Implementation Model: Washington

Washington's Clean Energy Roadmap

Washington's commitment to clean technology innovation, development, and deployment attracts new businesses and creates jobs. To continue this momentum, the Washington Department of Commerce (COM) collaborated with Oregon's Department of Energy, Business Oregon, and two industry associations dedicated to advanced energy technology and business innovation to launch the Clean Energy Roadmap for Washington and Oregon (Roadmap). Clean energy is a subset of the state's robust clean technology sector, which includes 100+ companies, possessing 195 patents serving more than 12 industrial sectors. Ongoing implementation of the Roadmap will continue its initial economic and employment gains, while keeping Washington at the forefront of energy innovation.

Goal

Expand Washington's clean technology sector to grow the state's economy and improve its environmental performance.

Barrier

Lack of a comprehensive strategy and public-private cooperation needed for establishing and nurturing clean technology sector growth.

Solution

Washington State's COM developed a Roadmap that defined action items to help policy makers support existing and emerging companies that produce technologies to advance clean energy in the Pacific Northwest.

Outcome

Washington State adopted a 2017-2019 Clean Technology Sector Strategy that formalizes state plans for ongoing implementation of the Roadmap action items developed by COM and industry partners. State data collected after the completion of the Roadmap show that gross business income (GBI), a measure of economic activity, grew by 2.5% from 2015 to 2016 for the industrial sector—which encompasses clean technology, as well as aerospace, agriculture, military, life sciences, maritime, forest products, and information communications subsectors. Similarly, employment grew 9.5% from 2012 to 2015, exceeding the state's 2015 goal by one-third across all clean technology and other industrial subsectors. The roadmap effort contributed to these positive economic trends.

Policies

Washington's energy policy framework, as seen in the table below, is grounded in longstanding efforts in Pacific Northwestern states to develop affordable, clean, and local energy resources. The Pacific Northwest houses one of the world's most extensive networks of hydroelectric generating facilities and high voltage transmission lines that deliver low-cost, emissions-free electricity to Washington, Montana, Oregon, and Idaho. These four states have conducted regional planning through the Northwest Power and Planning Council to support electric energy efficiency and environmental sustainability since 1978. Such extensive energy infrastructure and planning have helped Washington and the region advance policies that position clean energy technologies as a driver of economic growth.

Employment grew **9.5%** in **3 Years**

from 2012 to 2015, **exceeding the state's 2015 goal by one-third** across all clean technology and other industrial subsectors. The roadmap effort contributed to these positive economic trends.

Timeline of Washington's Support for the Clean Energy Technology Sector

2009	Washington Legislature passes the Energy Independence Act, which sets a statewide renewable portfolio standard (RPS) that required that 15% of the state's electricity come from nonhydro renewable energy sources.
2012	Washington releases its State Energy Plan, which summarizes energy needs for the Washington Legislature and governor and includes a recommendation that the state further invest in clean energy technology partnerships and workforce training.
2013	Washington Legislature approves a $76 million Clean Energy Fund that supports development, demonstration, and deployment of grid modernization technologies that facilitate greater production of clean energy resources.
	Washington launches the Economic Development Sector Strategy, which defines state support for the clean technology industry including the use of third-party partnerships (companies, trade associations, accelerators, etc.) to help early-stage companies connect to experts and grow workforce initiatives to ensure companies can attract and retain needed talent.
	Washington receives U.S. Department of Energy State Energy Program competitive award to develop a Clean Energy Roadmap.
2014	Washington's governor issues Executive Order 14-04 creating a state-industry clean energy technology support program.
2016	Washington releases its Sector Strategy for 2017-2019. The strategy formalizes support for action items in the draft Roadmap.

