

SCALE 2030

Clean Energy
Transition Institute 

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Clean Buildings
Transition Framework
for Washington



Acknowledgments

About the Clean Energy Transition Institute

The [Clean Energy Transition Institute \(CETI\)](#) is a Seattle, WA-based nonprofit organization whose mission is to accelerate an equitable clean energy transition in the Northwest (Idaho, Montana, Oregon, and Washington). We provide unbiased research and analytics and convene decisionmakers to evaluate decarbonization strategies with the goal of steering limited resources toward affordable solutions that will best reduce greenhouse gas emissions.

About the 2050 Institute

The [2050 Institute](#) is a Seattle, WA-based clean buildings research and policy consulting company. The Institute partners with utilities, policymakers, and market actors to deliver building efficiency and decarbonization at scale in the Northwest and beyond. The Institute uses a “2050” lens and whole systems design to develop strategies, frameworks, policies, codes, and programs that interlock across regional, state, local, community, and utility programs and policies.

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- In October 2022, the Bullitt Foundation awarded CETI a grant for \$30,000 to support the organization's building decarbonization projects, specifically [Operation 2030](#), the precursor project to SCALE 2030.



Sunset over Mt. Rainier, Tacoma, WA. Photo credit: Mark.

Cover: Spokane, WA landmark clocktower downtown. Photo credit: agnormark.

Opposite: The Hans Rosling Center for Population Health, University of Washington. Photo credit: sea turtle

SCALE 2030



Washington state is at a pivotal moment in its clean buildings transition. To meet the state's greenhouse gas emission reduction targets by 2050, the building sector must dramatically scale up efforts to achieve equitable clean buildings at pace by 2030. Accelerating the pace of change will require a radical shift in the way buildings are built and retrofitted, and how their emissions are accounted for.

SCALE 2030 is a Clean Energy Transition Institute and 2050 Institute project that aims to shift Washington from an approach focused on incremental energy efficiency and emissions reductions to a systemic framework that will enable the rapid market transformation needed to decarbonize buildings in just over 25 years.

SCALE 2030 is guided by five key organizing principles:

- S**implicity
- C**ost reductions
- A**lignment
- L**everage
- E**quity



Current SCALE 2030 initiatives include:

- Clean Buildings Ecosystem Assessment for Washington
- Clean Buildings Transition Framework for Washington
- Clean Buildings Transition Roadmap for Washington

Future SCALE 2030 initiatives may include:

- Clean Buildings Cost Reduction Blueprint for Washington
- Clean Buildings Strategic Investment Plan for Washington
- Clean Buildings Planning Framework for Washington
- Clean Energy Regions Model for Washington

Significant systemic barriers stand in the way of decarbonizing buildings at scale by 2030:

- Complexity and friction across the building sector ecosystem
- High upfront costs, split incentives, and financing barriers
- Lack of alignment across policies, programs, and market activities
- Incremental-change approach with high administrative burden
- Inadequate funding to transition the building sector market and ensure a stable workforce and equitable distribution of benefits

Working with market actors and subject matter experts, SCALE 2030 is analyzing and prioritizing policy and investment recommendations to remove systemic barriers and inform policy, planning, and budgeting efforts. This critical analysis and engagement will support policymakers working on strategies and regional efforts aimed at rapidly modernizing the building sector and reducing emissions across Washington.

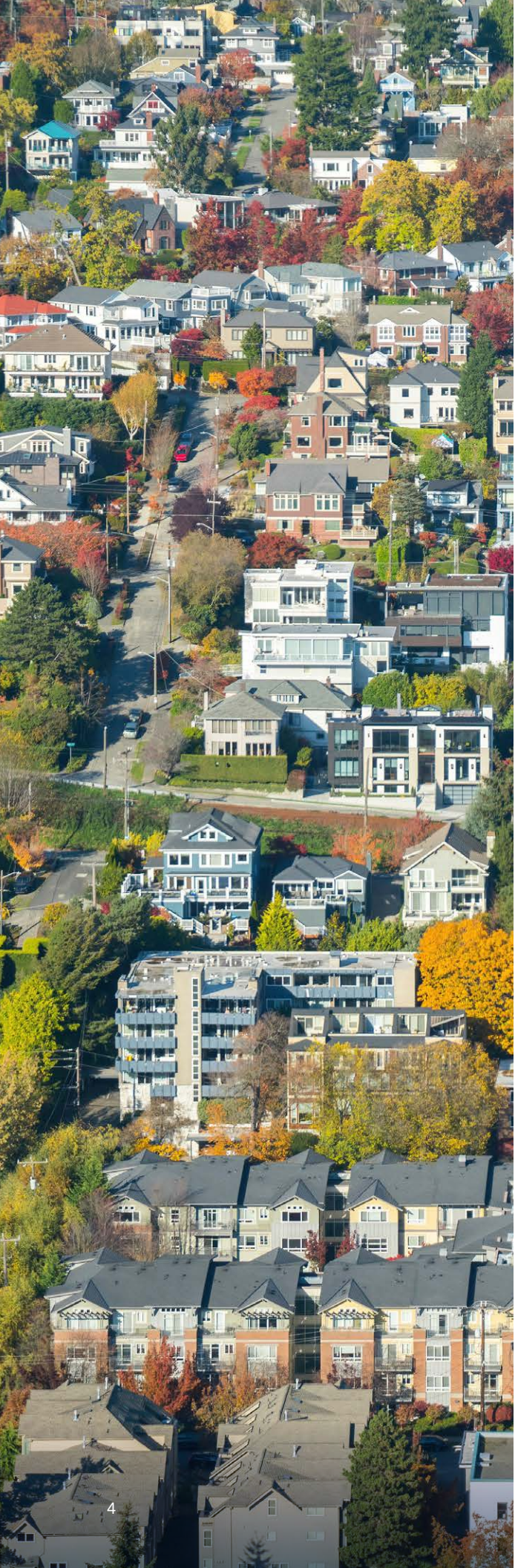


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Aerial view of a residential area at Tacoma, WA. Photo credit: Jason

Executive Summary

Washington policy commits the state to achieve net-zero greenhouse gas emissions by 2050¹ and to use 100% renewable or non-emitting electricity by 2045.² Decarbonizing the state's building sector and reducing energy use are critical to achieving these policies as commercial and residential buildings accounted for 26% of total emissions in 2021.³

In the 31 years between 1990 and 2021, building sector emissions increased by 62% in Washington.⁴ To meet Washington's statutory, economy-wide, net-zero emissions limits by 2050, the building sector must reduce emissions to nearly zero in just 25 years. Transitioning to a clean building sector by 2050 will require a dramatic transformation of the building sector ecosystem. To achieve this, all regions across Washington must have the tools, resources, tailored design strategies, and implementation capacity to successfully decarbonize buildings at the necessary pace and scale.

However, the building sector's ecosystem is not currently structured to reduce emissions at the necessary speed of change and lacks the programs, funding, equipment, and workforce that need to be in place by 2030 to scale clean buildings by 2050.⁵ A new framework is required to decarbonize the building sector while ensuring equity and grid reliability.

Today's building ecosystem faces multiple challenges—it is incentive-based, focused on incremental change, and underfunded. *SCALE 2030: Clean Buildings Transition Framework for Washington* outlines these challenges and proposes five strategies as part of a transition framework that emphasizes building performance, increased and targeted funding, rapid market transformation, coordinated planning, and a regional approach to implementation.

This paper is the second initiative of SCALE 2030, a Clean Energy Transition Institute and 2050 Institute project that aims to accelerate clean buildings at scale in Washington and lays the groundwork for developing a policy roadmap to achieve the transition.

Current Building Sector Ecosystem

Emissions from residential and commercial buildings in Washington increased an average of 1.56% annually between 1990 and 2021 and continue to rise. Together, residential and commercial buildings consume 77% of the state's electricity.⁶

Ninety-two percent of households in Washington reside in single-family or low-rise multifamily buildings,⁷ and five commercial building types—retail, offices, schools, warehouses,



Neighborhood in Bellevue, WA. Photo credit: Zac Gudakov

and mixed-use buildings—make up 75% of commercial floor area in Washington.⁸ These building types should be the focus of programs and policies to scale clean buildings.

Over half of residential housing units and two-thirds of commercial floor area are in the Puget Sound region.⁹ Hence, this region can address more than 50% of the clean buildings transition in the state and can be used to establish strategies that can inform tailored approaches in other regions of the state.

Residential and commercial buildings account for 43% of the state's natural gas consumption, concentrated in urban areas with access to natural gas pipelines.¹⁰ Reducing natural gas emissions is a critical strategy and converting end uses from natural gas to electricity offers both a carbon emissions benefit and an economic advantage as spending would shift from mostly imported natural gas to electricity mostly produced in the state or domestically.

Clean Buildings Transition Framework

The Clean Buildings Transition Framework includes five strategies that are structured to drive deeper levels of:

- Alignment
- Investment in structural change
- Funding
- Coordinated planning
- Geographic focus

If Washington begins implementing this framework in 2025, it could achieve market transformation between 2030 and 2035, which would position the state to complete a permanent transition to a clean buildings sector by 2050.

Strategy #1 Performance as a Resource Ecosystem

Current ecosystem The current ecosystem for clean buildings is not comprehensive. Major policies, such as the Washington Clean Buildings Performance Standard (CBPS),¹¹ currently focus on only a portion of buildings and lack a complete set of interim targets in statutes. Utility incentives focus on energy efficiency rather than on emissions reductions. Tracking and reporting on greenhouse gas (GHG) metrics are infrequent and inconsistent. There is no universal method for valuing or communicating the performance of buildings. Overall, the buildings ecosystem lacks a path for all buildings to reach 2050 targets.

Proposed strategy The Performance as a Resource (PAR) Ecosystem reorients policies, programs, and reporting to focus on whole-building performance as a resource for society and the electricity grid, integrating the transition of all building segments with specific targets

supported by tracking, policies, programs, and market transformation efforts. This ensures that all buildings have a clear regulatory and programmatic trajectory to meet 2050 emissions reduction. Core elements of the PAR approach include:

- Performance targets and tracking for all building segments
- Low-cost solutions for priority segments, including low-rise residential and small/medium commercial buildings
- Performance-based policies and programs, particularly in three key areas: building performance standards, appliance standards, and energy codes
- Interconnectivity and interoperability to create a common method for valuing and communicating the performance of buildings

Strategy #2 Rapid Market Transformation

Current ecosystem Barriers to a successful transition for buildings include high-cost zero-emissions technologies, insufficient market capacity, and persistent dominance of high-emission equipment market share.

Proposed strategy To complement the PAR Ecosystem policy and program approach, a rapid market transformation for clean buildings would focus on the scale of systemic change needed to mainstream the adoption of the lowest-cost and highest-performing solutions to

decarbonize key building segments. This involves increasing market development and investment in supply chains and workforce for key technologies, such as heat pumps. It is essential that both the upfront and lifecycle costs of zero-emission, low-energy, flexible equipment be lowered to become competitive with fossil fuel-powered, less efficient options. Workforce development that would create high-quality jobs is also a crucial component of rapid market transformation that would support an equitable clean energy transition.

Strategy #3 Strategic Transition Funding

Current ecosystem Funding is limited relative to the need to transition the building stock in Washington. Sources include federal funding such as Inflation Reduction Act credits and incentives, state funding such as grants and early adopter incentives, utility program incentives, and private financing.¹² The future of federal funding is uncertain and existing funding opportunities

often come with a high administrative burden while covering a fraction of the project cost.

Proposed strategy Washington must develop dedicated funding streams to invest in market transformation and modernized and decarbonized buildings as essential infrastructure and a critical resource to the electricity grid, the economy, and society overall.

Strategy #4 Coordinated Planning

Current ecosystem Many plans to address emissions reductions and clean buildings already exist in Washington, including the Washington 2021 State Energy Strategy,¹³ the 2021 Northwest Power Plan Northwest Power Plan,¹⁴ and utility integrated resource plans and related conservation or demand-side management potential assessments. However, the agencies and organizations that produce these plans are not coordinated with aligned goals to transition buildings at the scale and pace needed to achieve the state’s 2050 emissions targets.

