

# Woody Biomass National Update

Northeast Forest Planners  
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# Legislation and Policy Framework

- Biomass Research and Development Act of 2000— resulting in MOU between USDA, USDI and DOE [www.bioproducts-bioenergy.gov](http://www.bioproducts-bioenergy.gov)
- National Fire Plan and 10-year Implementation Plan (2001)
- Healthy Forests Restoration Act of 2003
- Energy Policy Act of 2005

# Context- why should we care

- Energy costs and Energy Security
- State renewable energy portfolios (RPS)
- Greenhouse Gases
- Sustainability issues surrounding communities and forests
- Condition of forest resources

# Woody Biomass Potential



**368 million tons  
annually**

Billion Ton Report



# Energy from Biomass- today

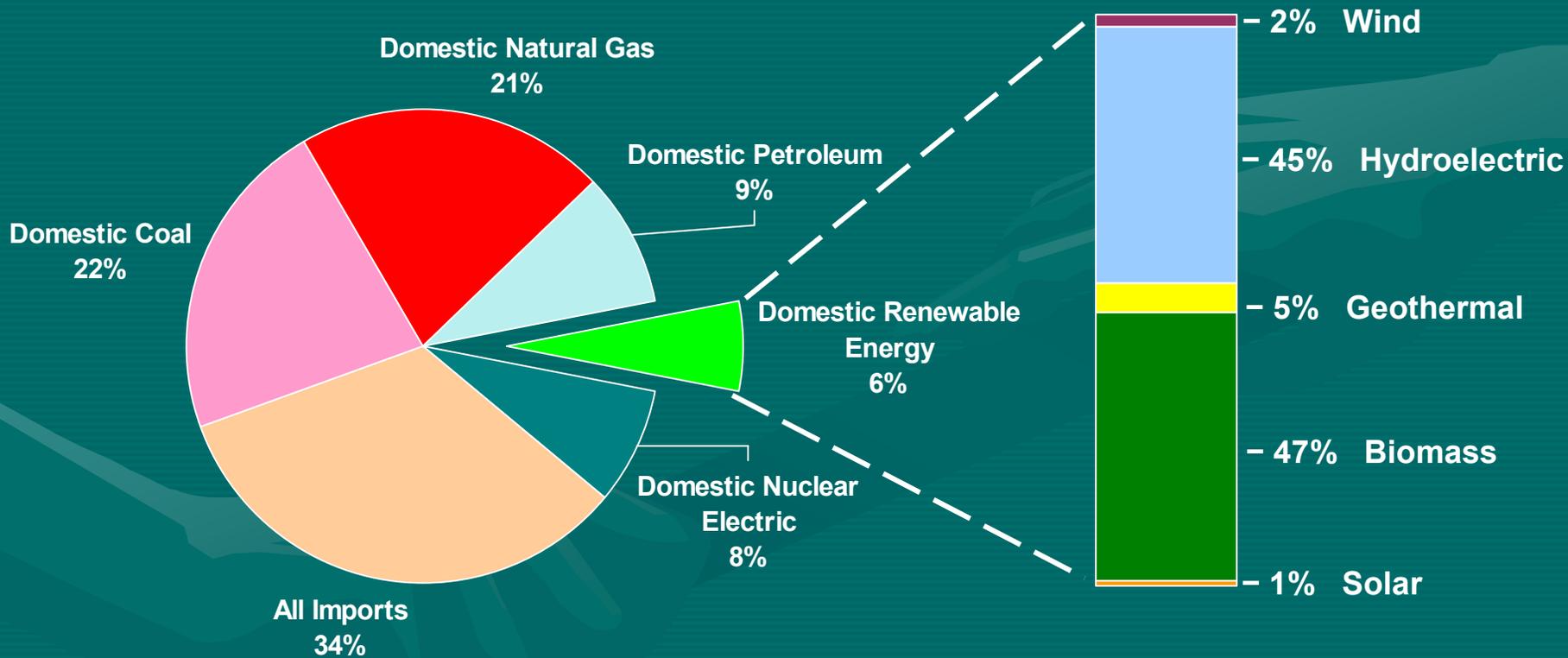
- Fuels for heating schools and community buildings
- Wood pellets for heating homes
- Co-firing of wood with coal at power plants
- Biomass waste to energy at wood products manufacturing facilities

Is economical only when part of a more integrated forest restoration or hazardous fuels portfolio of business enterprises.

