

Advanced Hardwood Biofuels Northwest - Laying the foundation for a PNW biofuels and bio based chemicals industry

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WASHINGTON



Feedstock



Conversion



Sustainability



Education



Extension

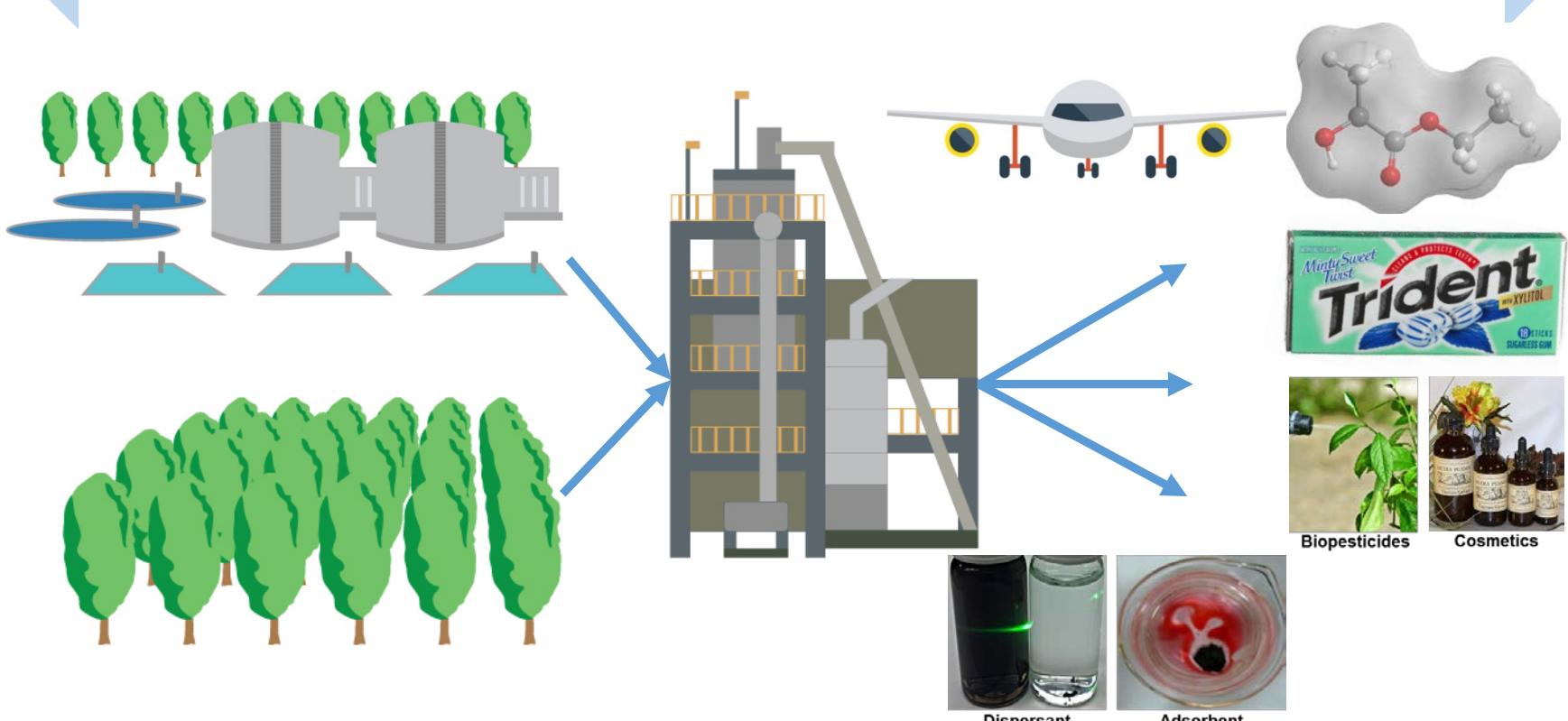


United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Our vision

Sustainable System

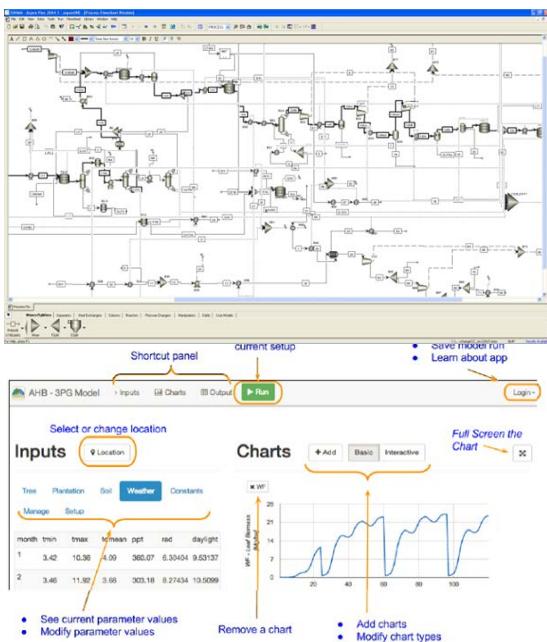
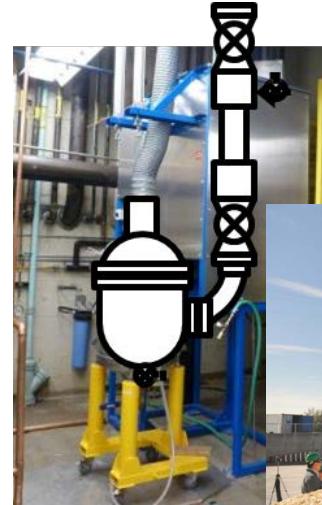


Poplar biomass from tree farms
