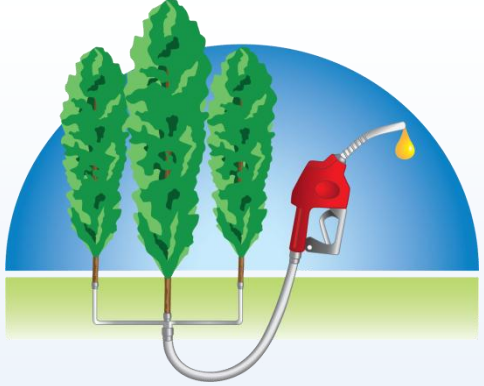

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Advanced **Hardwood Biofuels** Northwest: **Opportunities for Landowners in Washington**

Agroforestry Working Group

Nora Haider, Biofuels Program Specialist
Shiba Kar, Regional Extension Specialist, Biofuels Educator
Patricia Townsend, Regional Extension Specialist, Biofuels Educator
Kevin Zobrist, Regional Extension Specialist, Forest Stewardship

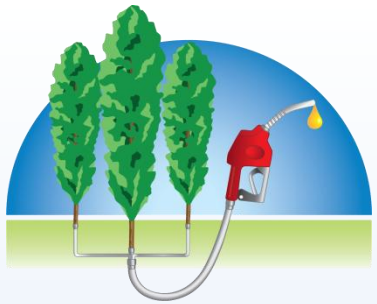
USDA United States Department of Agriculture National Institute of Food and Agriculture

Advanced **Hardwood Biofuels** Northwest

Purpose grown hybrid poplars

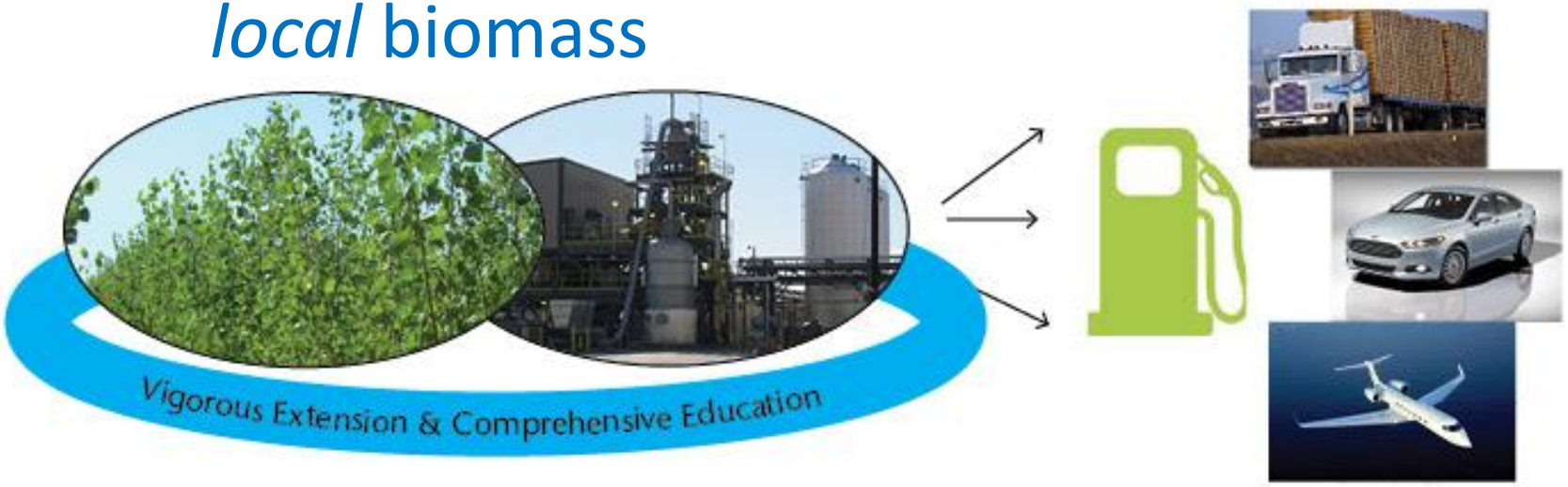
Drop-in replacement transportation fuels

USDA United States Department of Agriculture National Institute of Food and Agriculture



