Northwest **Power** and **Conservation** Council

September 6, 2017

MEMORANDUM

TO: **Council members**

FROM: **Elizabeth Osborne**

SUBJECT: **Presentation by Tony Usibelli, Special Assistant to the Director for Energy and Climate Policy, Washington Department of Commerce**

BACKGROUND:

Presenter: Tony Usibelli

Summary: Tony Usibelli will present to the Council on Washington state energy policy issues and will discuss the state's investment in innovative energy technologies and financing programs through the Clean Energy Fund (CEF). Since its inception in 2013, the CEF has provided a variety of grants to utilities, nonprofit lenders, research and development organizations, and renewable energy technology manufacturers. Tony will discuss some of the ways in which CEF-funded projects have impacted the power system in the state and region.

Background: Prior to becoming the Special Assistant to the Director for Energy and Climate Policy at the Washington Department of Commerce, Tony Usibelli was the assistant director of the Washington State Energy Office. He has also worked for the Washington State University Energy program, and was a staff scientist focusing on energy efficiency and environmental issues at the Lawrence Berkeley National Laboratory.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Department of Commerce

Washington State Energy Policy, Technology, and Innovation

Tony Usibelli

Special Assistant to the Director for Energy and Climate Policy

Sept. 12, 2017

We strengthen communities

The Department of Commerce touches every aspect of community and economic development. We work with local governments, businesses and civic leaders to strengthen communities so all residents may thrive and prosper.

Planning | Infrastructure | Community Facilities | Housing | Safety / Crime Victims | Business Assistance

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Energy Programs at Commerce

- State Energy Office
- Low-Income Weatherization Program
- Low-Income Home Energy Assistance Program (LIHEAP)
- Energy Efficiency and Solar for Public Facilities
- Growth Management Assistance

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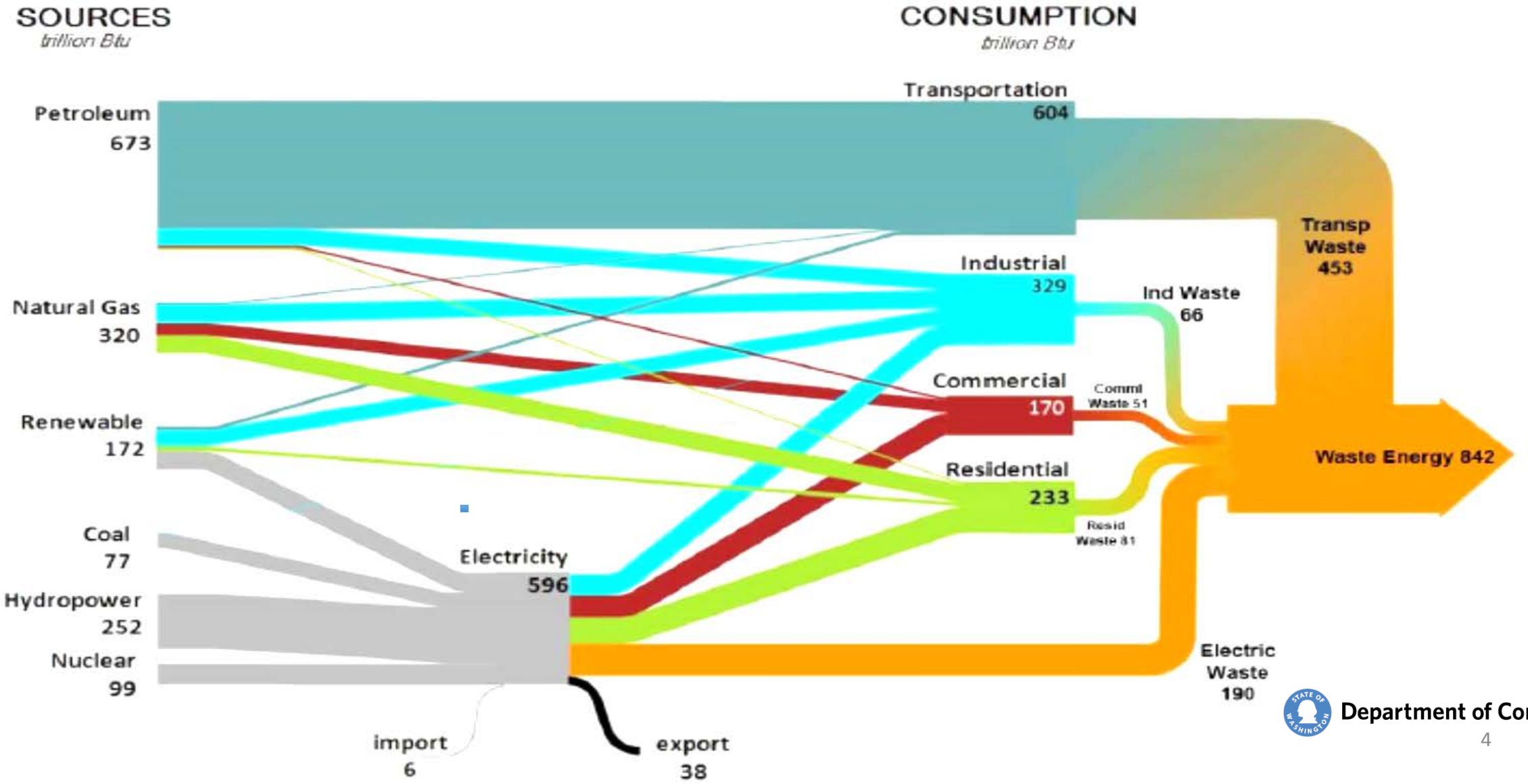
Washington's Energy System

