The Value of Biomass in State RPS

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Outline:

- Making the case for biomass as a renewable feedstock for electricity generation
- Definition of biomass – feedstock types and end-uses
- What are states doing to incorporate biomass energy in their state energy plans?

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Environmental and
Energy Study Institute

- Founded in 1984 by a bipartisan Congressional caucus as an independent non-profit organization (but receives no Congressional funding)
- Source of non-partisan information on energy and environment policy development for Congress and other policymakers
- Climate change is one of the most serious problems facing civilization today — impacting infrastructure, water supply, agriculture, public health and natural ecosystems

Biomass is an abundant resource in Midwest

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Courtesy of Wikipedia

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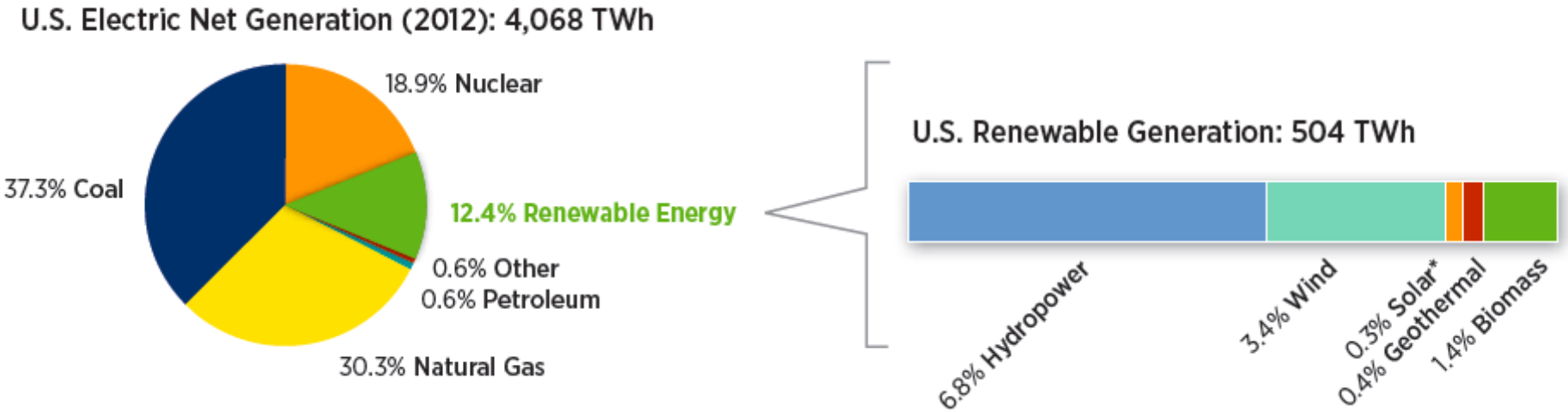
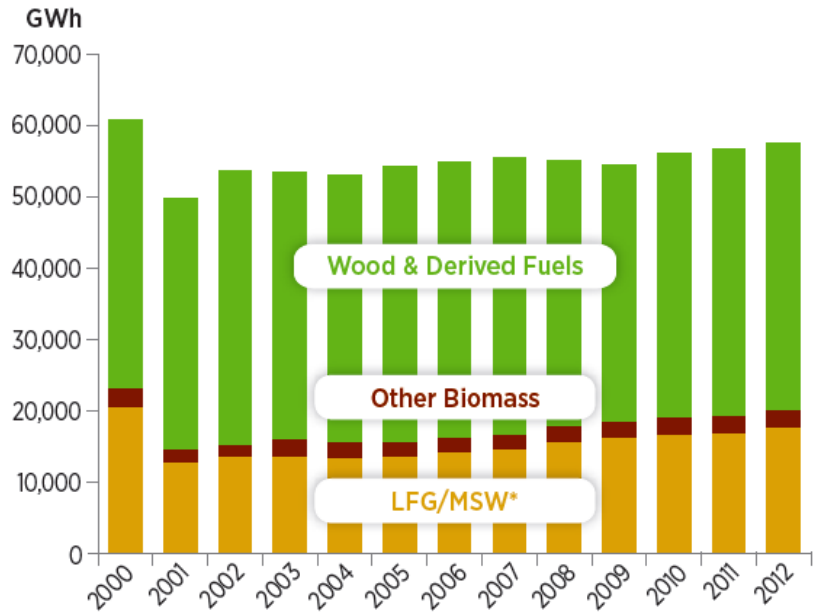
Current Role of Biomass in Utility Generation





