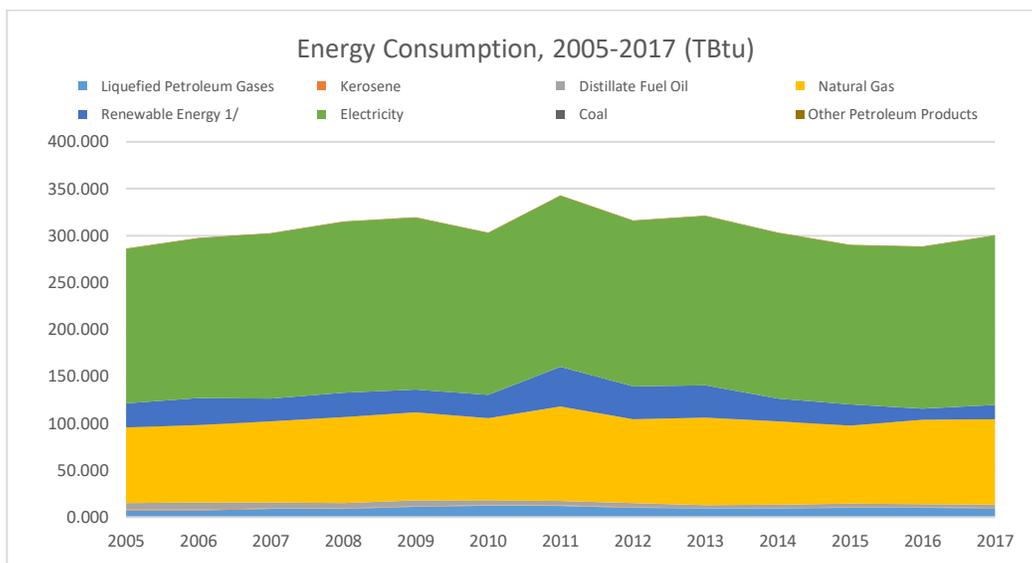
Figure 1. Washington greenhouse gas emissions by key sector (electricity use allocated by sector)



Source: Derived from data from Washington State Department of Ecology

Historically, energy consumption in the building sector has been dominated by electricity and natural gas, with some renewables and a small fraction of fuel oil, kerosene, and other fossil fuels (**Figure 2**).

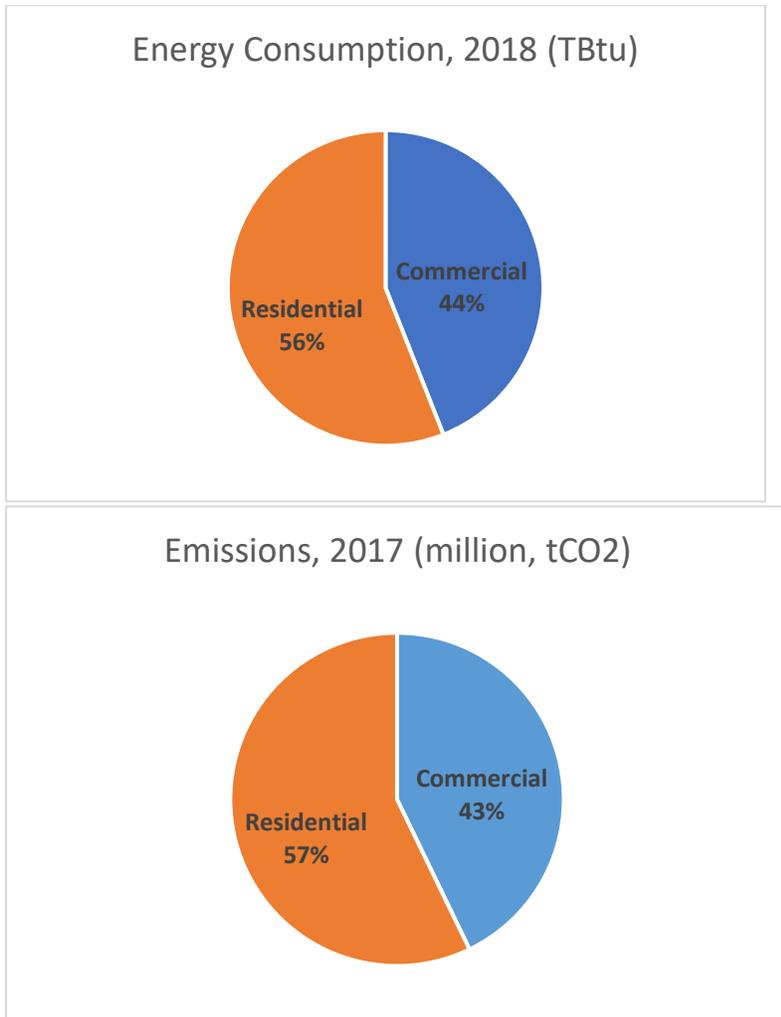
Figure 2. Building sector historical energy consumption in Washington State



