

PROPOSED STRATEGIC PLAN FOR WASHINGTON STATE CLEAN TECHNOLOGY SECTOR 2017 – 2019



Department of Commerce



Department of Commerce

OFFICE OF ECONOMIC DEVELOPMENT
& COMPETITIVENESS

ABOUT THE SECTOR LEAD



Brian Young

Clean Technology Sector Lead
Office of Economic Development
and Competitiveness

brian.young@commerce.wa.gov
206.256.6129

Brian Young brings diverse strategic and operational experience to his role as Governor Inslee's Clean Technology Sector Lead. He is the point of contact for clean technology companies who want to navigate Washington State's political and economic landscape. He is focused on developing a prosperous and varied clean technology sector based on the state's existing strengths.

Prior to joining the Department of Commerce, Brian worked in a variety of clean technology industries. After serving as an officer in the United States Navy, he joined an early stage biofuel start-up that grew into Imperium Renewables, the largest independent US biodiesel producer. After Imperium, Brian created Element Strategic Partners, a clean technology consultancy that

led the development of the Washington Clean Energy Leadership Council and worked internationally on sustainability and carbon issues. In 2011, he became a business development manager for a Tri-Cities engineering firm working on nuclear remediation efforts at Hanford and elsewhere within the Department of Energy complex. Brian graduated from Georgetown University's School of Foreign Service with a degree in Science, Technology, and International Affairs. In the winter, you can find him on the slopes at Alpental, where he is a member of the Volunteer Ski Patrol.

CLEAN TECHNOLOGY INDUSTRY SNAPSHOT

Governor Inslee's top priority is to create an economic climate where innovation and entrepreneurship to thrive and create good-paying jobs in every corner of our state. To support this priority, the Washington Clean Technology sector is working with a variety of industries to provide technologies and related production processes that will improve their environmental and business performance.

CLEAN TECH INDUSTRY DEFINED

Clean Tech spans many industrial sectors and represents a wide range of manufacturing processes, services and products. All of these comprise what is known as the Clean Tech Sector. Consumer products produced in the Clean Tech Sector provide greater value to the consumer, at a lower environmental cost. Each industrial sector will likely express its own set of environmental performance objectives. If these objectives are significantly greater than previous processes or the product or service represents a significant improvement over previous production methods, then these products would likely qualify for reference in the Clean Tech Sector. For example, Clean Tech in the electric utility industry can include a technology that allows utilities to purchase or re-sell more electrical power from renewable sources. This would include grid scale batteries and system controllers, as well as the software that allows the integrated units to capture and deliver electrical energy generated from renewable sources as well. This means that the solar or wind units would be considered in the Clean Tech industry but also the batteries, controllers and associated software.

IMPACTS OF THE CLEAN TECH CONTRIBUTIONS TO INDUSTRY

The Clean Tech Industry in the state of Washington employs nearly 57,000 workers and is backed by more than a billion dollars in venture capital. These companies are supported by world-class research institutions, including the Pacific Northwest National Laboratory, University of Washington, and Washington State University.

These companies are poised to make a significant contribution to the worldwide demand for cleaner industrial processes. Important trade and industry organizations include the Washington Clean Technology Alliance, Washington Technology Industry Association and Northwest Energy Efficiency Council.

PUBLIC SUPPORT FOR THE CLEAN TECH INDUSTRY

Washington State has a big stake in the future of renewable and clean energy. The state's legislature mandated that 15% of Washington's electricity come from new energy sources, including wind, tidal, biomass, biofuel and solar. This has led to significant private sector investment in next-generation technologies in the Clean Tech Sector.

CLEAN TECH BY THE NUMBERS

900+ Companies,
Possessing 195 Patents,
Serving more than 12
Different industrial sectors

To attract investment, the state offers businesses a range of incentives, including:

- business and occupation tax reductions for manufacturers of solar energy systems
- components or semiconductor materials
- sales and tax exemptions for semiconductor gases and chemical purchases
- sales and tax credits for equipment that generates electricity using renewable energy
- business and occupation tax credit and sales tax exemption for forest-derived biomass harvesters
- The Clean Energy Fund, a \$40 million fund to support development, demonstration, and deployment of clean energy technologies that save energy and reduce energy costs, reduce harmful air emissions, or otherwise increase energy independence for the state.

New ideas are encouraged at all levels, from the use of real-time mathematical and computer computational science to improve power grid management and control and the use of algae to create energy efficient fuel sources to tidal power generators and more efficient solar production capabilities.

INDUSTRY SECTOR BASED ECONOMIC DEVELOPMENT STRATEGIES

Governor Inslee's top priority is to create an economic climate where innovation and entrepreneurship can continue to thrive and create good-paying jobs in every corner of our state. Our sector-based economic development strategy is a reflection of the fact that we face intense international and interstate competition for good jobs. We have to be constantly vigilant about identifying opportunities and strategies for supporting existing employers

and cultivating new ones in Washington - we can't rely on luck for the next Boeing, Microsoft or Amazon to land here.

As such, Washington's industry sector economic development program's primary mission is to grow and strengthen communities through statewide industry sector strategies. While every industry has unique needs and ways of accomplishing their vision for growth,

the Industry Sector Development Program focuses our efforts across three common efforts:

- Fostering Collaborative Public/Private Partnerships
- Growing and Diversifying Washington's Industry Sectors with a Strong Business Climate
- Encouraging a 21st Century Workforce Ready to Meet Industry Needs

A BALANCED REGIONAL ECONOMIC DEVELOPMENT STRATEGY WILL HAVE ACTIVITIES AND INVESTMENTS IN EACH OF THE FOCUS AREAS.