Process

Program Design

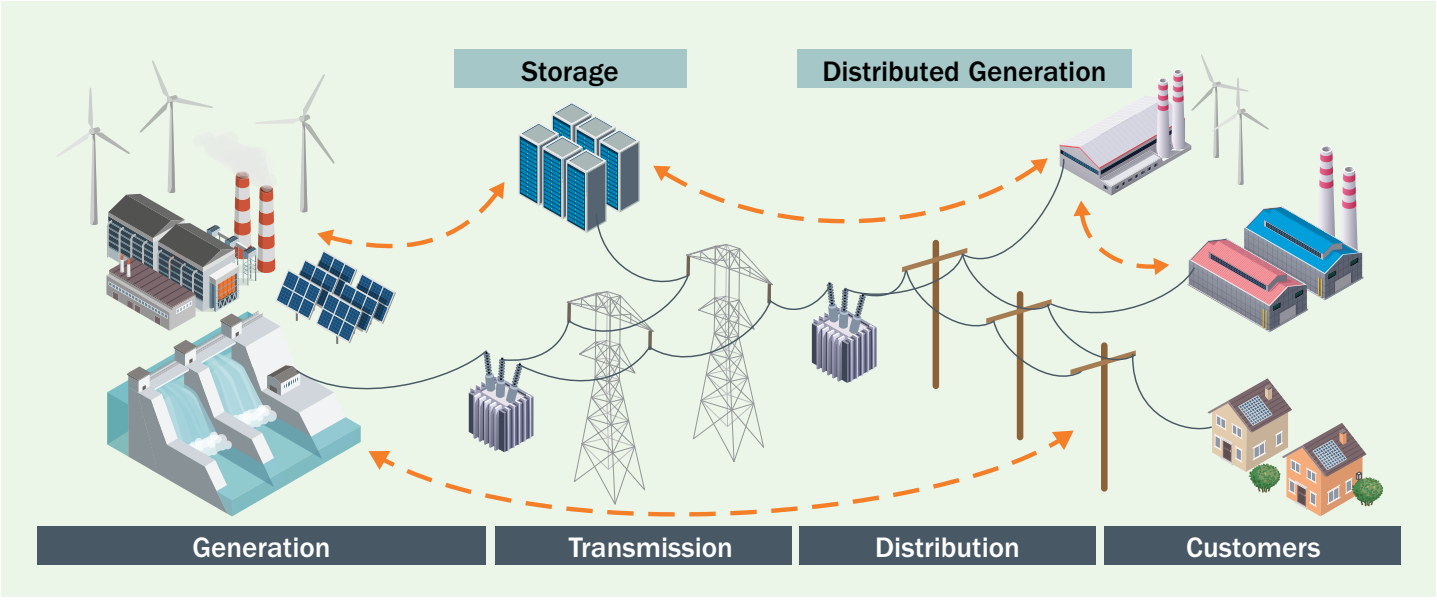
The *Roadmap* was designed to build upon Washington's policy framework and chart a path forward for clean technology market development. COM performed five distinct steps to complete the *Roadmap*.

1. Review Existing Energy Roadmaps
2. Survey Industry Leaders
3. Interview High-Profile Clean Technology Companies
4. Outline Existing Market Opportunities And Barriers
5. Define Action Items

1. Review Existing Energy Roadmaps

COM began the *Roadmap* development process by reviewing existing technology-focused roadmaps. The Bonneville Power Administration's 2015 Energy Technology Roadmap series was particularly useful. It outlined research and development priorities and illustrated links to market opportunities for near-commercially-available clean energy technologies in the Pacific Northwest, including Washington and Oregon.

Since 2014, when the fund was established, Washington has invested more than **$132 million in guided capital funds** directly into clean energy projects, companies, and research initiatives.



Washington industry—areas of focus

The Roadmap team's work to survey clean technology companies helped inform priorities for the CEF and has attracted more than

$320 million

in matching funds from businesses—a

$2.42 return for every $1

invested by the state.

2. Survey Industry Leaders

After outlining market opportunities, COM conducted a confidential online survey of approximately 70 industry leaders across the traditional and distributed energy system to collect baseline data on companies in the clean technology sector. The 24-question survey was used to assess the size and scope of clean technology firms, their understanding of the current policy and regulatory environment, and the extent of existing corporate connections across the sector. COM targeted companies involved in the production and deployment of:

- Batteries and energy storage devices
- Inverters
- Smart grid controls and meters
- Advanced transmission and distribution equipment
- Distribution and other system controls software.