Source: Washington State Department of Commerce's Carbon Tax Assessment Model, based on US Energy Information Administration Annual Energy Outlook 2019.

Washington residential buildings use about 56% of building sector energy use and emit about 57% of the sector emissions (**Figure 3**). Washington commercial buildings use about 44% of overall sector energy use and emit about 43% of the sector emissions (**Figure 3**).

Figure 3. Distribution of greenhouse emissions and energy use in Washington State by building segment

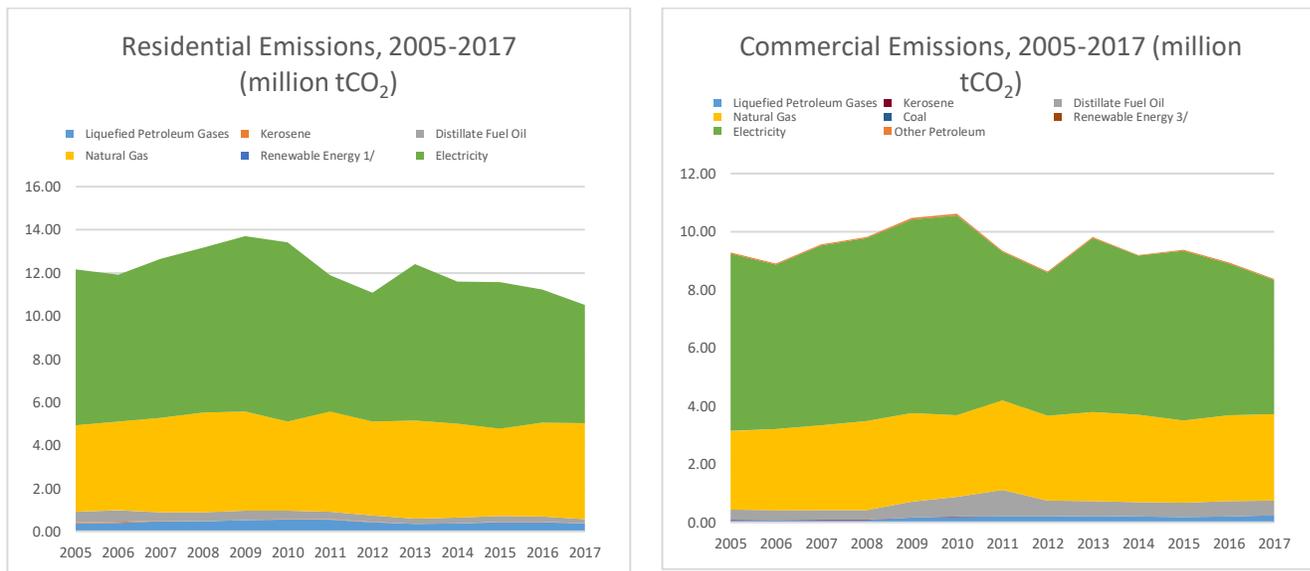


Source: US EIA, State Energy Data System¹

¹ Energy Consumption: <https://www.eia.gov/state/data.php?sid=WA#ConsumptionExpenditures>, Emissions: <https://www.eia.gov/state/search/#?7=150&2=228>

Between 2005 and 2017 the total and distribution of emissions sources has fluctuated, but overall have not changed significantly over this timeframe (**Figure 4. Historical greenhouse emissions in Washington State by building sector segment**). However, fuel oil is a higher fraction of emissions for commercial buildings than residential buildings.