Proposed strategy Align state, regional, and utility planning efforts, timing, and interconnectivity in a Clean Buildings Sector Roadmap, a coordinated planning approach that would index all planning, policy development, and utility planning and program requirements to Washington’s 2050 emissions limits and the Washington 2021 Energy Strategy’s recommended actions for the clean buildings transition. A roadmap would clarify the targets and timelines for electrification, efficiency, rooftop solar, demand flexibility, and virtual power plants (VPPs) statewide and integrate them into relevant utility, state, and regional plans.

Strategy #5 Clean Energy Regions

Current ecosystem No single agency is responsible for implementing or coordinating a clean buildings transition to reach 2050 emission targets. The Washington Department of Commerce works at the state level, and utilities operate within their service territories with a focus on achieving efficiency requirements. Most cities and counties do not have the capacity to plan, coordinate, implement, or fund significant clean buildings efforts.

Proposed strategy A regional approach to clean buildings implementation for Washington would use eight groups of counties, defined in this paper as Clean Energy Regions,

that possess unique building attributes and distinct challenges and opportunities to achieve clean buildings. These regions line up with utility service territories, air quality agencies, and county boundaries. This regional approach recognizes that most towns and cities in Washington do not have the capacity to support large-scale clean buildings activities. Regions could adapt strategies that work for their specific building ecosystems and communities, lead implementation, and provide a one-stop shop for information and resources on clean buildings for building owners and occupants, contractors, local government entities, utilities, etc.

Next Steps

SCALE 2030’s third initiative will be to assemble a Clean Buildings Transition Roadmap for Washington with a timeline for policies, simplified program designs, strategic funding, and a market transformation approach. Together, these first three SCALE 2030 initiatives are intended to create the foundation for a systemic approach to Washington’s clean buildings transition.



Glossary of Acronyms

CBPS – Clean Buildings Performance Standard

CCA – Climate Commitment Act

CETA – Clean Energy Transformation Act

C-PACER – Commercial Properties Assessed Clean Energy and Resilience

CPUC – California Public Utilities Commission

EPIC – Electric Program Investment Charge

EUI – Energy Use Intensity

GHG – Greenhouse Gas

MMT CO₂e – Million metric tons of carbon dioxide equivalent

PAR – Performance as a Resource

RMT – Rapid Market Transformation

TOU – Time of Use

UBID – Universal Building Identification

VPP – Virtual Power Plant

1

Introduction

Scale 2030: Clean Buildings Transition Framework for Washington assesses the state's building sector ecosystem and proposes recommendations for systemic changes. The paper is rooted in holistic systems and design thinking and starts by analyzing constraints and opportunities in the current building sector ecosystem. The paper assesses current policies, programs, and market transformation efforts and suggests how the current ecosystem can change at a systemic level to deliver on Washington's 2050 goals. The analysis, findings, and recommendations align with Washington economy-wide emissions limits and building sector decarbonization strategy as laid out in the Washington 2021 State Energy Strategy.

The paper proposes a 25-year clean buildings transition framework, including high-level strategies and potential policies intended to inform a detailed clean buildings transition roadmap that would equitably modernize and decarbonize all residential and commercial buildings as reliable grid resources across Washington by 2050. To develop the Roadmap, SCALE 2030 will work with building sector constituents and subject matter experts to help policymakers and advocates prioritize and weigh the relative value of various approaches to systemic change and clean buildings strategies.

Advancing Systemic Change to Scale Clean Buildings

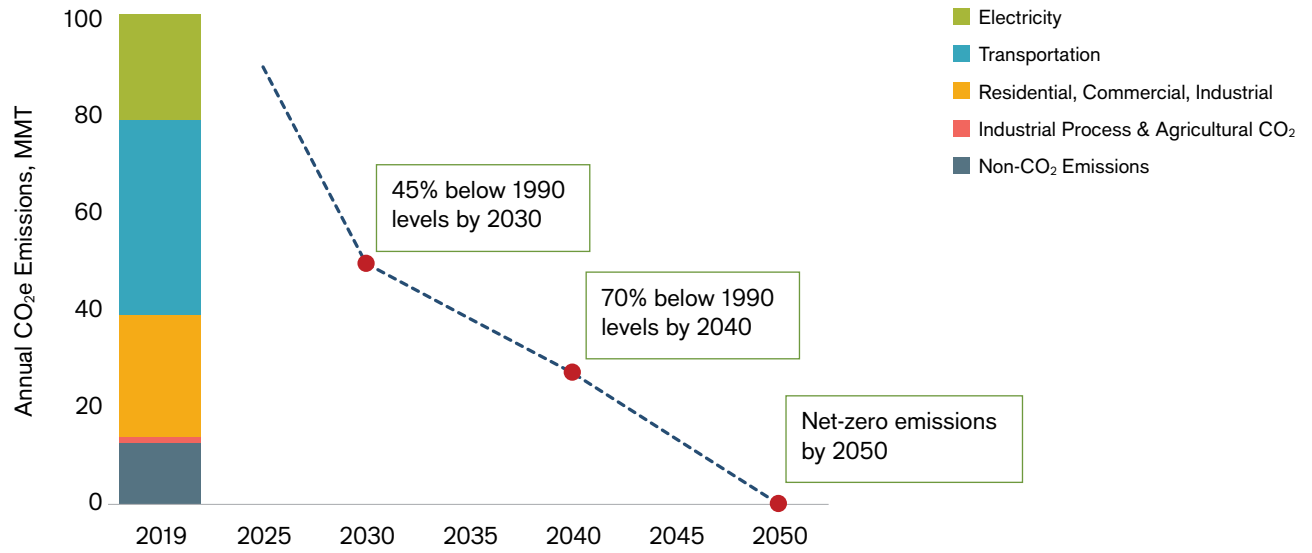
Washington's building sector comprises approximately 17% of the state's gross domestic product¹⁵ and accounted for 77% of electricity consumption in 2023,¹⁶ making the building sector the majority consumer of electricity in the state. The Washington 2021 State Energy Strategy commits the state to decarbonizing its building sector by 2050 by maximizing building electrification and energy efficiency, optimizing buildings as grid resources, and minimizing embodied carbon.¹⁷

A central hypothesis of this paper is that although Washington has many high-level climate policies in place, the scale and pace of building decarbonization required to meet emissions targets far exceed the capacity of current building sector policies, programs, market transformation efforts, and overall funding. Current economy-wide policies are not structured to directly transition the building sector. These policies include statutory economy-wide emissions limits (Figure 1.1),¹⁸ the Clean Energy Transformation Act (CETA) to decarbonize the electricity sector,¹⁹ and the Climate Commitment Act (CCA),²⁰ which requires progressive GHG reductions from the state's largest emitters.

Workers installing solar panels. Photo credit: Renovus Solar



Figure 1.1. Washington state emissions limits



Source: Clean Energy Transition Institute's *Net-Zero Northwest: Technical and Economic Pathways to 2050* report



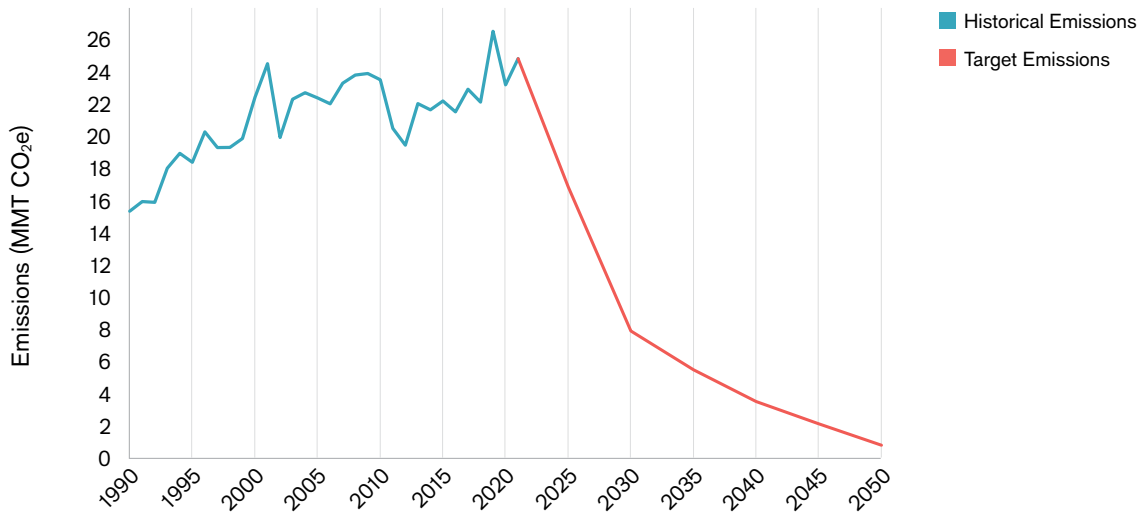
Asgard Pass near Leavenworth, WA. Photo credit: bchen22

In the 31 years between 1990 and 2021, commercial and residential buildings increased emissions by 62%, or an average of 1.56% annually.²¹ Looking only at the most recent decade available (2012-2021), the rate of increase is higher, at 2.74% annually. To meet Washington’s statutory, economy-wide, net-zero emissions limits by 2050, the building sector must reduce emissions to nearly zero in just 25 years (Figure 1.2). Transitioning to a clean building sector by 2050 will require a dramatic transformation of the building sector ecosystem. To achieve this, all regions across Washington

must have the tools, resources, tailored design strategies, and implementation capacity to successfully decarbonize buildings at the necessary pace and scale.

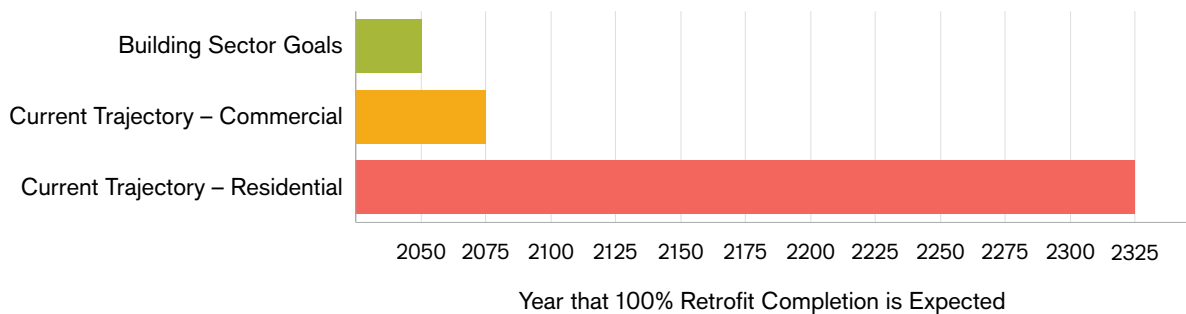
At the current pace of national retrofits, it will take 300 years to retrofit all residences and 50 years to retrofit all commercial buildings.²² This stands in stark contrast to the 25-year time frame that is necessary to meet Washington’s 2050 emissions limits (Figure 1.3). With commercial and residential emissions in Washington increasing at an average annual rate of 1.56%, the building sector is not on track to reach these limits.

Figure 1.2. Washington building sector emissions trajectory



Source: 2050 Institute and Clean Energy Transition Institute analysis using Washington Greenhouse Gas Emissions Inventory data; and projected energy use from deep decarbonization modeling performed for the Washington 2021 State Energy Strategy by Evolved Energy Research. Target emissions for 2021-2024 are adjusted to reflect updated emissions published after the State Energy Strategy.

Figure 1.3. Current commercial and residential retrofit trajectories vs 2050 goals



Source: American Council for an Energy Efficient Economy’s Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals.

