

ACWA Annual Conference 2013

July 25th

Mount Bachelor Village Resort, Bend Oregon

The Compelling Case for Natural Gas

Rick Wallace

Oregon Department of Energy

Columbia Willamette Clean Cities Coalition



Columbia Willamette Clean Cities Coalition

- **Public / Private Partnership**
- **Contributes to the Environmental, Economic, and Energy Security of the US**
- **Dedicated to the Reduction of Petroleum Consumption**
- **Advance the use of: Alternative Fuels & Vehicles, Idle Reduction & Hybrids**
- **Over 90 Coalitions in the US**



Columbia-Willamette Clean Cities Coalition dues-paying members:

City of Beaverton

City of Canby

City of Eugene

City of Hillsboro

City of Longview City Shop

City of Portland

City of Salem

Clark County Public Works

Coda Automotive

CUB Policy Center

Drive Oregon

Environmental Protection Agency

Eugene Water & Electric Board

EV 4 Oregon LLC

Gresham Sanitary Services

Lane Transit District

Linn Benton Community College

McCoy Freightliner

Metro Parks & Env. Services

Northside Ford Truck Sales

NW Natural Gas

Oregon Department of Energy

Oregon Department of Transportation

Oregon Department of Environmental Quality

PAPE Kenworth

Port of Portland

Portland Community College