BRAINPOWER

To compete globally, a region needs 21st-century brainpower—people with the skills to support globally competitive businesses. Economic development starts with sound education and imaginative, entrepreneurial educators.



INNOVATION AND ENTREPRENEURSHIP NETWORKS

A region needs business development networks to convert this brainpower into wealth through innovation and entrepreneurship. These networks include cluster organizations, angel capital networks, mentoring networks, and so on.



QUALITY, CONNECTED PLACES

Third, a region needs a strategy to develop quality, connected places. Skilled people and innovative companies are mobile; they can move virtually anywhere. They will choose to locate in places that have a high quality of life and that are connected to the rest of the world.



BRANDING EXPERIENCES

Next, a region needs to tell its story effectively through defining its most distinctive attributes and communicating them. These stories are important, especially for regions facing a "brain drain." Young people want to live in regions with a future, and they can see this future most clearly through the stories they hear about a region.



CIVIC COLLABORATION

Finally, a region needs leaders skilled in the art and discipline of collaboration. The economy demands the ability to collaborate to compete. Economic and workforce development investments involve multiple partners. A region that understands how to collaborate will be more competitive.

ABOUT THE INDUSTRY



From energy to advanced materials to clean water and recycling, Washington's clean technology industry represents a wide range of manufacturing, services and products. With low energy costs and abundant clean energy resources, Washington is leading the nation's transition to a clean energy economy. The clean technology sector helps grow our economy, protect our environment and ensure the health and well-being of all Washingtonians.

MISSION STATEMENT

To create a foundation of opportunity for Washington's clean technology sector by helping corporations, research institutes, and entrepreneurs to develop solutions to worldwide environmental challenges, enter global markets and expand jobs that support thriving communities across the state.

As clean technology business continues to grow around the state, the clean technology sector employs over 58,000 workers and contributes over \$17 billion to Washington state's economy. Governor Inslee's top priority is to create an economic climate where innovation and entrepreneurship can continue to thrive and create good-paying jobs in every corner of our state. To support this priority, the Washington State is working with a variety of partners to innovate technologies and related production processes that will improve environmental and business performance by investing in clean technology R&D, pushing energy innovation and supporting clean technology businesses.

Washington boasts over 2000 companies active in some aspect of the clean technology, and they possess over 195 clean technology patents while serving more than 12 different industrial sectors. These companies are supported by world-class research institutions and a strong workforce development ecosystem.

Washington is the nation's low-cost electricity leader, with average rates as low as 4.25¢ per kilowatt hour. Nearly 75% of the state's power comes from an extensive, carbon-free hydroelectric system, drawing renewable energy from the state's abundant water supply. In 2006, Washingtonians approved a Renewable Portfolio Standard, I-937, which mandated that 15% of Washington's electricity come from renewable energy sources other than hydro, including wind, tidal, biomass and solar. Due to I-937 the state boasts over 3000MW of installed wind capacity and the utility with the largest wind portfolio in the nation.

The Pacific Northwest's electricity system is among the 20 largest electricity system in the world. The backbone of the system is an extensive network of hydroelectric generating facilities and high voltage transmission lines. In the 1970s the region began to realize that electricity demand growth would soon outstrip existing supplies and that the operation of the hydroelectric system had major detrimental impacts of the survival of the region's iconic salmonid populations. In response to those challenges Congress passed the NW Power Act (PL 96-501) which established an interstate compact

CLEAN TECHNOLOGY

WASHINGTON STATE DEPARTMENT OF COMMERCE



to plan for the region's electricity future simultaneously with recovery of the region's wild fisheries. Established in 1980, the Northwest Power and Conservation Council has helped make the region and national and international leader in electrical energy efficiency and salmon recovery.

Since 1980 the Northwest (WA, OR, ID, and western MT) have saved more than 49 million megawatt hours of electricity saving electricity ratepayers \$3.5 billion/year and lower carbon dioxide emissions by 20.8 million tons in 2012. Washington State accounts for half of those savings.

Our hydroelectric infrastructure that has succeeded in restoring salmon populations while maintaining some of the lowest electricity costs in North America. Because of achievements in energy efficiency the state has numerous examples of highly efficiency buildings not the least of which being the Bullitt Center, home of the Bullitt Foundation and the greenest commercial building in the world. And the region is not "resting on its laurels." Through programs such as Washington's Clean Energy Fund, Pacific Northwest National Lab's Energy and Environment division, the Pacific Northwest Smart Grid Demonstration, and the Bonneville Power Administration's technology innovation program the state and region are recognized as leaders in emerging smart grid technology, software, and utility operations.

Washington State's main areas of focus – clean transportation, alternative and renewable energy, pollution reduction, power storage and grid management – are supported by a world-class network

of research labs at the University of Washington, Washington State University and Pacific Northwest National Laboratory – one of only 10 such federal laboratories in the United States. New ideas are being explored at all levels: the development of highly-efficient integrated storage battery systems that can store wind and solar energy; the use of computational science to improve power grid management; and the utilization of low-value plant biomass to produce biofuels and other bioproducts in an environmentally and economically viable manner. Through this research pipeline, Washington continues to see a healthy entrepreneurial climate for clean technology.

A key to the success of Washington's Clean Technology Sector is the ability for our innovative companies to not only address the state's specific clean technology needs but, more importantly, to use their technologies and know-how to help address some of the world's most pressing environmental problems. To this end, it is crucial that we leverage the state's prowess in trade and exporting to ensure our companies can access the global marketplace. These companies are poised to make a significant contribution to the worldwide demand for cleaner industrial processes. Important trade and industry organizations include the Clean Technology Alliance Washington, Northwest Energy Efficiency Council, Northwest Environmental Business Council, SmartGrid Northwest, Washington Technology Industry Association, Center for Advanced Manufacturing Puget Sound, International Future Living Institute, and others.