Project vision

Sustainably grown
local biomass

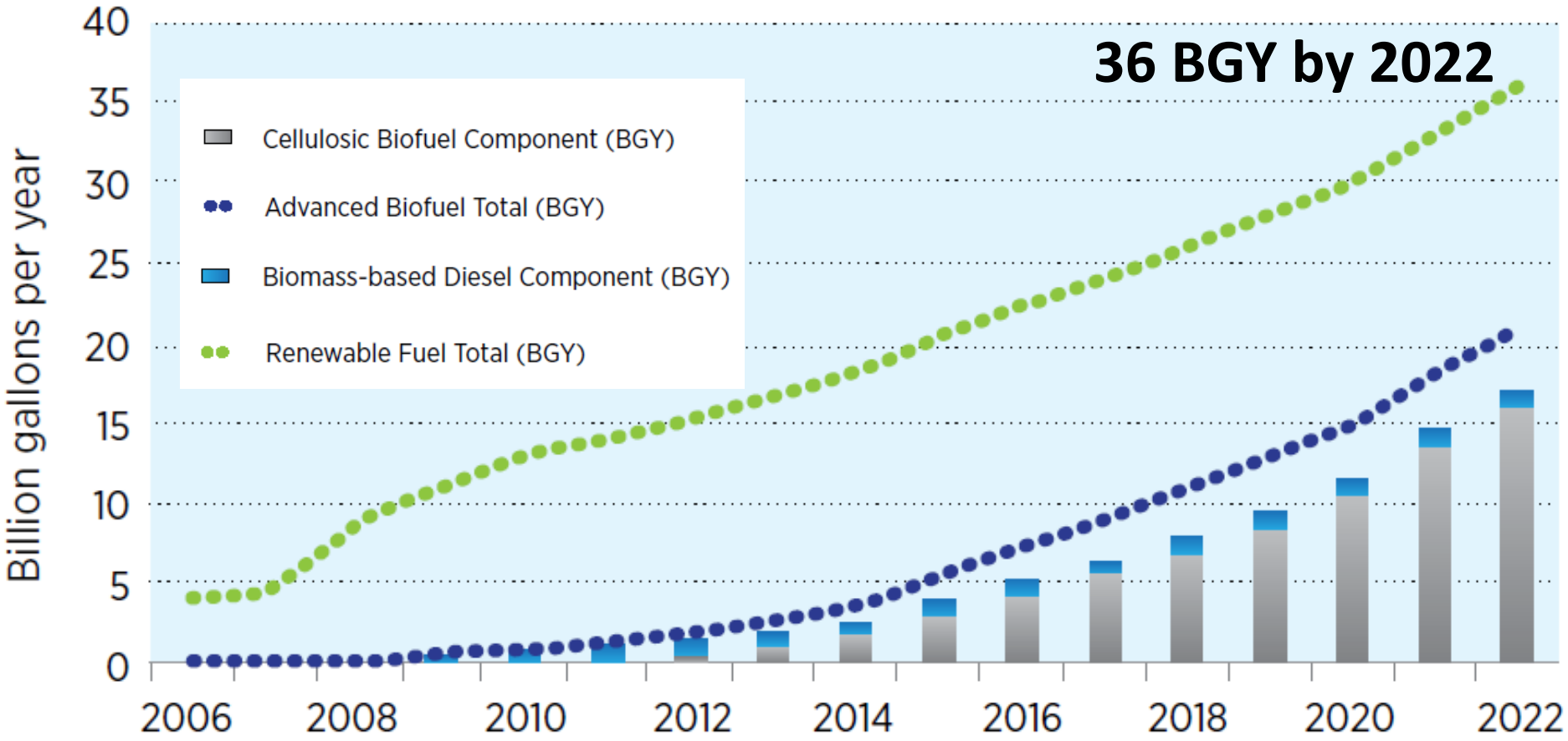


400,000 acres to supply 4 strategically located biorefineries.

100% infrastructure compatible biofuels

400 million gallons/year (75% of PNW RFS2 for 2022)

Energy Independence and Security Act 2007 RFS2



U.S. Department of Energy. 2011. *U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p.