Figure 2: Sources and Consumers of Energy in Washington in Calendar Year 2014



Washington's 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**

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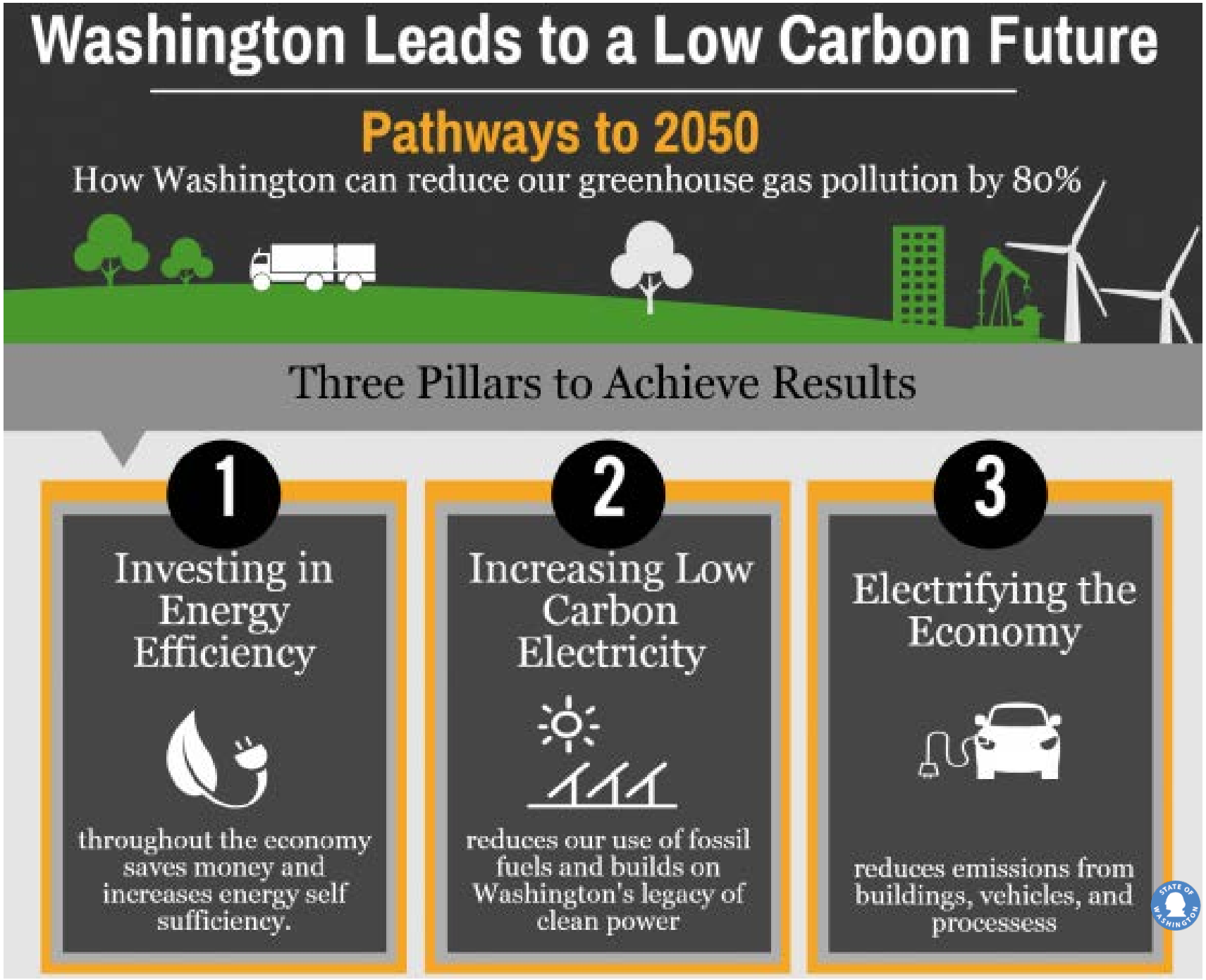
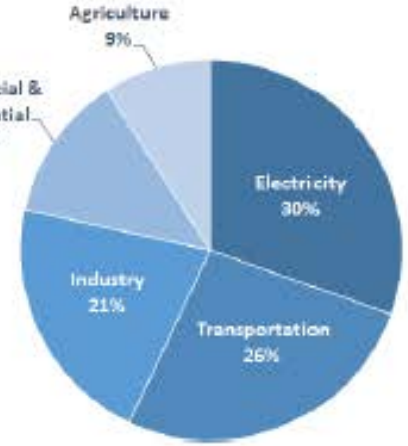