SECTOR INDUSTRY ANALYSIS

Washington's Clean Technology sector spans many industrial segments and represents a wide range of manufacturing processes, services and products. All of these comprise what is known as the clean technology sector. Consumer products produced in the clean technology sector provide greater value to the consumer; at a lower environmental cost. Each industrial sector will likely express its own set of environmental performance objectives. If these objectives are significantly greater than previous processes or the product or service represents a significant improvement over previous production methods; then these products would likely qualify for reference in the clean technology sector. For example, clean technology in the electric utility industry can include a technology that allows utilities to purchase or re-sell more electrical power from renewable sources. This would include grid scale batteries and system controllers; as well as the software that allows the integrated units to capture and deliver electrical energy generated from renewable sources as well. This

means that not only would the solar or wind units be considered clean technology but also the batteries, controllers and associated software.

The clean technology sector boasts a varied workforce representing multiple sectors of the economy from transportation workers, to nearly all disciplines of engineers, to construction workers and research scientists. Total wages were almost \$4 billion, or about \$69,000 per employee. The sector is supported by workforce development organizations such as WA Employment Securities Division, the regional Workforce Development Councils (WDCs), and the Community Technical Colleges Centers of Excellence program.

The clean technology sector's growth is highly dependent on a dynamic policy environment as policy makers at all levels struggle to adapt to rapid changes in the fossil and clean energy sectors. One of the main impediments to growth both in Washington and the nation as a whole has been the lack of coherent long-term energy policies.

One impediment to growth specific to Washington State is our extremely low electricity rates.

Although the low rates, and the nearly carbon free electricity we enjoy, are a boon to residents it can make it that much more difficult for renewable energy projects to make financial sense. That being said, companies that can find opportunities related to the electricity and the grid in Washington will most likely find success in many other regions of the country and the globe. Investment in key infrastructure to support the transformation of the grid remains critical and continues to lag the rapid build-out of renewable technologies in some regions of the country.

By law, the State of Washington has three energy strategy goals (RCW 43.21F.010):

1. Maintain competitive energy prices that are fair and reasonable for consumers and businesses and support our state's continued economic success
2. Increase competitiveness by fostering a clean energy economy and jobs through business and workforce development
3. Meet obligations to reduce greenhouse gas emissions

	INDUSTRY SEGMENT	SUB-CATEGORIES	
CLEAN ENERGY	Energy Generation	Renewables	
	Energy Storage	Electrochemical	Mechanical
	Energy Infrastructure	Transmission	Smart Grid
	Energy Efficiency	Buildings	Services
	Transportation	Vehicles	Fuels
ENVIRONMENTAL	Water and Wastewater	Water/Wastewater Treatment	Water Conservation/Reuse
	Air and Environment	Emissions Control/Monitor	Cleanup/Safety
	Waste Reduction	Prevention/Reduction	Monitoring/Control
	Agriculture	Natural Pesticides	Land Management
			Trading/Offsets
			Recycling
			Waste Reuse

MISSION STATEMENT

Our mission is to assist the state of Washington become the world leader in the commercialization and deployment of Clean Technology solutions to industries. To this purpose, we will combine world-class research and commercialization expertise with industry specific domain knowledge to develop high-value products that use less energy and create greater consumer value while using valuable natural resources in a variety of sustainable business models.

INDUSTRY DRIVERS

- Energy efficiency
- Regional competitiveness
- Controlling climate pollution
- Job and income creation
- Integration of intermittent energy sources
- Generation of renewable energy

STRENGTHS

- Low price, low carbon intensity electricity
- No income tax
- State and Federal Grant funding through WA Department of Commerce Clean Energy Fund and multiple DOE programs.
- Tax Incentives
- World class academic and federal research institutions
- Strong political and government support of clean technology programs and initiatives
- Efforts to lead on energy storage systems, controls, and standardization
- Strong industry alliances and partnerships
- High caliber of software, mechanical, electrical, chemical and power engineering grads
- High quality of life
- Strong relationship with utilities
- Strong angel investor community
- Partnerships with large battery producers

WEAKNESS

- Inexpensive power can make market penetration for new technologies difficult
- Inability to pay top dollar for new hires
- Difficulty hiring international workers
- Difficulty finding experienced engineers
- Difficulty finding qualified trades workers
- Difficulty for startups to gain capital resources
- Highly decentralized and localized system of government in WA makes consensus building difficult
- 64 individual utilities consisting of a mix of IOUs, PUDs, Muni's, and Rural Co-ops

THREATS

- Overregulation of crowdfunding for small businesses and startups
- WA investors and capital focused primarily on other high technology sectors
- Increased competition from Pacific Rim
- Silicon Valley companies have potential to lure workers away
- Work overlaps with research at universities, but industry/academia link needs strengthening
- Lower quality competitors benefitting from other states' policies
- Banks and Small Business Administration not lending to startups

OPPORTUNITIES

- Carbon pricing
- Smart cities initiatives
- Abundance of biomass through forestry and agriculture
- Energy imbalance market
- Transactive energy systems development and adoption
- Sustained state investment during clean technology sector's formative years can enable it to be self-sustaining in the future
- Existing infrastructure is aging and will soon need replacement
- Trade alliances and regional branding of PNW clean technology sector
- Reduction of carbon in power and transportation sector
- Capitalize on strong collaboration between research and academic institutions in WA

WASHINGTON'S CLEAN ENERGY COMPETITIVE ADVANTAGES

The Clean Technology Sector is bigger than just clean energy; however, there is no doubt Washington holds a special place in the clean energy conversation in the United States. Our hydro system gives us the world's strongest clean energy foundation and from this foundation Washington has developed competitive advantages across a wide range of energy sources and systems.