and environmental services

Robust bioeconomy of
biofuels and bioproducts

Vigorous Extension and Comprehensive Education

Work we are doing



Press coverage – where are biofuels??

A Path for Climate Change,
Beyond Paris
NY Times – 1 December 2015



"- wind is a good option for Iowa,
solar power in Arizona or Australia."

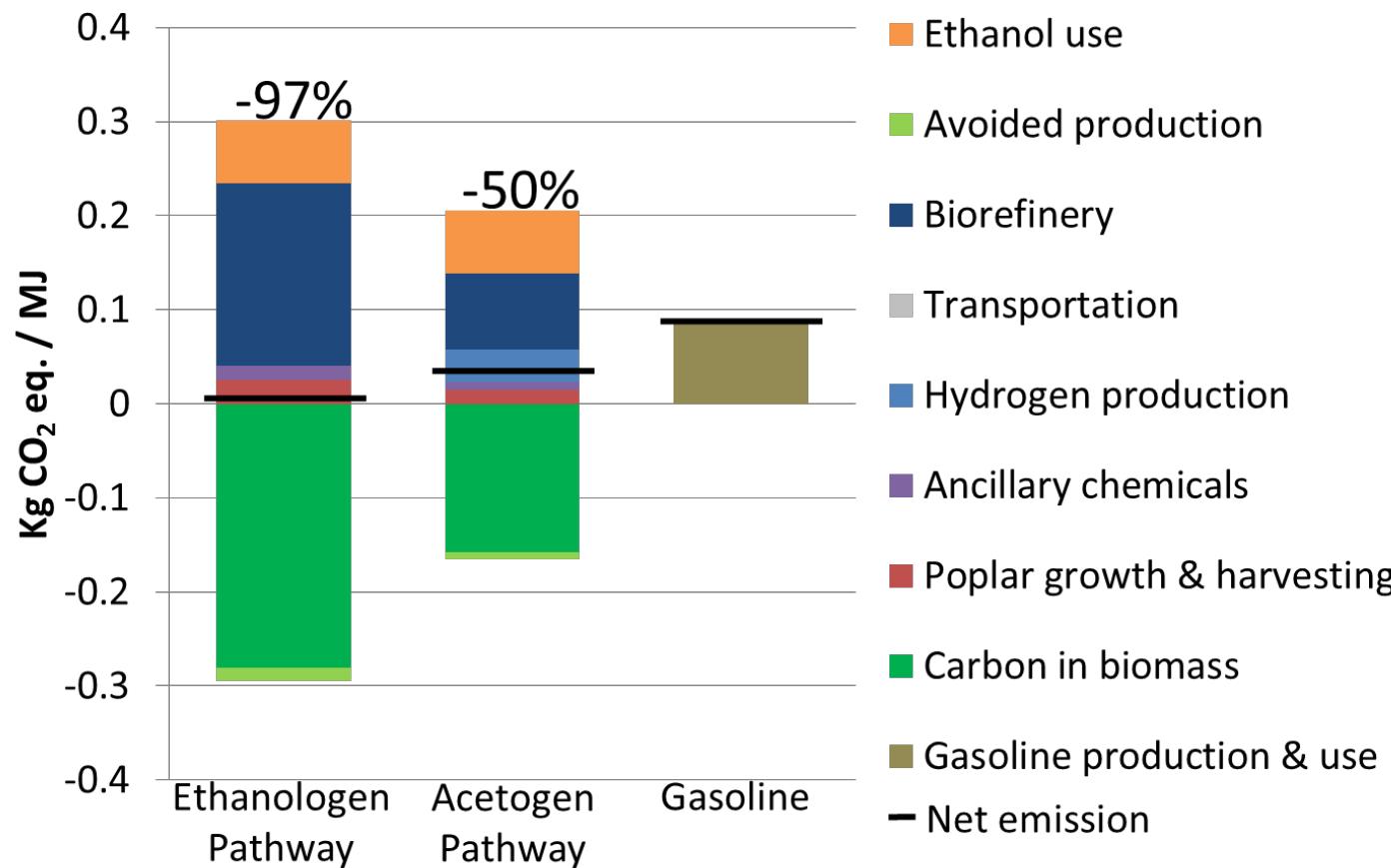
Elon Musk vs. Jeff Bezos: The debate over
alternative fuels for your car
Seattle Times – 9 April 2017