Advanced **Hardwood Biofuels** Northwest

Feedstock

Conversion

Sustainablity

Education

Extension

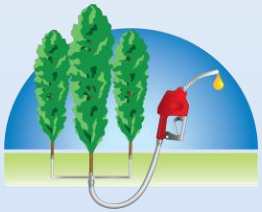
Washington State University
University of Washington
UC Davis University of California
Oregon State University OSU
GreenWood Resources
University of Idaho
ZeaChem
Agriculture Center of Excellence

AFRI CAP projects

Liquid Biofuels From Wood

USDA United States Department of Agriculture | National Institute of Food and Agriculture

Hybrid poplar – Hardwoods (AHB)



UNIVERSITY OF WASHINGTON

- Jet fuel
- Diesel
- Gasoline

Woody residuals – Softwoods (NARA)

NARA

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- Jet fuel
- Lignin co-products

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What is Hybrid Poplar?

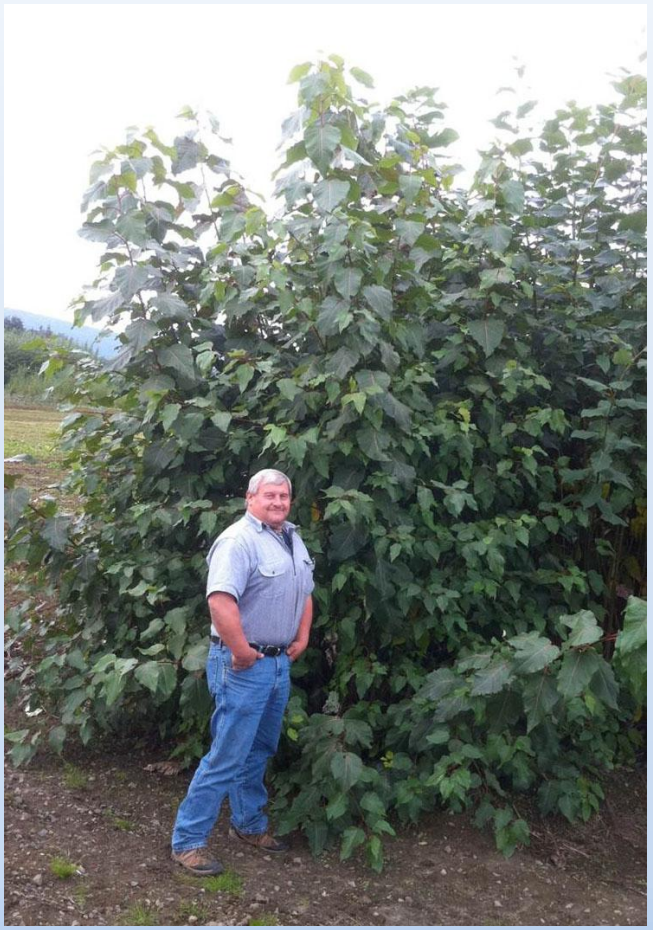
Crosses between *Populus* species:

- Black cottonwood *(P. trichocarpa)*
- Eastern cottonwood *(P. deltoides)*
- Japanese poplar *(P. maximowiczii)*
- European black poplar *(P. nigra)*