ENERGY GENERATION

INNOVATION

R&D cluster: Univ. of Washington, Washington State, PNNL, Battelle, Analytical Resources (biofuels)

WORKFORCE

Forest/Agriculture Cluster

FINANCE

High VC/Angel activity, high relative Federal funding, Indian nations can obtain low interest financing

LOGISTICS INFRASTRUCTURE

Excess refinery capacity for biofuels, ports, pipelines

RESOURCES

Hydro, geothermal, strong tides, wind, solar (East), biofeed-stocks, cooling water, Inexpensive electricity

GOVERNANCE (Regulations)

Indian Reservations can ease permitting

QUALITY OF LIFE

Natural beauty, climate, housing costs

ENERGY STORAGE

INNOVATION

R&D cluster: Univ. of Washington, Washington State, PNNL, Battelle, Analytical Resources (biofuels)

WORKFORCE

FINANCE

High VC/Angel activity, high relative Federal funding, Indian nations can obtain low interest financing

LOGISTICS INFRASTRUCTURE

Transmission Grid

RESOURCES

Hydro, geothermal, strong tides, wind, solar (East), biofeed-stocks, cooling water

GOVERNANCE (Regulations)

Indian Reservations can ease permitting

QUALITY OF LIFE

Natural beauty, climate, housing costs

ENERGY INFRASTRUCTURE

INNOVATION

R&D cluster: Univ. of Washington, Washington State, PNNL, Battelle, Analytical Resources (biofuels)

WORKFORCE

IT Cluster

FINANCE

High VC/Angel activity, high relative Federal funding, Indian nations can obtain low interest financing

LOGISTICS INFRASTRUCTURE

Transmission Grid

RESOURCES

Hydro, geothermal, strong tides, wind, solar (East), biofeed-stocks, cooling water

GOVERNANCE (Regulations)

Indian Reservations can ease permitting

QUALITY OF LIFE

Natural beauty, climate, housing costs

CLEAN TECHNOLOGY

WASHINGTON STATE DEPARTMENT OF COMMERCE

ENERGY EFFICIENCY

INNOVATION

McKinstry Innovation Center

WORKFORCE

Large utility workforce

FINANCE

High VC/Angel activity, high relative Federal funding, Indian nations can obtain low interest financing

LOGISTICS INFRASTRUCTURE

RESOURCES

Inexpensive electricity hindrance

GOVERNANCE (Regulations)

Relatively stringent codes spur market

QUALITY OF LIFE

Natural beauty, climate, housing costs

TRANSPORTATION

INNOVATION

R&D cluster: Univ. of Washington, Washington State, PNNL, Battelle, Analytical Resources (biofuels)

WORKFORCE

Aerospace Cluster

FINANCE

High VC/Angel activity, high relative Federal funding, Indian nations can obtain low interest financing

LOGISTICS INFRASTRUCTURE

RESOURCES

GOVERNANCE (Regulations)

QUALITY OF LIFE

Natural beauty, climate, housing costs

CLEAN TECHNOLOGY

WASHINGTON STATE DEPARTMENT OF COMMERCE

MARKETING PLAN



PRIORITIES

1. Increase awareness of programs that are available to clean technology companies in the state of Washington, with special focus on the Clean Energy Fund.
2. Increase awareness of the clean technology sector and its contribution to the economy, health, and clean environment of Washington State.
3. Increase awareness of the clean technology sector in audiences outside of the state that work in the industry.
4. Listen to feedback from the clean technology sectors on what is needed to help create a more robust ecosystem for companies in the state.

PERFORMANCE GOALS

- Coordination - Establish CleanTech Alliance as the resource, and conduit for information about, and coordinated support of the clean technology sector.
- Awareness - Create awareness among the public, key stakeholders and constituencies of the importance of the clean technology sector.
- Advocacy - Communicate messages of the policy/investment priorities of the clean technology sector.

KEY AUDIENCES

- General Public
- Elected officials: local, state and federal
- Business leader and entrepreneurs, both in-state, national and international

OBJECTIVES

- Washington's \$76M Clean Energy Fund and the its potential to transform the clean technology sector and increase employment.
- Clean technology sector is a \$17 billion economic driver contributing over 58,900 direct living wage jobs across the state in its many sub-sectors.
- Clean technology is the key sector to address one of the most pressing issues of our time, global climate change, through market based solutions and innovations.
- The clean technology sector is bigger and more influential than anyone in Washington or the rest of the country realizes, and we will work to change that misunderstanding.
- Broad regulatory predictability is important for commerce, the clean technology sector and consistent decision making.
- The objective of our communications is to share the great work being done all over the state. It is also important that our communication material is unified across the Department of Commerce and that our data is unified among our partners at the CleanTech Alliance and other industrial partner groups.

IMPLEMENTATION

STRATEGY	TACTICS	PARTNERS
Communicate information about the industry, events, hot policy issues to Federation members	<ul style="list-style-type: none"> • Update and utilize the Website regularly and drive traffic • Email delivery lists at Department of Commerce and external partners • Use Social Media 	CleanTech Alliance SmartGrid Northwest Associate Development Organizations University of Washington Washington State University Pacific Northwest National Laboratory NW Energy Efficiency Council
Create and reuse collateral about the industry	<ul style="list-style-type: none"> • Update study on economic impact of industry • Link to and use subsector organizations' collateral 	
Provide information about the clean technology industry to key audiences	<ul style="list-style-type: none"> • Set up a speakers' bureau who can make presentations to community and business organizations • Write op-eds • Editorial meetings with news outlets 	NW Environmental Business Council Craft3 Element8 Puget Sound Cooperative Credit Union
Create events and participate in other organizations' events	<ul style="list-style-type: none"> • Provide speakers, collateral and content for other clean technology events • Participate in cross-sector events to highlight the role of clean technology and build partnerships. • Organize events around key issues 	Center for Advanced Manufacturing Puget Sound

WHO SPEAKS FOR THE SECTOR?