Courtesy of US DOE EERE

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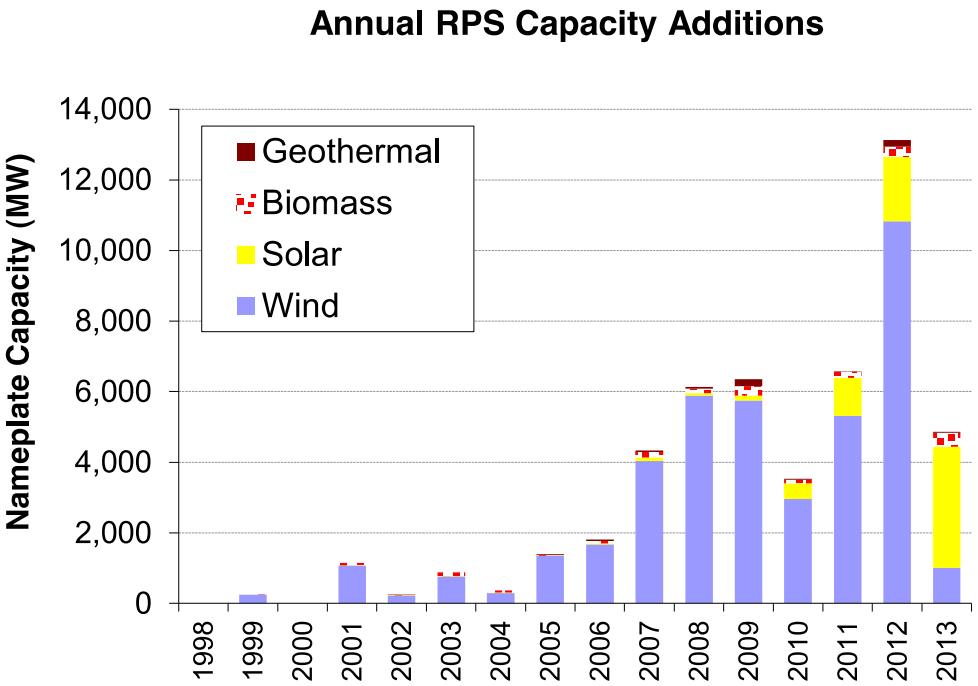
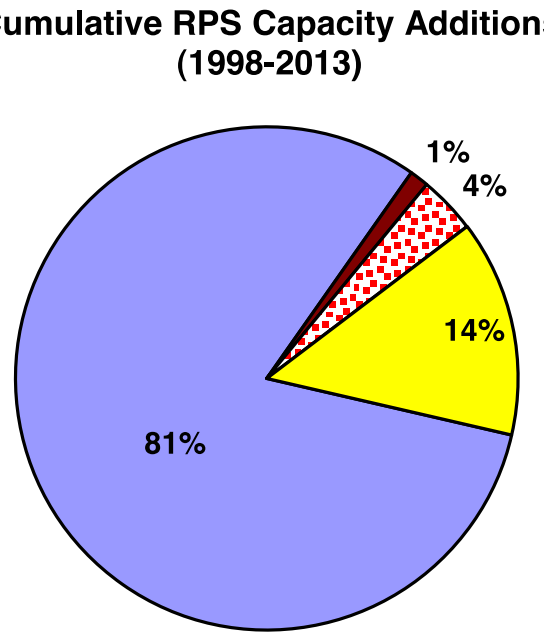
Current Role of Biomass in RPS





Courtesy of Galen Barbose, Lawrence Berkeley National Laboratory

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Why biomass?

- Can provide base load power to more intermittent renewables
- Can be co-deployed with other renewable and non-renewable electricity
  - Biogas and Solar at landfills & wastewater treatment facilities
  - Combined Heat and Power (CHP) using a combination of wood waste and natural gas

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Biomass – Utilizing Waste Material

- Biomass is commonly disposed of as waste.
- A renewable resource that, if not managed sustainably, can contribute to environmental degradation and climate change.
  - Municipal solid waste → Landfill gas
  - Hazardous fuel build-up → Forest fires
  - Untreated manure → Nutrient loading in watersheds

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Economics of Biomass

Benefits local economies

- Biogas could support approximately 20,000 direct jobs
- Biomass power supports 18,000 direct jobs

Provides multiple revenue streams to Producers, small businesses, municipal government in the forms of:

- Gas, electricity
- Co-products

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Biogas – Anaerobic Digestion

- Biogas ➔ Renewable Natural gas (RNG) ➔ biomethane
- Biogas is derived from anaerobic digestion of wastes
- Feedstocks
  - Municipal solid waste (MSW)
  - Waste water treatment plants
  - Manure (cow & pig manure, poultry litter)
  - Food processing waste
- Can be converted to biogas, liquid fuels, compost, pellets.

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Biogas Opportunities

Current digester numbers:

- 1,500 at waste water treatment facilities
- 576 digesters at landfills
- 239 at US farms and dairies

Potential for upwards of 11,000 anaerobic digesters in US.

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Defining biomass – Woody Fuels

- Forestry residues – tops, limbs, scraps.
- Timber/pulp industry residues – sawdust, chips.
- Agricultural residues
- What is and is not acceptable from GHG standpoint?
  - EPA's Biogenic Carbon language in 111(d)
  - National Climate Assessment
  - Various state policies
  - Opinion is evolving

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EPA Clean Air Act Section 111(d): Existing Source Performance Standards

- "Sustainable forestry and agriculture can improve resiliency to climate change .. contribute to climate change mitigation by acting as a 'sink' for carbon."
- "Burning biomass-derived fuels for energy recovery can yield climate benefits as compared to burning conventional fossil fuels."
- "We anticipate that states … consider biomass-derived fuels in energy as a way to mitigate the CO2 emissions attributed to the energy sector."