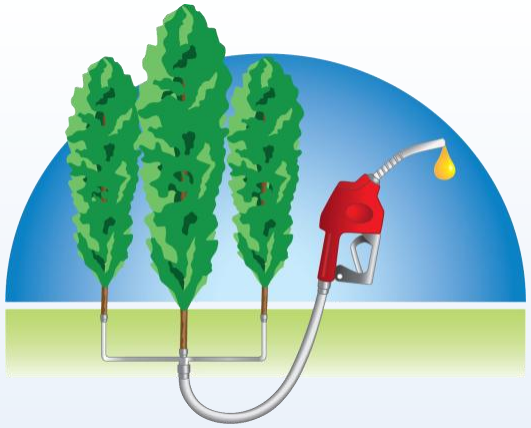
Black cottonwood *(P. trichocarpa)*

Poplars for bioenergy

Pulp and paper poplars

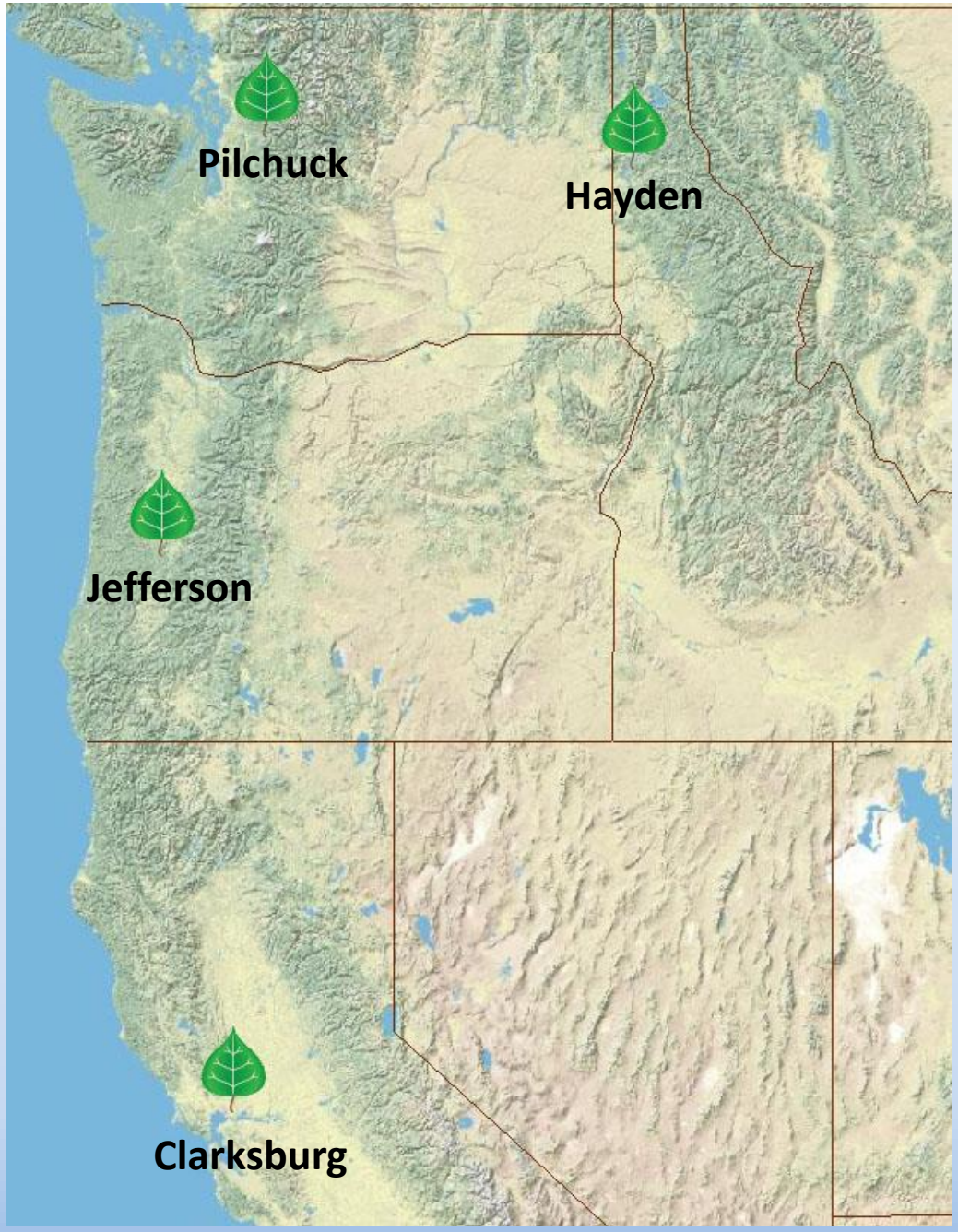


Short rotation poplar



Regional Demonstration Sites

- Stanwood, WA (95 acres)
- Hayden, ID (65 acres)
- Jefferson, OR (85 acres)
- Clarksburg, CA (50 acres)