Portland General Electric

Salem Keizer Transit

Smokey's CLN. NGV Tech

Springfield Utility Board

Trans Energy Solutions

Truck Modifications Systems

Tualatin Hills Park & Recreation

Washington County Fleet Services

Western Bus Sales, Inc

Whole Energy Fuels

World CNG

Art Ashton, Douglas Dunford,

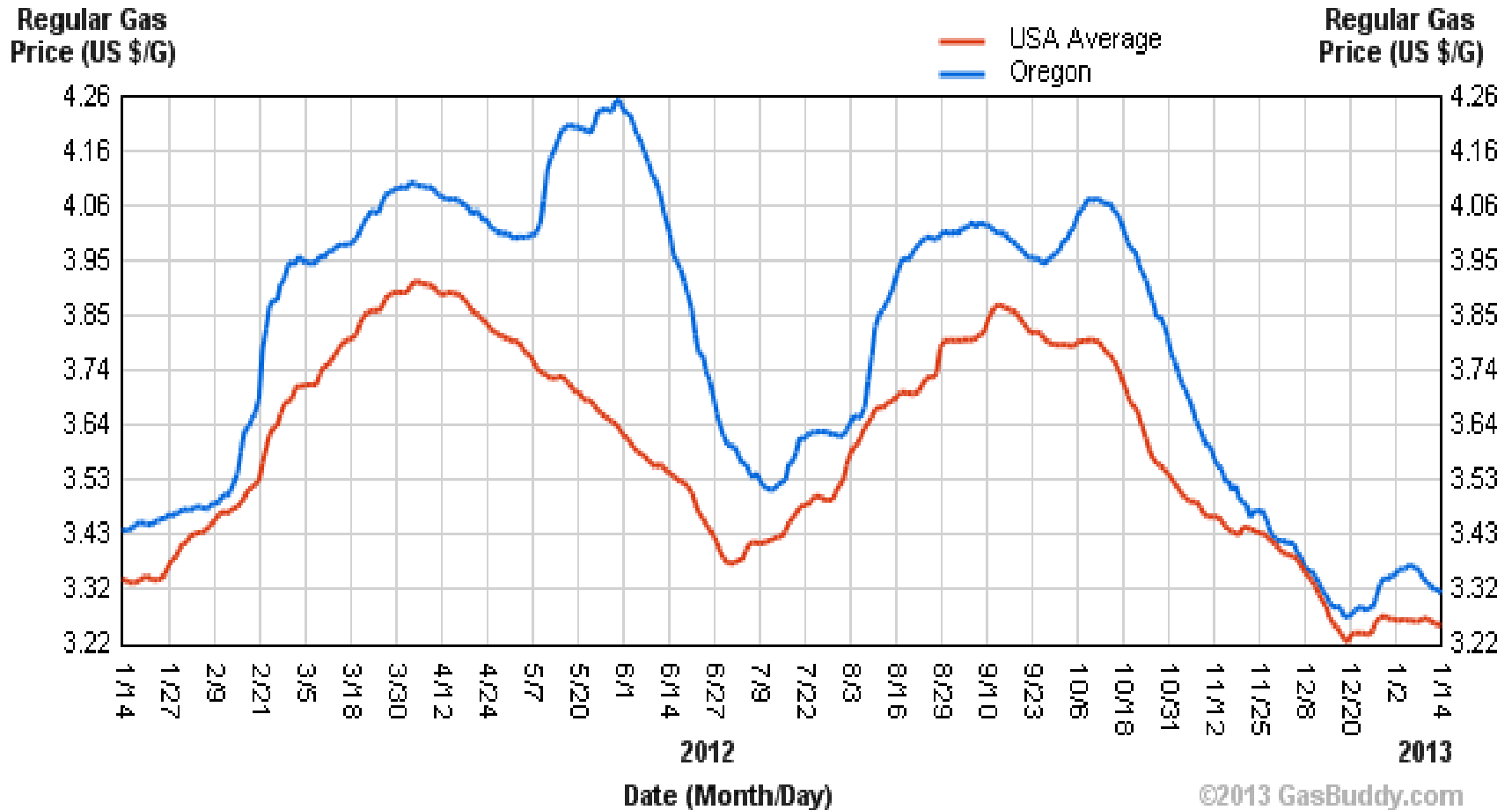
Chase Jackson, Dave Mayfield



Oregon verse US Average Gas Prices for 2012



12 Month Average Retail Price Chart



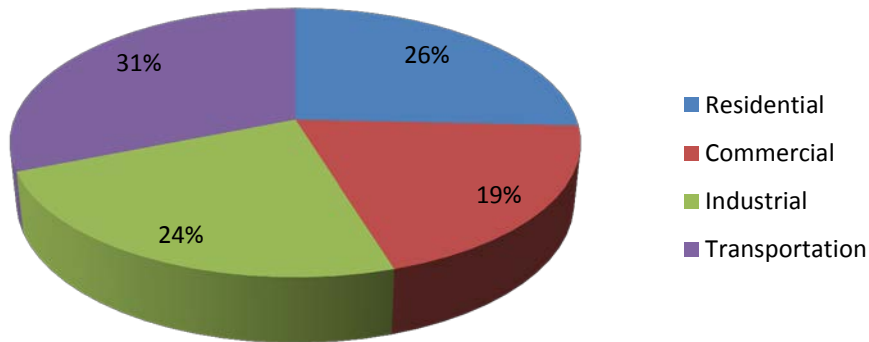
Why Alternatives



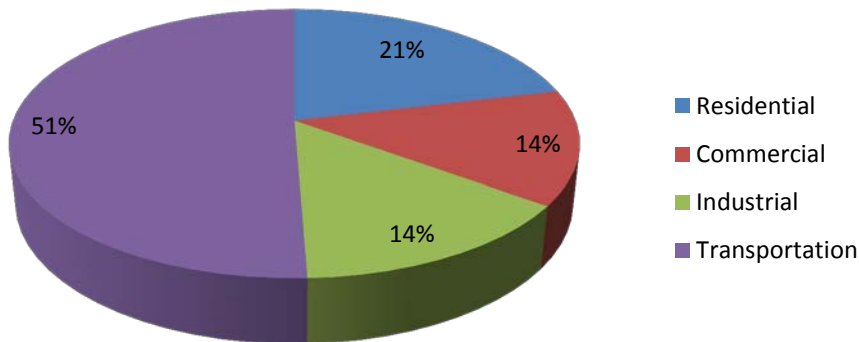
- Oregon spent over \$8 billion on gasoline and diesel last year, over \$6 billion of that money left our state.
- In 2012 gasoline avg. \$3.81/gal & diesel avg. \$4.11/gal
- In 2000 the avg. OR household spent 3.31% of their income on trans fuel, in 2012 they spent 7%. This continues to rise.
- Electricity, biofuels & natural gas are primarily domestic products, with a large share of electricity & biofuels produced in Oregon
- We need to diversify fuel sources in the transportation sector for our energy security

Transportation fuel consumes 31% of all the energy we use however it takes 51% percent of the money spent on energy in the state making it the most expensive energy we use.