1. Introduction

Installing zero-emission appliances in most building end uses when existing fossil fuel appliances reach the end of their useful service is the most strategic and lowest-cost path to scale clean buildings.²³ To ensure that space- and water-heating equipment is fully zero emissions across the building stock by 2050, Washington's building sector must steadily shift the market to a 100% replacement by 2030 (Figure 1.4).²⁴

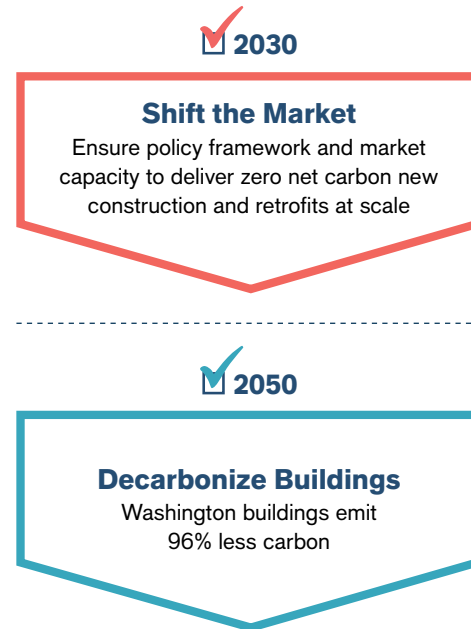
Establishing and committing the building sector ecosystem to a more rapid transition timeline will require a major shift in strategy for how the state builds and retrofits buildings. It is imperative that Washington start thinking about the long-term actions required to enable a permanent transition to a resilient clean energy economy, including the building sector. This means moving from a mainly voluntary and incentive-focused paradigm to one with strong market signals, high capacity, productivity, and resilience focused on rapid cost reduction and market transformation.

Based on a review of existing reports from the Northwest Energy Efficiency Alliance,²⁵ the Clean Buildings Workgroup,²⁶ CETI and 2050 Institute,²⁷ the Lawrence Berkeley National Lab,²⁸ and RMI,²⁹ the state's actions, decisions, and policies must address the following system barriers to achieve clean buildings at scale in Washington:

- Complexity and friction throughout the building sector ecosystem
- High upfront costs, split incentives, and financing barriers
- Misaligned policies, programs, and market activities
- An incremental-change approach with high administrative burden
- Inadequate funding to ensure a transition of the building sector market, a stable workforce, and equitable distribution of benefits

Significantly altering the clean buildings trajectory from incremental change based on legacy incentive-based strategies to large-scale systemic change, major investments, and cost reductions could deliver rapid and measurable increases in the share of zero-emission equipment and demand flexibility, thereby reducing emissions and keeping Washington on track to transition the full building stock by 2050.

Figure 1.4. Washington state must scale clean buildings by 2030 to progressively transform the building stock by 2050



Source: Clean Energy Transition Institute and 2050 Institute's Operation 2030 report



The skyline of Seattle, WA's University District. Photo credit: Zoshua Colah

Addressing Equity in the Clean Buildings Transition

Washington has both a critical opportunity and legislative requirements to address systemic racism, inequality, energy burden, housing insecurity, and economic insecurity as the building sector transitions to clean energy.

Requirements such as the equitable distribution of benefits in the Clean Energy Transformation Act,³⁰ the elimination of environmental and health disparities for overburdened communities in the Health Environment for All Act,³¹ and climate resiliency investments built into the Climate Commitment Act³² all forefront equity.

Cost is one of the key barriers to achieving equity in the clean buildings transition.³³ This paper addresses the imperative to lower costs of clean technologies, and the need for deep

public investment in buildings, as part of making clean buildings accessible to all households and businesses. Without lower costs, addressing equity will be difficult to achieve.

Scaling the clean buildings transition will also require a skilled workforce with access to affordable housing, healthcare, and the education needed to deliver the physical transition of the building stock. Workforce development is a major co-benefit of the clean energy transition,³⁴ and one that should be prioritized for equitable distribution of benefits.

Addressing these critical equity issues will not only require intentional planning and community engagement, but also significant public and private funding. The state must commit to ensuring that the clean buildings transition unfolds equitably.



Miniature houses and rolling hills in the Palouse region of WA after autumn harvest. Photo credit: Kush Dwivedi



2

Applying Systems Thinking

Large-scale, transformative change over a short period of time will require the building sector ecosystem to be high-performing and deliver positive outcomes across a wide range of government, market, and community actors. This paper applies systems thinking to ask critical questions and re-envision a building sector ecosystem that delivers high-performing, zero-emissions buildings as a natural outcome of ecosystem interactions and functioning.

Systems thinking is a method of understanding the behavior of key actors within a system and focuses less on the actors themselves and more on the relationships, interconnectivity, communication, and productivity among actors as part of a larger system.³⁵ The ability of key actors to self-organize and effectively transmit and process information is critical to high-performing systems.

Two important intervention strategies for realizing change in complex systems are to reduce friction within the system and increase the leadership capacity and interconnectivity of system actors.³⁶ This is important for building sector market actors, such as building owners and tenants. Reducing excessive friction and stress within a system increases overall system resilience.

Key systems-thinking techniques this paper applies include:

- Mapping complex systems and identifying root causes of problems
- Establishing a systemic view to reframe problems from different perspectives to uncover new solutions
- Determining the right problems to solve and picking the best solutions to experiment with
- Deepening our understanding of social and organizational systems by taking an iterative approach to test solutions and gain insights
- Bringing in concepts from chaos theory, such as the goal-seeking nature of seemingly chaotic systems and how to structure interventions to reorient systems toward new goals and mutually beneficial activities

This paper applies systems-thinking strategies to develop a clean buildings transition framework by coupling comprehensive upfront building sector regulations with targeted market transformation and public investment in building sector infrastructure and industries, increasing interconnectivity between goals, and using targets and large-scale strategic investment to develop optimism and confidence in the larger building sector and economy-wide transition.

Tradesman on the roof of a house. Photo credit: Chanwit

3

Current Clean Buildings Ecosystem

It is important to understand the state of the current clean building ecosystem as part of developing a transition framework. The specific points of performance and policy levers within the current ecosystem—and the relationships and interconnectivity among various ecosystem actors and resources—are critical to envisioning a transition framework capable of delivering on the state’s 2050 goals.

This section presents highlights from *SCALE 2030: Clean Buildings Ecosystem Assessment for Washington*,³⁷ including data from existing building stock, energy use, and emissions. It also looks at market actors, market interventions (such as policies and programs), interoperability across market actors and interventions, and the overall funding landscape and limitations. Each section of findings informs the strategies and focus areas of the proposed framework in Section 4.

Population

People need to be centered in an equitable clean building transition. How population is distributed across the state offers insight into how to equitably support the clean buildings transition.

Table 3.1. Population highlights

Highlights
Rural population is small relative to the total population.
About 90% of Washington’s population lives in urban areas; 10% of the population lives in rural areas. ³⁸
Washington cities are relatively small. Only one has a population greater than 250,000; three range from 200,000 to 250,000; and 84% of Washington’s 281 cities and towns have less than 25,000 people. ³⁹
Key Takeaways
Including rural areas in the clean buildings transition is critical despite their smaller share of the population. Both rural areas and the majority of cities lack capacity to support large-scale transition activities, meaning most interventions need to be supported at the utility, county, regional, state, and federal level.

Seattle, WA waterfront. Photo credit: Washington State GPA Photo Archive

Building Stock

The state’s existing building stock offers insights into which efforts can have the greatest impact on clean buildings.

Table 3.2. Building stock highlights

Highlights	Key Takeaways
92% of housing units are single-family or low-rise multifamily. ⁴⁰	<p>Solutions for certain building segments and types can address a large portion of the clean buildings transition—single-family and low-rise multifamily for residential and the top five types for commercial. While all buildings need a path to transition, solutions for these key building types could have an outsized impact.</p> <p>Similarly, the Puget Sound region can address more than 50% of the clean buildings transition and can be used to pilot and establish strategies that can inform tailored approaches in other regions of the state.</p>
Only 1/3 of residential units are rentals. ⁴¹	
55% ⁴² of residential units and 2/3 of commercial floor area are in the Puget Sound region. ⁴³	
75% of all Washington commercial floor area is retail, mixed-use, warehouses, offices, and schools. ⁴⁴	

Energy Use and Emissions

Electricity and natural gas are the two main forms of energy used in buildings. A clean buildings transition will need to address emissions from natural gas use, while emissions from electricity use will be addressed through CETA electricity emissions reduction goals.

Table 3.3. Emission and energy use highlights

Highlights	Key Takeaways
Emissions from residential and commercial buildings increased 62% between 1990 and 2021. ⁴⁵ This is an average increase of 1.56% per year (1.50% annual increase for the residential sector and 1.65% increase for the commercial sector).	<p>A significant shift in the trend of building emissions is needed to reach the statutory goal of 95% reductions by 2050. Nearly half of all natural gas consumption in Washington—and resulting emissions—can be eliminated by removing natural gas use from buildings. Shifting from natural gas to electricity in buildings also shifts expenditures from foreign imports to mostly Washington- or U.S.-produced electricity.</p>
Residential buildings consume 44% of Washington’s electricity. Commercial buildings consume 33%. Together, the two sectors consume 77% of the state’s electricity. ⁴⁶	
Residential and commercial buildings together are 43% of Washington’s total natural gas consumption, making them the state’s largest end use for natural gas. Residential buildings are 25% of natural gas consumption and commercial buildings are 17%. ⁴⁷	
In 2022, the residential and commercial sectors spent nearly \$2 billion on natural gas and \$7 billion on electricity. ⁴⁸ Most natural gas in Washington is imported from Canada, while Washington is a net exporter of electricity. ⁴⁹	

Building Sector Policies

While existing state climate policies establish high-level goals for clean buildings, there are large gaps in building sector policies that need to be addressed. The SCALE 2030 Team review indicates that no building segments have a complete regulatory pathway to reduce emissions and energy use by 2050.

Table 3.4 summarizes critical building sector policy levers that exist (blue squares) or are missing (dashes). The table

presents all Clean Buildings Performance Standard (CBPS) tiers, including a proposed future Tier 3 for small commercial and residential buildings. These tiers collectively cover all segments of the residential and commercial building population in Washington.

As the table shows, relatively few building sector policies are in place to support the clean buildings transition by 2050.

Table 3.4. Building sector policy gap analysis

Critical Policy Levers	Building Sector Tiers & Segments				
	Tier 1: Commercial (>50k sq.ft.)	Tier 2: Commercial (>20k ≤50k sq.ft)	Tier 2: Multifamily (>20k sq.ft.)	Tier 3 (Future): Commercial (≤20k sq.ft.)	Tier 3 (Future): Residential (≤20k sq.ft.)
State Clean Buildings Transition Target (New Construction)	—	—	—	—	—
State Clean Buildings Transition Target (Existing Buildings)	—	—	—	—	—
Transition Rate and Milestones	—	—	—	—	—
Annual Building Sector GHG Inventory and Progress Reporting	—	—	—	—	—
Zero-Emission Appliance Standard	—	—	—	—	—
Energy Code	■	■	■	■	■
Performance Benchmarking (for real estate transactions)	■	■	■	—	—
Performance Benchmarking (publicly disclosed)	—	—	—	—	—
Standardized Mandatory Performance Labeling	—	—	—	—	—
CBPS Targets by Building Type, 2025 BPS Cycle	■	—	—	—	—
CBPS Targets by Building Type, 2030 BPS Cycle	—	—	—	—	—
CBPS Targets by Building Type, 2035 BPS Cycle	—	—	—	—	—
CBPS Targets by Building Type, 2040 BPS Cycle	—	—	—	—	—
CBPS Targets by Building Type, 2045 BPS Cycle	—	—	—	—	—

— No current policy ■ Policy in place



Table 3.5 presents key highlights and takeaways from current policies, programs, market transformation, and funding.⁵⁰

Table 3.5. Summary of policy and program highlights

Highlights	Key Takeaways
<p>Existing programs, largely implemented by utilities, are designed to deliver energy efficiency and are not structured to deliver the whole-building performance or depth of efficiency needed for a complete clean buildings transition by 2050. Programs often do not address fundamental barriers such as split incentives, economic pressures that limit the ability to obtain credit, and short ownership durations that require short payback periods.</p>	<p>In addition to aligning existing programs and policies across all levels, there is a need to shift focus to the end goal of a highly efficient, flexible, and zero-emissions building stock by 2050 and to how programs can address split incentives and financing barriers.</p> <p>The cost of decarbonization and other clean building technologies is an obstacle for many residential and commercial buildings, even when combining federal, state, and local incentives.</p>
<p>Market transformation has been a key strategy for reducing building energy use over several decades. Increased funding, incentives, financing, and industrial policy-level interventions are necessary to scale the supply and widespread adoption of clean building technologies.</p>	<p>Washington will need new sources of funding to cover the costs of the clean buildings transition. In Washington, four million residential units will need to be efficient, zero-emissions, and grid-interactive by 2050.</p>
<p>Currently, many of the interventions in the building sector are fragmented and lack clarity and interconnectivity in terms of goals, targets, metrics, communication formats, etc. For example, major policies like the CBPS are not aligned with emissions reductions suggested by the Washington 2021 State Energy Strategy.</p>	



Construction workers install heat pumps in South Seattle, WA. Photo credit: Marcela Gara



Clean Buildings Transition Framework

This paper proposes a clean buildings transition framework structured to drive deeper levels of alignment, investment in structural change, funding sources, coordinated planning, and geographic targeting than currently exists within the ecosystem. If Washington starts to implement this framework in 2025, it could achieve market transformation between 2030 and 2035. This would position the state to complete a permanent transition to a clean buildings sector by 2050.