Figure 4. Historical greenhouse emissions in Washington State by building sector segment



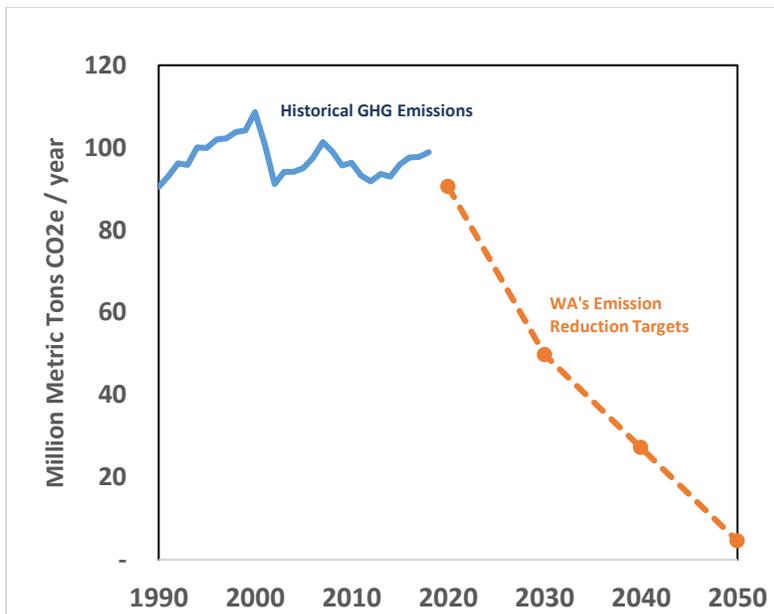
Source: Washington State Department of Commerce’s Carbon Tax Assessment Model²

3. Key Goals for the Sector

Unlike the electricity sector, there are no existing state targets for building sector decarbonization; specific goals for buildings should be considered as part of the SES. To meet statewide greenhouse gas limits, the building sector will need to achieve steep reductions in carbon emissions in line with what is needed from Washington’s energy sector as a whole (**Figure 5**), suggesting the need for aggressive and comprehensive policies.

Figure 5. Historical GHG emissions and target reductions needed to achieve Washington State decarbonization goals

² AEO 2019 Reference Case, derived from the Pacific region reference forecast. AEO High and Low Growth side cases included



Source: CETI Team with data from Washington State Department of Ecology

To meet the 2030 and 2050 economy-wide targets, the emissions trajectory in Washington State over the next 30 years must contrast sharply with the trajectory over the last 30 years. The building sector strategy elements are described in more detail below (

Table 1). The building sector modeling, research, TAP discussions, and strategy development will focus on developing these elements for inclusion in the overall SES.

Table 1. Key elements of the building sector strategy

Building Sector Strategy Elements	Description
Sector Targets	2030 through 2050 energy and GHG reduction targets for residential and commercial construction. Endpoint energy use and GHG emissions for buildings, e.g., the path and timeline for residential and commercial buildings to be zero energy and/or zero carbon.
Technical Strategy	Strategy for how to balance efficiency, decarbonization, renewables, microgrids/district energy systems, grid optimization, embodied carbon, etc. within the building sector to deliver on the sector targets.
High-Level Policy Strategy	Key policies, programs, capacity building, funding sources, etc., that can deliver the technical changes to buildings implied by the technical strategy, and required to meet the sector targets, described above.
Action Plan	Recommendations for near-term next steps, additional research, and assignments for state agencies, local governments, and regional power planning and efficiency organizations.

4. Potential Policies and Actions

Developing a vision and strategy for shifting the building sector trajectory toward deep decarbonization on a 30-year timeframe will require creative solutions and opportunities. To transform this sector, a diverse array of policy and regulatory options will be needed, along with a framework for thinking creatively about how to use them, and a common focus on increased energy efficiency and

decarbonization at all stages of a building’s lifecycle, from planning and design to construction, operation, and renovation. This process will include assessing current and future needs for existing policies, technologies, and capabilities, as well as new innovations moving forward.

The Northwest states and utilities have developed a robust regional power and energy efficiency planning and delivery system over the last 40 years, however it does not address emissions directly. A decarbonization strategy for buildings should build upon and learn from the drivers, goals, design, development, achievements, and limitations of that system.

