



West Coast Partnership to Promote Alternative Fuel Corridors

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

Alternative Fuel Infrastructure Corridor Coalition (AFICC)

Webinar Session #6

Thursday, December 13, 2018

1:00 p.m. – 2:30 p.m. PT

Overview

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

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

Webinar Sessions

Session #1
**M/HD Alternative Fuel
Landscape and Opportunities**
Thursday, Sept. 20, 2018
1:00 – 2:30 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

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

Session #4
**M/HD Alternative Fuel
Infrastructure Needs**
Thursday, Dec. 13, 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
2:00 – 3:00 p.m.

Session # 2:
Thurs. 10/11/18
1:00 – 2:00 p.m.

Session # 3:
Fri. 11/30/18
10:00 – 11:00 a.m.

Champion Strategy Calls



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

AFICC Project Overview



Present Outcomes to Partners

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

Develop AFV Stakeholder Synthesis

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

What's Next!



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



Round 3
Applications Due
January 31, 2019

Corridor-Ready Criteria for 3rd Round of Designations

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	Public stations only	5 miles from highway	5 miles from highway	Public stations only
Public stations only (no Tesla)	Fast fill, 3,600 psi	Public stations only	Public stations only	Primary stations only

West Coast Alternative Fuel Corridors

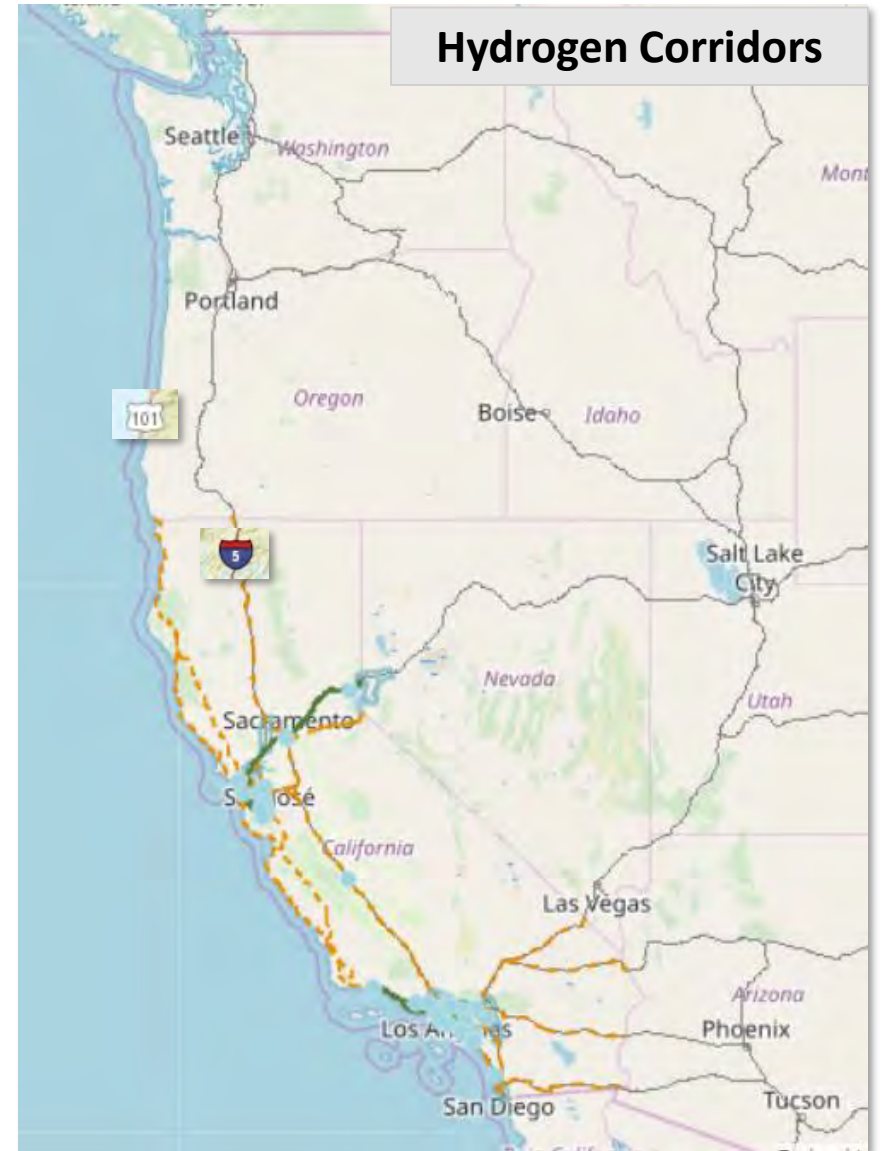
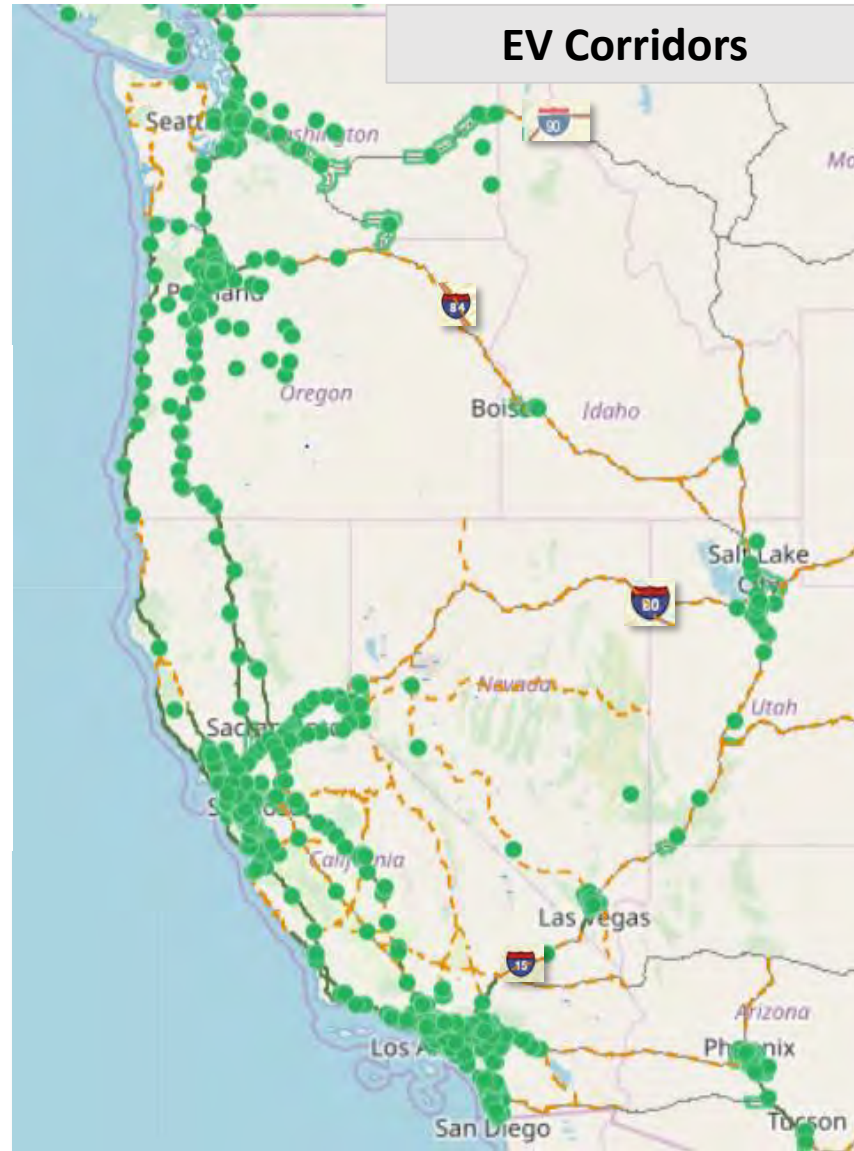
Alternative Fuels Data Center

