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Fueling Oregon with Sustainable Biofuels

***John Galloway
Program Director
Oregon Environmental Council***

Presentation to Office of Sustainable Development 7/24/08



Oregon Environmental Council

- Celebrating our 40th anniversary this year
- We work to:
 - Slow global warming
 - Protect kids' health from toxic pollution
 - Clean up Oregon's rivers
 - Promote healthy food and farms
 - Build a sustainable economy



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Biofuels Policies: Current

- Renewable Fuels Standard
 - Statewide standard adopted 2007, currently in roll-out
 - E10 (10% ethanol) and B2 / B5 (biodiesel blends)
 - Portland just celebrated one-year anniversary of its RFS
 - Federal RFS: 36 billion gallons by 2022
- Financial Incentives for Biofuels Feedstock and Fuel Producers
 - State: Feedstock incentives, BETC, property tax exemptions
 - Federal: loan guarantees, blender credits



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Broader Fuel Policies: Future

- Low-Carbon Fuels Standard
 - Reduce carbon in transportation fuels 10% by 2020
- Including transportation fuels in Carbon Cap and Trade



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Markets for Diesel and Gasoline

	<u>Diesel</u>	<u>Gasoline</u>
Gallons consumed in U.S. in 2002	~57 billion	~110 billion
Gallons consumed in Oregon each year	~720 million	~1.4 billion
Gallons consumed in Oregon each day	~2 million	~4 million



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Source: SeQuential Biofuels



OEC Report: *Fueling Oregon with Sustainable Biofuels*

- Explains difference between first-generation biofuels & second-generation biofuels
- Describes environmental concerns associated with biofuels production
- Details current and potential biofuel feedstocks in Oregon
- Suggests principles for making biofuels sustainable
- Provides policy recommendations



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Environmental Concerns Associated with Biofuels Production

- Net energy
- Global warming impact
- Air quality
- Water quality
- Water use
- Soil erosion
- Forest health
- Biodiversity and ecosystem conversion



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Current and Potential Biofuels Feedstocks in Oregon

- A number of different potential feedstocks for biofuels in the Pacific NW
- Interesting possibilities include:
 - Oilseed crops (e.g. canola, camelina)
 - Potatoes unsuitable for commercial use
 - Hybrid poplar
 - Agricultural residues (e.g. wheat)
 - Whey & other ag byproducts
 - Woody biomass (e.g. forest thinnings)
 - Algae (the Holy Grail?)



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Principles for Making Biofuels Sustainable

- Support only biofuels that reduce GHGs on life-cycle assessment
- Process with minimal fossil fuel inputs
- Protect air & water quality
- Grow feedstocks using sustainable practices
- Conserve water
- Protect biodiversity
- Avoid conversion of native ecosystems
- Support socially responsible & locally owned production, spur local/regional economic development
- Provide consumer info



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OEC's Next Steps

- Secure a Low-Carbon Fuel Standard in Oregon and establish a “West Coast low-carbon fuels corridor”
- Promoting fuel cap & trade as part of Western Climate Initiative
- Ensure Renewable Fuels Standard remains in place and achieves intended goals
- Working with agriculturalists, forestry interests & biorefiners to develop and disseminate “best management practices” (BMPs); develop case studies



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Our report can be found at...



oeconline.org/our-work/economy/sustainablebiofuels



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Food vs. Fuel: Who Wins?

- Many factors affecting the increase in food prices in global markets, not just biofuels
 - rising cost of petroleum-based energy inputs
 - higher labor costs
 - declining value of the U.S. dollar
 - burgeoning food demand in developing nations
 - serious droughts and other weather-related events occurring throughout the world
 - food commodity speculation
 - increase in retailer profits
 - underinvestment in agricultural production



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80+% of the retail grocery cost is added after the food leaves the farm.





Future of Food and Energy

- No silver bullet or single pathway to accomplish:
 - GHG reduction
 - food and fiber production
 - transportation needs
- Need multiple strategies, including:
 - Conservation/Efficiency
 - Renewable Fuels
 - Fossil Fuels
 - Higher fuel economy vehicles/plug-ins
 - Better utilization of rail and barge in shipping
 - Emerging energy and crop technologies
 - Trade reforms and worldwide investment in agriculture production



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Making Sense of Concerns

- Land Use Change: agricultural markets, urban sprawl, deforestation for hardwoods...
 - US loses 1.2 million acres of ag land/year to urbanization/development
- Net Energy Balance: numerous scientific studies demonstrate biofuels decrease GHGs relative to petroleum
- Alternative fuel?: dirtier petroleum supplies (water, energy, tar sands)
- Ethanol fuel economy: expect no more than 3-4% decrease, but anecdotes much higher



