WEST COAST COLLABORATIVE
A public-private partnership to reduce diesel emissions

West Coast Partnership to Promote Alternative Fuel Corridors

Medium- and Heavy-Duty Alternative Infrastructure Needs & Opportunities in Washington

Alternative Fuel Infrastructure Corridor Coalition (AFICC)

Webinar Session #5

Monday, December 10, 2018

1:00 p.m. – 2:30 p.m. PT

Overview

- AFICC Roadmap Progress
- Status of Washington Alternative Fuel Corridors
- Discussion Leader Presentations: Alternative Fuel Infrastructure Needs & Opportunities for Washington
- Workgroup Discussion

Alternative Fuel Infrastructure Corridor Coalition (AFICC)
2018 Washington Workgroup Roadmap

Webinar Sessions

Session #1
M/HD Alternative Fuel Landscape and Opportunities
Friday, Sept. 21, 2018
10:30 a.m.– 12:00 p.m. PT

Partners provide an update on alternative fuel activities & opportunities to promote emission reductions, advance clean techs , & transportation sustainability through alternative fuel corridors.

Session #2
Natural Gas & Propane Technologies
Thursday, Nov. 1, 2018
2:30 – 4:00 p.m. PT

Session #3
Plug-In Electric & Hydrogen Fuel Cell Technologies
Tuesday, Nov. 6, 2018
10:30 a.m. – 12:00 p.m. PT

Technology manufacturers and fueling infrastructure providers provide information on the latest emerging technologies, operational suitability, infrastructure considerations, & fleet best practices. These sessions are open to CA, OR and WA partners.

Session #4
M/HD Alternative Fuel Infrastructure Needs
Monday, Dec. 10, 2018
1:00- 2:30 p.m. PT

Partners provide input on critical gaps & infrastructure needs along key corridors & evaluate actions and funding opportunities to support partnership, coordination & project implementation.

Session # 1:
Thurs. 8/30/18
11:00 – 12:00 p.m.

Session # 2:
Fri. 10/12/18
11:00 – 12:00 p.m.

Session # 3:
Fri. 11/30/18
1:00 – 2:00 p.m.

Champion Strategy Calls

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AFICC Project Overview

Needs

- Prioritize Hot Spots (Areas of Congestion, Communities, Intermodal Freight Hubs)
- ID Alt. Fuel Infrastructure Gaps
- ID Best Techs/Fuels for Transportation Activities/Project Areas

Draft Implementation Plan

- Include Themes & Priorities
- Outline Strategy & Actions
- Provide Recommendations
- ID AFV Project Partnerships
- Estimate Project Costs & ID Funds

Present Outcomes to Partners

What's Next!

Develop AFV Stakeholder Synthesis

- Summarize Workgroup Feedback
- Respond to Questions
- Outline Critical Barriers & Challenges
- Evaluate Needs & Costs for AFV Infrastructure

Facilitate Workgroup Sessions [CA, OR & WA] Collect Feedback, Compile Info, & Research Q's

Establish Framework

- Define Workgroup Discussion Objectives
- ID Key Stakeholders
- ID Coalition-Supporting Resources
- ID Direct Outcomes

Opportunities

- ID partnerships with Freight Shippers, Carriers, BCOs, Ports, Railroads, Truck Associations (LMCs/IOOs) Truck Stops, Warehouses, EDCs, and Cities on Coordinated Alt. Fuel Corridor Projects

Corridor-Ready
Criteria for 3rd Round of Designations

Round 3 Applications Due January 31, 2019

https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/

EV	CNG	LNG	Hydrogen	Propane
DCFC only	150 miles between stations	200 miles between stations	100 miles between stations	150 miles between stations
50 miles between stations	5 miles from highway	5 miles from highway	5 miles from highway	5 miles from highway
5 miles from highway	Public stations only	Public stations only	Public stations only	Public stations only
Public stations only *(no Tesla)*	Fast fill, 3,600 psi			Primary stations only

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

West Coast Alternative Fuel Corridors

Alternative Fuels Data Center

Station Data for Nominating Alternative Fuel Corridors.

Alternative Fuel Corridors (09/10/2018)