3. Interview High-Profile Clean Technology Companies

COM also held informal discussions with a subset of companies that completed the online survey to gain a better understanding of clean technology companies' interactions with state and regional stakeholders. These phone interviews provided more qualitative than quantitative information but were instrumental in the *Roadmap* process.

The interviewees, who were drawn from an existing state industry database, helped COM understand the needs of the state's clean technology industry. COM found that companies were interested in state support in five distinct categories:

1. Clean energy policies
2. Supply chain networks
3. Workforce training
4. Access to capital
5. Public-private partnership opportunities.

4. Outline Existing Market Opportunities And Barriers

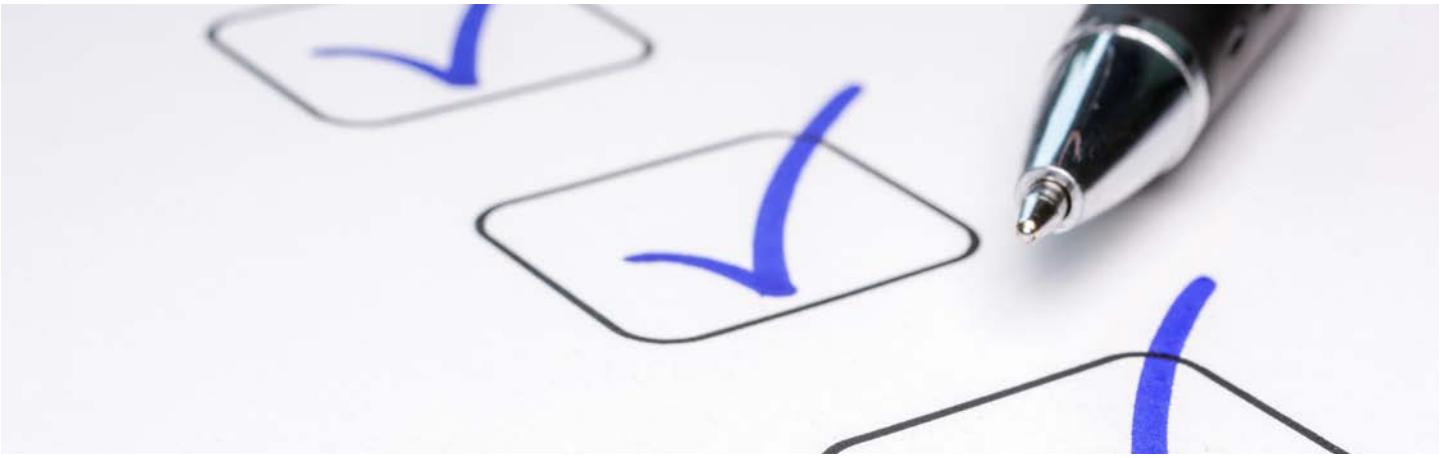
Using the data gleaned from the industry survey and discussions, COM conducted a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis for each of the five categories in which companies sought support. The SWOT analysis helped the state understand how Washington's energy market (i.e., supply mix, energy prices) and policies (i.e., Washington's RPS, tax incentives for renewable energy technology deployment) benefited or hindered clean technology businesses. The SWOT analysis also provided critical input into the state's 2017-2019 clean technology sector strategy.

5. Define Action Items

The SWOT analysis helped COM define seven priority actions to support companies within the clean technology sector:

Washington State – Analysis of Priority Actions Completed		
	Priority	**Action**
1	Extend the Washington State Clean Energy Fund (CEF) via legislation.	COM solicited industry feedback on the design and execution of the CEF (including areas of focus such as electrification) through a series of public meetings in support of an extension.
2	Provide clear information on carbon pricing and tax credits or incentives to support clean energy.	COM explored new policies and regulations based on feedback from industry.
3	Improve collaboration between industry and higher education.	COM has focused on identifying gaps and removing barriers to collaboration, particularly around the commercialization stage for products and services.
4	Facilitate activities that increase the deployment of distributed energy systems.	COM continues to explore energy policy options, such as carbon pricing, as well as ways to reduce the "soft costs" of clean technology, such as streamlined state permitting.
5	Assist start-ups in acquiring capital.	COM and partners continue to help identify companies and make connections to available capital resources.
6	Explore the development of transactive energy opportunities.	COM and partners have held state and regional meetings and networking events to help expand the discussion.
7	Expand domestic and foreign market access beyond Washington and Oregon.	COM continues to lead international trade missions that include clean energy technology company participation.