# U.S. Energy Consumption Overview

Domestic Energy Consumption = 99.7 Quadrillion Btu

Total = 6.2 Quadrillion Btu



★ 72% of biomass is wood based

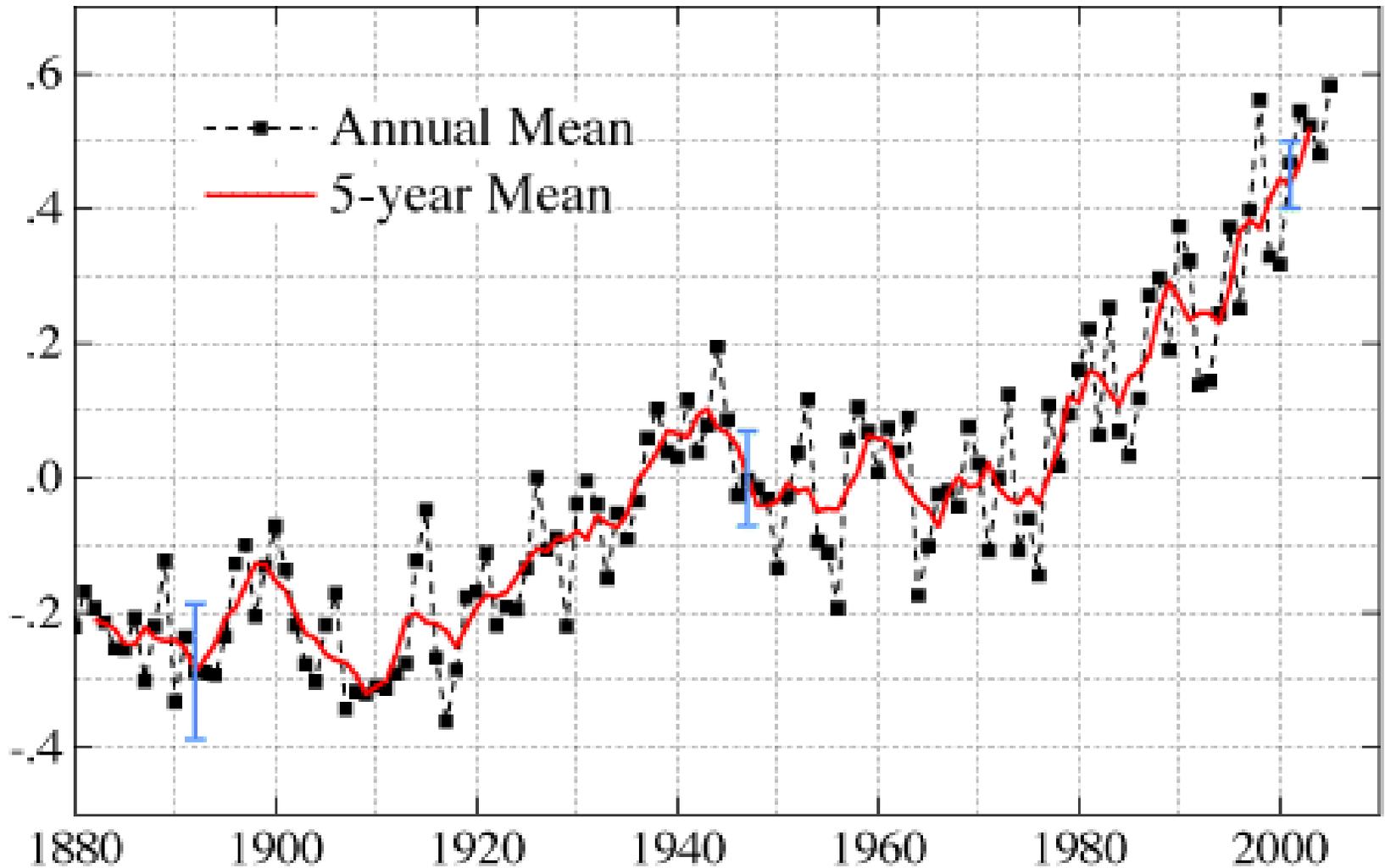
# President's State of the Union Address