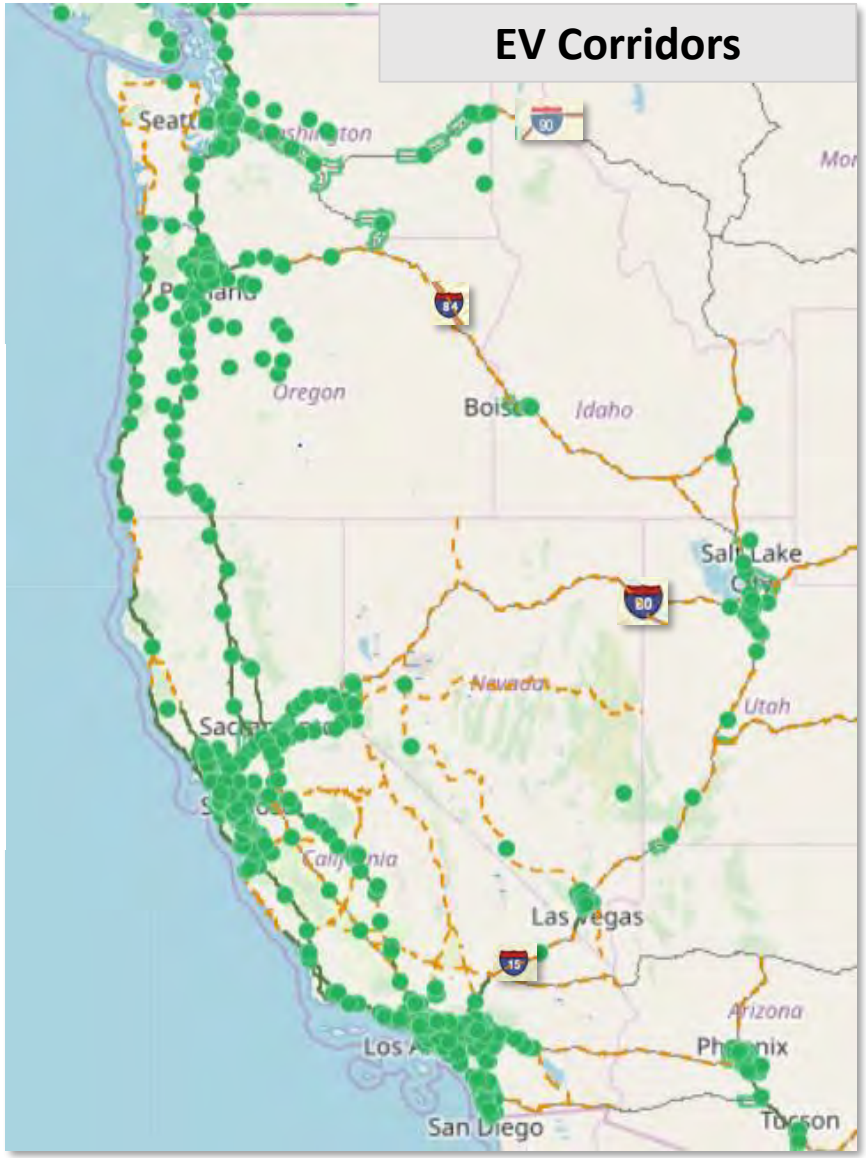
— Corridor Ready

- - - Corridor Pending

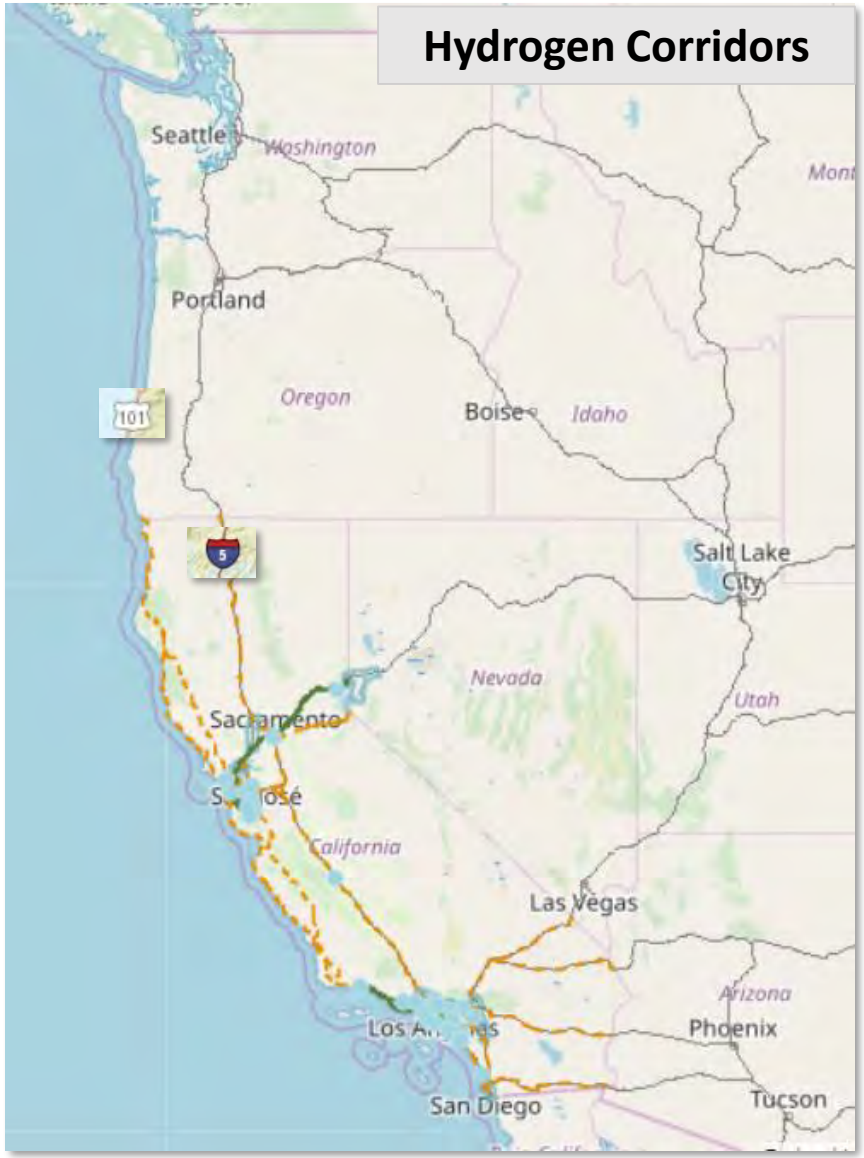
Potential Electric Corridors - Areas with enough stations to nominate new corridors or where a single station would lead to an extension of an existing corridor or a new corridor.