Tesla founder Elon Musk dismisses
hydrogen fuel cells as “fool cells.” Amazon
founder Jeff Bezos has just made a big bet
on the technology.

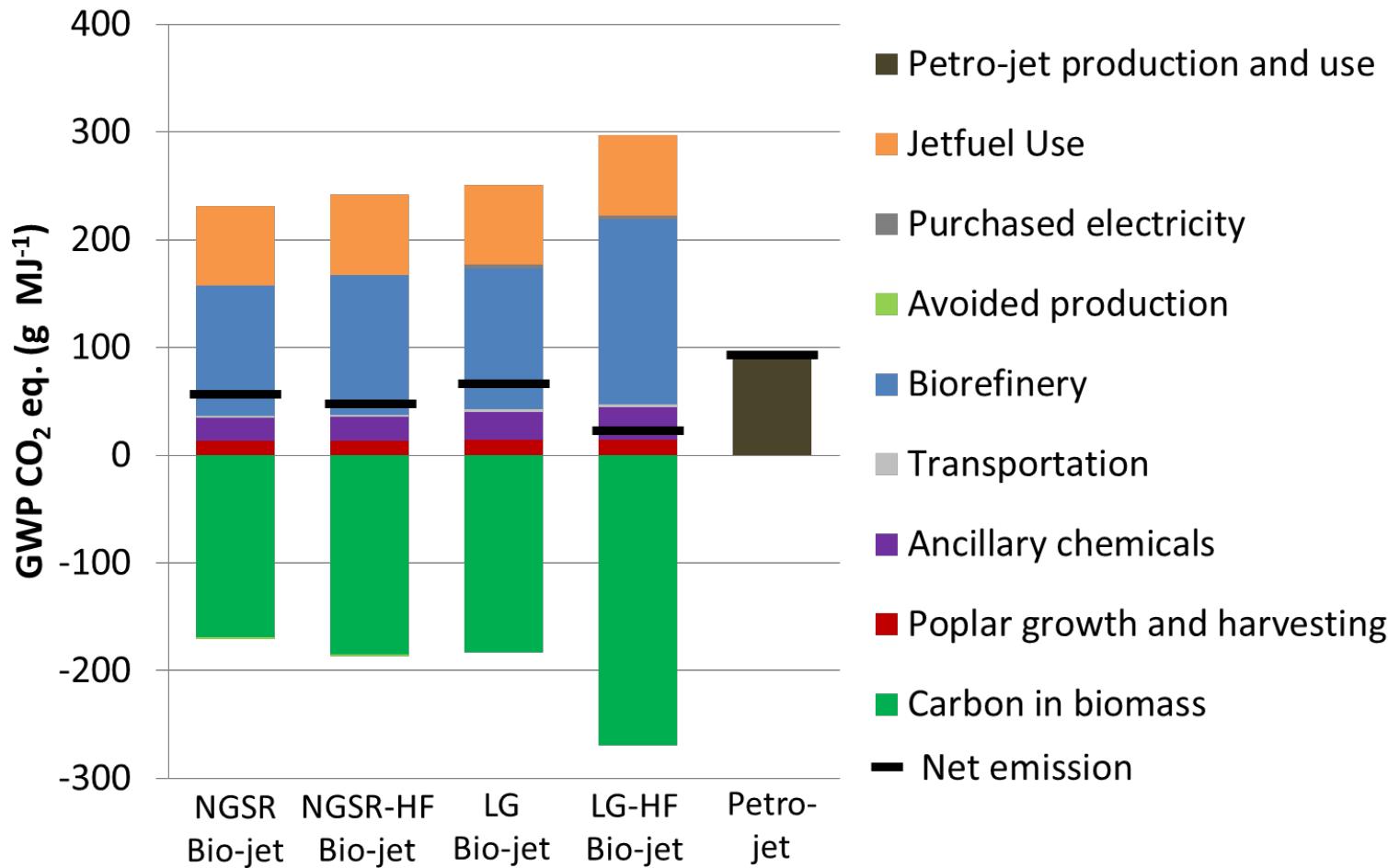
Global warming potential for cellulosic ethanol