“replace the equivalent of more than 75 percent of our oil imports from the middle east by 2030- 30 percent of gasoline pool or 50 billion gallons/year.. by 2012 fund additional research...to produce ethanol not just from corn, but from wood chips and stalks...”

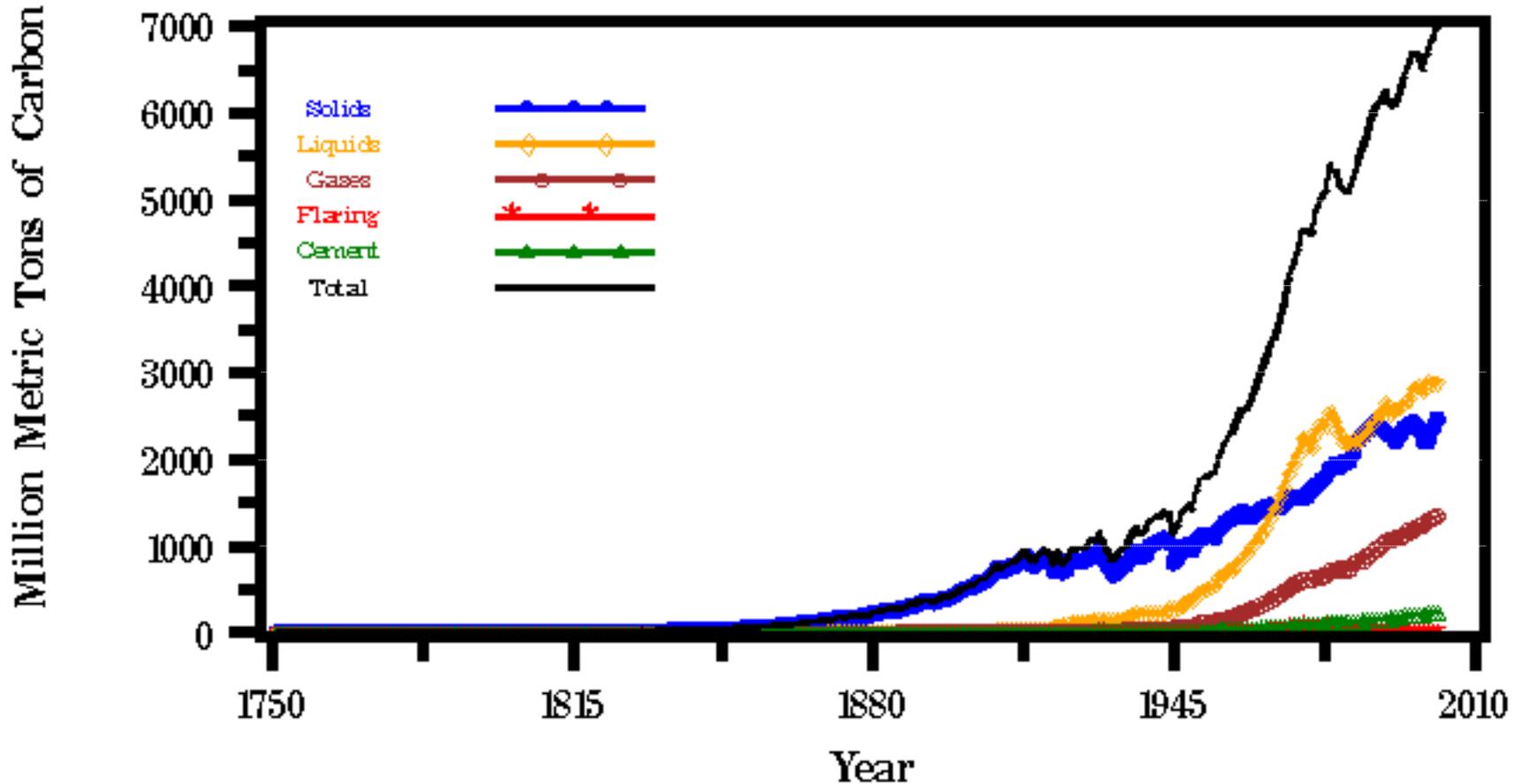
# Renewable Energy Goals

- **DOE/USDA Biomass Advisory Committee**
  - 30% displacement of current petroleum consumption by 2030
- **25x'25**
  - Working lands will provide 25% of Nation's energy from renewables by 2025
- **2006 State of the Union Address**
  - 75% replacement of our oil imports from the Middle East by 2025

(a) Global-Mean Surface Temperature Anomaly ( $^{\circ}\text{C}$ )