Station Data for Nominating Alternative Fuel Corridors.

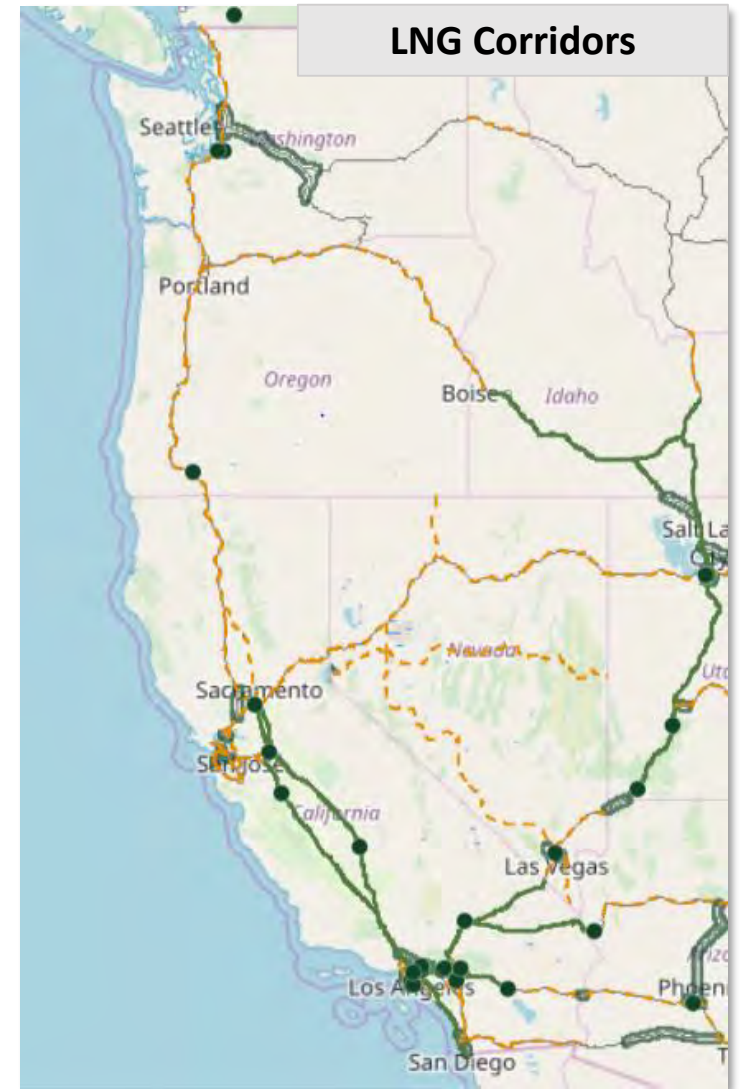