The Clean Buildings Transition Framework consists of five strategies that work together to mutually reinforce and support the clean buildings transition (Figure 4.1).

Performance as a Resource Ecosystem (PAR Ecosystem)

is about scaling market demand. It centers multidimensional performance at the heart of the framework and reorients mandatory policies, voluntary programs, and highly interoperable reporting to focus on whole-building performance as a resource for society and the grid. The transition must work for multiple actors and entities to function effectively. The building itself must be high-performing, but the transition must also work well for building owners, contractors, workers, utilities, economic development for communities in general, and the electricity grid. To implement this level of performance across the ecosystem, there must be near- and long-term targets, a comprehensive regulatory trajectory that sends clear market signals for all building sector segments, significant investment from the private sector, and transparent and interoperable reporting. This strategy fills gaps in current building sector policies and harmonizes policies and programs.

Rapid Market Transformation (Rapid MT) is about scaling market supply. It supports the PAR Ecosystem by focusing on the scale of structural change in the building sector needed to mainstream adoption of the lowest-cost and highest-performing solution sets for key segments. It supports building sector performance with highly targeted market development, and industrial policy to align the supply chain with PAR Ecosystem targets, policies, and programs.

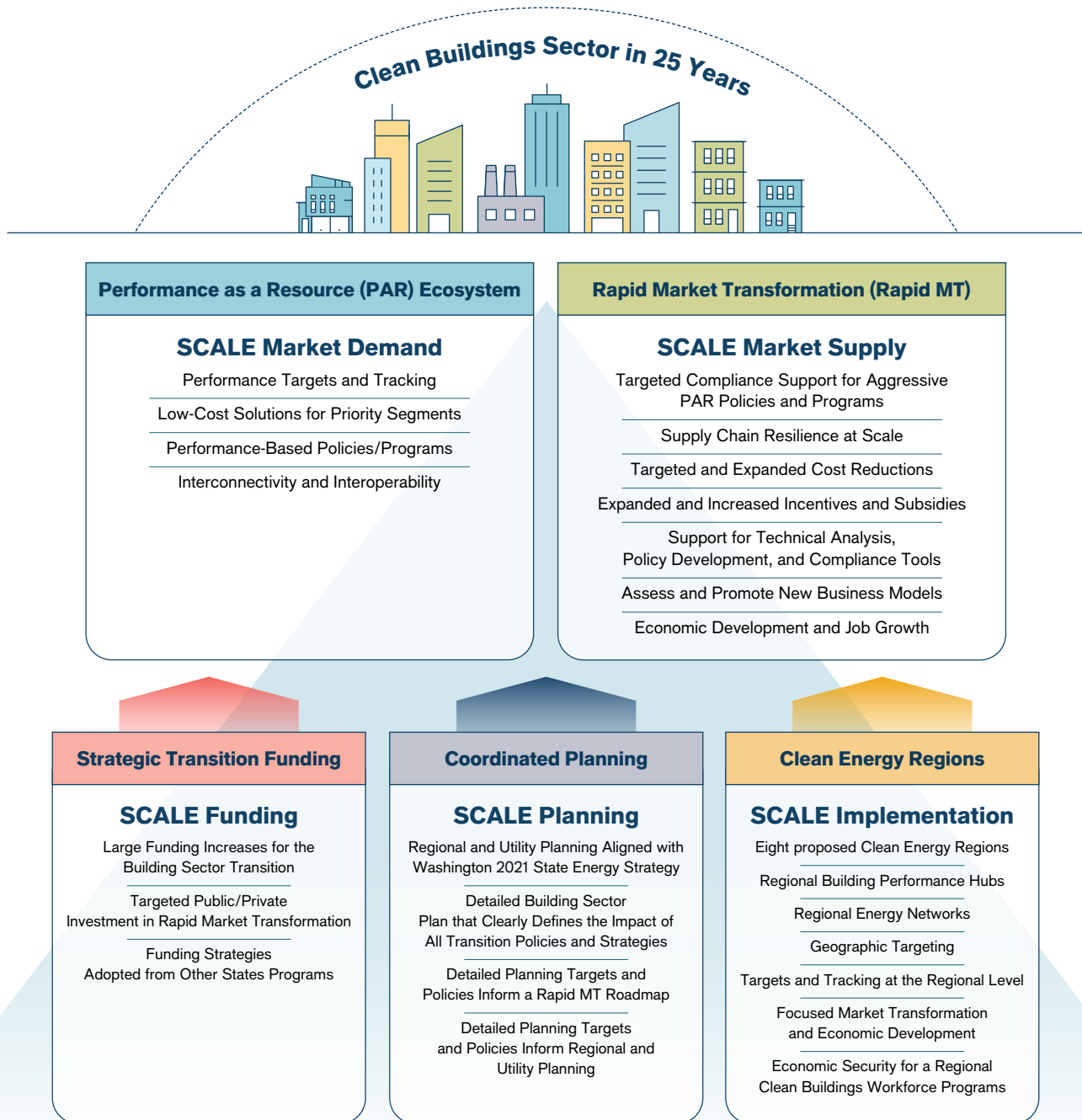
Strategic Transition Funding is about scaling funding. It focuses on providing significant new funding sources to support Rapid MT investments.

Brick building in Spokane, WA. Photo credit: digidreamgrafix

Coordinated Planning is about scaling integrated planning across many planning platforms. It ensures that all the policy, programmatic, and other market interventions are aligned with the clean buildings transition required in Washington to meet emissions limits.

Clean Energy Regions are about scaling implementation. They are an approach to regional implementation across the state to support the transition in a targeted, strategic, and participatory way across Washington’s diverse markets and communities. The Clean Energy Regions are where the other four strategies intersect to address the unique challenges, opportunities, and partners in each region.

Figure 4.1. Clean Buildings Transition Framework



Performance as a Resource Ecosystem

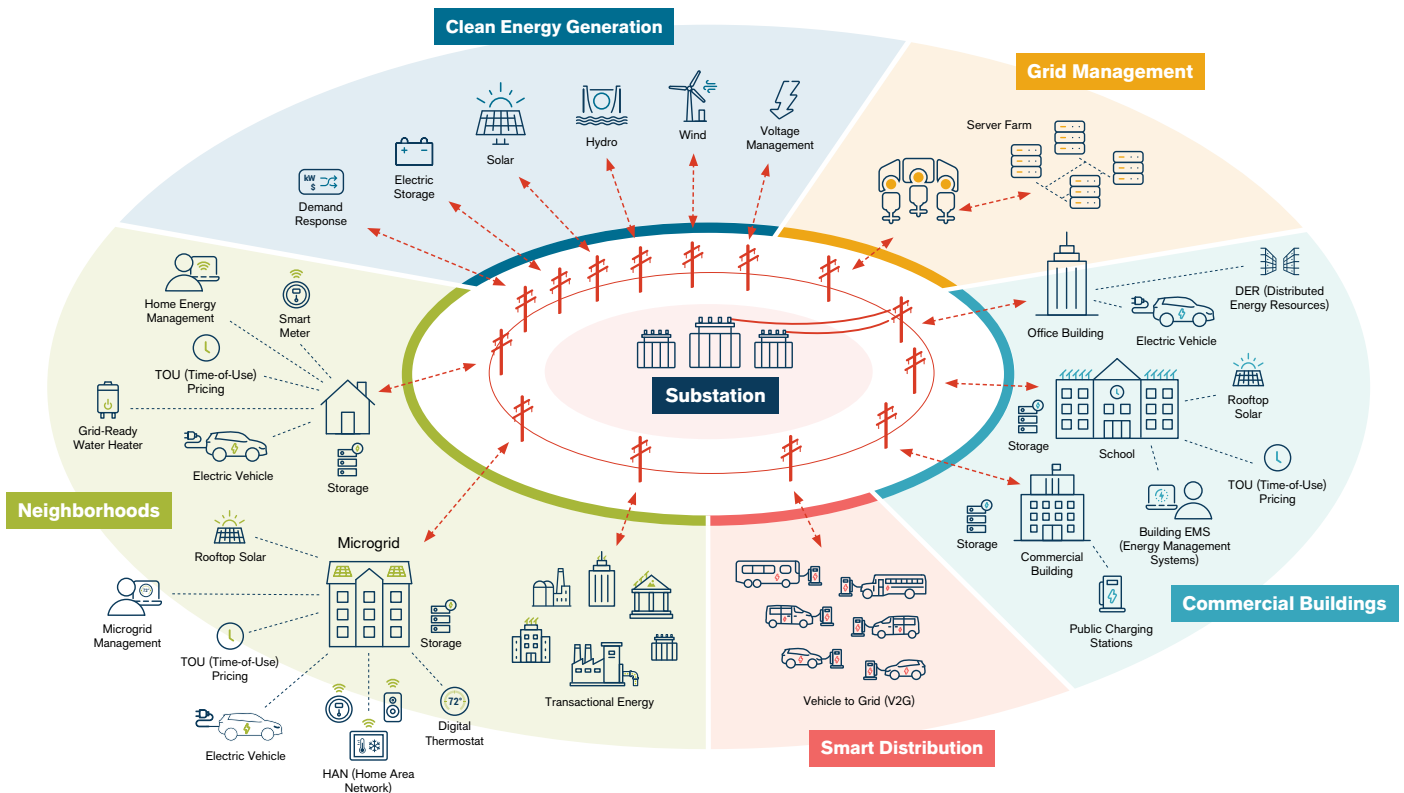
The **PAR Ecosystem** scales market demand across all building sector segments and integrates the transition of all segments into targets, tracking, policies, programs, and market transformation. The PAR Ecosystem recognizes that buildings are essential infrastructure, and that all commercial and residential buildings for the whole population at all income levels must transition for Washington to meet 2050 emissions limits.

Clean buildings will play a primary role in the clean energy future (Figure 4.2). They will be a critical element of a modern, resilient, highly interconnected grid. The collective performance of resilient clean buildings—with zero emissions, distributed energy resources, high-efficiency equipment and

materials, grid-interactive capabilities, and smart electric vehicle charging—will directly support the state’s capacity to decarbonize electricity and electrify transportation and industry. Considering the role of clean buildings in the overall clean energy transition, the state must invest in building performance as a grid resource and as a public good.

The PAR Ecosystem shifts focus from assessing the value of efficiency in isolation from other resources to a more holistic approach focused on integrated outcomes across multiple performance metrics. It also attempts to cover gaps in the current ecosystem of interventions by ensuring that all segments have clear targets and a coherent regulatory and programmatic trajectory to meet 2050 goals.