Percent Sector Energy Consumption

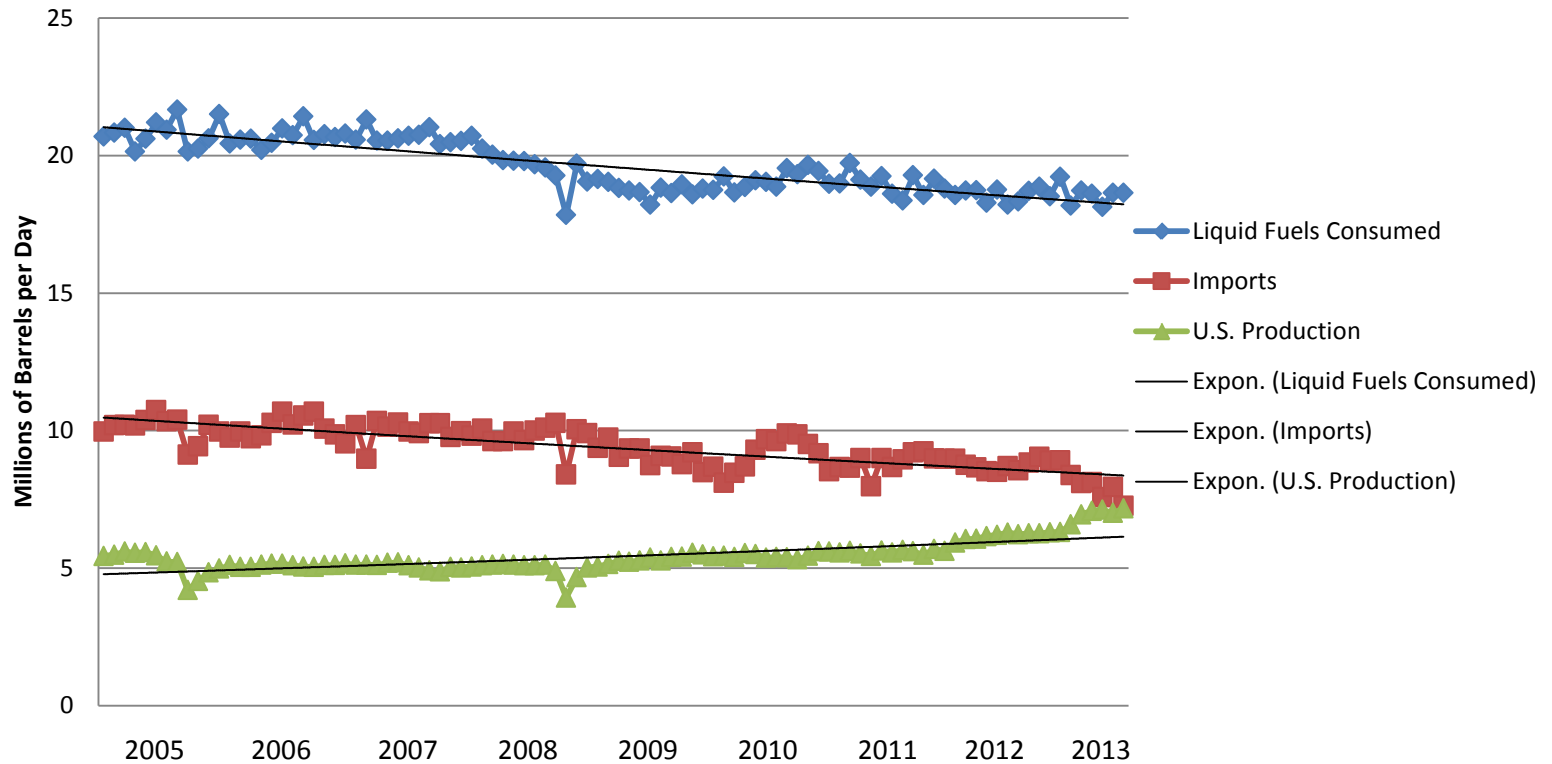


Percent Sector Energy Cost

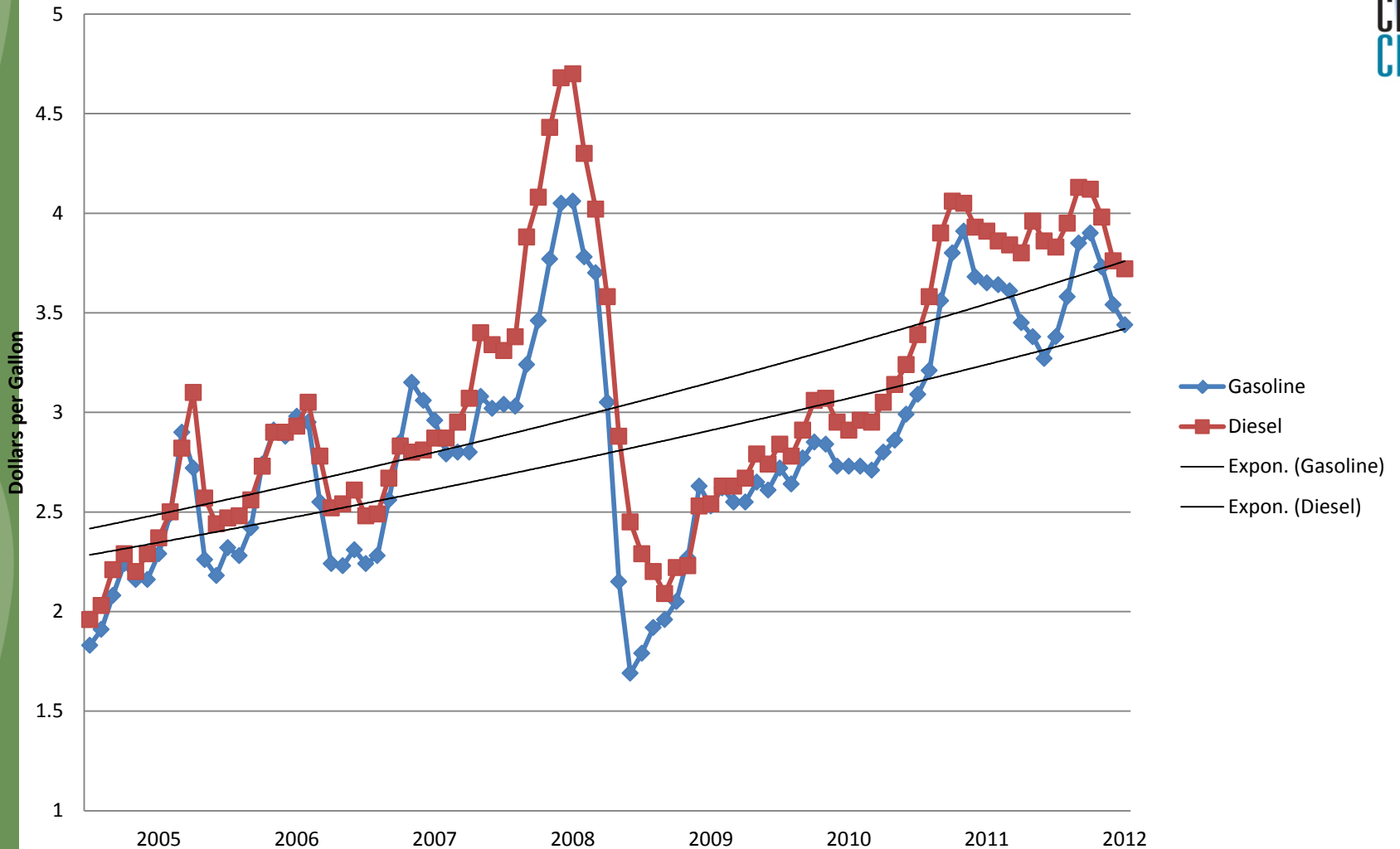


Consumption, Production & Imports

US Petroleum



Gasoline and Diesel Cost/Gallon