Brian Young

Governor's Clean Technology Sector Lead
 Office of Economic Development and Competitiveness
 206.256.6129
brian.young@commerce.wa.gov

THE WORK PLAN: 2017- 2019

Continue on course with communication with businesses and Economic Development Councils throughout the state. Continue business development meetings with aerospace companies through air shows, expos, etc.

Work with stakeholders to understand issues that can be resolved through state support. Continue communication between stakeholders and the Governor's leadership staff.

Continue working with technical colleges, workforce development groups, and the State Board of Community and Technical Colleges to maintain and enhance their continued support of programs designed to educate future aerospace workers.

GOAL 1

FOSTERING COLLABORATIVE PUBLIC/PRIVATE PARTNERSHIPS

ACTION STEP 1

Enhance Public Dialogue on Clean Technology Issues through statewide outreach and communications

WHO WILL DO IT?

Sector Lead in partnership with the CleanTech Alliance, Smart Grid Northwest, Northwest Environmental Business Council and the State Energy Office

BY WHEN?

Ongoing

RESOURCES

US Department of Energy grant funds

Clean Energy Fund

Industry and Research Organizations:

- CleanTech Alliance
- SmartGrid Northwest
- NW Energy Efficiency Council
- NW Environmental Business Council
- University of Washington
- Washington State University
- Pacific Northwest National Laboratory
- International Future Living Institute

POTENTIAL BARRIERS

- Complexity of the subject matter makes communication difficult
- Subject matter is considered political, which can hinder open communication
- Subject touches every corner of the state, and providing in-person, engaging outreach can be daunting
- Providing an open forum where all sides of a subject can be addressed can be contentious

COMMUNICATIONS PLAN

- Create topic specific communication plan with Department of Commerce's communication team
- Work with indicated partner organizations to leverage their existing communications infrastructure
- Use conference sponsorship, white papers, outreach events, social media, email lists, and other available communications tool to reach targeted audiences

Key Performance Indicator:

GOAL 1 *Continued*

FOSTERING COLLABORATIVE PUBLIC/PRIVATE PARTNERSHIPS

ACTION STEP 2

Improve collaboration between industry and research institutions

WHO WILL DO IT?

Sector Lead in partnership with the CleanTech Alliance, Smart Grid Northwest, Northwest Environmental Business Council and the State Energy Office

BY WHEN?

Ongoing

RESOURCES

US Department of Energy grant funds
Clean Energy Fund
Industry and Research Organizations:

- CleanTech Alliance
- SmartGrid Northwest
- University of Washington
- Washington State University
- Pacific Northwest National Laboratory
- US Departments of Energy, Agriculture, Commerce, and others

POTENTIAL BARRIERS

- Partnerships can be difficult to establish because of traditional silos and complexity of agreements
- Certain entities have strong views against the idea of public/private partnerships
- Developing opportunities where value can be derived for all partners
- No state support for corporate R&D efforts

COMMUNICATIONS PLAN

- Create topic specific communication plan with Department of Commerce's communication team
- Work with indicated partner organizations to leverage their existing communications infrastructure
- Develop series of conferences and white papers to highlight industry/research collaboration

EVIDENCE OF SUCCESS

- Program of statewide events to present non-partisan information on issues that impact energy, the environment and clean technology.
- Create a series of short films, seminars and fact sheets to disseminate information to the public on various aspects of Washington's clean technology sector.
- Launch an Innovation Council to bring together Washington research institutions and representative industry groups to grow our industrial innovation infrastructure.
- Support regional research and industry focus areas including grid modernization, transactive energy, distributed energy resources

EVALUATION PROCESS

- Number of outreach events held
- Communications and outreach metrics
- Development of new public/private partnerships
- Demonstrated growth/success of existing public/private partnerships

GOAL 2

GROWING AND DIVERSIFYING WASHINGTON'S CLEAN TECHNOLOGY INDUSTRY SECTOR WITH A STRONG BUSINESS CLIMATE

ACTION STEP 1

Grow and retain Washington State companies and organizations

WHO WILL DO IT?

Sector Lead in partnership with the Department of Commerce's Business Services and Energy Divisions as well as the CleanTech Alliance and other external stakeholders

BY WHEN?

Ongoing

RESOURCES

US Dept. of Energy grant funds
Clean Energy Fund
Governor's Office
Local Government Entities
Financial Partners:

- Craft3
- Element8
- Puget Sound Cooperative Credit Union

Industry / Research Organizations:

- CleanTech Alliance
- SmartGrid Northwest
- Associate Development Organizations
- University of Washington
- Washington State University
- Pacific Northwest National Laboratory
- NW Energy Efficiency Council
- NW Environmental Business Council
- Center for Advanced Manufacturing Puget Sound

POTENTIAL BARRIERS

- Resistance by some businesses in partnering with government entities
- Political nature of clean technology as a sector creates potential roadblocks to effective partnerships
- Limited ability for state to provide direct economic assistance to private companies
- Communications barriers between organizations and government entities working in this space

COMMUNICATIONS PLAN

- Create topic specific communication plan with Department of Commerce's communication team
- Work with indicated partner organizations to leverage their existing communications infrastructure
- Use conference sponsorship, white papers, outreach events, social media, email lists, and other available communications tool to reach targeted audiences