https://afdc.energy.gov/corridors

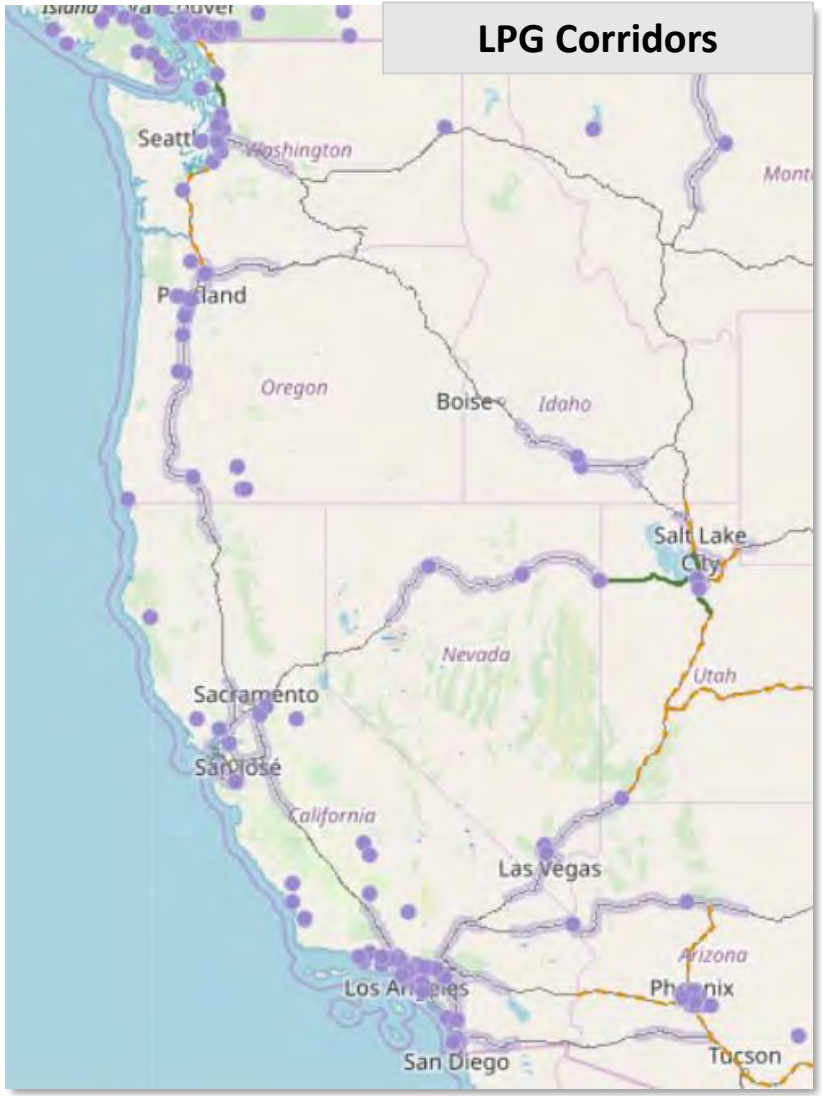
EV Corridors

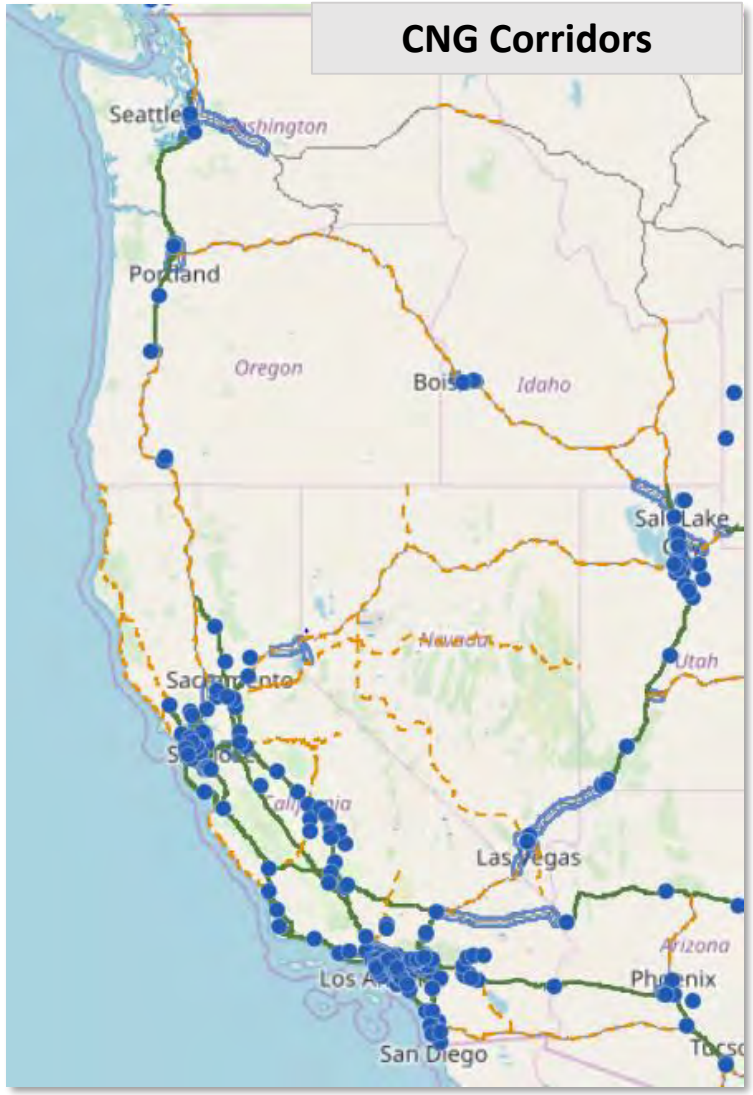


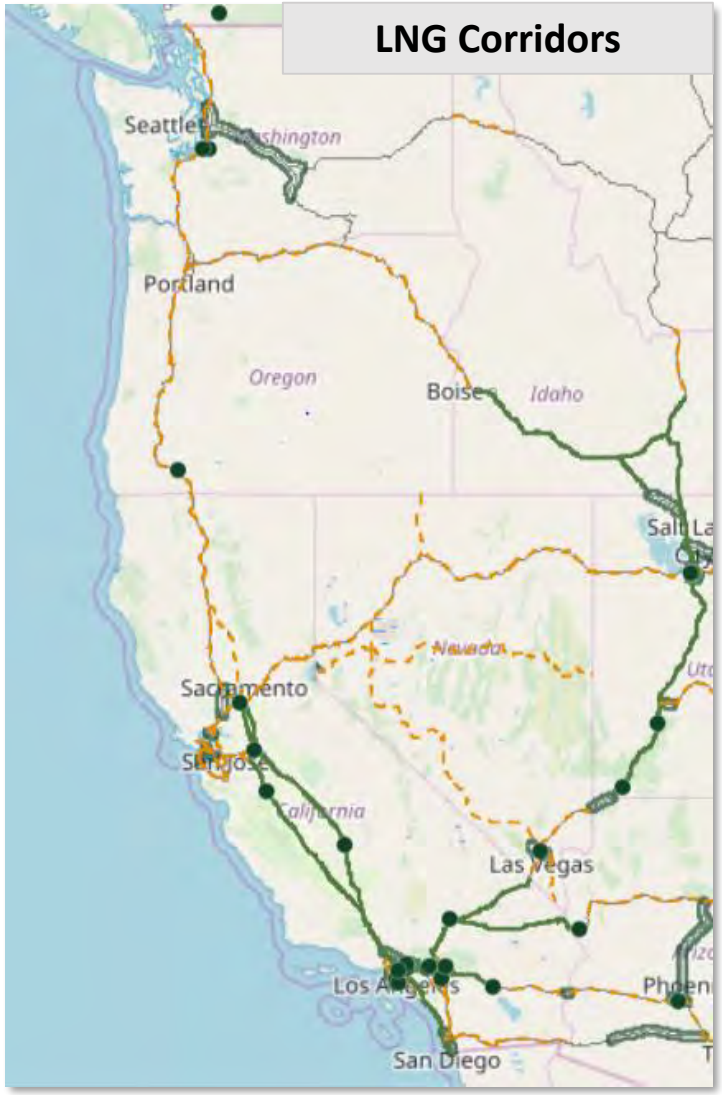
Hydrogen Corridors



West Coast Alternative Fuel Corridors





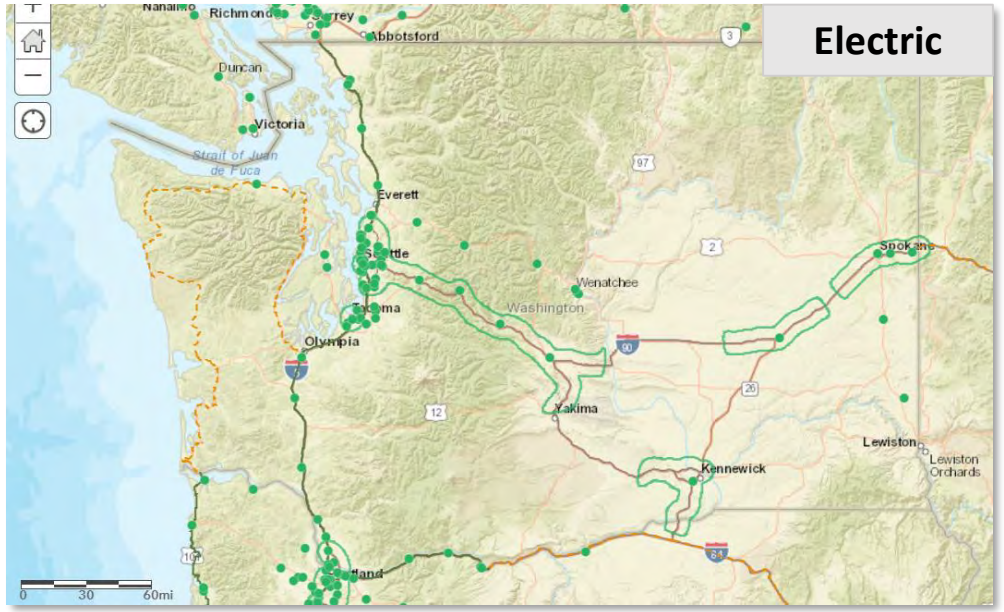


As of September 5 2018

Washington Alternative Fuel Corridors

Designated Interstate: I-5

Designated Route/State Highway: 101



Key

- Corridor Ready
- Corridor Pending
- Potential Corridor

As of 9/05/18

Alternative Fuels Data Center Station Locator and Corridor Tools

Johanna Levene - johanna.levene@nrel.gov

Resources:

Station Locator: https://afdc.energy.gov/stations

Station Data for Corridors: https://afdc.energy.gov/corridors

Webinar Objectives

Ports, fleets, industry associations and state agencies provide input on infrastructure needs and opportunities to advance medium- and heavy-duty alternative fuel corridors in Washington.

1) Clean Transportation Goals

2) Infrastructure Gaps

3) Resource & Partnership Needs

4) Opportunities for Coordination and Support

Today's Discussion Leaders

Program Facilitators

- **Alycia Gilde,** Director, Fuels & Infrastructure, CALSTART
- **John Mikulin**, Environmental Protection Specialist, EPA Region 9

Presentations by:

- **Jason Jordan**, Director of Environmental Programs, Port of Tacoma and Northwest Seaport Alliance
- **Alex Adams**, Senior Environmental Program Manager, Port of Seattle
- **Jeff Hove**, Vice President, Alternative Fuels Council, National Association of Truck Stop Operators
- **Sheri Call**, Executive Vice President, Washington Trucking Association
- **Danny Ilioiu**, Zero Emissions Fleet Strategic Planning Manager, King County Department of Transportation
- **Peter Moulton**, Alternative Fuels & Vehicles Policy Advisor, Washington State Energy Office

Port of Tacoma

Jason Jordan

Director of Environmental Programs,
Port of Tacoma and Northwest Seaport Alliance

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Port of Seattle

Medium- and Heavy-Duty Alternative Fuel Infrastructure Needs in Washington

Alex Adams

adams.a@portseattle.org

December 10, 2018

Port of Seattle®

Overview

Port of Seattle is:

- Sea-Tac International Airport
- Seattle's Seaport operations including cruise and grain terminals, fishing and recreational marinas, industrial and commercial real estate

Port of Seattle's Century Agenda set ambitious GHG reduction targets by 2050