In addition, Washington State has adopted and is implementing some of the nation’s most cutting-edge building energy and GHG reduction policies. A key objective in the building sector policy strategy will be to align existing policies, future policies, and the state’s statutory GHG reduction targets for the building sector segments to meet the 2050 and interim goals.

Deep decarbonization of the building sector will also require significant change management, broad market engagement and interconnectivity, well-defined roles and accountability, and a well-structured implementation timeline with interim goals for both policy and structural changes.

Washington Building Sector Policy Context

At a minimum, the building sector strategy must identify a path of core regulatory, programmatic, and market development strategies to draw down building emissions and energy use over the next 30 years. **Table 2** presents building sector segments and the central existing policies and programs intended to regulate and incentivize energy and GHG reductions in each segment. A more comprehensive inventory of Washington State building sector policies is included in Appendix A-

Existing strategies are identified in green; partial strategies are in yellow; and those that need to be created are in red. WSEC stands for Washington State Energy Code and BPS stands for Building Performance Standard.

Table 2. Policy status for key building sector segments

Building Sector Segment	Explicit State Goals?	WSEC	BPS	Utility Programs	State Benchmarking	Market Capacity Development
Commercial Building Stock						
Existing Commercial > 50k sf	No	Yes, for retrofits	Yes	Yes	Somewhat via BPS	TBD
Existing Commercial 20k – 50k sf	No	Yes, for retrofits	No	Yes	No	TBD
Existing Commercial 10 – 20k sf	No	Yes, for retrofits	No	Yes	No	TBD
Existing Commercial < 10k sf	No	Yes, for retrofits	No	Yes	No	TBD
Existing Multifamily above > 3 stories	No	Yes, for retrofits	No	Yes	No	TBD
New Commercial > 50k sf	No	Yes	Yes	Yes	Somewhat via BPS	TBD
New Commercial 20k – 50k sf	No	Yes	No	Yes	No	TBD

New Commercial 10 – 20k sf	No	Yes	No	Yes	No	TBD
New Commercial < 10k sf	No	Yes	No	Yes	No	TBD
New Multifamily above > 3 stories	No	Yes	No	Yes	No	TBD
Residential Building Stock						
Existing Multifamily 1-3 stories	No	Yes, for retrofits	No	Yes	No	TBD
Existing Single Family Homes	No	Yes, for retrofits	No	Yes	No	TBD
Existing Manufactured Homes	No	No (federal standard)	No	Yes	No	TBD
New Multifamily 1-3 stories	No	Yes	No	Yes	No	TBD
New Single Family Homes	No	Yes	No	Yes	No	TBD
New Manufactured Homes	No	No (federal standard)	No	Yes	No	TBD

Note that the fact that a cell for a specific core strategy is green does not mean that the segment does not need tuning and development. A key step in developing the policy strategy will be to determine how aligned the current and potential policies are with the 2030, 2040, and 2050 targets.

In addition, since the WSEC applies to existing buildings when triggered by system replacements and other changes, how can the existing building sections of the WSEC be fortified and strategically aligned with other policies and programs? Further, how can local governments adapt energy code enforcement strategies to ensure that potential energy, GHG, and operating cost savings that the energy code calls for are actually delivered to building owners and renters? And how can utility programs harmonize with codes, standards, benchmarking, and large-scale state-driven market capacity development programs to increase collective impact and drive building sector savings?

Potential for a Retooled Building Sector Framework

To achieve structural and transformational change in the buildings sector, a new framework and platform may be required. For example, we need a framework that recognizes the long lifecycle of buildings and retrofit measures and includes policies to ensure stock replacements align with state decarbonization goals.

The central elements of this framework must be fast-tracked so that we can move forward on early action items to meet 2030 goals, while simultaneously developing the institutional and market capacity development needed to meet 2050 goals. Building up manufacturing and retrofitting capacity to transform the building stock is a significant task requiring market predictability and longer lead times for the market to ramp up. This is also why it is so critical that we determine the basic structure of the building sector transition now in 2020 so we can develop policies and adopt codes on a timeline that provides predictability to the market in terms of clear policy signals that building owners, other market actors, and program designers can adequately respond and animate the transition.

To inform research and dialogue on the development of the policy strategy, this section lays out some possible elements of a building sector framework, a typology of policies and actions to support decarbonization, and some policy options for both residential and commercial decarbonization.