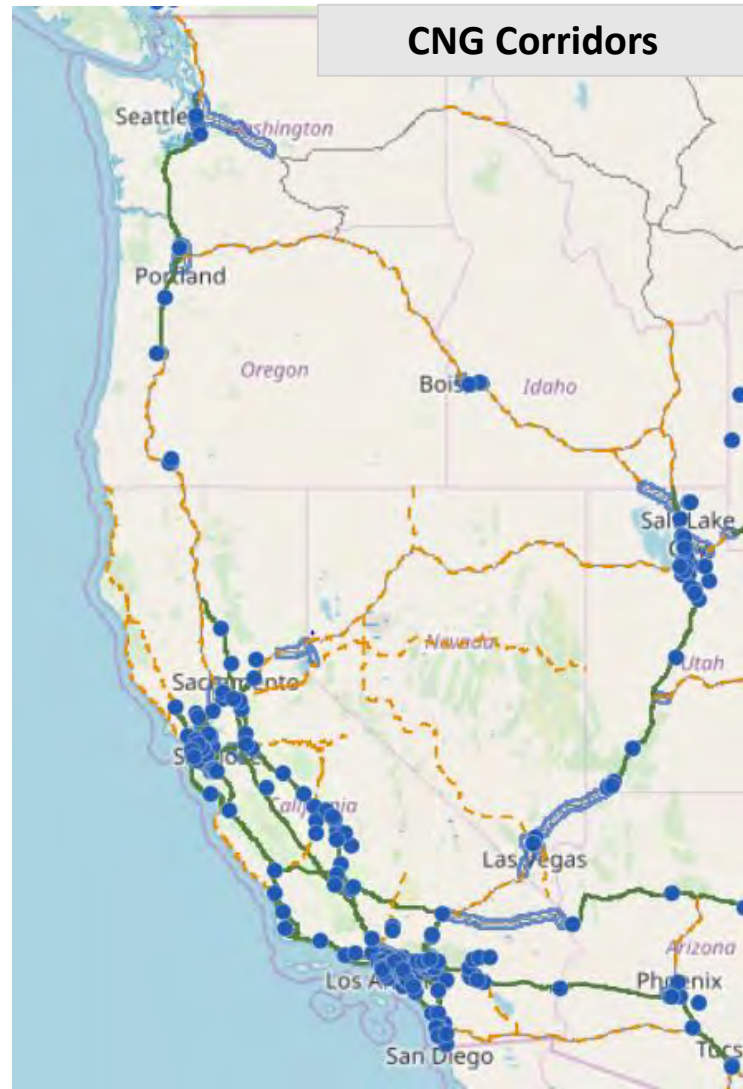
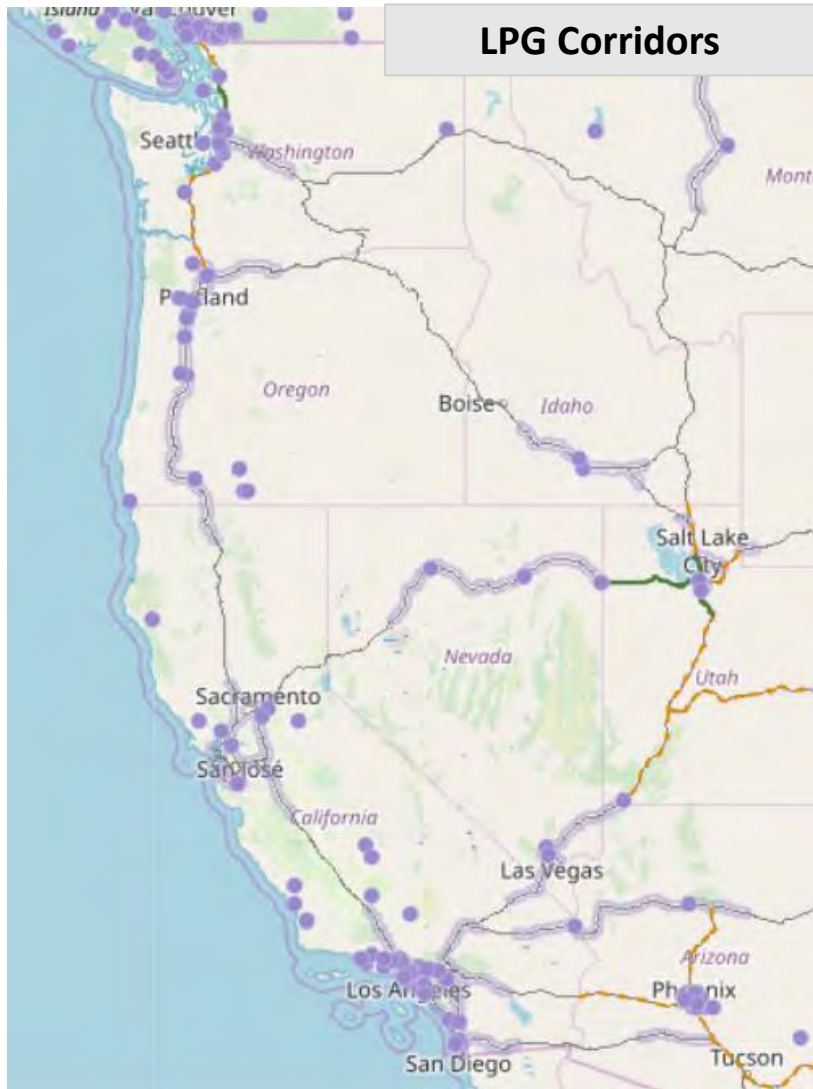
Alternative Fuel Corridors (09/10/2018)