GOAL 2 *Continued*

GROWING AND DIVERSIFYING WASHINGTON'S CLEAN TECHNOLOGY INDUSTRY SECTOR WITH A STRONG BUSINESS CLIMATE

ACTION STEP 2

Increase industry and research organizations access to national and international markets and partners

WHO WILL DO IT?	BY WHEN?	
Sector Lead in partnership with Dept. of Commerce's International Trade Unit and Energy Division, CleanTech Alliance, state academic and research institutions, and multiple federal agencies	Ongoing	
RESOURCES	POTENTIAL BARRIERS	COMMUNICATIONS PLAN
US Department of Energy grant funds Associate Development Organizations Governor's Office Local Government Entities Industry / Research Organizations: <ul style="list-style-type: none"> • CleanTech Alliance • SmartGrid Northwest • Trade Development Alliance • Associate Development Organizations • University of Washington • Washington State University • Pacific Northwest National Laboratory 	<ul style="list-style-type: none"> • Funding for international outreach and coordination extremely limited • Clean Technology Sector still nascent nationally and internationally, providing limited strong and organized partner organizations • Political nature of clean technology as a sector creates potential roadblocks to effective partnerships 	<ul style="list-style-type: none"> • Create topic specific communication plan with Department of Commerce's communication team • Work with indicated partner organizations to leverage their existing communications infrastructure

GOAL 2 *Continued*

GROWING AND DIVERSIFYING WASHINGTON'S CLEAN TECHNOLOGY INDUSTRY SECTOR WITH A STRONG BUSINESS CLIMATE

ACTION STEP 3

Make Washington an epicenter of clean technology innovation and entrepreneurship

WHO WILL DO IT?

Sector Lead in partnership with the CleanTech Alliance and US Dept of Energy, and multiple local partners

BY WHEN?

Ongoing

RESOURCES

US Department of Energy program funds
Clean Energy Fund
Governor's Office
Local Government Entities
Industry / Research Organizations:

- CleanTech Alliance
- SmartGrid Northwest
- NW Energy Efficiency Council
- NW Environmental Business Council
- University of Washington
- Washington State University
- Western Washington University
- Pacific Northwest National Laboratory
- International Future Living Institute
- Center for Advanced Manufacturing Puget Sound

Financial Partners:

- Craft3
- Element8
- Puget Sound Cooperative Credit Union

POTENTIAL BARRIERS

- Lack of equity and venture capital focused on the clean technology sector
- Lack of support for early stage entrepreneurs outside of state academic institutions for the clean technology sector
- Need for communication across the state to inform communities and entrepreneurs of the opportunities in clean technology
- No state support for corporate R&D efforts
- Government procurement policies and efforts lack support to innovative, young companies and their products

COMMUNICATIONS PLAN

- Create topic specific communication plan with Department of Commerce's communication team
- Work with indicated partner organizations to leverage their existing communications infrastructure

GOAL 2 *Continued*

**GROWING AND DIVERSIFYING WASHINGTON'S CLEAN TECHNOLOGY INDUSTRY SECTOR WITH
A STRONG BUSINESS CLIMATE**

EVIDENCE OF SUCCESS

- Monitor and communicate successes of Clean Energy Fund 1 projects, successful rollout and execution of Clean Energy Fund 2
- Develop a resource catalog and a clean technology sector gap analysis available to companies and entrepreneurs
- Create a directory of mentor and business connections available to startups across the state
- Develop a conceptual plan for a clean energy public private partnership focused on providing support to entrepreneurs
- Creating a statewide commercialization steering committee to identify opportunities and gaps

EVALUATION PROCESS

- Lead clean technology delegations to multiple trade shows and industry events, including one international event
- Represent Washington's clean technology sector through speaking engagements at major industry conferences
- Number of outreach meetings with in-state companies, companies within the U.S., and foreign companies or industry representatives
- Gain traction on projects outlined in memorandums of understanding currently in place with foreign partners

GOAL 3

ENCOURAGING A 21ST CENTURY WORKFORCE READY TO MEET CLEAN TECHNOLOGY INDUSTRY NEEDS

ACTION STEP 1

Facilitate the CleanTech Alliance's goals for workforce development

WHO WILL DO IT?

Sector Lead and the CleanTech Alliance

BY WHEN?

Ongoing

RESOURCES

- Washington Integrated Sector Employment Grant
- Industry support
- Pacific Northwest Center of Excellence for Clean Energy and Construction
- Employment Security Division
- Workforce Development Council

POTENTIAL BARRIERS

Clean technology sector is still relatively young and is continuing to find its voice as a sector on workforce issues

COMMUNICATIONS PLAN

Utilize the CleanTech Alliance communications plan in cooperation with the Department of Commerce's communications resources

ACTION STEP 2

Collaborate with the Pacific Northwest Center of Excellence for Clean Energy and Construction.

WHO WILL DO IT?

Sector Lead in coordination with Center of Excellence Directors

BY WHEN?

Ongoing

RESOURCES

- Washington Integrated Sector Employment Grant
- Barbara Hins-Turner, Pacific Northwest Center of Excellence for Clean Energy
- Shana Peschek, Center of Excellence for Construction

POTENTIAL BARRIERS

No major hurdles as funding from the Washington Integrated Sector Employment Grant has provided the resources to develop and execute a plan over the coming years

COMMUNICATIONS PLAN

Utilize the designated Centers of Excellence communications plans as and support with Department of Commerce communications team

GOAL 3 *Continued*

ENCOURAGING A 21ST CENTURY WORKFORCE READY TO MEET CLEAN TECHNOLOGY INDUSTRY NEEDS

ACTION STEP 3

Liaison between CleanTech Alliance and Employment Security Department, Workforce Training and Education Coordinating Board and applicable Workforce Development Councils

WHO WILL DO IT?