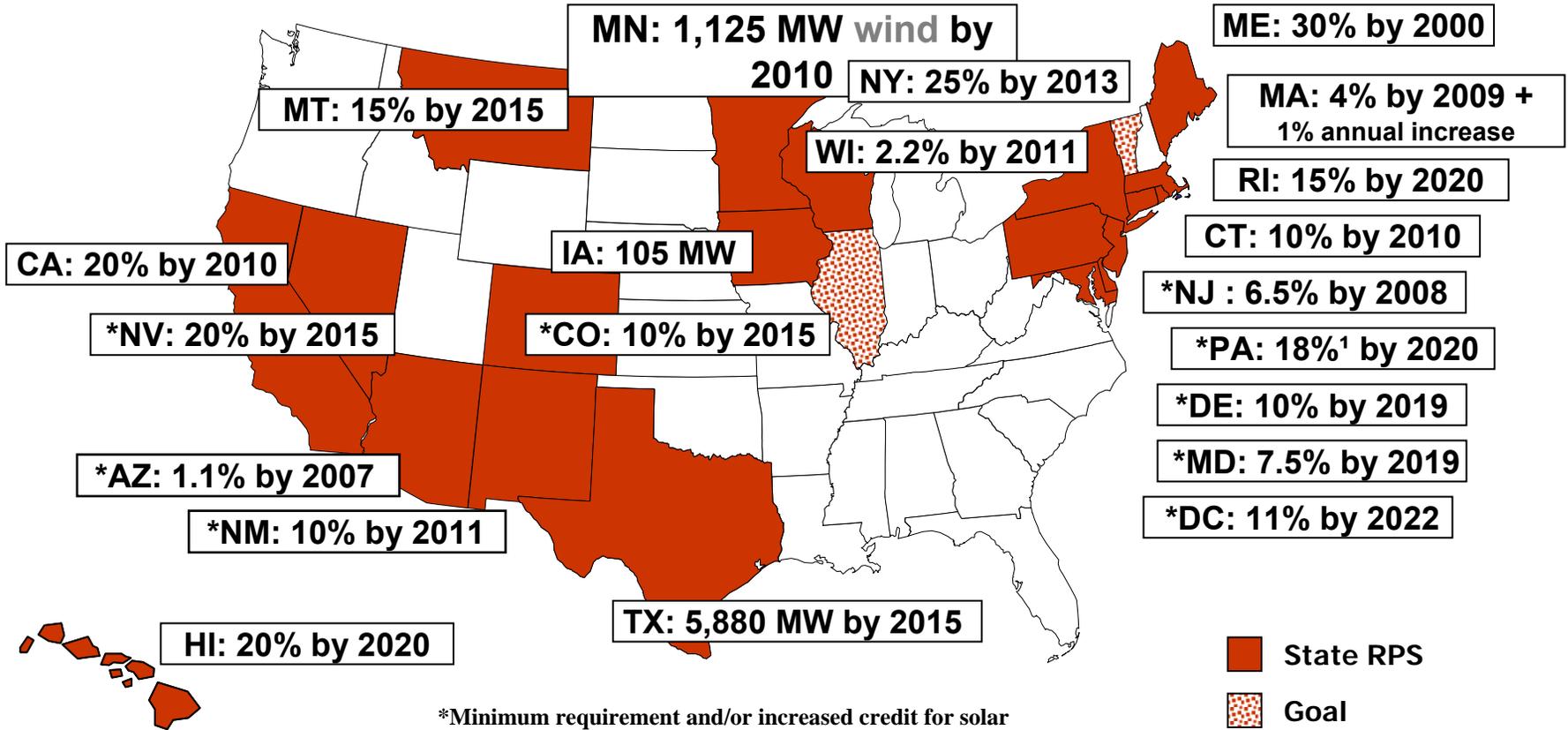


# Global, Regional, and National CO<sub>2</sub> emissions



Global CO<sub>2</sub> emissions from fossil fuel burning, cement production, and gas flaring for 1751-2002

# Renewables Portfolio Standards

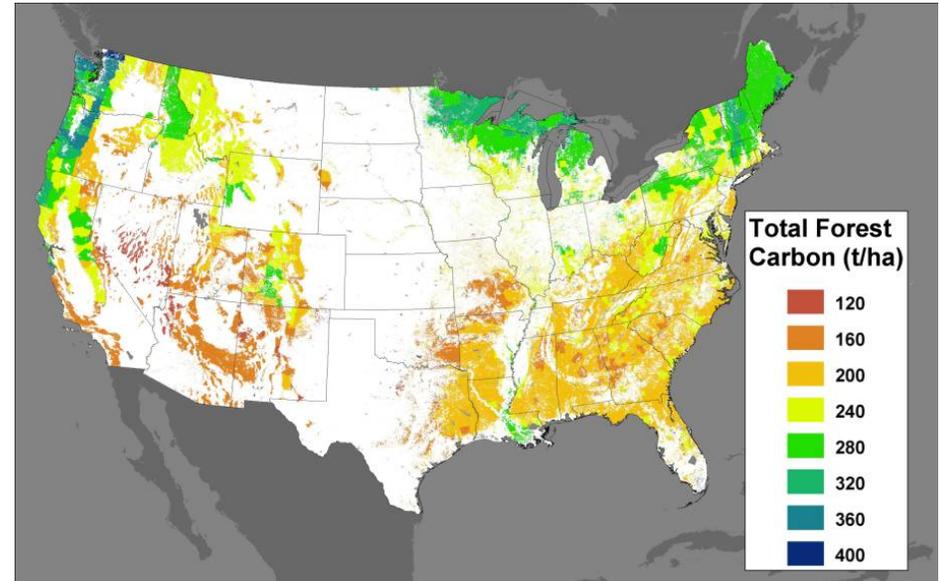


\*Minimum requirement and/or increased credit for solar  
<sup>1</sup> PA: 8% Tier I, 10% Tier II (includes non-renewable sources)



# Forests Help Mitigate Greenhouse Gas Emissions

- **Remove CO<sub>2</sub>**
  - 200 million tons/yr C
  - 10% of U.S. fossil fuel emissions)
- **Increase sequestration rate**
  - Plant more trees
  - Maintain healthy forests
  - Manage productivity
  - Residue management
- **...and forest products**
  - Biomass energy offsets
  - Use more wood



**Biomass  
Management  
and Use**

# Biomass as an Energy Resource

- “Billion Ton Report” USDA and DOE
- Energy Policy Act of 2005- renewable energy for federal facilities and purchase of green power
- Potential Energy Title of the 2008 Farm Bill
- Fuels for Schools and Beyond– moving from a regional to national initiative in 2007