Results – Global Warming Potential



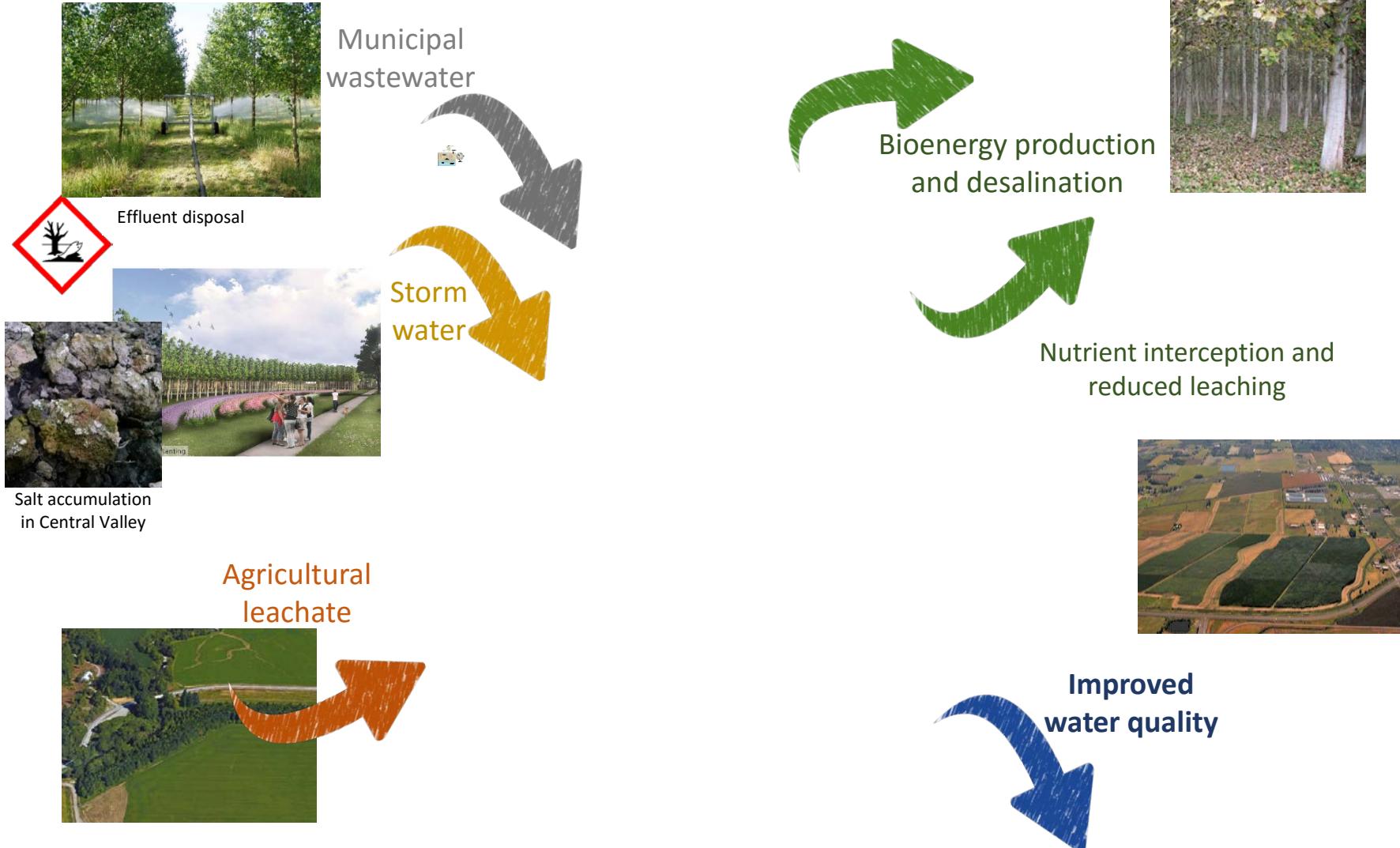
Cellulosic ethanol can be virtually carbon neutral