- 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.



West Coast Alternative Fuel Corridors



As of September 5 2018

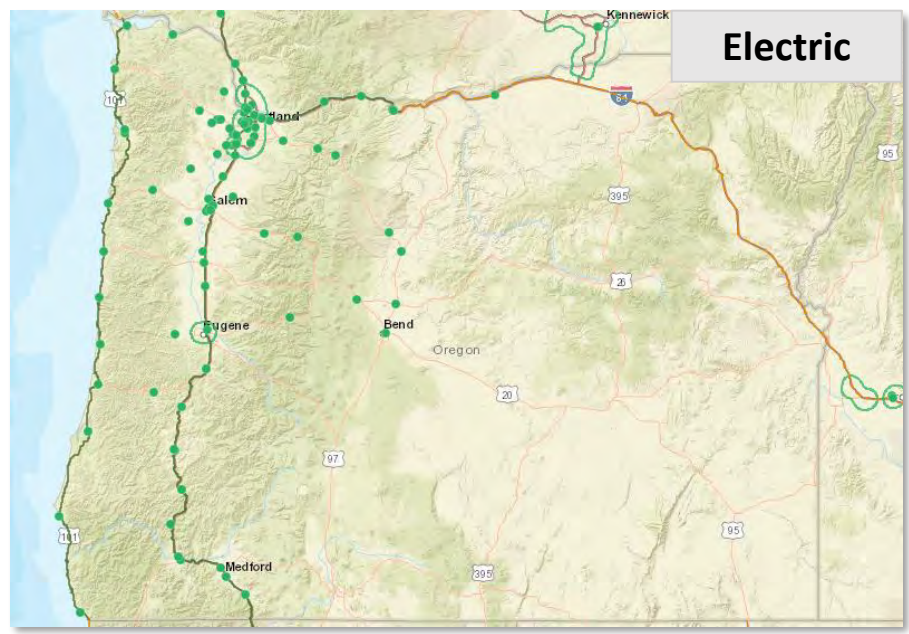
Oregon Alternative Fuel Corridors

Designated Interstate:
I-5 and I-84

Designated Route/State Highway:
101

Key

- Corridor Ready
- - - Corridor Pending
- ▭ Potential Corridor





FHWA Alternative Fuel Corridor MotorWeek Segment

<https://www.youtube.com/watch?v=QZhLFqTXb-g>





Mike Scarpino

Transportation Project Engineer,
U.S. Department of Transportation - Volpe Center

michael.scarpino@dot.gov

(Key leads on Alternative Fuel Corridor Program)





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 Oregon.