Washington Leads to a Low Carbon Future
Pathways to 2050
How Washington can reduce our greenhouse gas pollution by 80%
Three Pillars to Achieve Results
1
Investing in Energy Efficiency
throughout the economy saves money and increases energy self sufficiency.
2
Increasing Low Carbon Electricity
reduces our use of fossil fuels and builds on Washington's legacy of clean power
3
Electrifying the Economy
reduces emissions from buildings, vehicles, and processess

Considerations for Designing DDP Cases in Washington State

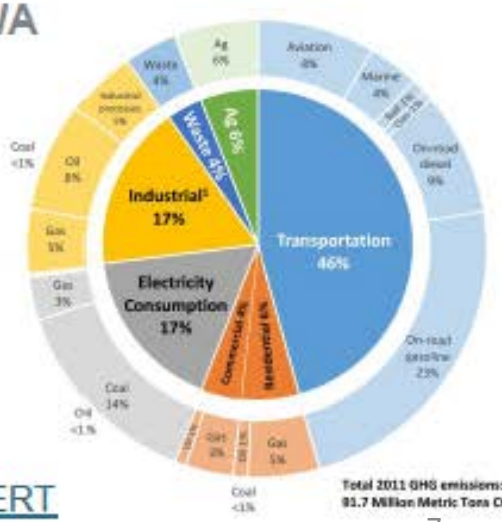
- Washington State is different from other regions of the U.S., so any energy system transformation must recognize the key differences to understand the advantages and disadvantages of various decarbonization options:
  - Electricity system dominated by hydro and highly interconnected with neighboring states/regions
  - Electricity already large source of home heating
  - Disproportionate share of emissions from the transportation sector

GHG emissions by sector

U.S.



WA



Sources: EPA and CERT

Case Overview

DDP cases designed to achieve an 86% reduction in energy-related CO2 emissions relative to 1990 levels by 2050

Reference

This scenario is a continuation of current and planned regulations, policies and infrastructure, including:

-Clean Air Rule
-Renewable Portfolio Standard
-Sound Transit 3

The case reflects existing energy policy. It is not designed to meet existing statewide GHG targets.

Electrification

This is a world where deep decarbonization is realized by electrifying end-uses to the extent possible and significantly reducing the consumption of pipeline gas in buildings. Liquid biofuels are deployed to decarbonize remaining fuel end-uses like freight trucks, marine vessels, and aviation.