Figure 4.2. Primary role of buildings in the clean energy future



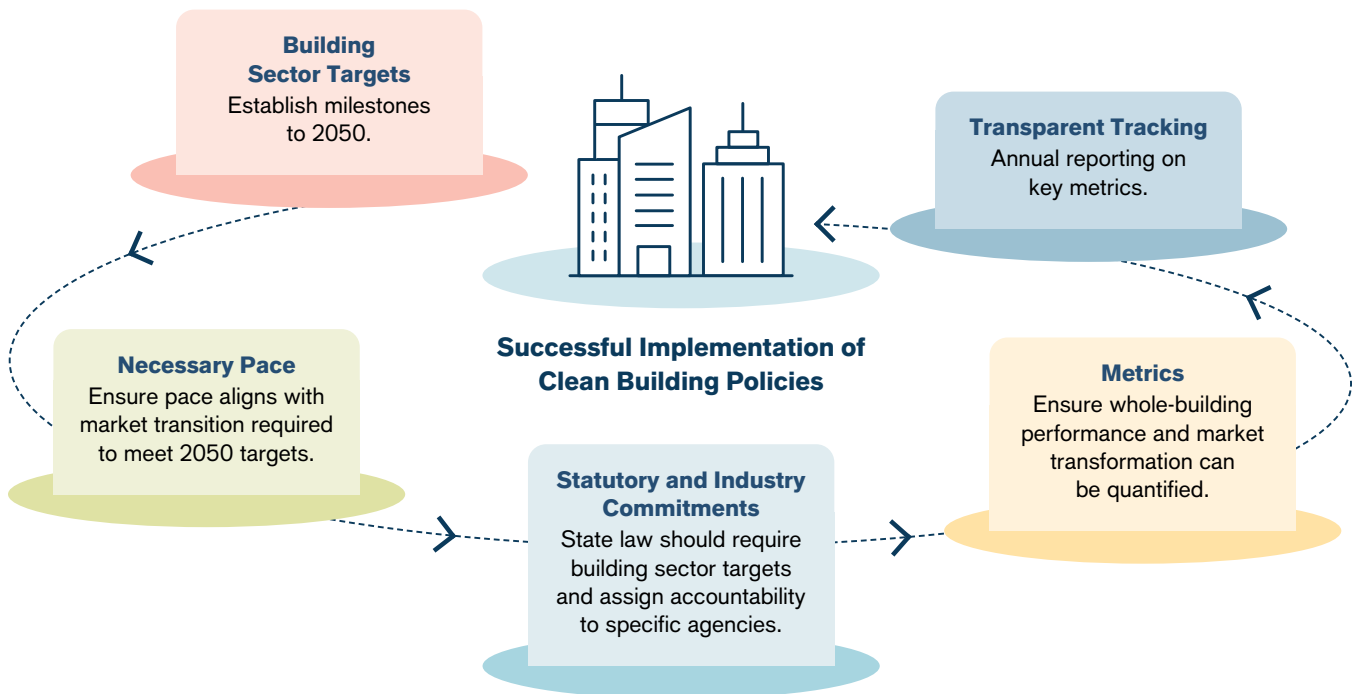
Performance Targets and Tracking

The PAR Ecosystem involves establishing statutes that commit to specific building sector targets and milestones over the next 25 years to achieve 2050 economy-wide emissions limits (Figure 4.3). The targets should include metrics that can be used in policies and programs. Metrics should in turn be coupled with transparent and frequent progress tracking, including annual reporting on building sector GHG emissions, energy consumption, and peak energy; annual reporting on sales shares for key technologies such as space- and water-heating heat pumps; and annual reporting on flexible demand resources including rooftop solar, batteries, micro grids, and virtual power plants.



Technician checking air conditioner. Photo credit: A Stockphoto

Figure 4.3. Factors driving successful implementation of building decarbonization policies



Low-Cost Solutions for Priority Building Segments

While all building sector segments must have a pathway to achieving zero emissions, low energy use, and demand flexibility by 2050, two segments make up the majority of building emissions and therefore must be prioritized for policies, programs, and market transformation: small/medium commercial buildings and low-rise residential buildings (including single-family units and multifamily buildings that are less than three stories).⁵¹

It is critical that these segments have clear policies, aligned programs, robust supply chains, and a trained workforce to ensure the most strategic solutions are available at the lowest possible cost. These technical and implementation solutions include technologies such as commercial rooftop heat pump units, heat recovery ventilation, digital controls, rooftop solar, batteries, and central and zonal residential heat pumps.

Performance-Based Policies and Programs

A key goal of the PAR Ecosystem is to close building sector policy gaps by harmonizing policies and programs around a simplified, whole building performance approach indexed to 2050 building sector targets and tracking mechanisms. The SCALE 2030 team recommend making bold changes to three keystone policy levers—building performance standards, appliance standards, and energy codes—and structuring them to apply to all commercial and residential segments. Within this ecosystem, all future building sector regulations would be integrated into these three policy categories, and programs and other supportive interventions would align with the structure and timelines of these policies. The three policy levers and the supportive role of programs are discussed in more detail below.

Keystone Policy Levers

Clean Buildings Performance Standards

The CBPS must be adapted to ensure all segments have pathways and tracking to meet 2050 emissions limits. Key recommendations include:

- **Create a new Tier 3** to require energy score benchmarking and to regulate asset-based energy and emissions in residential and commercial buildings ≤20,000 square feet.



Downtown Seattle, WA construction cranes. Photo credit: Steve Banfield

- **Adopt a final performance standard for 2050** and interim targets for each CBPS cycle through the final standard so building owners can align capital planning, strategic sequencing, and funding with a 25-year journey to 2050 performance outcomes.
- **Accelerate adoption of targets for the next compliance cycle (2031–2033)** to ensure that Tier 1 and Tier 2 buildings do not skip a cycle. Currently, the state is not required to announce updated Tier 1 targets or the first cycle of Tier 2 targets until the late 2020s, which could push compliance time frames out another five years, thereby skipping a cycle. Target adoption can be accelerated by refocusing target-setting efforts on establishing final performance endpoints and how to achieve them over time, rather than focusing on what the average Energy Use Intensities (EUIs) for buildings are now and how they should inform targets for the next compliance cycle.
- **Adopt multiple compliance metrics**, including a combination of energy, emissions, and maximum coincident peak electric load to ensure a complete, whole-building clean energy transition for commercial and larger multi-family buildings.
- **Require publicly-disclosed annual benchmarking** for Tier 1 and Tier 2 buildings to provide performance visibility to the real estate industry, finance industry, and tenants.

Appliance Standards

Appliance standards can play a critical role in equipment efficiency and emissions reductions. In addition to existing energy and refrigerant appliance standards,⁵² Washington should adopt a zero-emissions appliance standard. This standard would work much like the zero-emission vehicle standard⁵³ to phase out internal combustion engine vehicles by regulating incremental increases in the sales shares of zero-emissions appliances over time.

This new standard should apply to all building segments and would cover a major gap in building sector policy by regulating emissions in existing commercial and residential units of less than 20,000 square feet. These segments currently have no significant policy in place other than the energy code as it applies to existing buildings. Recommendations include:

- **Adopt a zero-emissions appliance standard** at the state level to establish a mandatory, stepped path to increase sale shares of zero-emission space- and water-heating appliances to 100% by 2030.
- **Improve appliance efficiency standards**, continuing current practices of adopting new, improved standards.
- **Adopt improved refrigerant standards** to reduce the global warming potential of refrigerants for critical transition appliances, such as heat pumps for space and water heating.

Energy Codes

According to state law, buildings permitted under the 2031 Washington State Energy Code must consume 70% less energy than 2006 code compliant buildings. This mandate has led to progressively more efficient commercial and residential energy codes for new construction. Recommendations moving forward include:

- **Increase stringency in new construction code** to align with Washington's 70% energy-reduction mandate.
- **Increase efficiency for existing buildings** in the energy code, including high-efficiency equipment for commercial and residential space- and water-heating replacements.
- **Increase demand flexibility**, including onsite renewables, batteries, and demand response.



Two air source heat pumps installed outside. Photo credit: Brebca

- **Require code alignment with CBPS targets and reporting requirements** to ensure the code permitting process requires predicted energy use and emissions estimates for new construction, additions, and substantial alterations. Commercial compliance documentation should also correspond with CBPS targets and reporting requirements, and residential compliance documentation should require home energy scores.
- **Create a simplified performance path for commercial buildings** to allow more buildings to use this pathway and ensure better alignment with CBPS requirements for new and existing construction.
- **Create a simplified performance path for residential buildings** to allow more units to use this path as efficiency requirements increase and the role of design strategies increases.
- **Increase the timeframe** between energy code adoption and effective date to allow for guidelines and market support to be built out prior to each code cycle launch. Increasing the timeframe would provide more time for market readiness, utility program adaptation, and other supportive efforts and investments to reduce compliance costs and other barriers.

Programs

For decades, utility programs have implemented energy efficiency as an alternative to adding more supply-side resources, such as power plants. This energy-efficiency-as-a-resource approach emphasizes energy savings and cost-effectiveness based on avoided costs on the supply side. However, new state goals and policies have shifted away from siloed energy efficiency or fragmented measures—for example, efficiency, emissions reductions, onsite solar, and demand response as separate performance outcomes—to whole-building performance and more integrated outcomes as laid out in the Washington 2021 State Energy Strategy and reflected in key building sector policies, such as the CBPS.

If nearly all buildings must fully electrify and maximize efficiency, onsite renewables, and demand flexibility to meet 2050 emissions limits and implement the Washington 2021 State Energy Strategy by 2050, then utility programs must quickly adapt to focus on performance outcomes and larger-scale implementation. These changes would likely require new regulatory targets in policies such as I-937,⁵⁴ or a new regulatory framework altogether with new metrics to allow utilities to quantify and demonstrate progress toward more holistic outcomes through their programs.

Robust and Targeted Midstream and Upstream Programs that Integrate Efficiency, Emissions, and Demand Flexibility

Robust and targeted midstream and upstream programs⁵⁵ should support engagement in the clean buildings transition along with incentive programs. The programs should include solutions and contractor training aligned with CBPS building size tiers and should heavily focus on supporting the transition for key building sector segments within those tiers that contribute the majority of energy use and emissions, such as small/medium commercial and low-rise residential.

Direct engagement with trade allies, such as manufacturers, distributors, and contractors, through midstream and upstream programs will help align the market with the equipment and design solutions required for critical building sector segments. These programs should also focus on dramatically reducing incremental costs for the most strategic solutions by bringing down equipment costs and incentivizing lower overall costs, including design and installation, with bulk buys, flat rate programs, and other strategic investments and interventions.



Solar energy technical and vocational training program at the Northwest Indian College, Lummi Nation. Photo credit: Jessica Plumb

Standardized Designs for Energy and Emissions Performance-Based Programs

Energy and emissions performance-based programs should align directly with CBPS Tier 1, Tier 2, and the new Tier 3. With the addition of Tier 3 for commercial and residential buildings up to 20,000 square feet, the CBPS tiers would cover all commercial and residential segments and should be the basis for standardized utility performance-based programs across Washington.

Rebates and incentives for incremental measures may still be warranted at some level but should be coupled with whole-building programs employing a long-term strategic energy management (SEM) lens to all segments, including residential. A whole building lens will improve strategic sequencing and long-term planning for both commercial and residential buildings. Because the state must transition to electric, zero-emission buildings, electric utilities should lead the implementation of performance programs in partnership with gas utilities for all tiers. This will help electric utilities ensure that buildings maximize efficiency and demand flexibility to support grid reliability and resilience as they electrify.

If electric utilities manage performance programs and coordinate access to a combination of incentives, rebates, tax credits, and innovative financing strategies, they will also be better positioned to align benchmarking, audits, planning, and retrofits with electric utility authority for incentivizing the clean energy transition for buildings. Public electric utilities are authorized to support efficiency, demand flexibility, and transportation measures but they are not authorized to use public funds to support fuel switching.⁵⁶ By leading the performance programs, the public electric utilities can use utility, state, and federal demand flexibility and transportation incentives within their authority to build out the infrastructure necessary to electrify key end uses. This work can be supported by state, federal, and gas utility incentives to cover gaps in electric utility financing authority, for example for fuel switching.



Person installing solar panel. Photo credit: Los Muertos Crew

New Metrics Focused on Whole Building Performance and Endpoints

Whole-building performance programs in Washington are still largely based on efficiency and savings from an existing baseline. This practice does not fully account for the overall performance resulting from an interaction of activities relating to efficiency, time-of-use rates, emissions reductions, onsite power generation, batteries, and other demand flexibility strategies. Washington should allow and adopt new metrics for measuring performance and calculating cost-effectiveness that recognize grid impacts of performance as an outcome, not just as the difference between past performance and current performance. For example, this might be accomplished by establishing the value of an EUI to the grid and society as a performance outcome rather than as savings from a previous baseline.