- 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 and Remarks by:

- **Mike Scarpino**, Transportation Project Engineer, U.S. Department of Transportation – Volpe Center
- **Jeff Hove**, Vice President, Alternative Fuels Council, National Association of Truck Stop Operators
- **Christopher Galati**, President, Columbia-Willamette Clean Cities Coalition
- **Dan Avery**, Senior Energy Policy Analyst, Oregon Department of Energy
- **David Breen**, Senior Manager, Air Quality, Port of Portland





Jeff Hove

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

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WCC Update
December 2018
Chris Galati, PE
Columbia Willamette Clean Cities



Agenda

- Goal Statement.
- Recap of the ask.
- What's changed.
- Next steps.

Goal Statement

- Goal: Deliver an infrastructure solution to increase Oregon's use of alternate fuels CNG and Propane in the major Interstate Corridors (5 & 84) and extend the network to State Highway Corridors (26, 30, 101 & 97).
 - Measure 1: Infrastructure must be adequate in capacity to meet Class 6-8 vehicle fueling needs.
 - Measure 2: Infrastructure must be a complete network.
 - Measure 3: Infrastructure must be convenient to access.
 - Measure 4: Infrastructure price controlled: fuel cost = $f(\text{CAPx}, \text{fuel}, \text{etc})$
 - Measure 5: Infrastructure must be reliable.

The Cold Hard Facts.

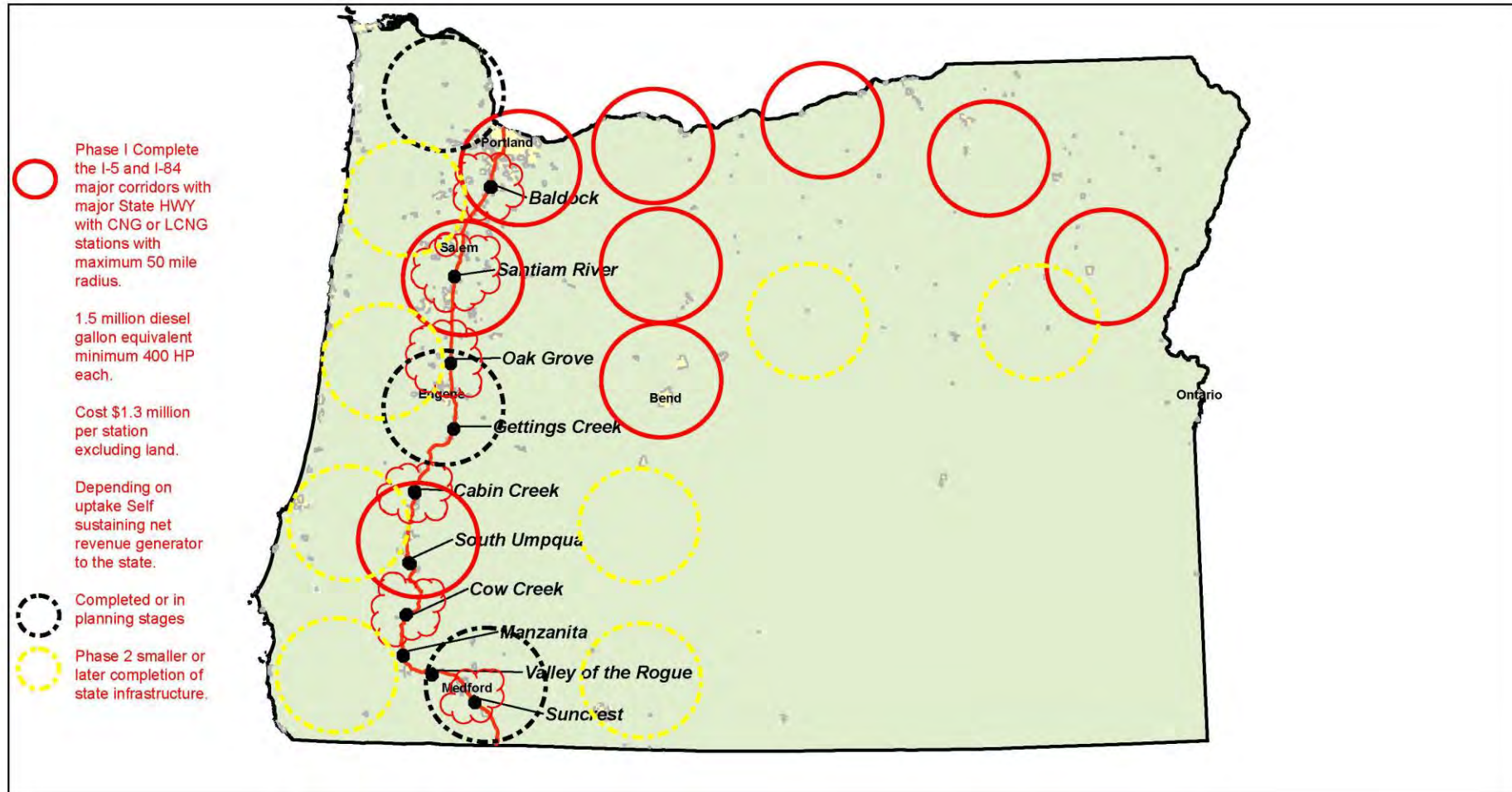
- This is not the chicken or egg syndrome.
- Fleets require certainty.
- Fleets require reliability.
- Fleets require range.
- Fleets require efficient use of vehicle/driver time.
- Fleets require a reason to change.