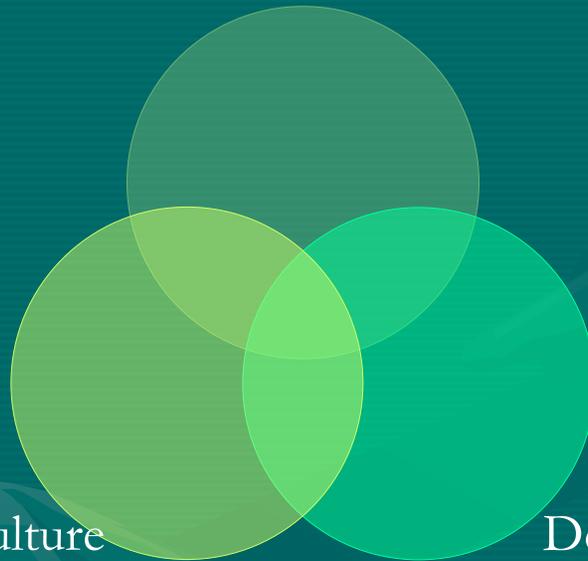
# How does it all fit?

Hazardous fuels and Forest Restoration Treatments that have biomass utilization as an integrated goal also contribute to:

- Jobs and sustainability for rural communities
- Stabilizing greenhouse gas emissions—using burning only where ecologically necessary
- Reducing cost of hazardous fuels treatments
- Contributing to renewable energy and carbon sequestration

# Interagency Woody Biomass Working Group

Department of Interior



Department of Agriculture

Department of Energy

# Vision and Goals for the Implementation Plan of the Woody Biomass MOU- USDA, DOI, and DOE

**Preamble:** The Secretaries support the utilization of woody biomass by-products from restoration and fuels treatment projects wherever ecologically and economically appropriate and in accordance with the law.

**Vision:** Ecologically and economically sustainable woody biomass utilization will result in more diverse forest, woodland, and rangeland ecosystems – characterized by native flora and fauna, healthy watersheds, better air quality, improved scenic qualities, resilience to natural disturbances, and reduced wildfire threats to communities – and provide an alternative waste management strategy contributing to rural economic vitality and national energy security.

# Draft Goals of Woody Biomass Utilization – Inter-Agency Strategy

1. Reduce Forest restoration cost and increase the use of woody biomass as a renewable energy resource through environmentally sound actions which also provide economic opportunity in rural communities
2. Risk of catastrophic fires is reduced through adoption of widespread woody biomass utilization practices.
3. Provide a sustainable and reliable supply of woody biomass from forests, woodlands and rangelands across a range of ownerships and regions of the nation.
4. Develop and implement consistent and complementary policies and procedures will maximize Federal efficiency and effectiveness of woody biomass utilization.

# Draft Goals of Woody Biomass Utilization – Inter-Agency Strategy

5. At-risk forest, woodland, and rangeland ecosystems are restored to healthy and resilient conditions.
6. Communities develop sustainable, living wage jobs and appropriately-scaled industries.
7. National security is enhanced through clean, renewable, diversified energy production.
8. Contribute to the stabilization of greenhouse gas concentrations.
9. Appropriate technologies are developed and applied and technology transfer is provided to stakeholders.
10. Biomass currently directed to landfills is substantially diverted to higher value use.

# Forest Service Woody Biomass Utilization Team



# Work In Progress

- Healthyforests.gov biomass website is a joint effort of the interagency woody biomass utilization group to provide a portal to the extensive biomass information available electronically
- Forest Service Strategy for Woody Biomass Utilization that includes Bioenergy is being developed— States are **KEY PARTNERS**

# Roles of the Forest Service

## **National Forest System**

- developing management prescriptions
- implementing stewardship contracts
- overseeing forest restoration activities

## **State & Private Forestry**

- providing technical and financial assistance to businesses and communities
- developing partnerships and community fire plans
- managing fire prevention and suppression activities

## **Research & Development**

- developing new assessment, management, harvesting and conversion technologies and tools
- creating innovative biobased products and biofuels
- assessing ecological and economic impacts



# The Opportunity & Potential



Photo: Jake Eaton, Podlatch Corporation



## Forest Biomass Feedstock

- Forest Residues
- Hazardous Fuel Treatments
- Short Rotation Woody Crops
- Wood Waste