Principles to consider for a transformational building decarbonization framework:

- **Account for sector targets in policy design efforts.** The building sector targets must be set at a detailed level and reflected within the design and implementation for all policies and programs, at all levels, by all agencies and utilities.
- **Leap from energy efficiency to energy optimization and decarbonization.** Energy efficiency as an overarching model and framework for energy reductions has dominated the Northwest energy landscape over the past 40 years and was a total game changer when initiated as an innovative approach to addressing critical resource constraints and goals in the 1970s, namely, to meet load growth in the most cost-effective way, thereby offsetting the need for new generating resources. “Energy efficiency as a resource” is a powerful and useful concept that we must continue to embrace, but it has limitations as an overarching model to address the critical issues and goals we face in the 2020s; namely deep decarbonization and full transformation to a clean energy economy. Energy optimization or other paradigms will be required that allow the degree of flexibility necessary to leverage the full spectrum of solutions that must be employed across the building stock, such as renewables, demand response, grid optimization, microgrids, etc. Hence, the state does not just need innovative policies; it needs an innovative framework that best allows those policies and strategies to harmonize and deliver deep energy and GHG savings.
- **Align around performance-based metrics.** Optimizing energy at the sector and economy-wide level may require a whole building and performance-based approach at every level of policies and programs. This means switching from a framework that values measure-based outcomes focused solely on reducing energy use, to one that values outcomes based on a range of whole-building solutions. A shift to performance-based metrics across all policies and programs may be needed. Adopting a common “language” across policies and programs related to determining baselines, attribution, energy/GHG reductions, and cost-effectiveness, such as energy use intensity (EUI), GHG intensity (GHGI), and other metrics, will support interconnectivity across codes, standards, programs, and market-support strategies.
- **Design for collective impact.** Currently, the state, local governments, utilities, market actors, and regional organizations are all engaged in decarbonization at some level. This creates a patchwork of goals, standards, programs, and outcomes around the state. In order to achieve a dramatic 30-year turnaround in outcomes, and a more equitable transition, Washington will likely need to promote a more coordinated “whole-system” approach that emphasizes the contributions and technical support needs of local and tribal governments, communities, and the market.
- **Prioritize learning and communication.** All technical change is social change at its heart requiring human beings and human systems to interact and organize in new ways to deliver new outcomes. A new framework for decarbonization in the Washington building sector should recognize the primacy of learning and communication in social change. We require an explicit change management lens with an emphasis on the learning and communication infrastructure

required for all the different actors in the residential and commercial sector ecosystems to adapt and truly align around common goals.

Typology of Policies and Actions

Following is a breakdown of the types of “whole-system” policies, actions, and general areas that will be explored for the building sector strategy.

1. Policies and regulations
2. Technology and infrastructure investments
3. Programs (government, private sector, civic, collaborative)
4. Research, development, and dissemination
5. Funding mechanisms (market and institutional)
6. Incentives (including economic and non-economic, positive and negative)
7. Market capacity and mechanisms
8. Institutional capacity and other systemic changes (e.g., alignment, coordination)
9. Tracking, disclosure, and communication
10. Complementary actions not specific to the energy sector but needed or helpful to enable the transition (e.g., workforce development)

5. Topics for Further Research and Deeper Dive Discussions

Through the TAP process, the CETI Team will develop key issues and strategies, conduct background research, and organize discussions for key topic areas with experts and AC members. The discussions will be conducted with the overall intent of exploring the framing questions described in this memo and developing a high-level policy strategy for how to cultivate thriving residential and commercial sector ecosystems capable of rapid economic development and delivery on the state’s GHG reduction goals.