- Port-controlled sources will be carbon neutral or negative
- Port-influenced sources will be reduced 80-percent

Port of Seattle's Key Alternative Fuel Interests: Policy and infrastructure to support access to sustainably-sourced, renewable vehicle and aviation fuels and provide additional clean electricity to ships, vehicles, and cargo handling equipment

Access to Low Carbon Fuels is a Key to Achieve Port Emission Reduction Targets

Port Alternative Fuel Successes

Sea-Tac Airport

- R99 being piloted in all diesel fleet vehicles fueled on-site
- Hybrid and electric fleet vehicles in use
- EV charging available for public and Port vehicles
- 50% of airport ground support equipment is electric
- 45-bus fleet powered by natural gas

Seaport

- Shore power available at 2 of 3 cruise ship berths
- Hybrid and plug-in hybrid fleet vehicles in use
- B20 used in all diesel fleet vehicles fueled on-site
- EV charging available for public and Port vehicles

Port of Seattle has a Long History of Alternative Fuel Use and Innovation

Airport-Related Fuels

Infrastructure Challenges

- Limited global supply of Sustainable Aviation Fuels (SAF)
- Indirect control over airline SAF use
- High SAF costs in a very cost- sensitive industry and requires integration into conventional fueling procedures
- Access to Renewable Natural Gas (RNG) to power natural gas bus fleet and gas-fired terminal boilers
- Electric ground support equipment requires unique charging infrastructure

Opportunities

- Port success as convener to address barriers to SAF use
- Onsite natural gas bus fueling infrastructure already in place
- National RNG solicitation coming soon for bus and terminal supply
- Continued Low Carbon Fuel Standard interest in WA—Port supported previous legislation

Affordable Access to SAF and RNG are Key to Reduce Emissions at Sea-Tac Airport

Maritime Fuels

Infrastructure Challenges

- Affordable, consistent access
- Costly electric infrastructure
- Alternative fuel technologies for ships are nascent (except for LNG)
- Ports have indirect control over largest sources of emissions
- Higher costs and availability for alt. vessel fuels a major barrier to widespread use

Opportunities

- Strong statewide, regional and Port support for climate action
- Interest in maritime electricity use across jurisdictions—a partnership opportunity
- State, federal funding available to support innovation
- Industry access to alt. fuel may be a future competitive advantage