## Conversion Processes

- Manufacturing
- Co-firing
- Combustion
- Gasification
- Enzymatic Fermentation
- Gas/liquid Fermentation
- Acid Hydrolysis/Fermentation

## USES

### Fuels:

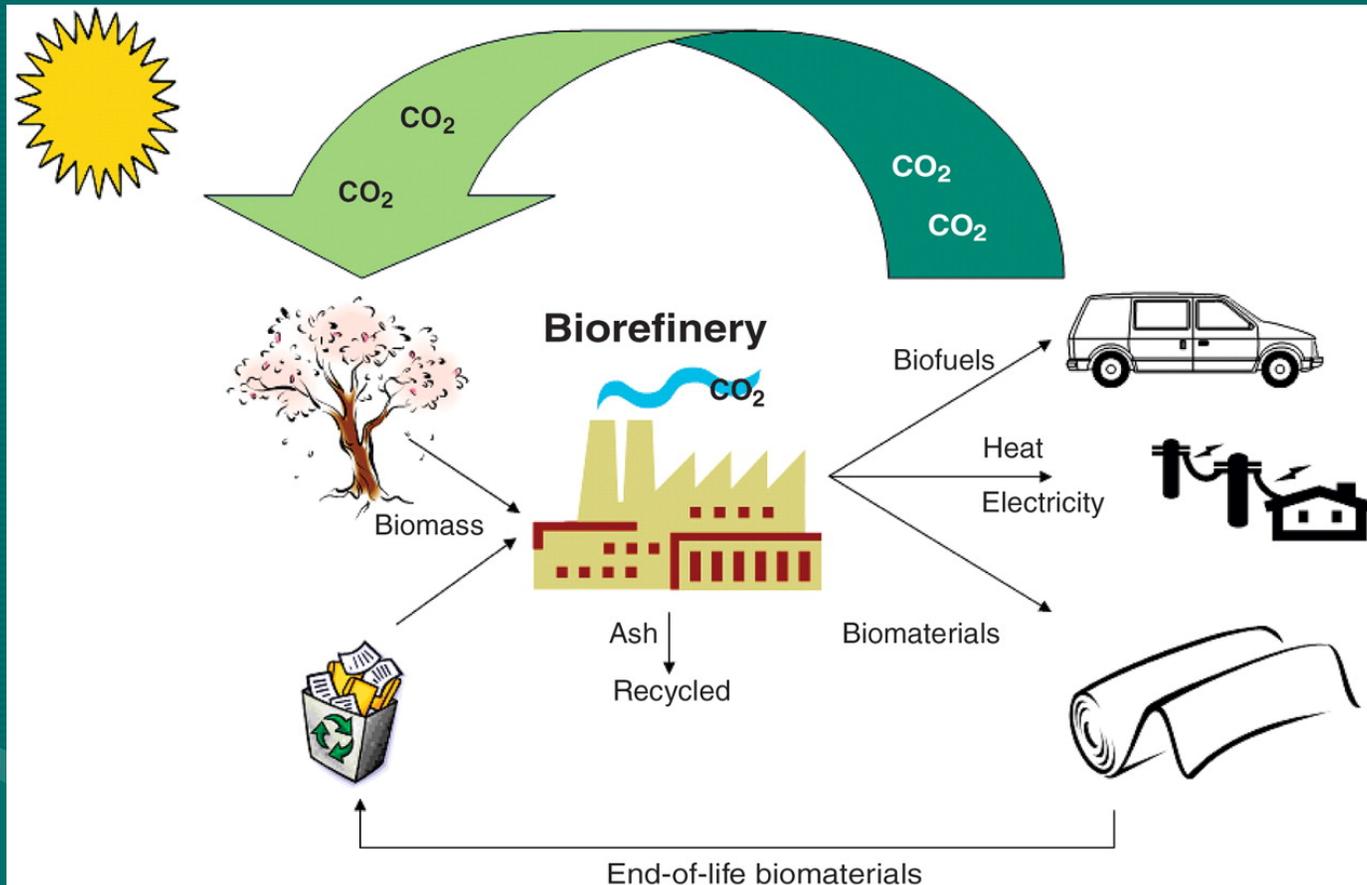
- Renewable Diesel
- Ethanol

### Electricity and Heat

### Biobased Products

- Composites
- Specialty Products
- New Products
- Chemicals
- Traditional Products