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Defining Acceptable Woody Fuels

Despite uncertainties on GHG accounting, consensus exists on:

- Wood waste from logging debris
- Wood culled from:
  - Pine beetle kill
  - Accumulated hazardous fuels
- States should move forward on these accepted uses.
  - Avoids sending to landfill, open burns

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Federal support of biomass & biogas

- Renewable Fuel Standard
  - Biogas now has a pathway under the RFS – has provided HUGE boost to industry
- Production Tax Credit Sect. 45
- Title IX of the 2014 *Farm Bill*
  - Significant support for renewable energy, energy efficiency
- President's Biogas Roadmap (part of methane strategy)
  - Voluntary compliance
- DOI, USFS and others recognizing importance of woody biomass to hazardous fuels reduction.
- EPA's *Clean Power Plan* 111(d)
  - Policy signal that carbon will be increasingly expensive.

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What States are Doing to Help Biomass

- Specifically recognizing biomass in RPS:
  - Indiana: Recognizes thermal energy
  - Iowa: Recognizes resource recovery, refuse derived fuel, agricultural residues, wood burning facilities
  - Ohio: Recognizes cogeneration and waste heat recovery
- Creating carve-outs for DG
- Production Incentives
- Rebates
- Tax Credits

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What States are Doing to Help Biomass

- Grants, Loans
  - Biofuels Production Facility Grants, IL
  - Community Conservation Challenges, IN
  - Methane Digester Loan Program, MN

- Exemptions from sales tax/property taxes
  - Biomass Gasification and Methane Digester Property Tax Exemption, IL
  - General sales tax exemption for biomass technologies, WI

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Barriers for further integration

- Distributed Generation generally not favored in RPS
- Public perceptions on sustainability
- Lack of knowledge on technology available for waste re-use
- States and federal government still working through biogenic carbon issue
- Renewable Fuel Standard proposed reduction – affects all areas of the biomass industry (not just liquid transportation fuels)

State Action to Realize Biomass/Biogas Use

- Further recognize the value of distributed generation (DG)
  - Offsets fossil fuel use
  - Efficiency gains
- Include thermal energy in RPS
  - Waste to energy & renewable heat are often ignored in state policies
- Incentivize co-deployment of renewables
- Recognize avoidance costs
  - Reduced fossil fuel use, nutrient loads

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THANK YOU

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Back-up Slides

Digester Products – A thought exercise

US dairy farms could support 2,600 digesters:

- 11.7 million megawatts of biogas per year
  - Valued at $894 million

Co-Products:

- Nitrogen = $467 million
- Phosphorous = $325 million
- Fiber (ie. compost) = $217 million

Data from the Dairy Checkoff

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Bioenergy in the 2014 Farm Bill

Energy Title (IX): $694 million in mandatory funding over 5 years

- Sec. 9002 Biobased Markets Program
- Sec. 9003 Biorefinery Assistance
- Sec. 9004 Repowering Assistance Program
- Sec. 9005 Bioenergy Program for Advanced Biofuels
- Sec. 9006 Biodiesel Fuel Education Program
- Sec. 9007 Rural Energy for America (REAP)
- Sec. 9008 Biomass Research and Development Initiative (BRDI)
- Sec. 9010 Biomass Crop Assistance
- Sec. 9012 Community Wood Energy Program (no mandatory funding)

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111(d): biogenic carbon rule forthcoming

- "EPA expects that [it] will be a resource that could help inform states in the development of their CAA section 111(d) plans."

- Senators advocating for "simple and implementable" regulations recognizing the utility of bioenergy in CO2 in letter to Gina McCarthy.

  –Jeff Merkley (D-OR), Debbie Stabenow (D-MI), Mark Begich (D-AK), Angus King (I-ME), Amy Klobuchar (D-MN), Mark Udall (D-CO), Al Franken (D-MN), Ron Wyden (D-OR), Patty Murray (D-WA), Tammy Baldwin (D-WI) and Jeanne Shaheen (D-NH)

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Installed Capacity in Midwest Biomass & Waste

State	MW installed as of 2012
Illinois	148.6 MW
Indiana	62.3 MW
Iowa	14.6 MW
Kansas	7.2 MW
Michigan	488.4 MW
Minnesota	491 MW
Missouri	9.8 MW
Nebraska	10.9 MW
North Dakota	9.8 MW
Ohio	185.8 MW
South Dakota	0 MW
Wisconsin	358.1 MW

Courtesy of ACORE, data from EIA. Includes combustion, anaerobic digestion, gasification, co-firing, landfill gas or pyrolysis.