For the building sector, we propose to organize deeper dive discussions with experts and AC members around the following potential policies and actions. Other options suggested by participants and AC members may also be evaluated, as appropriate:

Category	Potential Policies and Actions
Policy	Formal residential energy code tiers and roadmap to meet sector targets
Policy	Performance disclosure requirement for residential and commercial buildings
Policy	Formal commercial energy code tiers and roadmap to meet sector targets
Policy	More robust and formal stretch code program for jurisdiction adoption
Policy	Formal Building Performance Standard tiers and roadmap to meet sector targets
Programs	Allow existing conditions baselines for retrofit programs

Category	Potential Policies and Actions
Programs	Allow utilities to pay incentives for code compliance for a transition period
Programs	Allow "all fuels" new and retrofit programs
Institutional Capacity	Technical support for local government decarbonization planning and tracking
Institutional Capacity	Public benefits charge to support energy office research, planning, and implementation
Market Capacity	Comprehensive state heat pump market transition program
Market Capacity	State strategy to dramatically reduce the cost of heat pumps
Market Capacity	Develop state heat pump and solar manufacturing capacity
Market Capacity	Central website for building decarbonization, hub for resources, tracking, etc.

Appendix A. Overview of Existing Washington State Policies Related to the Building Sector

B1. Monitoring, Reporting & Disclosure

- B1.1 Municipal Building energy benchmarking.** The City of Seattle requires buildings over 20,000 square feet to report their energy usage. Building owners are required to share their energy benchmarking reports to prospective buyers before selling. ([Municipal code 22.920](#))
- B1.2 Public building energy benchmarking.** Performance standards, benchmarking, and other reporting requirements for public buildings. Utilities must keep energy consumption data for qualifying public buildings which they service and make it available to potential buyers or lessees of the building. ([RCW 19.27A](#))

B2. Energy Code; Efficiency and Renewables in New Construction

Policy that affects energy efficiency in both existing and new construction appears in subsection B5.

- B2.1 State energy code.** The state requires that energy codes be cost-effective to the consumer, considering the retail cost of utilities rather than the utility marginal costs. Social cost of carbon is not to be included in the cost-effective analysis. – [WAC 51-11](#)
- B2.2 Energy conservation in public buildings.** Energy conservation in design of publicly funded buildings – life-cycle cost analysis required ([RCW 39.35](#))
- B2.3 LEED silver requirements for public buildings.** LEED silver standard requirements for publicly funded buildings ([RCW 39.35D](#))
- B2.4 Energy code strategy and energy efficiency.** A strategic plan for enhancing energy efficiency and reducing greenhouse gas emissions from homes and buildings. The State Energy Code to move toward a 70 percent reduction in annual energy consumption for new buildings by 2031. ([RCW 19.27A](#))

B3. Appliance and Equipment Standards

- B3.1 Appliance efficiency standards.** State appliance efficiency standards for more than 20 appliances, including first standard in the country for water heaters. ([RCW 19.260](#))

B4. Landscaping and Site Considerations

See also category L Land Use, Land Use Change, and Urban Planning.

B4.1 Further energy conservation in landscape objectives. Department of General Administration must seek to further energy conservation in landscape objectives. ([RCW 43.19.682](#))

B5. Energy Efficiency, Recommissioning and Retrocommissioning

B5.1 Aggregation of energy efficiency measures among government entities. Municipalities may aggregate energy audits and implement cost-effective energy conservation measures among multiple government entities. ([RCW 43.19.691](#))

B5.2 Performance-based energy contract negotiation. Municipalities are authorized to negotiate performance-based energy contracts with energy service contractors. ([RCW 39.35A](#))

B5.3 Incentive return for conservation investments for senior citizens or low-income customers. WUTC must adopt a two percent incentive return for conservation investments made in support of new building code or programs that provide a priority for senior citizens or low-income customers. ([RCW 80.28.260](#))

B5.4 Enhancing energy efficiency. Enhancing Energy Efficiency: The Legislature approved (2009 Legislation [E2SSB 5649](#))

- Implements community-wide energy efficiency upgrades.
- Enhances the low-income residential weatherization program.
- Assesses the energy efficiency of properties in the Housing Trust Fund.