Bigger Role for Time-of-Use (TOU) and other Rate-Centered Approaches to Incentivize Performance

Time-of-use (TOU) rates better recognize performance in terms of demand flexibility to reduce energy usage at certain times of the day. They are a de facto way to measure performance without relying on a baseline or traditional cost-effectiveness test. They could also be a basis for expanding the market for energy service agreements in Washington. The low cost of electricity in Washington decreases profitability and therefore the incentive for companies to provide energy retrofits and management as a service paid for via energy cost reductions. TOU rates can increase the profitability of retrofits and energy management for service providers that reduce and shift loads during peak times with higher rates.

Rates could also incorporate an EUI component to better align with building performance standard metrics and goals. For example, some rates could also be indexed to an EUI where rates would be lower for buildings with EUIs below a certain threshold. The key is to make performance a natural outcome of service providers turning a reasonable profit by seamlessly helping building owners comply with performance standards and benefit from utility performance program incentives. Without the market driving performance improvements, it will be hard to drive change at the pace and scale necessary to reduce emissions. All these elements working together as a high-performing ecosystem could help reduce retrofit barriers and risks and thereby facilitate a smoother market transition to a clean buildings sector.



Net-zero housing development in Issaquah, WA. Photo credit: Issaquah Z-Home

Virtual Power Plants (VPPs) to Create Aggregated, Reliable Grid Resources

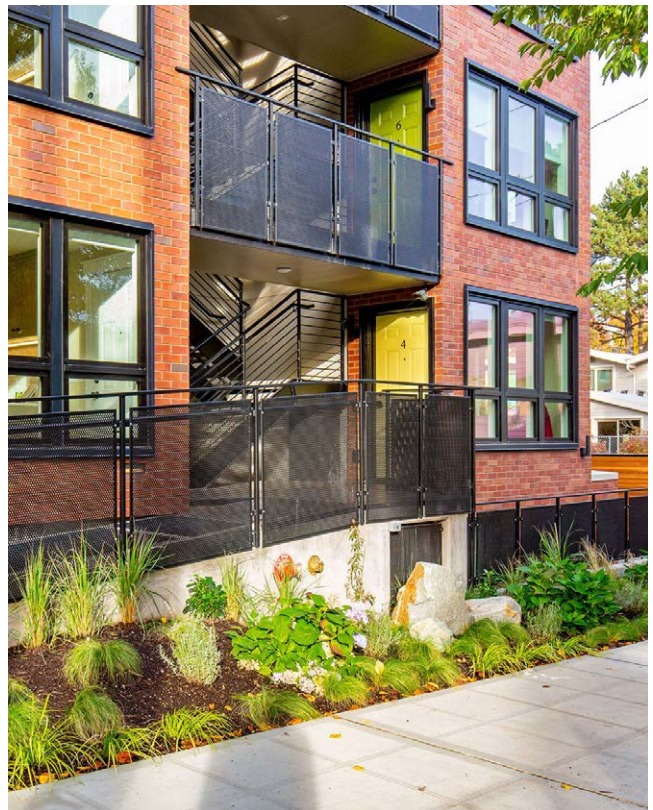
To ensure reliable electricity in the context of large-scale transportation and building electrification, utilities will need large-scale flexible loads. A Virtual Power Plant (VPP) is a system that combines small-scale energy sources, such as solar panels, electric vehicles, and smart water heaters that are connected by software, to generate power for the electricity grid.⁵⁷ To aggregate, coordinate, and procure performance across many buildings, and to measure that performance procured by utilities, VPPs are imperative for valuing buildings as critical infrastructure. The value of VPPs expands beyond the grid, with the potential to deliver savings and resilience benefits to communities across Washington in addition to load flexibility.

Neighborhood-Scale Clean Energy Transition Programs

Approaching electrification and demand flexibility programs at the neighborhood scale can accelerate the pace of the transition and help ensure a just and managed transition for low- to moderate-income customers by prioritizing systematic electrification of low- to moderate-income neighborhoods. Neighborhood-scale programs and other types of geographic targeting can also be combined with VPPs to ensure neighborhood-scale performance for large parts of utility service territories.



Electric vehicle charging at house with solar panels. Photo credit: coreyfrey



Jansen Court apartments in WA. Photo credit: CAST Architecture



Canyon Street affordable housing in the Methow Valley, WA. Photo credit: CAST Architecture

Interconnectivity and Interoperability

Currently, the building sector ecosystem does not have a common method for valuing or communicating the performance of buildings. To ensure the interoperability and high functioning of the PAR Ecosystem, the SCALE 2030 team proposes increasing the interconnectivity of policies, programs, and market communications by standardizing how buildings and building performance are tracked. CBPS compliance reporting should be standardized and used across the building sector ecosystem as a labeling system. The following recommendations thread together and augment elements of other PAR Ecosystem recommendations to address the issue of interconnectivity and interoperability:

- **Assign Universal Building Identifications (UBID)** to all buildings so they can be easily identified in county assessor data and for CBPS, energy code and permitting, utility customer tracking and billing data assembly, and real estate tracking and valuations. In addition, establish standardized data requirements and data quality standards for county

assessor data, particularly in relation to how buildings and parcels are identified and grouped, and how square footage is calculated to ensure more accurate EUIs for performance compliance and labeling purposes.

- **Standardize performance labeling** for publicly disclosed CBPS commercial compliance documentation. The label should account for near- and long-term upgrades required for future compliance. Home energy scores for Tier 3 buildings should also be publicly available. All performance labels and scores should be designed to be updated and used as part of energy code compliance and permitting, and for real estate valuations to consider CBPS compliance status, future requirements, and cost implications.
- **Implement transparent progress tracking** using annual performance labels to assemble a database. This database could be used, along with GHG inventory updates and sales share data to assess progress against 2050 targets and as the sample frame and energy use data for Washington building stock assessments and other research.

Rapid Market Transformation (MT)

Washington needs large-scale, front-loaded market transformation, market development, and an overall industrial policy approach to support the PAR Ecosystem and transition the building sector in 25 years. Rapid Market Transformation (MT) scales market supply by investing in and facilitating a permanent and sustainable transition to a clean buildings sector. The scale and pace of this transition will require infrastructure-level investments in the building sector as a critical resource for the grid, the economy, and society overall.

Unlike traditional market transformation that slowly shifts the market and assumes new technologies and practices will eventually become “locked into” codes and standards as the final step,⁵⁸ SCALE 2030 proposes Rapid MT, which requires aggressive, stepped codes and standards with clear endpoints established early in the transition. In this case, the codes and standards act as critical upfront market signals that drive efforts to adapt and prepare the market to comply at the lowest cost and with the least market friction.

Rapid MT specifically complements the PAR Ecosystem to ensure that all buildings can successfully transition within the PAR regulatory and programmatic ecosystem. The increase in demand for key technologies and supplies driven by the PAR policies and programs must be met at the lowest cost on the supply side. To accomplish this, Rapid MT focuses on ensuring that investments in the building sector transition lead to lower costs, permanent market shifts, and increasingly less dependence on incentives and programs.

Rapid MT requires taking an industrial policy approach to market readiness by identifying the type and volume of technologies required to transition the building sector by 2050 and implementing strategies to ensure Washington manufactures these technologies and/or has a solid plan for ensuring the state can import them from other states or countries at a reasonable price point. Rapid MT requires the state to increase collaboration with and funding for regional market transformation efforts in the Northwest, the West Coast, and beyond.

A Rapid MT approach to the transition can be leveraged to ensure a more inclusive transition, increased comfort and health benefits for all constituencies, and economic



Downtown Tacoma, WA. Photo credit: Jon Lanzieri

development across the state in various regions. Rapid MT also benefits grid reliability when designed to ensure that the transition is implemented at the right time in the right places to allow the grid to adapt to new electric loads.

This approach also presents an opportunity to leverage current national trends toward reindustrialization and domestic investment, and to more directly consider the potential negative impacts of national trade policy, such as tariffs.⁵⁹ New tariffs could dramatically increase prices for imported heat pumps, for example, which are essential to building sector decarbonization. New tariffs on natural gas from Canada could greatly increase energy costs for Washington consumers, especially for low- and moderate-income households. Workforce retraining efforts could help transition workers from building and maintaining gas pipelines to delivering and maintaining building performance.

Particularly with federal incentives for key technologies at risk, it is essential to reduce equipment and installation costs. Key technologies to focus on include heat pumps, rooftop solar, batteries, electrical panels, and digital control systems (for commercial buildings). These are known technologies that must be deployed at a faster rate and at much lower price points.

To implement a Rapid MT approach, SCALE 2030 recommends developing a cost-reduction blueprint, including a detailed technical roadmap to support key segments and solutions. The Rapid MT approach should focus on the following recommendations:

- **Align compliance support and investments** with aggressive PAR policies and programs. Invest in market transformation and industrial policy to rapidly prepare the market to meet PAR policy and program requirements.
- **Increase supply chain resilience** by reducing dependence on imported fossil fuels and products, shifting equipment and materials manufacturing and distribution to Washington, boosting local economies, and retraining key workforce segments to deliver building performance at scale.
- **Target and expand cost reductions** for zero-emissions, low-energy, and flexible load equipment and building design strategies to ensure upfront and life cycle costs match the cost of fossil fuel and other less efficient equipment. Current incentives and programs are only funded to cover a small percentage of the overall market, and they often do not make a significant impact on first costs. Targeted and comprehensive cost reductions must be deepened and applied to the whole market, not just incentive program participants. These cost reductions can result from increased productivity, reduced equipment and installation costs, better design strategies, and efforts to buy down costs and encourage more competition for large-scale implementation. Ultimately, the market must move from premium price points for many critical technologies, like heat pumps, to mass market price points, and this will require an intentional, targeted, and well-funded strategy.
- **Expand and increase incentives and subsidies**, in addition to fundamentally reducing first costs. The state should invest more heavily in incentives and subsidies especially for electrification and flexible demand infrastructure for low-/moderate-income homes and businesses. In many cases, retrofit costs go well beyond just equipment and installation costs, but can also require new wiring, electrical panels, batteries, and—in the case of commercial buildings—new vaults, transformers, ventilation systems, and digital controls that would not be required when just replacing existing equipment with like-for-like fossil fuel options. Mass-scale electrification that will significantly benefit society as a whole requires public investment in fixed, strategic investments to phase out fossil fuel equipment.
- **Support technical analysis, policy development, and compliance tools** to complete the analyses and strategy development required to craft key policies, such as the CBPS, zero-emission appliance standards, and the energy code. The state should also fund deep technical and cost analyses on pathways to deliver performance endpoints for all building types and then structure those solutions into the energy code, standards, and associated market development and compliance and enforcement support. The state should also develop simplified modeling tools to support performance-based code compliance for commercial and residential construction and retrofits that align with CBPS compliance and reporting formats.
- **Assess and promote new business models**, including in the real estate, finance, and service provider industries to support longer-term profitability and circular economic practices. These industries are essential to a successful clean energy transition in buildings, and new business models may also reduce the costs of the transition.
- **Ensure economic development and job growth** by focusing on increasing Washington production of key technologies and services. This aligns clean buildings with maximizing job and economic benefits to Washington communities. Powering Rapid MT will require a flexible, diverse workforce with sufficient economic security and stability required to sustain high retrofit rates through 2050. The clean energy transition has the potential for substantial job growth in the building sector, as outlined in CETI's *Net-Zero Northwest Workforce* analysis.⁶⁰ Ensuring that these are high-quality jobs is a key aspect of an equitable clean energy transition in line with CETA's requirement to prioritize family wage job creation.

Strategic Transition Funding

To fund the Rapid MT required to implement clean buildings policies, programs, and structural change, the state must scale funding well beyond current funding coming from sources such as utility customer surcharges, federal funding, the general fund, or the CCA. There are funding strategies in several other states that could be used as models.