Alt Fuel Use is Challenged by Fuel Availability, Technology and Infrastructure Costs

ALTERNATIVE FUELS COUNCIL

Jeff Hove

Vice President, Alternative Fuels Council,
National Association of Truck Stop Operators

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Sheri Call

Executive Vice President,
Washington Trucking Association

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Metro's Zero-Emission Fleet

Presented by:

Danny Ilioiu

Zero-Emissions Fleet

Strategic Planning Manager

King County METRO

King County Metro's Trek to a Sustainable Future

- Strategy options:
  - **study:** learn from others, observe
  - ***deploy**: test, evaluate and scale*
  - **convert:** start replacing now

ELIAS

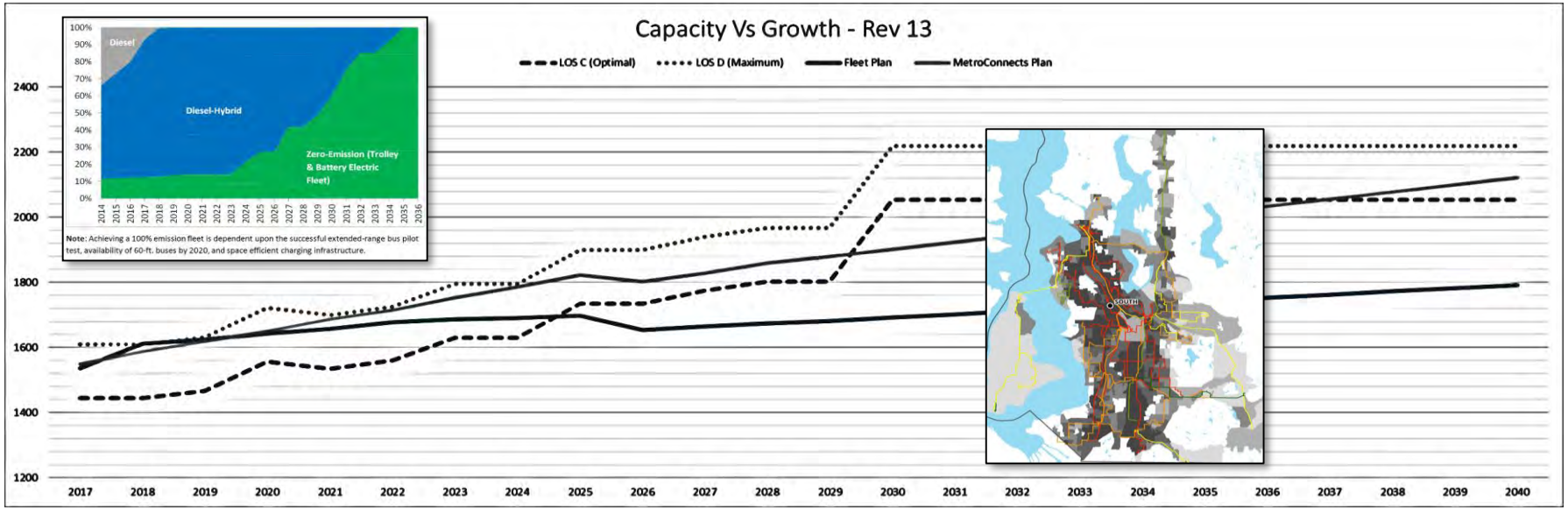
King County Metro, Transit Operator
Seattle, Washington

"I have been driving for King County Metro for 5 years. Basically I've driven every single bus that we have in King County. The riders actually love these buses. I don't think they realize it's a 100% battery operated bus. When I tell them it's an electric bus they just love it because it's good for the environment."

King County METRO

Bus Fleet – 1,500 (58% 60’ Articulated)

- Current technology electric buses (AEB, BEB, ZEB) can theoretically meet **70%** of KC Metro **operational requirements**
  - **174** Zero-Emissions ***Electric Trolley Buses (110 Artics)***
  - **11** Zero-Emissions ***Battery Electric Buses (Std. 40’)***
  - **10 additional** Zero-Emissions ***Battery Electric Buses 2018Q4 (6 Std 40’ and 4 Artics 60’)***



King County METRO

Infrastructure needs for successful scaling

- Base, Terminal, and Transit Hub location of chargers
- Charging Standards and Interoperability
- Automation & Controls
- Software that integrates operations and charging
  - Dispatch, crew scheduling, service planning, charging, and full facility energy management

Nov. 20, 2018 Contact: Chad Lewis, 206-263-1250

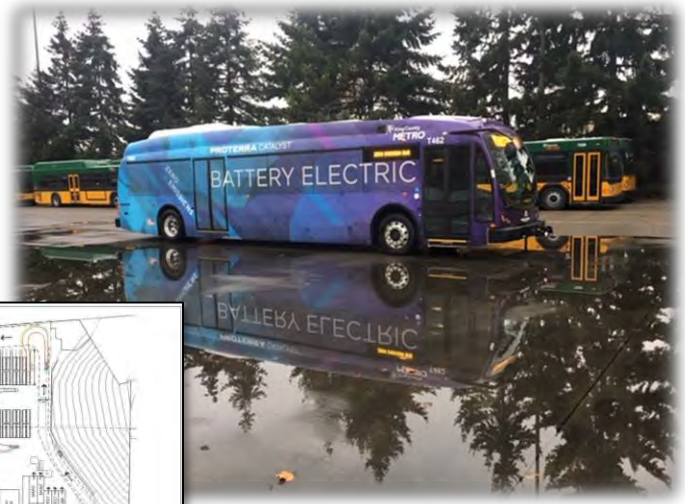
King County Metro will test long-range battery-powered buses that can travel more than 140 miles on a single charge

King County Metro will soon begin testing long-range battery-powered buses that can travel more than 140 miles on a single charge, the latest milestone toward a zero-emission fleet.

The latest models can travel nearly six times farther than the fast-charge buses Metro currently has in its fleet. At that distance, the battery-powered buses could satisfy about 70 percent of Metro's bus routes, reducing air and noise pollution throughout the region.

"Leading the transition to zero-emission transit requires ingenuity and partnerships – and we have both," said King County Executive Dow Constantine. "We are challenging manufacturers to create reliable battery buses that meet our service needs on long routes with steep hills. This test is the next step on our path to a clean, quiet fleet powered by renewable energy."