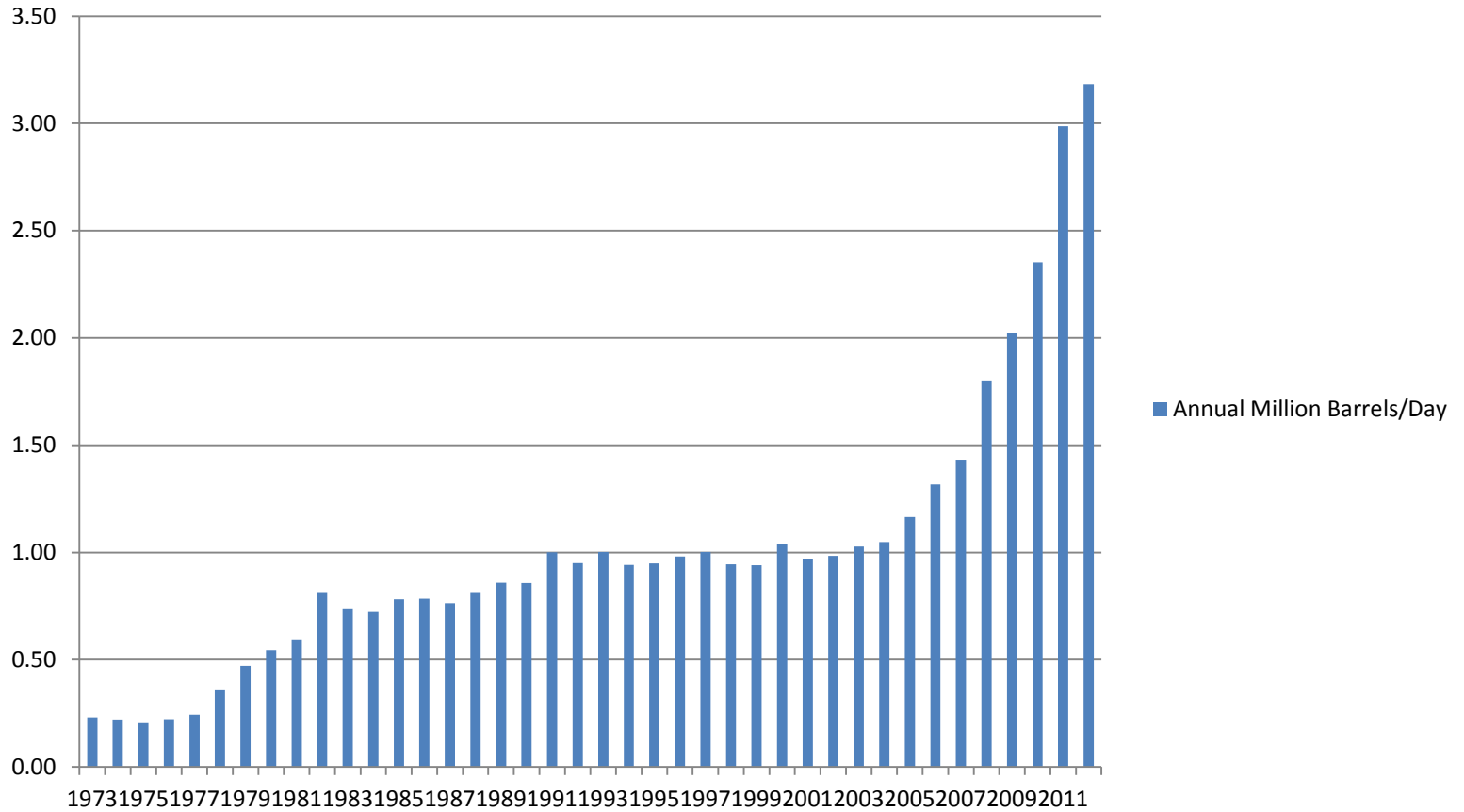


Gasoline has increased 34% and diesel 35%

The gap between gas & diesel price has doubled, \$0.15 to \$0.30

U.S. Petroleum Exports

Annual Million Barrels/Day



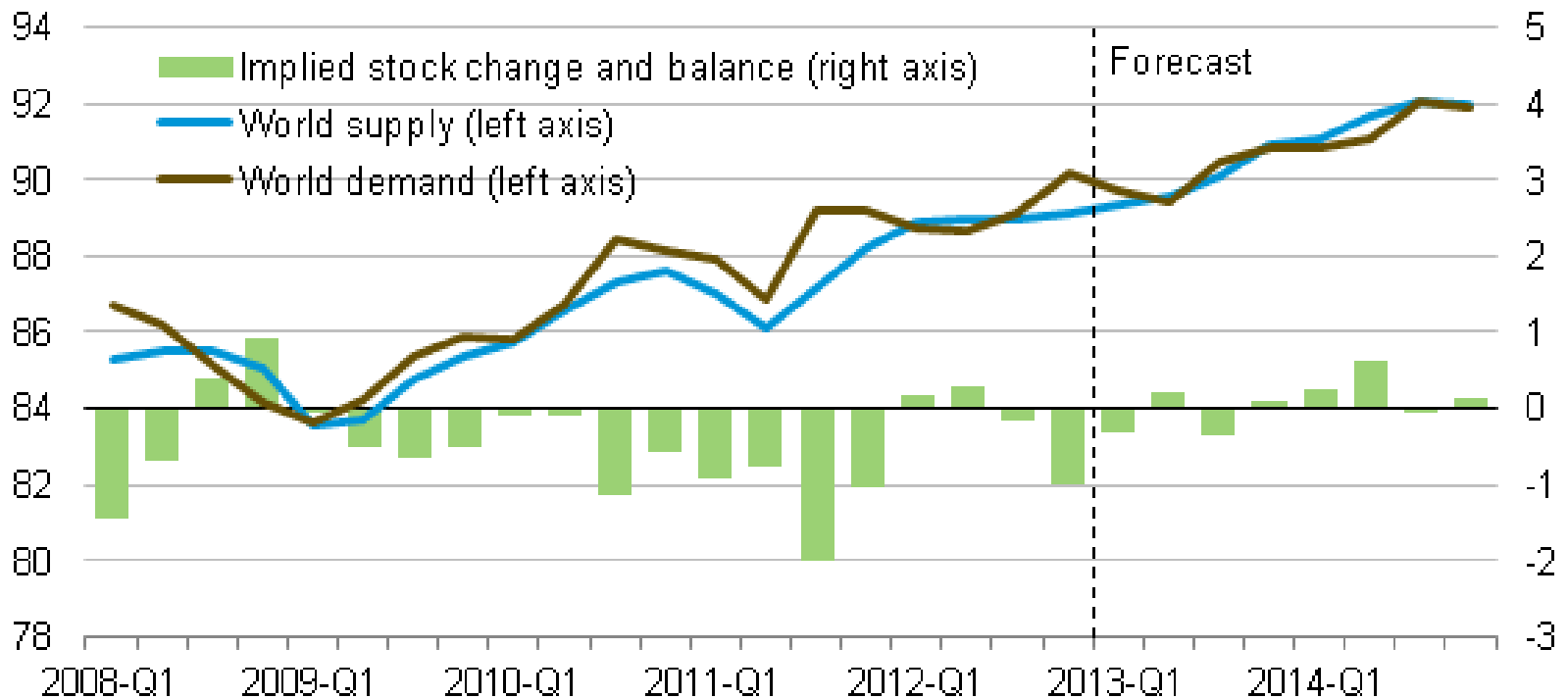
98% refined product, 2% crude



World Supply & Demand Determine Price

World Liquid Fuels Supply and Demand Balance

million barrels per day



Source: Short-Term Energy Outlook, January 2013



Oregon Transportation Policy

- **Reduce Vehicle Miles Traveled**

- Land use, mass transit, bicycles, telework, carpooling, rail, combine trips

- **Vehicle Efficiency**

- ECO driving or driving efficiently

- High mile per gallon vehicles (ie. hybrids)