Global warming potential for bio-jet fuel

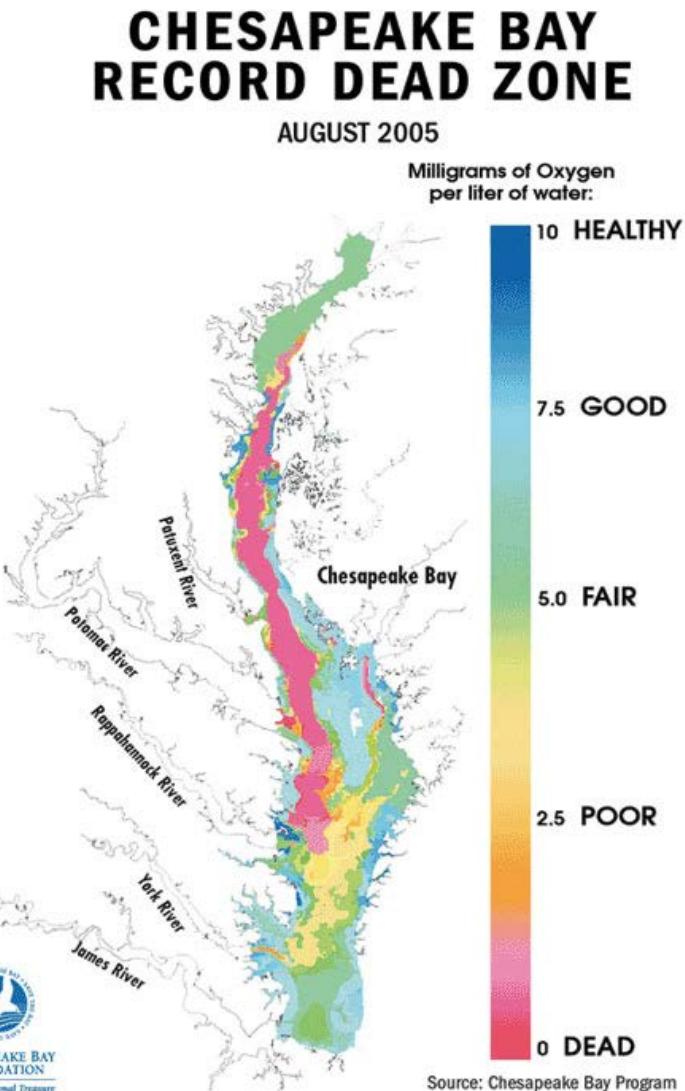


And you can't fly a 787 on electricity or hydrogen!!