The SWOT analysis helped the project team identify key drivers of the clean technology sector, many of which aligned with investments in renewable energy integration or grid modernization technologies in Washington. While the *Roadmap* was in development, COM began to consider how to implement action items and determine which partnerships would be most beneficial.



Implementation

To most effectively implement the *Roadmap*, COM sought strategic partnerships with stakeholder organizations that had industry connections and policy savvy. The agency formally partnered with the CleanTech Alliance and Grid*Forward* (formerly Smart Grid Northwest), both of which brought different strengths to the project team and were essential to the team's success.

The CleanTech Alliance used its network of 300 member organizations to facilitate the generation and growth of early-stage clean technology companies and jobs through statewide deployment of education, research, products, and services. Grid*Forward*, a trade association that promotes advanced technology, policy, and business innovation through education, advocacy, and stakeholder engagement, provided training and mentorship to more established companies working in the clean technology sector in the Pacific Northwest.

Both entities collaborated with COM and effectively engaged their diverse members to help policy makers in Washington understand key technical issues and needs associated with clean energy sector growth.

Washington and GridForward Provided assistance to 136 early-stage companies which **raised over $3.1 million** in funding.

Outreach

Together, COM, CleanTech Alliance, and Grid*Forward* performed the following actions originally outlined in the *Roadmap* SWOT analysis (described on page 5):

- Summarized the state's energy tax credits and existing carbon pricing proposals within the *Roadmap* to help companies better understand the policy landscape and implications for economic development in Washington.
- Catalogued entrepreneurial resources available across Washington state that identify low and no-cost assistance from national labs, colleges, universities, and nonprofit organizations that can support clean technology start-ups across the Pacific Northwest.

During development of the *Roadmap*, CleanTech Alliance:

- Produced a series of short educational films on transactive energy, energy storage, and clean technology markets in the Pacific Northwest.
- Hosted three networking events for early-stage companies that provided a detailed inside look into a start-up's success from seasoned CEOs in Washington. More than 80 entrepreneurs and clean energy industry professionals attended each networking event, which connected 42 emerging clean technology start-ups to 35 seasoned CEOs, investors, and other experts.
- Established the first clean-technology-specific incubator in the Washington and Oregon region in partnership with Oregon Best. The joint development effort resulted in the creation of a series of tools to enhance the Cascadia CleanTech Accelerator, a business accelerator program with Oregon BEST, including:
  - The CleanTech Entrepreneurial Support Network to ensure Washington state entrepreneurs have access to angel and venture capital groups, economic development services, co-working spaces, funding competitions, and lending institutions.
  - A mentorship program that offered six hours of coaching to help clean technology start-ups with needed aspects of their emerging businesses, such as career training programs, connections, and funding opportunities.

Grid*Forward*, in its work on the *Roadmap*, successfully:

Held a Transactive Energy System Conference that convened industry groups and Pacific Northwest National Lab to discuss how the changing nature of generation, consumption, and flow of electric power might create economic opportunities for hardware and software firms in Washington. The conference was held in Portland, Oregon, and was attended by more than 200 energy experts from around the world.

Convened a NW Demand Response Symposium in Seattle, Washington. The event focused on opportunities for demand response (DR) in the Pacific Northwest's electrical system. More than 100 participants attended. The symposium outlined best practices and case studies to improve understanding of the policy side and the operational side of administering DR programs.

Participated in the Northwest Demand Response & Energy Storage Summit. The summit was attended by more than 200 participants, including state and regional industry and utilities from across the region.

The industry associations' outreach events provided key insight into the needs and solutions of clean energy stakeholders in the Pacific Northwest and were essential in defining and starting to implement several of the *Roadmap*'s seven priority action items, notably: improving collaboration between industry and higher education (#3), assisting start-ups in acquiring capital (#5), and exploring the development of transactive energy opportunities (#7).