The electricity sector adds significant new renewable resources largely balanced using existing and new pumped hydro storage and new battery energy storage resources.

Renewable Pipeline

In this world, buildings and industry continue to use a large share of pipeline gas, but the pipeline gas supply is decarbonized with a mix of biogas (primarily through gasification), synthetic natural gas and hydrogen. Decarbonized pipeline gas is also used in medium-duty and heavy-duty vehicles.

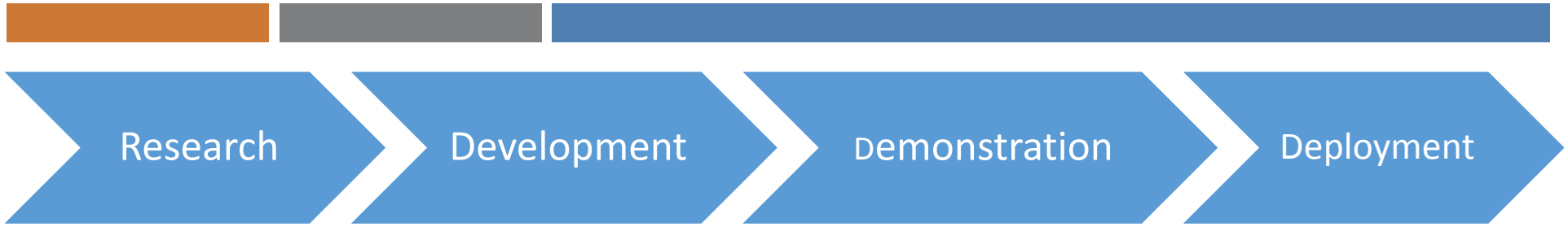
Power-to-gas facilities become a principal balancing resource in the electricity sector.

Innovation

In this world, policies of electrification are pursued and are aided by technology breakthroughs in vehicle electrification and hydrogen fuel cells. This allows further electrification of hard-to-decarbonize end-uses like trucking and a means to reduce biomass usage. Efforts to electrify the LDV fleet are aided by autonomous vehicle technology.

In the electricity sector, an additional breakthrough in wave technology results in the resource providing 5% of generation needs. Power-to-gas and electrolysis facilities are deployed for balancing.