See the full web version



King County METRO

Renewable Energy

- **Sourcing and alignment partners: Seattle City Light, Puget Sound Energy**
  - Goals and contracts in place for Renewable energy sourcing
  - Goals for GHG reductions
  - Solar, Wind, Energy Storage (secondary life for batteries), …?
    - Upstream of the Meter
    - Downstream of the Meter

Renewable energy (abstract from eia.gov site)
Washington ranks second in the nation, after California, in the amount of electricity generated from renewable resources.[53] On average, about **80% of the state's net electricity generation originates from renewable energy**, mostly hydroelectric power, and Washington produced about one-eighth of the total electricity generated nationwide from renewables in 2017.[54]

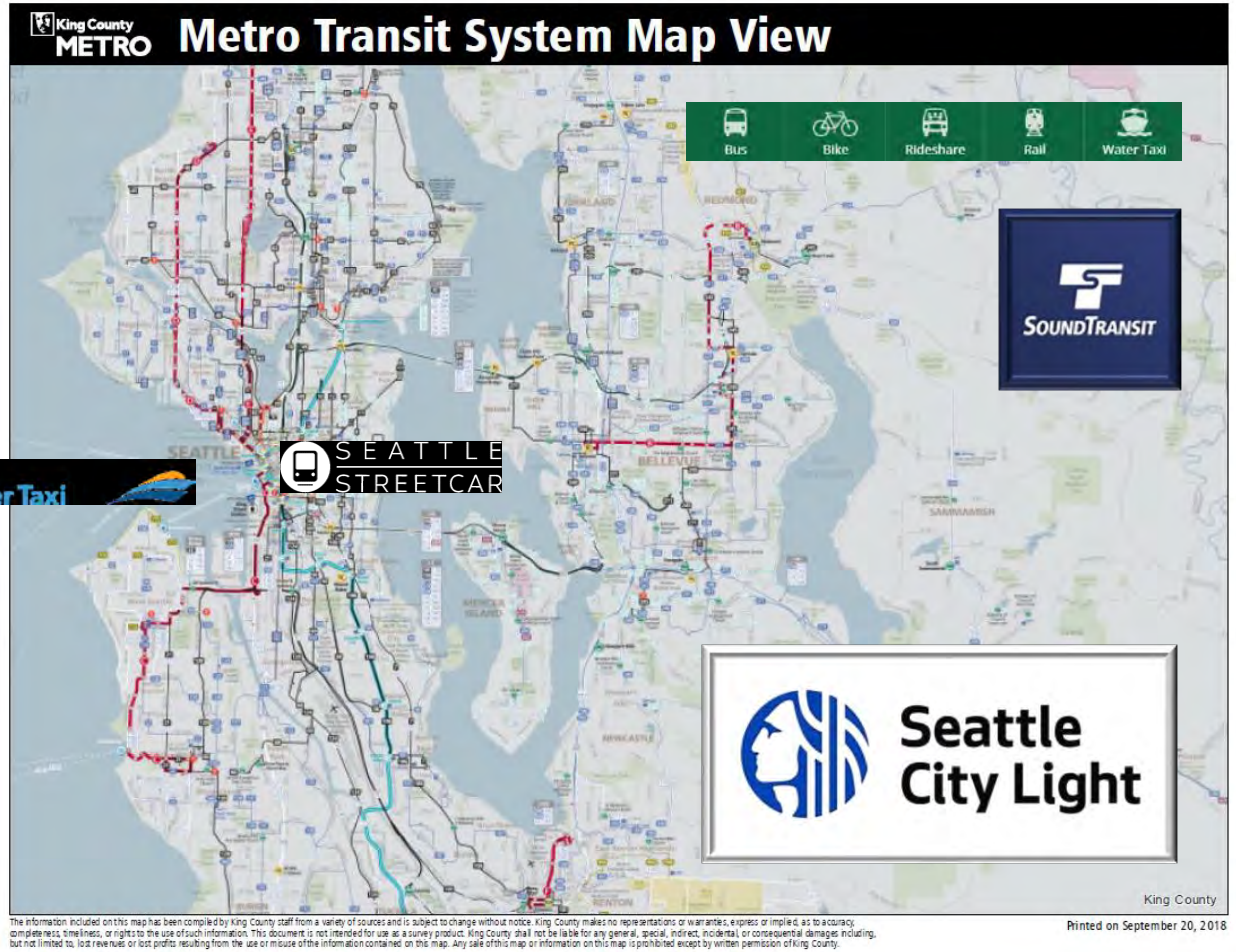
Electric Bus Ecosystem

PSE PUGET SOUND ENERGY

PROTERRA
COST-EFFECTIVE SOLUTIONS FOR CLEAN TRANSPORTATION

NEW FLYER

BYD
Build Your Dreams



King County METRO

Sustainability and Metro's Zero-Emission Fleet
13% there, 87% to go…

Thank you!