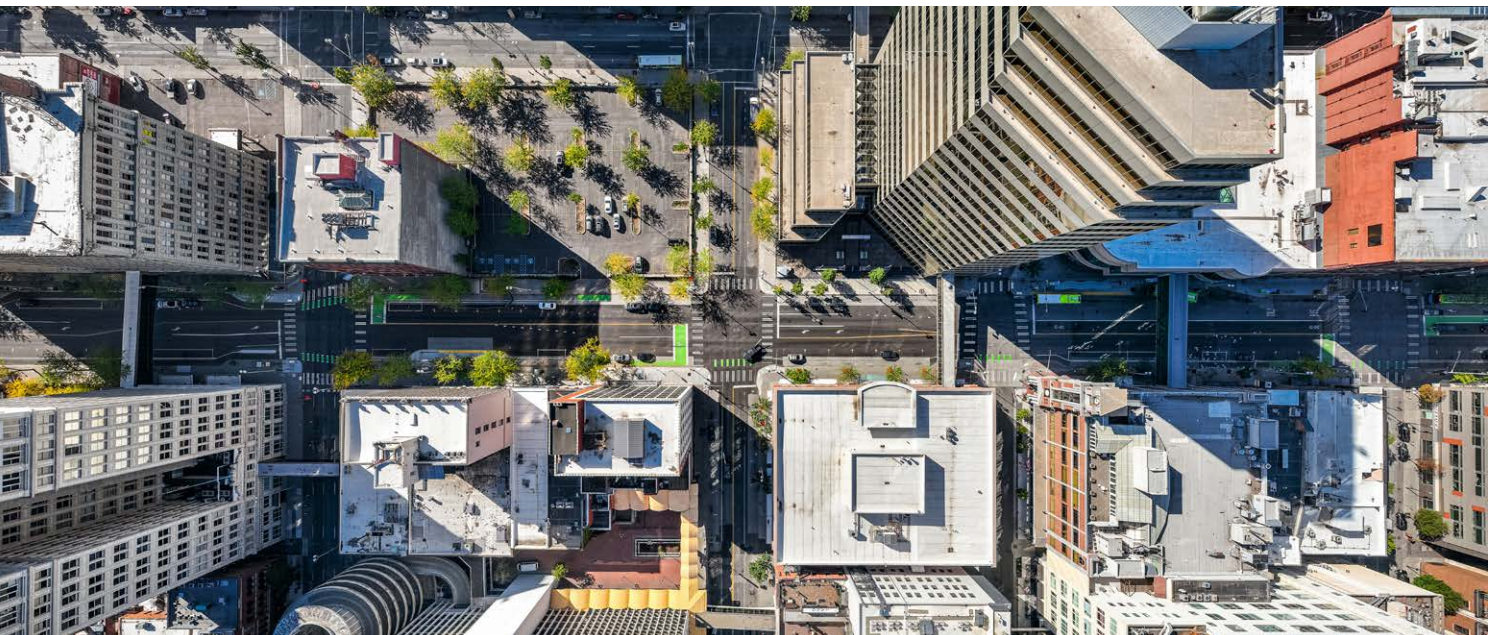
In California, the Public Goods Charge, collected as a monthly surcharge on electricity bills, pays for expansive energy programs, research and development, and low-income support for rate discounts and efficiency services.⁶¹ California also has an energy resources surcharge of \$.0003/kWh that funds the State Energy Commission.⁶² The California Public Utilities Commission (CPUC) established the Electric Program Investment Charge (EPIC) in 2011 to fund research to support California's clean energy goals.⁶³ EPIC has an annual budget of \$148 million,⁶⁴ which would be the equivalent of nearly \$30 million per year for statewide clean energy research and development based on Washington's population.

Climate Superfund laws (adopted by New York State⁶⁵ and Vermont,⁶⁶ and considered by several other states) offer a polluter-pay model that requires large emitters to pay to recover state climate mitigation and adaptation costs. Other funding options could include bonds or a less regressive tax code.

Within Washington, several funding innovations offer potential strategies as well, including the Washington State Green Bank⁶⁷ and expansion of tools such as Commercial Property Assessed Clean Energy and Resilience (C-PACER) that allow for financing by private lenders.⁶⁸

Recommendations for Washington include:

- **Explore and implement large funding increases** for the building sector transition as part of a strategic transition funding plan focused on scaling and increasing the pace of the clean buildings transition. The strategic transition funding plan should include a per capita comparative analysis of Washington's funding relative to other states for investments in things such as the state energy office, research and market transformation, and incentive programs.
- **Target public and private investment** in Rapid MT and key technologies.
- **Adopt funding strategies from other states**, such as those from California, New York, and Vermont mentioned above.



Downtown Spokane, WA. Photo credit: agnomark

Coordinated Planning

Washington needs a coordinated planning strategy that aligns state, regional, and utility energy and emissions planning efforts. While Washington's 2021 State Energy Strategy, the Northwest Power Plans, utility integrated resource plans, and related conservation or demand-side management potential assessments exist, these efforts are not coordinated in a way that recognizes the structural and systemic change that must happen in the building ecosystem and the planning required to implement it.

The details of a coordinated planning strategy will be developed in more detail as part of the SCALE 2030 Initiative 3: Clean Buildings Transition Roadmap. The overarching objective will be to better align the various building sector-related planning methodologies, plans, and studies that already exist with Washington's 2050 emissions limits. As part of this strategy, all planning, policy development, and utility planning and program requirements would be indexed to the 2050 emissions limits and specifically to the Washington 2021 State Energy Strategy's actions for the building sector transition. Key recommendations are described below:

- **Align regional and utility planning** with Washington's 2050 emissions limits and the Washington 2021 State Energy Strategy that already lays out a high-level strategy for achieving the emissions limits, including near-total electrification of the building sector, high levels of efficiency, onsite renewables, and demand flexibility to offset increased electric loads largely driven by transportation and industrial electrification.
- **Develop a detailed building sector plan** as recommended in the Washington 2021 State Energy Strategy, that clarifies in more detail the specific targets and timelines for electrification, efficiency, rooftop solar, demand flexibility, and VPPs statewide. The plan should lay out the specific policies and actions necessary to fully implement the Washington 2021 State Energy Strategy and transition all the building sector segments by 2050, including estimates of policy and action impacts demonstrating a complete plan for the transition.⁶⁹ The plan should be used to directly inform downstream policy development, utility planning and regulation, and regional power planning.
- **Develop a technical roadmap for Rapid MT** informed by detailed planning targets and policies. To be accurate and responsive to the Washington 2021 State Energy Strategy, Rapid MT must be directly indexed to the amount of electrification, efficiency, onsite renewables, and demand flexibility identified in the strategy and reflected in planning targets and policies.
- **Use detailed planning targets and policies** to align regional and utility planning. Ensure that state and local emissions limits, climate policy, and the PAR Ecosystem policies and programs are fully integrated into utility and Northwest energy planning goals and methodologies.



Electric lines on the Chief Sealth Trail in Seattle, WA. Photo credit: Jeff Bottman

Clean Energy Regions

This Clean Buildings Transition Framework requires that targets, policies, programs, key segments, and solutions from the PAR Ecosystem receive tailored implementation. This includes investment in the manufacturing of critical technologies, supply chain management, market and workforce development, and targeted policies and programs to support low-/moderate-income and rural communities.

Washington is composed of diverse climates, demographics, building sector markets, and utility service territories. As a result, different regions of the state require targeted engagement and support to ensure that all buildings and homes can meet performance goals and comply with various codes and standards, and that communities benefit economically from the transition and ongoing maintenance of high-performing, zero-emissions buildings. To scale implementation and ensure

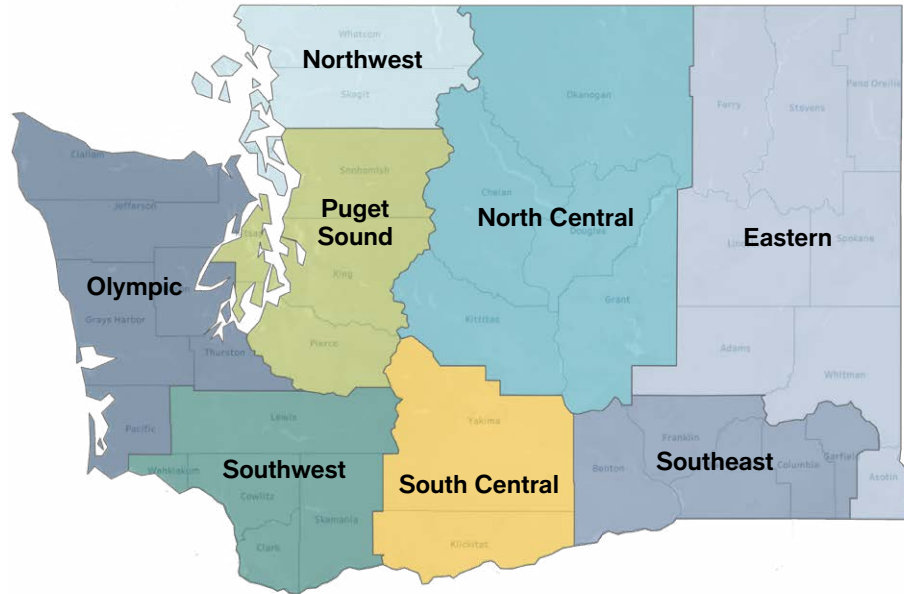
this strategy is successful and responsive to Washington’s diverse building ecosystem, SCALE 2030 recommends the state establish Clean Energy Regions.

Figure 4.4 on the next page shows eight proposed Clean Energy Regions that reflect the distribution of people, buildings, and utility service territories across the state. Clean buildings efforts and strategies should be tailored so that each Clean Energy Region can develop the capacity, interconnectivity, collaboration, and coordination required to implement an equitable clean energy transition across all economic sectors within the region. It would also provide state agencies with single regional touchpoints for the many intersecting efforts the state is working on. Determining how Clean Energy Regions would operate, and how to implement them, is a question to answer in SCALE 2030 Initiative 3: Clean Buildings Transition Roadmap.

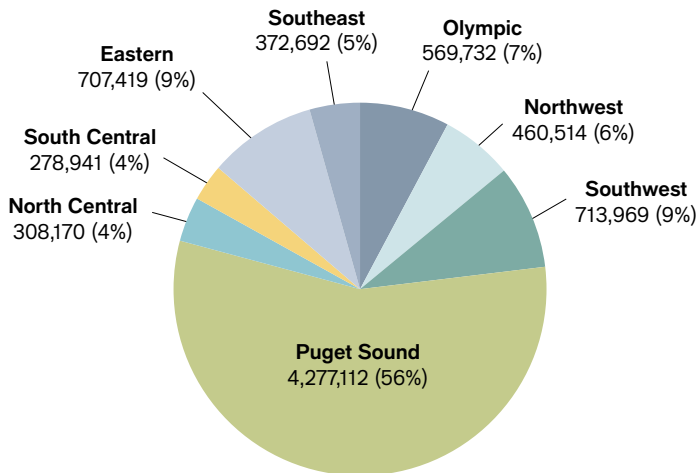


Windmills outside of Tri-Cities, WA. Photo credit: jdoms

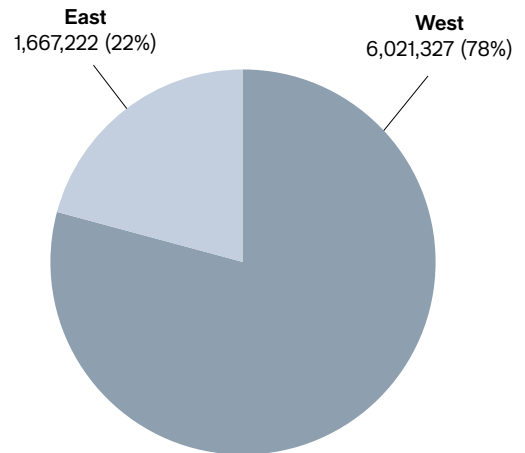
Figure 4.4. Proposed Clean Energy Regions, and population by region and by East/West



Population by Region



Population by East/West



Source: Population data from https://www.washington-demographics.com/counties_by_population WA Clean Energy Regions developed by SCALE 2030 team.