Measuring Success

The *Roadmap* defined a set of key metrics the state can use to quantify activity in the clean technology sector. The state formally tracks sector targets on a public dashboard, Results WA, which is updated quarterly. The dashboard shows solid progress toward sector goals:

- Gross Business Income (GBI), a measure of economic activity, **grew by 2.5%** from 2015 to 2016.
- Employment in the clean technology sector **increased 9.5% from 2012 to 2015,** surpassing the state's 2015 goal of 6.5% growth.

Success is also measured qualitatively through the continued efforts of COM and its partners to support events, programs, and projects that strengthen the clean technology sector. Two areas that have been influenced and enhanced by the *Roadmap* include:

- **New business networks,** which is measured in the number of events held and participation levels.
- **Direct investment**, which is measured by the amount of CEF matching funds utilized for clean energy projects.

Outcomes

The state continues to track its progress advancing the success of clean technology companies. The focus on sector-based economic development, in which the clean technology sector plays a major role, has been extremely successful.

In addition to GBI, employment increased in key industrial sectors, including clean technology. After exceeding its employment growth goal of 6.5% by achieving 9.5% employment growth through 2015, the state increased the target for its key industrial sectors' employment growth to 9.9% by 2020.

Washington recognized the importance of addressing training and mentorship needs for early-stage companies seeking to engage in the growing grid modernization cluster in Washington by partnering with Grid*Forward*. The association provided assistance to 136 early-stage companies, which have raised more than $3.1 million in funding.

Washington also increased CEF matching funds. Since 2014, when the fund was established, Washington has invested more than $132 million in guided capital funds directly into clean energy projects, companies, and research initiatives. The *Roadmap* team's work to survey clean technology companies helped inform priorities for the CEF and has attracted more than $320 million in matching funds from businesses—a $2.42 return for every $1 invested by the state.

The *Roadmap* has provided Washington with essential input for a 2017-2019 Clean Technology Sector Strategy that will continue to serve as a useful primer to support the sector's role in advancing economic growth in the state. The *Roadmap* will be posted on COM's sector web page, as it closely aligns with the Clean Technology Sector goals.

The partnerships developed through the process and the continued implementation of the *Roadmap*'s action steps will help sustain the positive economic impact made possible by the clean technology sector.

Tools and Resources

2012 Washington State Energy Strategy: http://www.commerce.wa.gov/wp-content/uploads/2016/06/energy-state-strategy-2012.pdf

Results WA: http://www.results.wa.gov/

CleanTech Alliance: http://www.cleantechalliance.org/

Cascadia CleanTech Accelerator: https://cascadiacleantech.org/

GridForward (formerly Smart Grid Northwest): https://gridforward.org/

Washington Department of Commerce key industrial sector focus: https://www.commerce.wa.gov/growing-the-economy/key-sectors/

Washington Clean Technology Sector: http://www.commerce.wa.gov/growing-the-economy/key-sectors/clean-technology/

Washington Clean Energy Fund: http://www.commerce.wa.gov/growing-the-economy/energy/clean-energy-fund/

Appendix: SWOT Analysis

Strengths	Weaknesses
• Grant funding through Clean Energy Fund • No income tax • Tax incentives for renewable energy and clean fuels • State and industry partnership leading the creation of standards for the energy storage industry • High caliber of software engineering grads • High quality of life • Strong relationship with utilities	• Low electricity rates reduce the market for their product in the state • Inability to pay top dollar for new hires • Difficulty hiring international workers • Difficulty finding experienced engineers • Difficulty finding qualified electricians • Difficulty for start-ups to gain capital resources
Opportunities	**Threats**
• Carbon pricing • Smart cities initiatives • Energy imbalance market • Better definitions of renewables • Transactive energy could improve the market • Sustained state investment during an industry's formative years can enable it to be self-sustaining in the future • Existing infrastructure is aging, thus providing a business opportunity for replacement • Trade alliances and regional branding of Pacific Northwest clean energy sector	• Overregulation of crowdfunding for small businesses and start-ups • Increased Asian share of worldwide inverter market • Silicon Valley companies may lure workers away • Work overlaps with research at universities, but schools rarely reach out to businesses • Lower-quality competitors benefitting from other states' policies • Banks and Small Business Administration not lending to start-ups

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