- Efficient Truck Technology (APU, Aero, Tires) reduce idling

- **Alternative Fuels**

- Electricity, Biodiesel, Ethanol, CNG, Propane

etc.



Natural Gas

- Worldwide 15.2 million vehicles, US 120,000 and Oregon about 1,600 vehicles
- A plentiful domestic product, Est. 100 yr supply-currently stranded in N. America
- In the U.S., about 50 different manufacturers produce 100 models of light-, medium-, and heavy-duty vehicles and engines.
- Ford, GM and Chrysler all make NG ready vehicles, conversion companies have worked with the OEM's to avoid warranty issues



Natural Gas

- Natural gas in the transportation sector is used in two forms, CNG or Compressed Natural Gas (3,000 to 3,600 PSI) and LNG or Liquid Natural Gas (-261 F degrees)
- Clean fuel that can extend service life of the vehicle by 2 to 3 years with lower maintenance costs



Local Emissions Reductions (CEC)

Full Fuel Cycle Analysis	Light-duty	Heavy-Duty
Volatile Organic Compounds (VOC)	55%	46%
Carbon Monoxide (CO)	11%	6%
Nitrogen Oxide (NOx)	54%	8%
PM 10	42%	27%
Air Toxics	99%	99%

Global Emissions



Gasoline & Gasoline Substitutes	Carbon Intensity (gCO ₂ e/MJ)	Diesel & Diesel Substitutes	Carbon Intensity (gCO ₂ e/MJ)
Gasoline	92.34	Ultra Low Sulfur Diesel	91.53
Ethanol-MW production & corn	64.82	Biodiesel-MW production soy beans	21.66
Ethanol-NW production & MW corn	53.79	Biodiesel-NW canola	27.31
Sugarcane ethanol	26.44	Biodiesel-NW yellow grease	10.28
Cellulosic-Farmed trees	15.54	Pipeline NG in Oregon/CNG	74.70
Pipeline NG in Oregon/CNG	70.22	LNG	83.13
Electricity	37.80	RNG-Landfill	11.26
		RNG-Dairy	13.45

Cost to Travel 100 Miles/ Pickup Truck

	Fuel Cost	MPG	Gal/100mi	Cost
Gasoline	\$3.81	16	6.25	\$23.81
Diesel	\$4.11	21.2	4.72	\$19.39
Biodiesel	\$3.99	21	4.76	\$18.99
E85	\$3.54	12	8.33	\$29.50
LPG/Propane	\$2.35/	14.16	7.062	\$16.60
	\$1.75			\$12.35
CNG	\$2.10/	15.5	6.45	\$13.55
	\$1.30			\$8.39
Electricity	\$0.10kWh/	2mi/kWh/	20 kWh/	\$2.00
	\$3.81	22	2.73/60mi	\$10.40



Source Oregon Dept. of Energy

ROI for Pickups

	Fuel Cost/mi	Fuel Cost Difference	Conversion or up Cost	Miles to ROI
Gasoline	\$0.238			
Diesel	\$0.194	\$0.044	\$3,500	79,545
Biodiesel	\$0.190	\$0.048	\$3,500	72,917
E85	\$0.295	-\$0.057	\$ 125	
LPG/Propane	\$0.166/ \$0.124	\$0.072/ \$0.114	\$6,000	83,333/ 52,632
CNG	\$0.136/ \$0.084	\$0.102/ \$0.154	\$9,750	95,588/ 63,312
Electricity/Gas	\$0.124	\$0.114	\$8,880 with incentive	77,895