CWCCC consensus: These are Boolean .AND. conditions.
They have not changed.

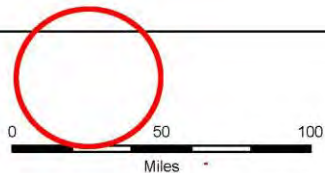
Recap of the ask

- 20 large stations, 10 Phase I, 10 Phase II
- Swept capacity of 500 DGE per hour.
- Maximum station spacing of 60 miles.
- Accessible within 5 minutes from corridors.
- Partner with Public or Private entities to avoid real property costs.
- Adequacy of maintenance personnel and parts.
- \$15 million USD to accomplish Phase I.
- First step designation, second step funding.
- Leverage funds where possible.



OREGON DEPARTMENT OF TRANSPORTATION

Interstate 5 Rest Areas



DISCLAIMER:
 This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



What's changed since the WCC started?

- Economics and Policy:
 - Current diesel rack price for B-5 \$1.75 12/12/2018
 - State of Oregon AFITC-AFV EIP program terminated.
 - Economy hot: Labor and materials up. (20-30%)
 - NFPA Code changes.
 - State focus appears to be leaning towards EV infrastructure.
 - Fleet age has improved reducing environmental benefits.
- Activity:
 - One, small, CNG station completed for the City of Portland: City use only under NWN Schedule H. Trillium opened up a public access station in Vancouver, WA backed by Frito Lay.

What's unchanged since the WCC started?

- Pro Forma for a station is totally dependent on volume:
 - Cost of LDC delivered gas by rate schedule and O&M
 - Facility charges based on 50/50 D/E, 10% ROE, 5% interest, \$1.5 million station costs, 29% EFF TR. Depreciation IRS guidelines.
 - RNG RIN and CFP value shared with customer still unclear.

DGE Sold	100000	500000
O&M	\$ 0.50	\$ 0.10
Electricity	\$ 0.06	\$ 0.06
Commodity	\$ 0.80	\$ 0.62
Facility	\$ 3.00	\$ 0.60
Land	\$ -	\$ -
Clean Fuels	\$ -	\$ -
RINs (RNG)	\$ -	\$ -
<hr/>		
\$/DGE	\$ 4.36	\$ 1.38
Current Rack	\$ 1.75	\$ 1.75
Payback	None	13 Years

What's unchanged since the WCC started?

- Infrastructure development in Oregon.
 - Not a core comp for the State.
 - Too uncertain for private developers with current diesel pricing. Willing to build if it is backed by take or pay agreements and/or up front payment. 10-20 year time horizon too long. What's required is long sustained periods of high diesel prices approaching \$4 per gallon. No new stations in Oregon since filing.
 - A core competency for gas utilities but they need: grants, ratepayer participation and possible legislation to move forward. 10-20 year horizon is commensurate with other utility investments. Various approaches include combining the above with revolving/guaranteed loan program, floor and ceiling price schemes tied to diesel etc.

Conclusions

Keep up the effort at WCC.

The next wave will come.

Diesel will spike.

Lobby and educate whenever possible.

Look for ways to partner.

Oregon Department of Energy

Oregon Biogas / Renewable
Natural Gas Inventory - SB 334
(2017)

WCC AFICC

December 13, 2018

Dan Avery
Senior Policy Analyst



SB 334 (2017) – Overview

- Conduct a detailed feedstock inventory related to biogas and renewable natural gas (RNG) resources within the state of Oregon. Look at feedstock potential for gas production. Technologies include anaerobic digestion and thermal gasification.
- Examine existing biogas / Renewable Natural Gas sites and their supply chains.
- Estimate GHG emission and air pollution improvements based on using RNG as stationary fuel and transportation fuel.
- Form an Advisory Committee to specifically provide input on barriers to developing and utilizing biogas and renewable natural gas and to provide recommendations to the department on policy to promote RNG production and use.