B5.5 Strategic plan for enhancing energy efficiency. Develop and implement a strategic plan for enhancing energy efficiency in and reducing greenhouse gas emissions from homes, buildings, districts, and neighborhoods (RCW 19.27A.150)

B5.6 State efficiency and environmental performance. When making decisions that affect emissions agencies must consider benefits and costs (including social cost of carbon) of options to avoid emissions. Prioritize battery electric vehicles (BEVs) for state fleets and support installation of charging infrastructure. If BEVs are unavailable, prioritize most cost-effective low-emissions option. All newly-constructed state-owned or leased buildings should be zero energy or zero energy-capable (including consideration of embodied carbon). If zero energy is not cost effective, then building must exceed current state building code for energy efficiency (EE). Agencies must implement plans to reduce energy use in state facilities and increase EE including deep retrofits in the future. WSDOT shall start transitioning ferries to zero-carbon. Agencies must pursue opportunities to obtain zero-emission electricity sources. Better align current fiscal

policies to support emissions-reduction and carbon sequestration. ([Executive Order 20-01](#))

B5.7 Clean Buildings Act. Updates Washington state’s building code and increases energy efficiency requirements. Department of Commerce required to establish a state energy performance standard and buildings larger than 50,000 sq. ft. must comply. Goal for standard is maximum reduction of building GHG emissions. ([RCW 19.27A](#))

B5.8 Low-income weatherization and structural rehabilitation assistance account. Department of Commerce must prioritize weatherization and structural rehabilitation projects to facilitate funding from federal energy efficiency programs. Funds must go to projects maximizing energy efficiency and extending the life of a home through rehabilitation/repair and installing energy efficiency measures. Gives community agencies more flexibility to meet the needs of low-income customers. ([RCW 70.164](#))

B5.9 Energy efficiency improvements at schools. \$505 million in bonds will go toward creating jobs through construction of capital improvements and energy efficiency projects in public K-12 school districts and higher education facilities. \$500 million to Department of Commerce to use for energy cost savings improvements and related projects that result in energy, utility, and operational cost savings for K-12 schools and public higher education; these will be given as grants and 5% of each round of grants must go to small school districts. ([RCW 43.331](#))

B5.10 Reducing energy use in buildings and increasing energy efficiency in state-leased buildings. State energy codes must require homes and buildings constructed from 2013 through 2031 to move toward a 70 percent reduction in energy use by 2031. Utilities must maintain energy consumption data for all nonresidential and qualifying public agency buildings that they service; energy data must be disclosed to prospective buyers, lessees, and lenders. State agencies may not enter into a new lease or renew a lease for a building with an energy performance score below 75 unless owner agrees to an energy audit and implements cost-effective energy conservation measures within the first two years of the lease agreement. ([RCW 19.27A](#))

B6. Property-Assessed Financing

B6.1 Commercial property assessed clean energy and resiliency programs. Commercial property assessed clean energy and resiliency program for energy/resiliency retrofits and new construction. Allow property owners to borrow money for renewable energy or EE improvements and then pay costs back over time through a property assessment. This bill allows Commerce to establish a voluntary statewide C-PACER program that counties can choose to participate in. (Chapter 27, Laws of 2020; [E2SHB 2405](#))

B7. Renewable Natural Gas

B7.1 Promoting renewable natural gas. The WSU Energy Program, Department of Commerce, and UTC must submit recommendations on how to promote sustainable development of renewable natural gas (RNG) by September 2018, including the detailed inventory of the practical opportunities and costs associated with RNG production, opportunities for state agencies to take advantage of RNG, recommendations for limiting life-cycle carbon intensity of RNG, and whether to adopt procurement standards for RNG. Explore voluntary gas quality standards for injection of RNG into a natural gas pipeline; industry groups must be consulted. Explore sales and use tax exemptions for equipment/services necessary to process landfill biogas and the establishment and operation of anaerobic digesters. (RCW 82.08, [RCW 84.36.635](#), [RCW 82.29a.135](#))

<https://www.commerce.wa.gov/wp-content/uploads/2019/01/Energy-Promoting-RNG-in-Washington-State.pdf>

Bx. Expired/Superseded

Bx.1 Achieving energy efficiency in state buildings. All agencies must fully implement existing energy efficiency (EE) laws and regulations; funds are now available to do so. Agencies not meeting the appropriate EE levels must complete an energy audit. Deadline to complete cost-effective EE investments can be extended to July 2016 at latest. By 2020 each agency shall reduce building energy use by 20% below 2009 levels. Applies to state occupied buildings above 10,000 square feet. For leased facilities with scores less than 75, owner will be notified that the state lease may not be renewed unless all cost-effective EE improvements are made within 2 years. Superseded by [Executive Order 18-01](#) and [20-01](#) and rescinded. ([Executive Order 12-06](#))