Estimated Simple Payback of a Large CNG Pickup Truck at \$10,000 Incremental Cost

Miles Per Year	Price Differential between a DGE of CNG and a Gallon of Diesel					
	\$1.50		\$2.00		\$2.50	
	Annual Savings	Payback in Years	Annual Savings	Payback in Years	Annual Savings	Payback in Years
10,000	\$ 1,019	9.8	\$ 1,481	6.8	\$ 2,083	4.8
15,000	\$ 1,528	6.5	\$ 2,222	4.5	\$ 3,125	3.2
20,000	\$ 2,037	4.9	\$ 2,963	3.4	\$ 4,167	2.4
25,000	\$ 2,546	3.9	\$ 3,704	2.7	\$ 5,208	1.9
Miles to ROI		98,182		67,500		48,000
Gallons of CNG to ROI		9,091		6,250		4,444

Assumptions

CNG DGE MPG = 10.8

Diesel MPG = 12



Estimated Simple Payback of a Class 3-6 CNG Truck at \$30,000 Incremental Cost						
Miles Per Year	Price Differential between a DGE of CNG and a Gallon of Diesel					
	\$1.50		\$2.00		\$2.50	
	Annual Savings	Payback in Years	Annual Savings	Payback in Years	Annual Savings	Payback in Years
10,000	\$ 1,746	17.2	\$ 2,540	11.8	\$ 3,333	9.0
15,000	\$ 2,619	11.5	\$ 3,810	7.9	\$ 5,000	6.0
20,000	\$ 3,492	8.6	\$ 5,079	5.9	\$ 6,667	4.5
25,000	\$ 4,365	6.9	\$ 6,349	4.7	\$ 8,333	3.6
Miles to ROI		171,818		118,125		90,000
Gallons of CNG to ROI		27,273		18,750		14,286

Assumptions

CNG DGE MPG = 10.8

Diesel MPG = 12



Estimated Simple Payback of a Class 7&8 CNG Truck at \$35,000 Incremental Cost						
Miles Per Year	Price Differential between a DGE of CNG and a Gallon of Diesel					
	\$1.50		\$2.00		\$2.50	
	Annual Savings	Payback in Years	Annual Savings	Payback in Years	Annual Savings	Payback in Years
20,000	\$ 5,432	6.4	\$ 7,901	4.4	\$ 10,370	3.4
25,000	\$ 6,790	5.2	\$ 9,877	3.5	\$ 12,963	2.7
30,000	\$ 8,148	4.3	\$ 11,852	3.0	\$ 15,556	2.3
35,000	\$ 9,506	3.7	\$ 13,827	2.5	\$ 18,148	1.9
Miles to ROI		128,864		88,594		67,500
Gallons of CNG to ROI		31,818		21,875		16,667

Assumptions

CNG DGE MPG = 4.05

Diesel MPG = 4.5





Refueling System Incentives



- **Federal Credit**
- **Business**
Credit is 30 percent of the cost up to \$30,000
- **Personal**
Credit is 30 percent of the cost up to \$1,000
- **Use IRS Form 8911**
- **If the purchaser is a tax exempt organization, government unit or a foreign person the seller can take the credit**



Refueling System Incentives

- Oregon State Credit
- Business

Credit is 35 percent of the cost

<http://www.oregon.gov/energy/BUSINESS/Incentives/Pages/EIP-Trans.aspx>

- Personal

Credit is 25 percent of the cost up to \$750

<http://www.oregon.gov/energy/TRANS/Pages/hybridcr.aspx>



Programs Coming

- **SB 583**
- **Alternative Fuel Vehicle Revolving fund for public and tribal entities**
 - **Conversions & incremental cost of new**
 - **Create loan packages that payback the loan based on fuel cost savings**
- **Allows the Oregon Department of Energy's Transportation Energy Incentive Program to include alternative fuel vehicles in their eligible projects for tax incentives after January 1, 2015**

Questions?

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