Growing trees can do a lot more than sequester carbon



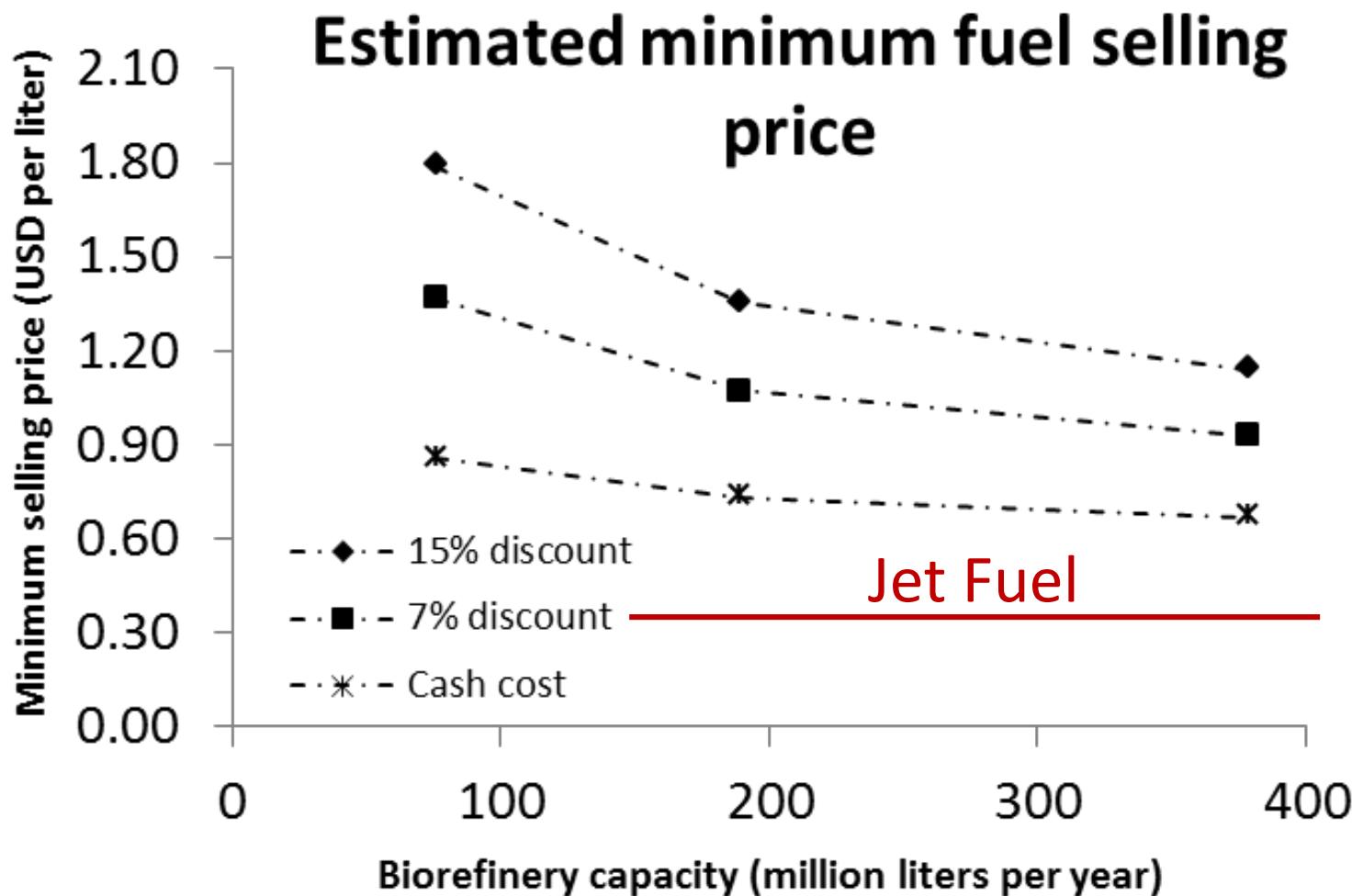
For example: cleaning up Chesapeake Bay



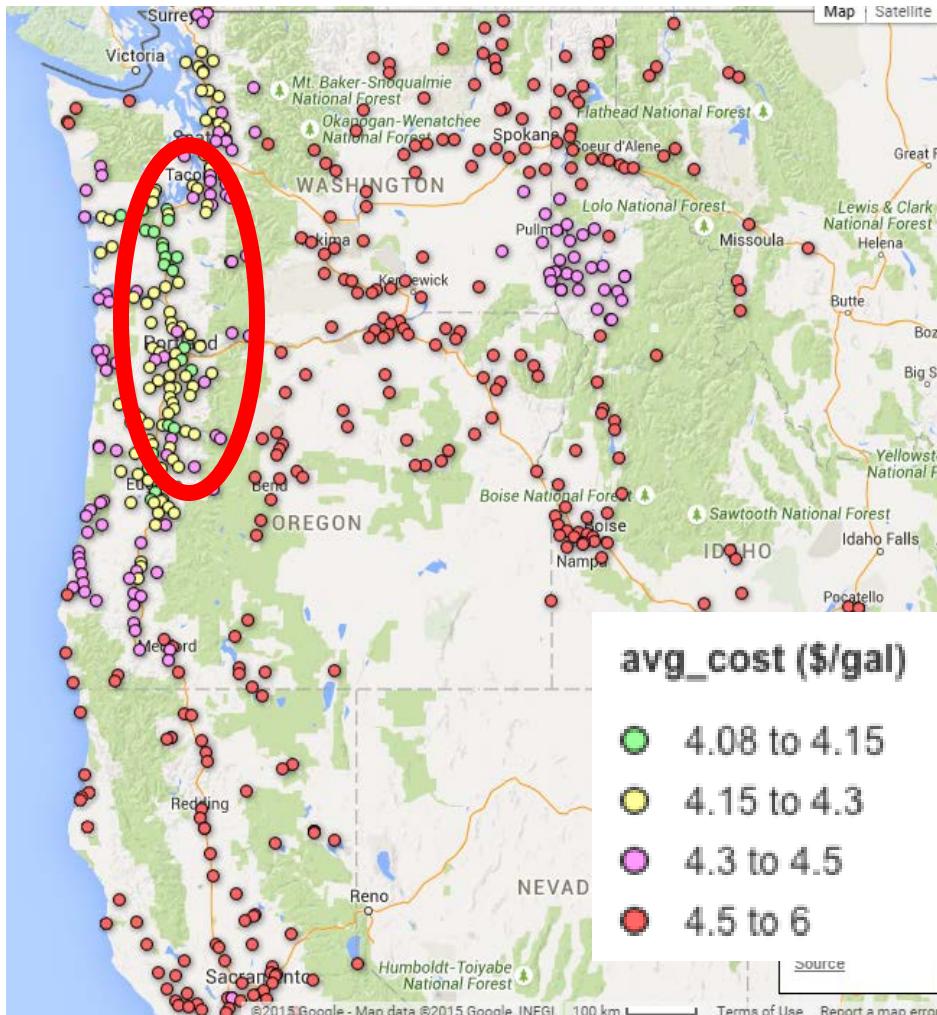
- 2010 Chesapeake Bay Agreement calls for 185 million lbs N limit – 65 million lbs reduction from current levels.
- 1,000,000 acres of perennial energy crops would reduce N loading by 24 million lbs
 - Provide 3 to 5 million tons of biomass feedstock