Sector Lead in partnership with Employment Security Dept Sector Representative and Workforce Development Councils

BY WHEN?

Ongoing

RESOURCES

- Jennifer Pepin, Employment Security Department
- Perry England, Board Chair, Workforce Board
- Various Workforce Development Councils

POTENTIAL BARRIERS

Better alignment and coordination still needed in this space. There is a need for data that is clean technology sector specific

COMMUNICATIONS PLAN

Coordinate communications plans and resources between the three entities

EVIDENCE OF SUCCESS

- Increased coordination between Centers of Excellence for Clean Energy and Construction and industry stakeholders
- Increased engagement between industry stakeholders and local WDC's
- Clean technology sector input to statewide workforce development initiatives.

EVALUATION PROCESS

- Successful execution and closeout of the Washington Integrated Sector Employment Grant
- A comprehensive clean technology workforce development plan from the CleanTech Alliance
- Continued, sustained funding sources available to clean technology workforce development.

2015 – 2017 ACCOMPLISHMENTS

SUPPORT / ASSISTANCE PROVIDED

CLIENT

COMPOSITE RECYCLING TECHNOLOGY CENTER (CRTC)

PUBLIC/PRIVATE PARTNERSHIP

Worked with CRTC to promote and support continued development of the Center including multiple visits, participation in various events, and assistance through letters of support to bring in additional public and private funds.

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
	CRTC has a strong workforce development angle with its partnership with Peninsula College, CEF funding has supported increased training and education development	Recipient of a Clean Energy Fund (CEF) funding

CLIENT

SMARTGRID NORTHWEST

PUBLIC/PRIVATE PARTNERSHIP

Direct support for two conferences focused on Transactive Energy Systems and Demand Response in cooperation with and funding from the US DOE

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Participate in board meetings and other events to support the businesses involved in grid modernization work in the NW		Implementation partner for US DOE Grant

CLIENT

PACIFIC NORTHWEST NATIONAL LABORATORY

PUBLIC/PRIVATE PARTNERSHIP

Represented WA at multiple PNNL events alongside US DOE and other federal, state and local government officials and politicians. Assisted in funding and promoting multiple clean technology research and demonstration projects

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
		Recipient of a CEF funding

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

CLEANTECH ALLIANCE

PUBLIC/PRIVATE PARTNERSHIP

Provide direct support for multiple outreach events across the state drawing attention to a host of clean technology topics, including support for the Clean Energy Fund

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Work in close coordination with CleanTech Alliance on multiple projects. Serve as a board member. Provide funding support for outreach and entrepreneur support programs		Implementation partner for US DOE Grant

CLIENT

UNIVERSITY OF WASHINGTON'S CLEAN ENERGY INSTITUTE

PUBLIC/PRIVATE PARTNERSHIP

Provide multiple avenues of support through representation, match-making, promotion and other collaborations

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Support early stage companies that have spun out of the Clean Energy Institute through introductions to the clean technology community and letters of support for funding opportunities		Recipient of a CEF funding

CLIENT

UW CLEAN ENERGY INSTITUTE NEW CENTER FOR ADV. MATERIALS AND CLEAN ENERGY TECHNOLOGIES

PUBLIC/PRIVATE PARTNERSHIP

Participated in the novel outreach design project for the new Clean Energy Institute building

CLIENT

NORTHWEST NATIONAL MARINE RENEWABLE ENERGY CENTER (NNMREC)

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Met with companies doing R&D in coordination with NNMREC and provided information on and introduction to the clean technology sector		Recipient of a CEF funding

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

SERVICE MEMBER FOR LIFE MILITARY TRANSITION SUMMIT

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
	Host multiple panels focused on workforce opportunities for transitioning service members	

CLIENT

GREEN TECHNOLOGIES SUPPLIERS MEETINGS (GTSM)

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Hosted and sponsored conference focused on direct B2B sales in clean energy technology sector		

CLIENT

DEPT OF COMMERCE ENERGY FUTURE CONFERENCE

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Support the development and execution of the conference including participation in conference sessions		

CLIENT

Amazon & McKinstry

PUBLIC/PRIVATE PARTNERSHIP

Supported the rollout of the District Energy System

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
		Recipient of a CEF funding

CLIENT

SHORELINE CC CLEAN ENERGY TECHNOLOGY & ENTREPRENEURSHIP ADVISORY COMMITTEE

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
	Participate in the committee to help Shoreline define and diversify its clean energy curriculum	

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

CLEAN ENERGY FUND

PUBLIC/PRIVATE PARTNERSHIP

Intimately involved with the design, deployment and communications associated with the highly successful program

CLIENT

ITRON

PUBLIC/PRIVATE PARTNERSHIP

Worked with CleanTech Alliance to introduce Itron to the clean technology sector and succeeded in bringing them into the CleanTech Alliance as a Platinum member and a presence on the board

CLIENT

AVISTA

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Work to promote their leadership role in grid modernization through joint public presentations		Recipient of a CEF funding

CLIENT

DEMAND ENERGY

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Worked to integrate them into state grid modernization efforts resulting in their selection of their technology to be used in the Transactive Energy Campus Project		Recipient of a CEF funding

CLIENT

DEMAND ENERGY

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Worked to integrate them into state grid modernization efforts resulting in their selection of their technology to be used in the Transactive Energy Campus Project		Recipient of a CEF funding

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

UNIENERGY TECHNOLOGIES

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Supported their work as part of CEF and worked to promote their \$30M funding round from Orix Investments		Recipient of a CEF funding

CLIENT

SUPERCritical TECHNOLOGIES

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Provided introduction to the TransAlta Centralia Board Funding, LLC helping foment future projects		