Biogas/RNG Fuel Production Pathways

Anaerobic Digestion



Food Waste

138.5 million cf/yr



Landfills

4.3 billion cf/yr



Animal Manure

4.6 billion cf/yr



Municipal Wastewater

1.2 billion cf/yr

Thermal Gasification



Forest Harvest
Residuals

16.9 billion cf/yr



Agricultural Harvest
Residuals

22.6 billion cf/yr

SUMMARY of GROSS POTENTIAL

AD = 10.3 billion cf/yr

TG = 39.7 billion cf/yr

50 billion cf/yr

GHGs and Air Pollution

RNG as an Alternative Stationary Fuel: RNG production prevents methane from sources like landfills and animal waste from being directly emitted to the atmosphere. The combustion of captured gas results primarily in carbon dioxide, a GHG that is at least 25 times less potent in the atmosphere than methane. Approximately **2 million metric tons** of fossil fuel-based carbon dioxide could be prevented from entering the atmosphere if the potential RNG volume in Oregon could be captured and used to displace fossil fuel natural gas.

RNG as an Alternative Transportation Fuel: RNG used as an alternative to diesel fuel can produce significant reductions in air pollutants. The analysis shows **reductions of 20 percent or more** for GHGs, CO₂, fine particulate matter (PM_{2.5} and PM₁₀), **and greater than 30 percent decrease** in the amount of organic carbon emissions. When used as an alternative for an equivalent amount of diesel fuel, the state's total RNG production potential from anaerobic digestion alone would reduce net GHG emissions by **2.3 million MTCO₂e**.

Potential Barriers

Finance Barriers

- Access to financing
- Gas upgrading costs to remove impurities, and increase heat content of biogas
- Interconnection costs, testing, verification, and pipeline construction costs

Information Barriers

- The perception of risk due to unfamiliarity with biomass technologies and fuel supply chains

Market Barriers

- Lack of natural gas vehicles, fleets, and fueling infrastructure

Policy/Regulatory Barriers

- Existing policy prevents Oregon utilities from making ratepayer-funded capital investments in RNG infrastructure, such as extension of pipelines or connection points for RNG producers, as well as the requirement for utilities to purchase the least-cost resource
- Lack of policy encouraging or mandating the source separation of wastes (such as food wastes)
- Lack of financial incentives for natural gas fueling infrastructure

Recommendations

1. Allow natural gas companies to buy and sell RNG to and for their customers.
2. Allow local gas distribution companies to recover pipeline interconnection costs through their rates.

Recommendations

3. Study how best to expand natural gas transportation fueling infrastructure.
4. Explore development of voluntary gas quality standards for injection of RNG into the natural gas pipeline.

Quality standards for injection of RNG would identify acceptable levels of impurities and heat content for safety and environmental purposes, while providing reasonable and predictable access to pipeline transmission and distribution facilities.

Recommendations

5. Explore financial incentives to help drive the nascent industry forward.

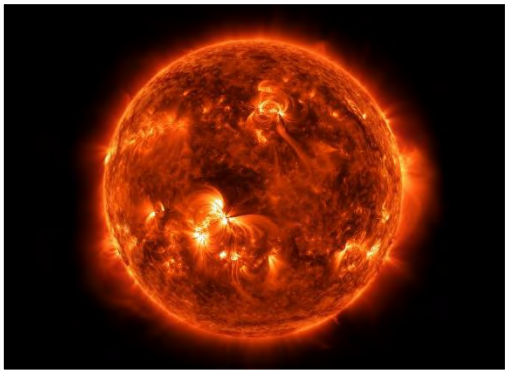
Near-term financial incentives to reduce the cost of RNG projects, pipeline interconnections, fueling infrastructure and fleet conversions, and grow other markets to stimulate demand for RNG.

6. Coordinate with RNG stakeholders and state agencies to develop a tracking and accounting protocol for production and use of RNG.

A protocol would assist in the accurate accounting and tracking of current and future RNG credits that can be traded in current and future markets.

Any protocol would need to mesh with current state and federal tracking in the Oregon Clean Fuels Program, the California Low Carbon Fuels Standard Program, and the U.S. EPA Renewable Fuels Program.