Fig. 1. The fully integrated agro-biofuel-biomaterial-biopower cycle for sustainable technologies



A. J. Ragauskas et al., *Science* 311, 484 -489 (2006)

“Biofuels represent an opportunity for a large share of the billions of dollars flowing to the Mideast to instead roll towards the Midwest, South and other farm belts. When farm fields replace drill fields and agricultural America becomes a net energy exporter, new revenue flows will reach farmers, and biofuels plant owners and workers, and then circulate and multiply throughout the rural economy.”

*The New Harvest* – The Energy Foundation 2005



## 25x'25 WORK GROUP

Our Vision:

By the year 2025, renewable energy from the nation's farms, ranches and forests will comprise 25 percent of the total energy consumed in the United States.

# 25x'25

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## Uncompensated (Ancillary) Benefits of Biomass Energy Production

(from 1999 NREL Report)

### US Biomass Fuel Mix

	<u>thousand bdt/yr</u>
Mill Residues	6,400
Forest Residues	1,800
Agricultural Residues	2,300
Urban Wood Residues	1,400
Total	11,900

### Value of the Benefits

	<u>¢ /kWh</u>
Criteria Pollutants	4.3
Greenhouse Gases	5.9
Avoided Landfill	1.1
Timber Stand Improvement	0.1
Total Benefits, US Biomass fuel mix	11.4

From: Morris, G. NREL, 1999

# The Challenges

## SUPPLY SIDE ISSUES

- Millions of acres needing treatment
- Treatment needs not matched to utilization facilities
- Little or no harvest/transport infrastructure
- High harvest and transport costs
- Predictability/Reliability of supply
- Sustainability and environmental concerns

## DEMAND SIDE ISSUES

- Marginal economic returns
- Fluctuating markets & prices
- Few markets and little infrastructure
- Conversion technologies

## INSTITUTIONAL ISSUES

- Conflicting priorities, missions, cultures, policies, etc.
- No comprehensive strategy or coordination
- Public concerns over tree removals
- Competition among products and sectors
- Community engagement

# Partners

- Western Governor's Association  
Clean and Diversified Energy Initiative– Biomass Task Force  
(energy on the electrical grid, only)  
Report is available at  
<http://www.westgov.org/wga/initiatives/cdeac/index.htm>
- National Association of Conservation Districts  
Regional Workshops and Communications  
<http://forestry.nacdnet.org/biomass/>
- State Foresters
- Department of Defense, Environmental Protection Agency, USDA Rural Development

# Working With States

- Successful biomass utilization requires strong local leadership, and a mechanism for bringing the private and local communities interests together with the needs for health forests and community wildfire protection.
- Sustainable supply of woody biomass from multiple sources (federal, private, state and tribal lands) reduced the risk of private investments.
- Long term and large scale planning are needed to attract new business investments where the forest products industry has been lost.

# Working With States

- Technical assistance and “seed” funding for demonstration projects help communicate the potential for woody biomass projects
- State Foresters can help bring other state interests to the table (Dept of Env Quality and Rural Economic Development Programs)

# Key Elements For Success

- **Must become a reliable supplier of biomass**
- **Science and technology for management, feedstocks, utilization, and conversion**
  - Sustainability
  - Energy efficient
  - Reduced costs and easy deployment
- **Biomass/stand assessment tools**
- **Planning, analysis, and decision-making tools**
- **Valuing benefits and credits**
- **Financial, & market assistance to local communities, businesses & organizations**

# Energy, the Environment, and the Economy

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- Emerging theme for natural resource and biomass management
- Need to address collectively in science and policy