CLIENT

SICHUAN PROVINCE, CHINA

PUBLIC/PRIVATE PARTNERSHIP

Represent the state in ongoing relationship with Sichuan including drafting and executing multiple MOU's and MC'ing signing ceremony during Pres. Xi's visit to Seattle

CLIENT

WSU ENERGY SYSTEM INNOVATION CENTER

PUBLIC/PRIVATE PARTNERSHIP

Participate in their annual conference and represent the state at multiple events

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
		Recipient of a CEF funding

CLIENT

SEATTLE POLICY FORUM

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Used the forum to host and panel and present to Seattle business and policy leaders on the potential and opportunities provided by grid modernization in WA		

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

ALASKA AIRLINES AND UW FOSTER SCHOOL ENVIRONMENTAL INNOVATION CHALLENGE

BUSINESS CLIMATE

WORKFORCE DEVO

NOTES

Participated as a judge to encourage entrepreneurship in WA

CLIENT

HANNOVER MESSE TRADE FAIR

PUBLIC/PRIVATE PARTNERSHIP

Hosted a delegation of WA businesses at the fair and represented the state in meeting with foreign dignitaries and companies interested in doing business in WA.

CLIENT

ENERGY STORAGE OF AMERICA (ESA)

PUBLIC/PRIVATE PARTNERSHIP

Presented on WA work to enhance funding for clean technology opportunities in the state through our Clean Energy Fund

CLIENT

11TH ANNUAL ENERGY & CONSTRUCTION BEST PRACTICES SUMMIT

BUSINESS CLIMATE

WORKFORCE DEVO

NOTES

Support the conferences in their design and participate as a speaker and presenter

CLIENT

INTERSOLAR EAST CONFERENCE IN BROOKLYN NY

PUBLIC/PRIVATE PARTNERSHIP

Presented to a national audience on WA work to enhance funding for clean technology opportunities in the state through our Clean Energy Fund

2015 – 2017 ACCOMPLISHMENTS *continued*

SUPPORT / ASSISTANCE PROVIDED

CLIENT

SMART GRID NORTHWEST TRANSACTIVE ENERGY CONFERENCE

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Provided direct funding support and participation in the conference		

CLIENT

WEST COAST ENERGY MANAGEMENT CONFERENCE

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Moderated and presented on panel and present to national industry leaders on the potential and opportunities provided by clean technology opportunities in WA		

CLIENT

JEFFERSON COUNTY ENERGY LUNCH PROGRAM

PUBLIC/PRIVATE PARTNERSHIP

Strong community energy group. Participate in their program through direct support and presentations.

BUSINESS CLIMATE	WORKFORCE DEVO	NOTES
Meet with local clean technology businesses in Jefferson County to discuss opportunities and update them on state programs		

CONCLUSION - FINANCIAL AND JOBS IMPACT OF YOUR WORK

WASHINGTON STATE'S CLEAN TECHNOLOGY SECTOR PICTURE

1. 2015 Gross Business Income (GBI) was \$17.43 billion.
2. 2015 employment data (Q4 2014 – Q3 2015): 58,900.
3. In 2015 there were 2,138 clean technology businesses. Total wages were almost \$4 billion, or about \$69,000 per employee.

THE CLEAN TECHNOLOGY SECTOR NATIONALLY

1. Since 2007, the US has poured \$445bn into renewable energy and energy smart technologies, which enable the integration of variable sources of power generation into the grid. Annual totals range from \$36bn to \$64bn; investment in 2015 hit \$56bn, up 8% from the year before. Just over half of all new investment was directed towards solar, and 21% towards wind. The increase came as project developers rushed to get projects online ahead of the anticipated expiration of critical federal tax credits, and as falling costs made rooftop solar economically competitive in parts of the country.
2. The US held its place as the second-most attractive country for clean energy investment – but it remains far behind China, which received \$111bn worth of capital flows into the sector compared to the US' \$56bn. Other APAC countries brought in \$58bn, while investment in Europe fell off dramatically to \$59bn from \$72bn in 2014.

THE GLOBAL CLEAN TECHNOLOGY PICTURE

1. The latest BNEF figures show dollar investment globally growing in 2015 to nearly six times its 2004 total, and a new record of one third of a trillion dollars.
2. 2015 Global new investment in clean energy alone was \$329bn, this does not even take into account the non-energy specific aspects of the clean technology sector.
3. An estimated 147 gigawatts (GW) of renewable power capacity was added in 2015, the largest annual increase ever, while renewable heat capacity increased by around 38 gigawatts-thermal (GWth), and total biofuels production also rose. This growth occurred despite tumbling global prices for all fossil fuels, ongoing fossil fuel subsidies and other challenges facing renewables, including the integration of rising shares of renewable generation, policy and political instability, regulatory barriers and fiscal constraints.
4. Employment in the renewable energy sector (not including large-scale hydropower) increased in 2015 to an estimated 8.1 million jobs (direct and indirect). Solar PV and biofuels provided the largest numbers of renewable energy jobs. Largescale hydropower accounted for an additional 1.3 million direct jobs. Considering all renewable energy technologies, the leading employers in 2015 were China, Brazil, the United States and India.
5. Costs keep falling. The 2015 renewables installation record is all the more remarkable as cost-competitiveness improvements in solar and wind power mean that more megawatts can be installed for the same price.
6. Wind and solar's capacity share rises. The 122GW of wind and solar installed in 2015 made up about 50% of the net capacity added in all generation technologies (fossil fuel, nuclear and renewable) globally.



Department of Commerce

OFFICE OF ECONOMIC DEVELOPMENT & COMPETITIVENESS
206.256.6100

DECEMBER 2016