Clean Energy Fund – Design



CEF 13/15

Grid Modernization

Loans

Research Match

CEF 15/17

Grid Modernization

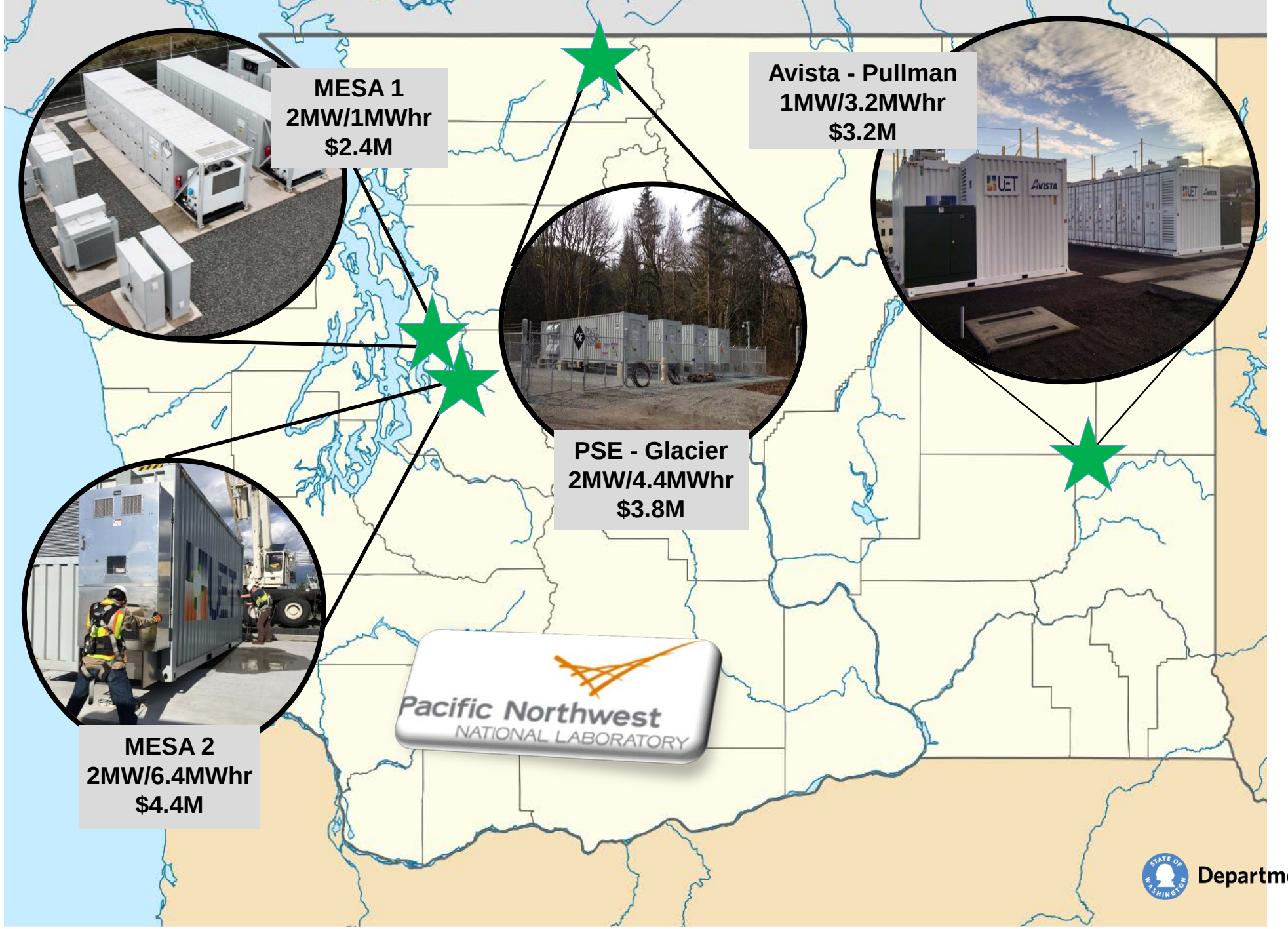
Loans

Research Match

Renewable Manuf.

Clean Energy Fund 1 (FY 13-15)

- Revolving Loan Program
  - $15 million
  - Non-profit lenders
- Smart Grid Program
  - $15 million
  - Washington electric utilities
- Matching Program for Federal Energy R & D
  - $6 million
  - Public and Private research organizations


MESA 1
2MW/1MWhr
$2.4M
Avista - Pullman
1MW/3.2MWhr
$3.2M
PSE - Glacier
2MW/4.4MWhr
$3.8M
MESA 2
2MW/6.4MWhr
$4.4M
Pacific Northwest
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Washington CEF PNNL Use Case Analysis

Use Case and application as described in PNNL Catalog	Avista	PSE	Sno – MESA1	Sno – MESA2	Sno - Controls Integration
UC1: Energy Shifting					
Energy shifting from peak to off-peak on a daily basis	Y	Y	Y	Y	
System capacity to meet adequacy requirements	Y	Y	Y	Y	
UC2: Provide Grid Flexibility					
Regulation services	Y	Y		Y*	
Load following services	Y	Y		Y*	
Real-world flexibility operation	Y	Y		Y*	
UC3: Improving Distribution Systems Efficiency					
Volt/Var control with local and/or remote information	Y		Y	Y	
Load-shaping service	Y	Y	Y	Y	
Deferment of distribution system upgrade	Y	Y			
UC4: Outage Management of Critical Loads		Y			
UC5: Enhanced Voltage Control					
Volt/Var control with local and/or remote information and during enhanced CVR events	Y				
UC6: Grid-connected and islanded micro-grid operations					
Black Start operation	Y				
Micro-grid operation while grid-connected	Y				
Micro-grid operation in islanded mode	Y				
UC7: Optimal Utilization of Energy Storage	Y	Y			Y

* A simulated set of signals will be provided by PNNL to test these use cases.