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Getting There from Here

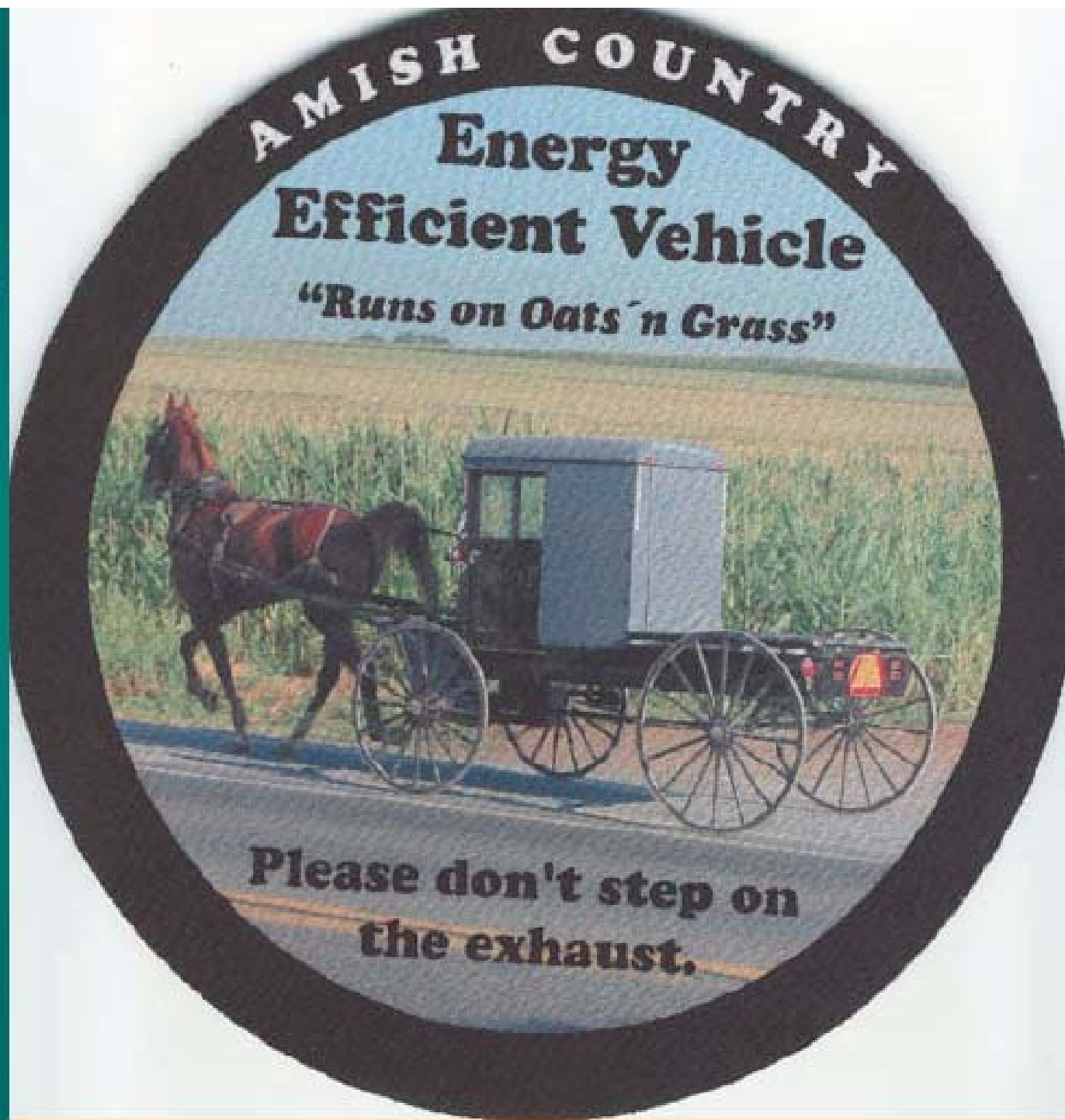
- First-generation fuels often framed as “bridge” to advanced fuels
- Second-gen, multi-feedstock fuels can use existing production facilities (contrast with hydrogen)
- Building on current the generation
 - quality standards
 - distribution methods
 - equipment performance
 - operator and maintenance training
 - equipment vendor and consumer acceptance



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**The original
Sustainable
transportation
system?**

**It required
nearly 50% of
the land to
produce the
fuel (feed) to
run the engine
(horse).**





Thank You!

John Galloway

Program Director

(503)222-1963 Ext. 117

johng@oeconline.org



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Extra Slides



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Overview: Biodiesel

Biodiesel is a biodegradable diesel fuel made from renewable materials, such as vegetable oil, recycled cooking oil and tallow.

**Meets national quality specifications
(ASTM D6751)**



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Biodiesel Health Effects and Emissions Reductions

Emission Type	B100	B20
Total Unburned Hydrocarbons	-56%	-11%
Carbon Monoxide	-43%	-13%
Particulate Matter	-55%	-18%
NO _x	+6%	+1%
Sulfates	-100%	-20%
PAH	-80%	-13%
NPAH	-90%	-50%
Mutagenicity	-80% to -90%	-20%
Ozone Potential of Speciated Hydrocarbons	-50%	-10%
Carbon Dioxide	-78%	-16%

Source: SeQuential Biofuels



Overview: Ethanol

- Most U.S. ethanol (C_2H_5OH) produced from corn (~92%)
- Remainder from grains and agricultural residual products
- These represent “first generation” biofuels
- Second generation fuels refer to non-food biomass feedstocks (cellulose) converted to ethanol using advanced processes (enzymatic, thermal)



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Agriculture BMPs

- Use conservation tillage, cover crops and rotations
- Plant tree buffers or native vegetation along streams
- Build healthy soil
- Apply IPM
- Apply nutrient management planning
- Do not clear native vegetation
- Leave enough crop residues to preserve soil quality



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Forestry Biomass BMPs

- Leave biomass in high conservation value native forests
- Withdraw biomass from:
 - Forests that are certified sustainable by a third-party certifier
 - Federal forests that apply scientifically sound sustainability criteria



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Biorefinery BMPs

- Design to handle multiple feedstocks
- Locate near primary feedstock(s)
- Locate near efficient transportation to markets
- Produce economically viable, environmentally friendly co-products
- Sell wet distiller's grains directly to nearby markets, rather than drying grains
- Use the cleanest, most efficient source of energy to power biorefinery
- Maximize efficient water use
- Protect water quality
- Source feedstocks from third-party certified farmers and foresters



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