Danny Ilioiu
Zero-Emissions Fleet
Strategic Planning Manager

Danny.Ilioiu@kingcounty.gov
West Coast Collaborative – December 2018

King County METRO

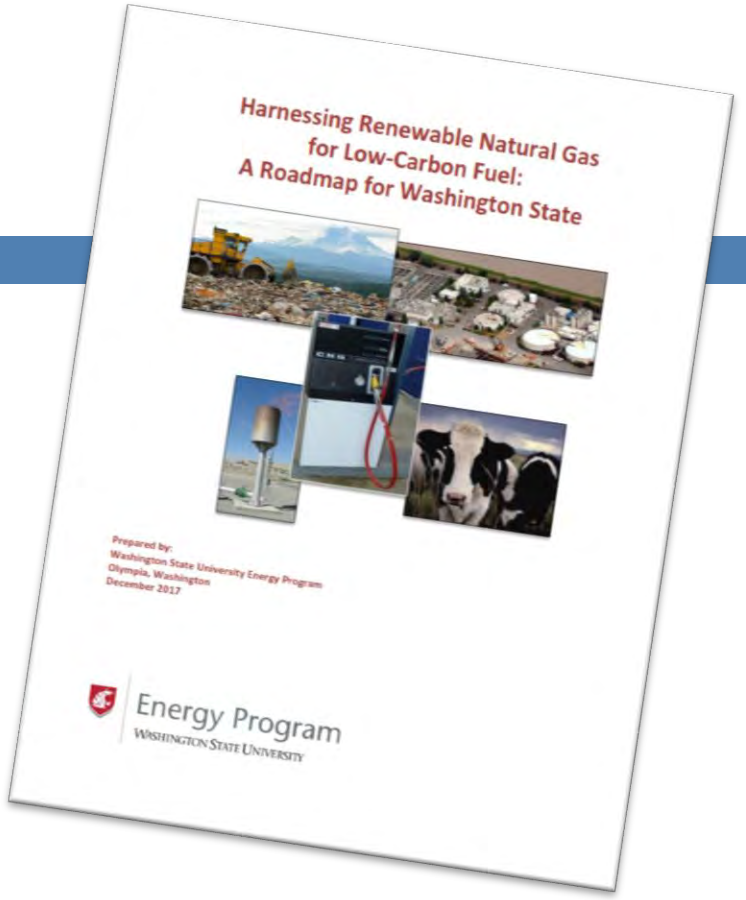
Department of Commerce

Promoting RNG Development in Washington State

Peter Moulton
Senior Energy Policy Specialist

October 2018

2017 RNG Roadmap



Power Sales Model Mature

- Utility RPS targets met
- Market in transportation

Incentives Need Overhaul

- Previous tax breaks expired
- Definitions dated, conflicting

Pipeline Quality Standards

Uncertain Policy Framework

Link: bit.ly/2mowmWn

2018 Legislation (HB 2580)

- Restore and expand production incentives
- Broader techno-economic assessment
- Update policy options
- Public sector preferential purchasing
- Regional voluntary pipeline standards

Energy Division · State Energy Office

HB 2580/SB 6449: Incentives for Renewable Natural Gas

Creating value from organic wastes

Department of Commerce

VALUE OF RENEWABLE NATURAL GAS – *Economic and environmental benefits*

Renewable natural gas (RNG) is produced by removing contaminants from the biogas that naturally results from the decomposition of organic materials in landfills and anaerobic digesters at wastewater treatment plants, food processing facilities, and farms. RNG is equivalent to conventional natural gas and can be used on-site to generate heat and electricity, or be incorporated into the existing natural gas supply system, with many added benefits:

- **Waste management for agriculture, especially dairies and food processors**
- **New revenue sources and job creation for private and public facilities**
- **Extended life expectancy for landfills through organic waste diversion**
- **Lowest carbon intensity of any transportation fuel**
- **Improved community resilience by diversifying natural gas supplies**

Maximizing yields of RNG from the most common public and private sources in Washington through existing technology could replace 8-10 percent of the natural gas consumed by Washington homes and businesses. If RNG were converted to vehicle fuel, it could displace roughly 20 percent of current diesel consumption.

LEGISLATIVE PROPOSAL – *The importance of incentives*

To fully realize the benefits available from developing Washington's RNG resources, public support through government policy is necessary:

- **Reinstate and expand tax incentives:** Cash-strapped agricultural enterprises and public waste management facilities can move away from the ineffective power sales model of digester development by tapping value-added markets for low-carbon transportation fuels and new fertilizer products.
- **Assess site-specific opportunities and develop quality standards:** A more detailed assessment of RNG production opportunities will help guide financial and technical assistance throughout Washington state, and a collaborative effort with natural gas utilities will help define appropriate quality standards for RNG before it enters the natural gas supply system.

Commerce's work to prepare an assessment and develop quality standards requires a general fund appropriation of $178,000 in FY 2017-2019.

AGENCY CONTACT

Xandre Chateaubriand
Legislative Director
360.725.4010
xandre.chateaubriand@commerce.wa.gov
www.commerce.wa.gov/growing-the-economy/key-sectors/

OUR MISSION

Grow and improve jobs in Washington State by championing thriving communities, a prosperous economy, and suitable infrastructure.

PROGRAM CONTACT

Peter Moulton
State Bioenergy Coordinator
Energy Division
360.725.1336
peter.moulton@commerce.wa.gov

WASHINGTON CONNECTIONS

Numerous Washington companies supply systems and equipment for RNG. Many are already doing business in other states:

- Biogas Energy, Seattle
- Cedar Grove Composting, Seattle
- DariTech, Lynden
- Edaleen Cow Power, Lynden
- Environmental Energy & Engineering, Olympia
- Farm Power Northwest, Arlington
- FPE Renewables, Lynden
- IGI Resources, Kirkland
- Impact Bioenergy, Shoreline
- Organik, Walla Walla
- Promus Energy, Seattle
- Regenis, Ferndale
- Raincountry Industrial, Arlington
- Trident Processes, Sumas
- Vaughan Company, Montesano
- Whole Energy Fuels, Bellingham
- Yield Biogas Solutions, Blaine

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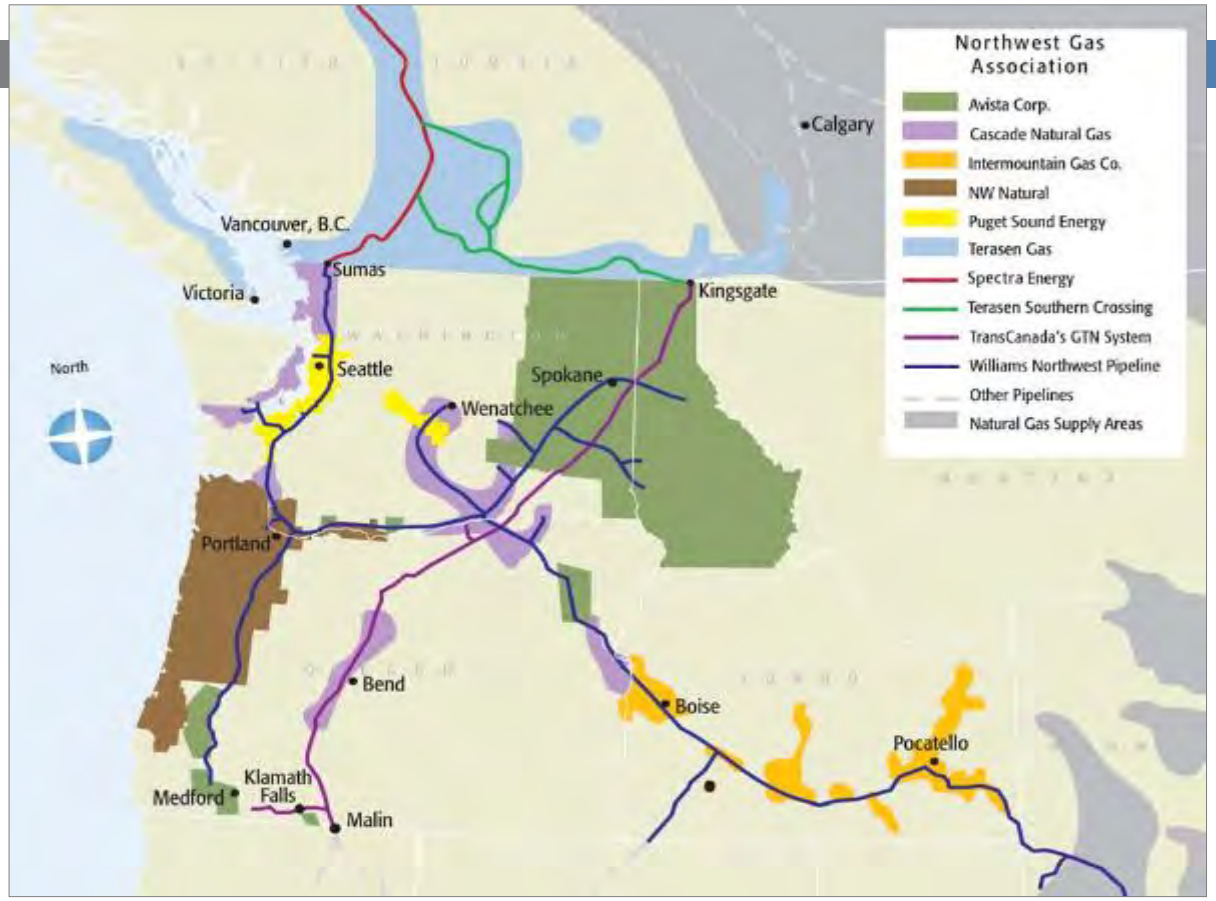
First Step: Better data, focus on pipelines