Questions



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Oregon 2018 RNG Inventory Report
<https://www.oregon.gov/energy/Data-and-Reports/Documents/2018-RNG-Inventory-Report.pdf>

Medium- and Heavy-Duty Alternative Fuel Infrastructure Needs



David Breen Senior Manager, Air Quality

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December 13, 2018

The Port of Portland: What We Do



Terminal 6

Terminal 2

Terminal 4

Terminal 5



The Port of Portland: What We Do



Troutdale Reynolds Industrial Park

Gresham Vista

Hillsboro Aviation Properties

Portland International Center

Swan Island Industrial Park

Rivergate

The Port of Portland: What We Do



Portland Troutdale Airport

Portland International Airport

Portland Hillsboro Airport



Aviation Business

PDX Commercial Flights



PDX Cargo



Hillsboro General Aviation



Troutdale General Aviation

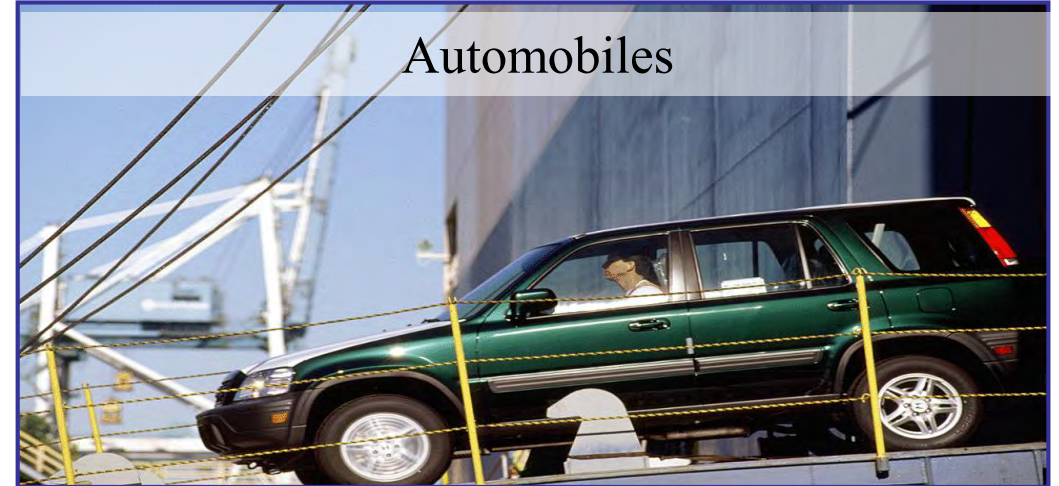


Marine & Industrial Development Business Lines

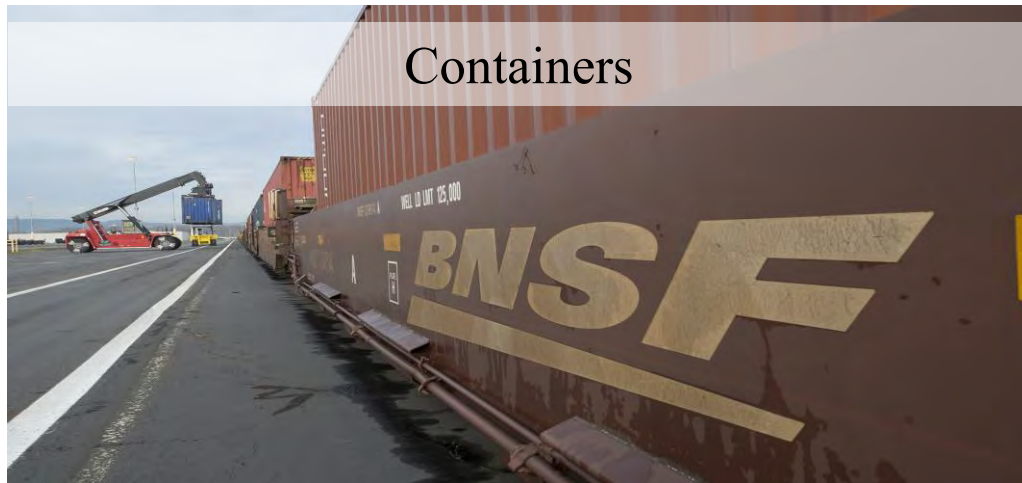
Mineral and Grain Bulks



Automobiles



Containers



Commercial / Industrial Parks



Portland International Airport

CNG BUSES



ELECTRIC BUSES



ELECTRIC GSE



Marine Terminals and Commercial Freight Centers

1) Cargo Handling Equipment (Port-owned)

- Need long term commitments & level of service to make substantial investments a reasonable risk

2) On-Road Vehicles (non-Port)

- Equipment duty requirements
- Vehicle costs
- Fueling infrastructure accessibility



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

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