Regional Demonstration Sites

Planting poplars

Cuttings planted bud-side up in rows

Harvesting

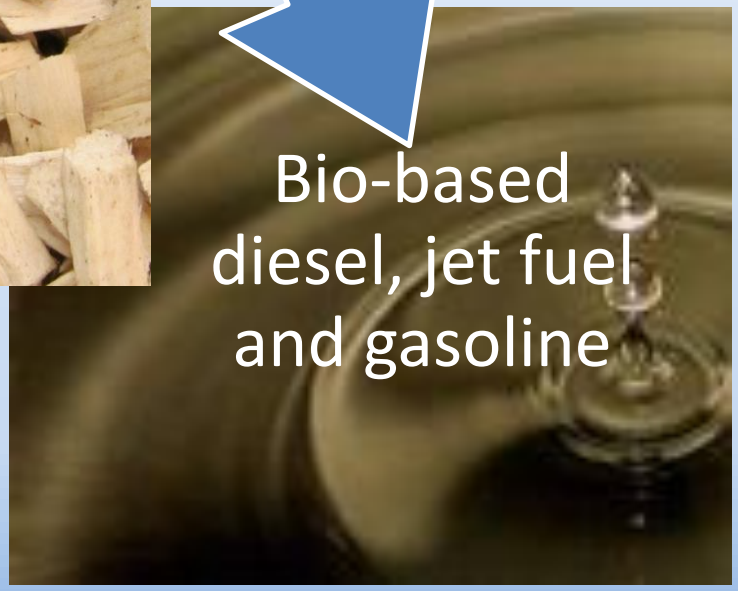
Conversion

Poplar chips

Hydrolosis

Fermentation

Conventional Refining



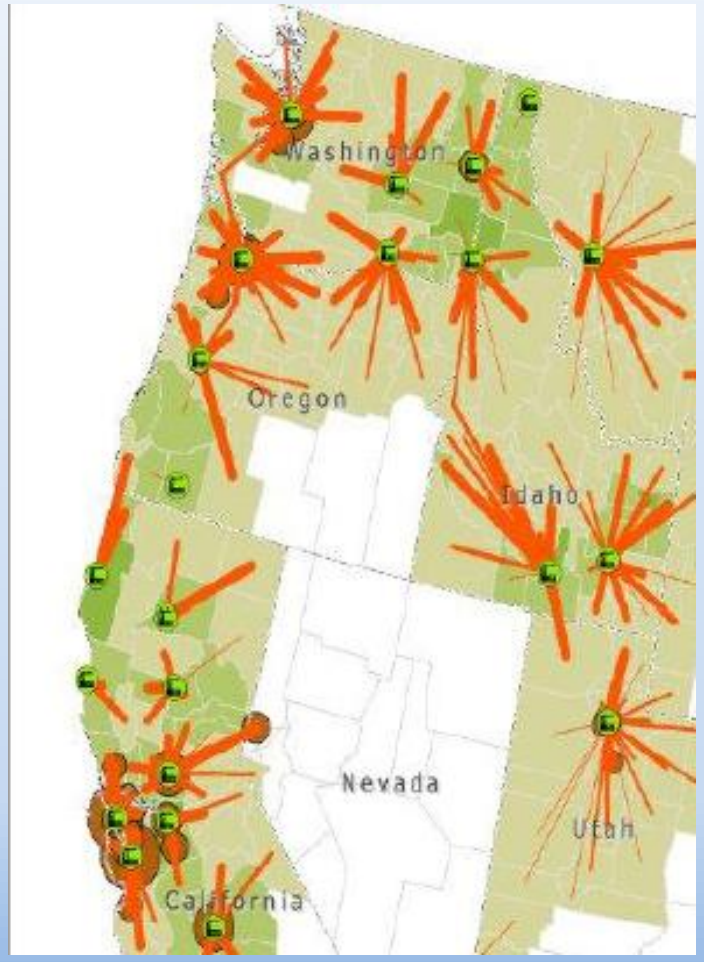
Renewable
2-3 year rotations

Spring growth after harvest

Mature poplar coppice

Landowner Critical Mass

WGA Region Biofuel Production:
Ligno-cellulosic Ethanol



Feedstock clusters

- Land availability near biorefineries
- Grower willingness near biorefineries

Poplars and Agroforestry

Contact Info

- Nora Haider: nora.haider@wsu.edu
- Shiba Kar: shiba.kar@wsu.edu
- Patricia Townsend: patricia.townsend@wsu.edu
- Kevin Zobrist: kevin.zobrist@wsu.edu

Visit us online at: hardwoodbiofuels.org

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