Federal Clean Energy Matching Funds

Primary Customers:

Universities, government agencies, and businesses engaged in energy research

- Pacific Northwest National Lab - $1.2 million
- Washington State University - $1.1 million
- University of Washington - $1.3 million
- Composite Recycling Technology Center - $1 million
- Snohomish County PUD - $1 million

Key Activities:

Matching funds investing in RD&D that will drive the future of energy efficiency, energy storage, and clean energy technology

Program Includes:

- Research, Development & Demonstration matching grants
- Incentivizes outside funding opportunities and increases potential leveraging

Energy Revolving Loan Fund Grants

Primary Customers:

Non-profit lenders who expand access to capital for businesses and private individuals

- Craft3 - $10.6 million
- Puget Sound Cooperative Credit Union - $2.9 million

Key Activities:

Encourages lenders to finance the use of proven weatherization and energy efficiency technologies, generating opportunities within the residential and commercial sectors.

Program Includes:

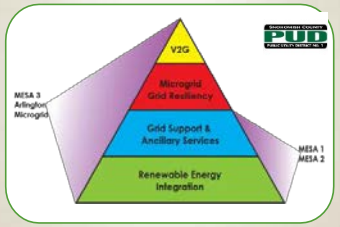
- Loss reserve & loan securities
- Provides backing for residential and commercial loans for energy retrofits, solar installations, anaerobic digesters, and combined biomass heat and power projects

Clean Energy Fund 2 (FY 15-17)

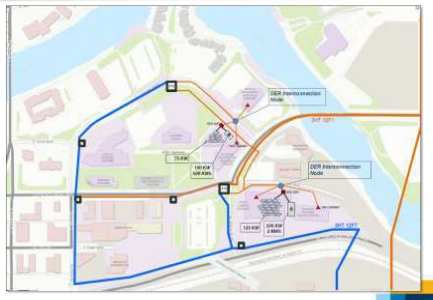
- Revolving Loan Program
  - $10 million
- Grid Modernization Program
  - $13 million
- Matching Program for ~~Federal~~ Energy R & D
  - $10 million
- Credit Enhancement for Renewable Energy Manufacturing
  - $6.6 million

OPALCO
Energy Storage

Arlington Microgrid



Spokane Micro Transactive Grid



Seattle City Light
Solar Microgrid

ENERGY NORTHWEST
4 MW Solar Storage & Training

Research, Development & Demonstration (RD&D) Grants

Primary Customers:

Universities, government agencies, and businesses engaged in energy research

- Composite Recycling Technology Center- $1.7 million
- Edaleen Cow Power- $273,000
- Six additional grantees selected

Key Activities:

Matching funds investing in RD&D that will drive the future of energy efficiency, energy storage, and clean energy technology

Program Includes:

- Research, Development & Demonstration matching grants
- Incentivizes outside funding opportunities and increases potential leveraging

Composite Recycling Technology Center

CEF 1 – Federal Funds Matching Grant - $1 million

- Funding to complete a new facility to recycle/reuse composite materials and co-locate Peninsula College program to perform industrial and workforce training
- Partners include: U.S. Department of Commerce, Port of Port Angeles, U.S. DOE's Institute for Advanced Composites Manufacturing Innovation, and Clallam County

CEF 2 – Research, Development, and Demonstration - $1.7 million

- Funding to purchase advanced composite recycling manufacturing equipment
- CRTC will demonstrate viable commercial processes to create recycled carbon fiber products with comparable strength to virgin material for a fraction of the cost
- World's first commercial product made from recycled carbon fiber entering production in February

25,000	2 M	30	200
square feet	pounds of materials (by year 5)	Up to workers trained/year	new jobs (by year 5)

Clean Energy Fund 3 (FY 17-19)

- Transportation Electrification
  - $11 million
- Grid Modernization Program
  - $11million
- Matching Program for Energy R & D
  - $8.6million
- Solar
  - $4 million
- Pacific NW National Lab Hardware
  - $ 8 million
- Alcoa – Intalco GHG project
  - $2.4 million
- Klickitat Pumped Storage Study
  - $1.1 million

Department of Commerce

Presented by:

Tony Usibelli
Special Assistant to the Director for
Energy and Climate Policy
(360) 725-3110
tony.usibelli@commerce.wa.gov

http://www.commerce.wa.gov/growing-the-economy/energy/