Sourced: Chesapeake Bay Foundation, IEA Bioenergy

Economic challenge



Scale is an issue



- Best sites in western WA and OR
- Most sites have costs >\$4.5/gal
- Challenges in aggregating enough low cost poplar

Monetizing ecosystem services

Payments for Ecosystem Services

- Monetization through the sale of water quality/quantity credits, carbon credits and soil conservation
- Increasing demand for cost-effective water treatment



Riparian buffers



Effluent treatment

Methods

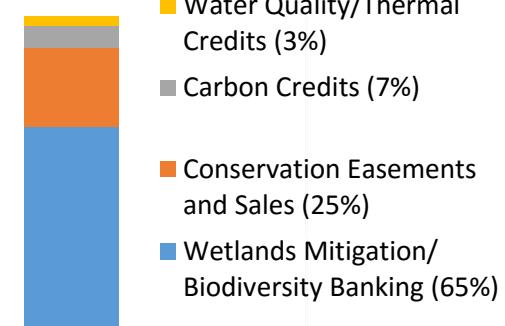
- Assess ecosystem services generated by poplar plantations, with a focus on water resources
- Evaluate local/national/global ecosystem service and water treatment markets

Results

- Calculate financial returns and input into *Arizona State University* integrated geospatial economic models
- Report of financial return for feedstock production and environmental benefits

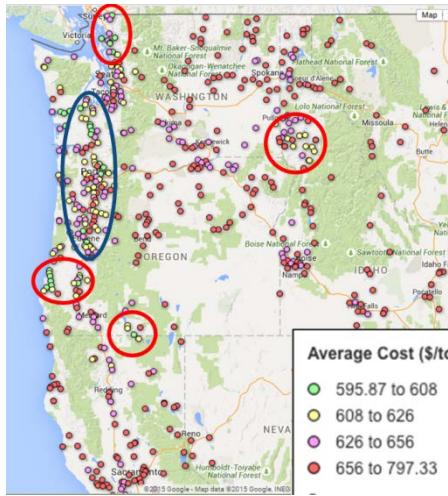
Payments for Ecosystem Service (PES)

Total in 2015 = \$3.1 billion

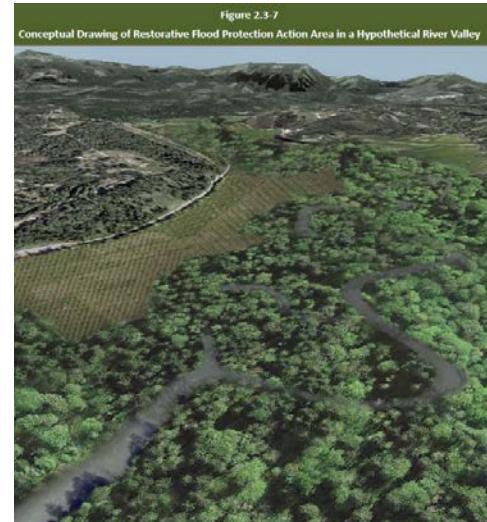
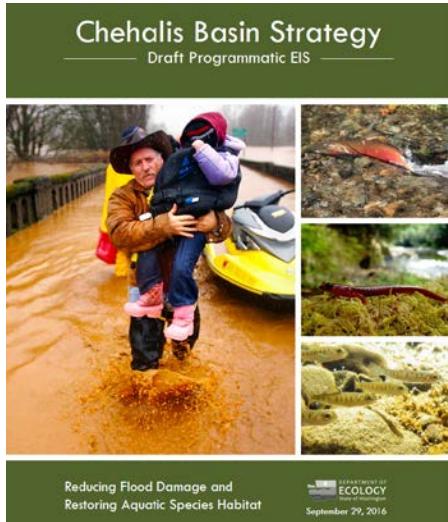


Sources: Freshwater Trust; Conservation Easement Database; Forest Trends Ecosystem Marketplace

What we can make happen



Centralia coal transition grants



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