4. Clean Buildings Transition Framework

The Clean Energy Regions are organized by geography and divided into eastern/central and western Washington in Tables 4.1 and 4.2, respectively. The tables include the counties, air agency territories, economic development districts, commerce engagement team members, electric and gas utilities, and

technical colleges located in each Clean Energy Region. Wherever possible, the Clean Energy Regions encompass an air quality agency⁷⁰ and utility service territories to ensure both can play a central role in the transition of their respective regions.

Table 4.1. Detail of relevant entities in each Clean Energy Region in eastern and central Washington

	Eastern	North Central	South Central	Southeast
Counties	<ul style="list-style-type: none"> Lincoln County Asotin County Whitman County Pend Oreille County Stevens County Adams County Ferry County Spokane County 	<ul style="list-style-type: none"> Kittitas County Chelan County Douglas County Okanogan County Grant County 	<ul style="list-style-type: none"> Klickitat County Yakima County 	<ul style="list-style-type: none"> Benton County Garfield County Franklin County Walla Walla County Columbia County
Clean Air Agencies	<ul style="list-style-type: none"> Ecology-Eastern Regional Office Spokane Regional Clean Air Agency 	<ul style="list-style-type: none"> Ecology-Central Regional Office 	<ul style="list-style-type: none"> Ecology-Central Regional Office Yakima Regional Clean Air Agency 	<ul style="list-style-type: none"> Benton Clean Air Agency Ecology-Eastern Regional Office
Community Engagement Team Members	<ul style="list-style-type: none"> Annica Eagle Soo Ing-Moody 	<ul style="list-style-type: none"> Soo Ing-Moody 	<ul style="list-style-type: none"> Norma Chavez 	<ul style="list-style-type: none"> Norma Chavez Annica Eagle
Economic Development Districts	<ul style="list-style-type: none"> Tri County Economic Development District Southeast Washington Economic Development Association 	<ul style="list-style-type: none"> North Central Washington Economic Development District 	<ul style="list-style-type: none"> Mid Columbia Economic Development District 	<ul style="list-style-type: none"> Benton-Franklin Council of Governments Southeast Washington Economic Development Association
Electric Utilities	<ul style="list-style-type: none"> Avista Inland Power and Light Pend Oreille PUD Chewelah Electric Department Ferry County PUD Big Bend Electric Coop Asotin County PUD #1 Clearwater Power Modern Electric Water Company Cheney Light Department Vera Water and Power 	<ul style="list-style-type: none"> Puget Sound Energy Chelan County PUD Douglas County PUD Town of Coulee Dam Ellensburg Electric Division Kittitas County PUD Okanogan County PUD #1 Okanogan County Electric Coop Town of Coulee Dam Grant County PUD #2 Nespelem Valley Electric Coop 	<ul style="list-style-type: none"> Klickitat PUD #1 Benton Rural Electric Association Pacificorp 	<ul style="list-style-type: none"> Benton Rural Electric Association Inland Power and Light Big Bend Electric Coop Columbia Rural Electric Assn Benton County PUD #1 Clearwater Power Franklin County PUD #1 Pacificorp
Gas Utilities	<ul style="list-style-type: none"> Avista 	<ul style="list-style-type: none"> Puget Sound Energy Ellensburg Cascade Natural Gas 	<ul style="list-style-type: none"> Avista NW Natural Cascade Natural Gas 	<ul style="list-style-type: none"> Cascade Natural Gas Avista
Technical Colleges	<ul style="list-style-type: none"> Spokane Falls College Spokane Community College 	<ul style="list-style-type: none"> Big Bend Community College Wenatchee Valley College 	<ul style="list-style-type: none"> Yakima Valley College 	<ul style="list-style-type: none"> Columbia Basin College Walla Walla Community College

Table 4.2. Detail of relevant entities in each Clean Energy Region in western Washington

	Northwest	Olympic	Puget Sound	Southwest
Counties	<ul style="list-style-type: none"> ▪ San Juan County ▪ Island County ▪ Skagit County ▪ Whatcom County 	<ul style="list-style-type: none"> ▪ Mason County ▪ Clallam County ▪ Jefferson County ▪ Pacific County ▪ Grays Harbor County ▪ Thurston County 	<ul style="list-style-type: none"> ▪ King County ▪ Snohomish County ▪ Kitsap County ▪ Pierce County 	<ul style="list-style-type: none"> ▪ Cowlitz County ▪ Wahkiakum County ▪ Clark County ▪ Skamania County ▪ Lewis County
Clean Air Agencies	<ul style="list-style-type: none"> ▪ Ecology-Northwest Regional Office ▪ Northwest Clean Air Agency 	<ul style="list-style-type: none"> ▪ Olympic Region Clean Air Agency 	<ul style="list-style-type: none"> ▪ Puget Sound Clean Air Agency 	<ul style="list-style-type: none"> ▪ Southwest Clean Air Agency
Community Engagement Team Members	<ul style="list-style-type: none"> ▪ Joe Downes 	<ul style="list-style-type: none"> ▪ Karlena Brailey ▪ Leah Brandenburg ▪ Stephen Dunk 	<ul style="list-style-type: none"> ▪ Chris Lovings ▪ Joe Downes ▪ Karlena Brailey ▪ Stephen Dunk 	<ul style="list-style-type: none"> ▪ Leah Brandenburg ▪ Stephen Dunk
Economic Development Districts		<ul style="list-style-type: none"> ▪ North Olympic Development Council 	<ul style="list-style-type: none"> ▪ Central Puget Sound Economic Development District 	<ul style="list-style-type: none"> ▪ Cowlitz-Wahkiakum Council of Governments ▪ Greater Portland Economic Development District, Inc.
Electric Utilities	<ul style="list-style-type: none"> ▪ Orcas Power and Light Coop ▪ Puget Sound Energy ▪ Snohomish County PUD ▪ Whatcom County PUD #1 ▪ Blaine City Light ▪ City of Sumas 	<ul style="list-style-type: none"> ▪ Mason County PUD #1 ▪ Clallam County PUD #1 ▪ Jefferson County PUD ▪ Pacific County PUD#2 ▪ Grays Harbor PUD ▪ Puget Sound Energy ▪ Mason County PUD #3 ▪ McCleary Light and Power 	<ul style="list-style-type: none"> ▪ Puget Sound Energy ▪ SnoPUD ▪ Peninsula Light ▪ Ohop Mutual Light ▪ Seattle City Light ▪ Tanner Electric Coop ▪ Lakeview Light and Power ▪ Milton Electric Division ▪ Parkland Light & Water ▪ Elmhurst Mutual Power and Light ▪ Peninsula Light ▪ Eatonville Electric Department ▪ Town of Ruston ▪ Steilacoom Electric Utility ▪ Tacoma Power 	<ul style="list-style-type: none"> ▪ Cowlitz County PUD #1 ▪ Wahkiakum PUD ▪ Clark County PUD #1 ▪ Skamania County PUD #1 ▪ Lewis County PUD #1 ▪ Centralia City Light
Gas Utilities	<ul style="list-style-type: none"> ▪ Cascade Natural Gas 	<ul style="list-style-type: none"> ▪ Cascade Natural Gas ▪ Puget Sound Energy 	<ul style="list-style-type: none"> ▪ Puget Sound Energy ▪ Cascade Natural Gas 	<ul style="list-style-type: none"> ▪ Cascade Natural Gas ▪ Avista ▪ NW Natural ▪ Puget Sound Energy
Technical Colleges	<ul style="list-style-type: none"> ▪ Whatcom Community College ▪ Skagit College ▪ Bellingham Technical College 	<ul style="list-style-type: none"> ▪ Grays Harbor College ▪ Peninsula College 	<ul style="list-style-type: none"> ▪ Bellevue College ▪ Edmonds College ▪ Olympic College ▪ Bates Technical College ▪ Cascadia College ▪ Clover Park Technical College ▪ Highline College ▪ Everett Community College ▪ Lake Washington Institute of Technology ▪ Green River College ▪ North Seattle College ▪ Renton Technical College ▪ Seattle Central College ▪ Shoreline Community College ▪ Pierce College (Fort Steilacoom and Puyallup locations) ▪ Tacoma Community College 	<ul style="list-style-type: none"> ▪ Lower Columbia College ▪ Centralia College ▪ Clark College



4. Clean Buildings Transition Framework

These delineations are intended to provide strategic boundaries for developing high-performing Clean Energy Regions and implementing tailored, regional support to fully leverage state and federal policies and funding. In the future, the Clean Energy Regions could be used to develop targeted Rapid MT action such as:

- **Regional building performance hubs** to provide guidance, tools, and other resources to local building sector markets.
- **Regional energy networks** to consolidate program offerings and streamline implementation across the region.
- **Geographic targeting** for standardized programs, subsidies, and neighborhood-scale implementation.
- **Targets and tracking at the regional level**, including GHG emissions, sales share of key technologies (such as heat pumps), and utility program performance.
- **Focused market transformation and economic development**, including ensuring region-wide market capacity to support policy compliance and regional targets toward the 2050 transition at the lowest cost.
- **Economic security for a regional clean buildings workforce**, including planning and support for housing, health, training and education, and care services necessary to build and sustain a high-performing clean buildings workforce within each region.

The Clean Energy Regions also provide an opportunity to analyze demographics, building stock characteristics, energy and emissions, etc., on a region-by-region basis. This approach could be very helpful in understanding how to tailor and scale interventions.

For example, 55% of residential units⁷¹ and two-thirds of commercial floor area⁷² are concentrated in the four Puget Sound-area counties, combined here into the Puget Sound Region. As a result, the Puget Sound Clean Energy Region is critical for the overall Washington clean buildings transition in terms of energy and emissions reductions. However, it will likely be on a different timeline and require different collaborations and interventions than other regions.

Clean Energy Regions should work collaboratively to develop clean energy strategies and pilot programs and tailor them to meet their unique regional, local, and utility landscapes. These interventions should be aligned with PAR Ecosystem policies and programs and supported by Rapid MT and Strategic Transition Funding to achieve clean buildings at scale by 2050.



Seattle, WA sunrise. Photo credit: Michael Brunk

5

Conclusions and Next Steps

The current pace of change in the building sector does not align with Washington's 2050 emissions limits. To meet those goals, the state needs a framework that can transition the building sector in 25 years and quickly generate a broad range of co-benefits. The level of systemic change and investment necessary to execute the five strategies in the proposed framework will be challenging to implement, but the alternative would be to stay on a trajectory that cannot meet the state's 2050 emissions-reduction targets. The five strategies that make up the Clean Buildings Transition Framework are:

- Performance as a Resource Ecosystem
- Rapid Market Transformation
- Strategic Transition Funding
- Coordinated Planning
- Clean Energy Regions

If Washington prioritizes systemic change and the SCALE 2030 Clean Buildings Transition Framework, key elements of the framework would have to be in place by 2030 to position the state to implement the transition by 2050. Between 2025 and 2030 Washington should:

- Set building sector targets and create a clear regulatory pathway for all building sector segments to meet those targets.
- Establish standardized programs to support policy compliance.
- Invest heavily in Rapid Market Transformation to support the building sector to meet the requirements of policies and programs.
- Develop new funding sources to increase investment in Rapid Market Transformation, programs, and incentives.
- Align energy planning with the 2050 emissions trajectory.
- Create a system of Clean Energy Regions to ensure widespread implementation and benefits of a clean buildings transition.

The next step toward realizing this framework by 2030 is to develop a Clean Buildings Transition Roadmap that prioritizes and proposes detailed policies and actions drawing on the five Clean Buildings Transition Framework strategies, with the aim of informing bold clean buildings legislative action in 2026 and beyond. The SCALE 2030 team will engage building sector actors to develop recommendations and sector-specific logic models for how the targets, policies, programs, investment, funding, planning, and regional deployment laid out in the Clean Buildings Transition Framework can be coordinated and implemented to transform commercial and residential buildings across Washington.

Port Townsend, WA Historic District. Photo credit: LoweStock



Aerial view of bridges crossing the Columbia River in the Tri-Cities, WA. Photo credit: Chad

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