- Facilities within 5-10 miles
- Feedstocks within 30 miles
- Public-private partnerships, priorities for public funding
- Data sets dated, incomplete and/or inferred



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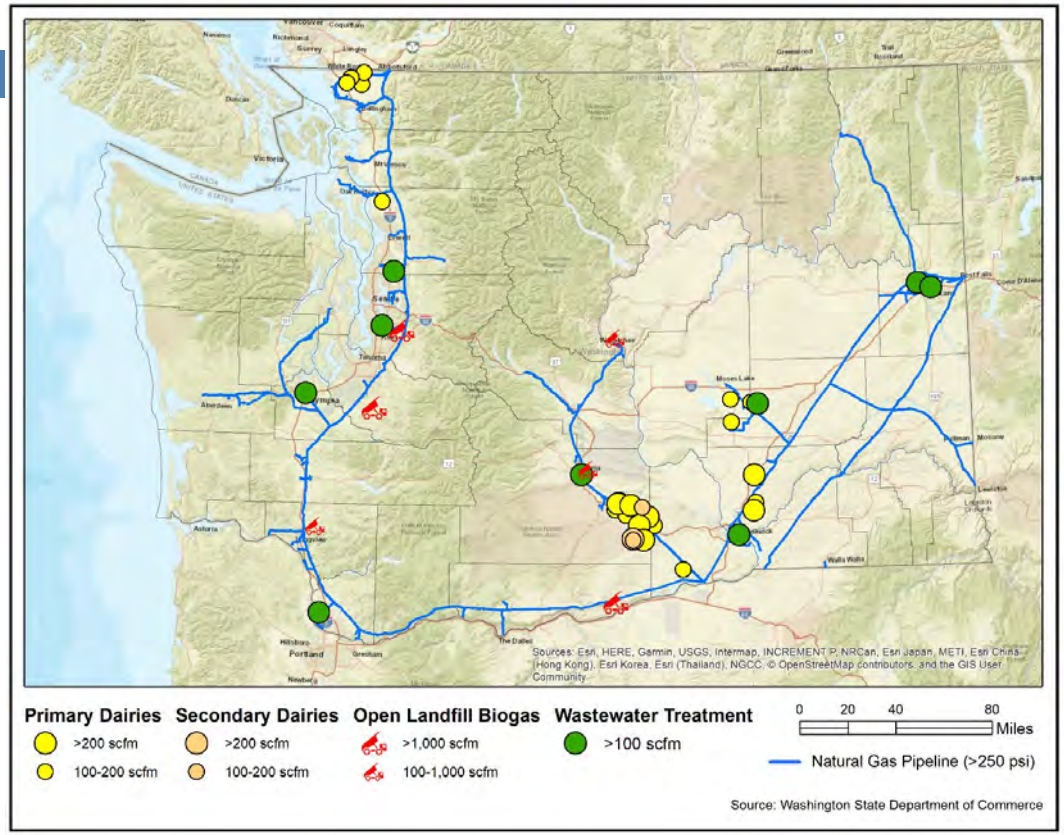
Next Step: Align feedstocks & facilities

- RNG currently ~1.5% of gas supply, what would it take to be 3%, 5%…
- Near-term: 30+ projects >500 scfm (LFG, WWTP, dairies, MSW organics)
- Medium-term: 70+ projects >500 scfm (deeper dive, especially food processing)



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Future Policy Considerations

- **Clean Fuel Standard** (statewide vs Puget Sound)
- **Renewable Portfolio Standard** (carbon-weighted?)
- **100% Clean** (RNG for peak generation)
- **Tax incentives** (distribution and sale of RNG)
- **Quality standards for pipeline injection** (WA, OR, ID)

Department of Commerce

For more information:

Peter Moulton
(360) 725-3116
peter.moulton@commerce.wa.gov

Discussion

What infrastructure needs do you have for your alternative fuel fleet?

Please raise hand to speak or submit a question via GoToWebinar.

Project Description

- Project Location
- Distance to Nearest Corridor
- Project Partners
- Fleet Vocation *(Delivery, Regional, Refuse, Transit, School Bus, etc.)*
- Vehicle Technology/Fuel Type
- Number of Vehicles
- Project Timeline

Infrastructure Needs

- Station Type
- Number of Dispensers/Chargers
- Estimated Fuel/Energy Use
- Equipment Costs
- Development Costs
- Operational Costs
- Construction Schedule

Contact Us

Alycia Gilde
Director
CALSTART
(626) 744-5613
agilde@calstart.org

John Mikulin
Environmental Protection Specialist
U.S. EPA Region 9
(415) 972-3956
mikulin.john@epa.gov

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