



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

IEA Bioenergy Multitask Conference

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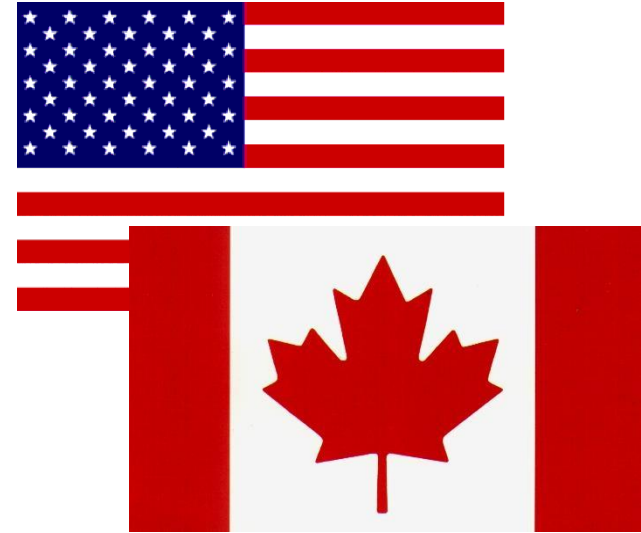
Office of Energy Efficiency and Renewable Energy
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U.S. – Canada Clean Energy Dialogue



- Launched by the U.S. President and Canadian Prime Minister in February 2009
- The Clean Energy Dialogue was created to enhance collaboration on the development of clean energy technologies to reduce greenhouse gas emissions and address climate change.
- 3 Bilateral Government Working Groups
Established to realize the objectives of the Clean Energy Dialogue and to identify key opportunities for joint collaboration in the following priority areas:
 - 1 Developing and deploying carbon capture and storage technologies
 - 2 Building a more efficient electric grid based on clean and renewable generation; and
 - 3 Expanding clean energy research and development



Advancing Presidential Priorities



Energy efficiency and renewable energy research, development, and deployment activities help the Nation meet its **economic**, **energy security**, and **environmental** challenges concurrently.

Energy Security

- Deploy the cheapest, cleanest, fastest energy source – energy efficiency
- One million plug-in hybrid cars on the road by 2015
- Develop the next generation of sustainable biofuels and infrastructure
- Increase fuel economy standards

Economic

- Create green jobs through Recovery Act energy projects
- Double renewable energy generation by 2012
- Weatherize one million homes annually

Environmental Pro

- Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050
- Make the US a leader on climate change
- Establish a national low carbon fuel standard

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Strategic Program Directions



PROGRAM PRIORITIES

Biomass	Investing over US\$1.4 billion to achieve cost competitiveness and commercialization of cellulosic and other advanced biomass feedstocks and biofuels through applied research, next generation pilot scale development, commercial scale biorefinery demonstrations and targeted infrastructure activities.
Buildings	Implementing a systems approach in deploying technologies for “net-zero” energy buildings that produce as much energy as they consume. Builder’s Challenge, the Commercial Buildings Initiative, and accelerated building codes and appliance standards implement this new approach.
Federal Energy Management Program	Doubled energy efficiency investment in Federal building through US\$1 billion of private-party performance contracting. New ESPC contracts will support up \$80 billion in energy savings at federal facilities and increase individual contract ceilings to \$5 billion over the life of the contract.
Geothermal	Program renaissance emerged on foundation of Enhanced Geothermal Systems (EGS) that allows geothermal energy to be harnessed nationwide providing up to 10% of our Nation’s future electricity.
Fuel Cells	Added focus on near-term stationary and early market applications to create economies of scale, accelerate learning-by-doing, and reduce cost of technology for transportation market.
Industrial	Concentrating on the Save Energy Now program, which through energy assessments has resulted in savings of over US\$100 million and 75 trillion Btus of natural gas.
Solar	Achieve grid parity with PV and other solar technologies by 2015 through advanced R&D over the entire supply chain. Re-invigorate Concentrated Solar Power program through launch of energy storage research and demonstration.
Vehicles	Focusing on fuel flexible Plug-in Hybrid Electric Vehicles through greatly enhanced battery research activities and new utility partnerships.
Weatherization/SEP	Developed stronger ties with States and utilities by providing technical assistance and by developing “best practices” and model policies for faster and larger scale adoption of efficiency and renewable energy.
Wind & Water Power	Assessed feasibility for wind energy to provide 20% of our Nation’s electricity which led to new industry vision. Launched new program in wave, tidal and current energy.

Recovery Act Funding for Renewables



Smart Grid Technologies	Smart Grid Investment Grants (\$3.4 billion)		High Penetration PV Deployment (\$17.5 million)
	Smart Grid Demonstration Program (\$615 million)		Smart Buildings (\$75 million)
Renewable Energy	Renewable Energy Projects (Department of Treasury and DOE) (\$3 billion)		
	Community Renewable Energy Deployment (\$22 million)		
Biomass	Pilot & Demonstration-Scale Biorefineries (\$480 million)		Fundamental Research (\$110 million)
	Commercial-Scale Biorefineries (\$176.5 million)		Ethanol Infrastructure Research (\$20 million)
Geothermal	Demonstration Projects (\$140 million)		National Geothermal Data System (\$30 million)
	EGS Technology R&D (\$80 million)		Geothermal Heat Pumps (\$50 million)
	Exploration Techniques (\$100 million)		
Solar	PV Technology Development (\$51.5 million)		PV Technology Research, Development and Design (\$22 million)
	Deployment (\$40.5 million)		Solar Energy Grid Integration (\$5 million)
	CSP R&D (\$25.6 Million)		
Wind/Water Power	Wind Turbine Drivetrain RD&T (\$45 million)	Technology Development (\$14 million)	New Wind Energy Projects (\$12.8 million)
	University R&D (\$24 million)	Wind Technology Center (MA) (\$25 million)	Modernize Existing Hydropower Infrastructure (\$32 million)
	National Wind Tech. Center upgrades (\$10 million)		

NOTE: Values are indicated in US\$

Recovery Act Funding and Initiatives



- **Renewable Energy Loan Guarantee Program:** \$6 billion to support loan guarantees for renewable energy projects to promote the rapid deployment of renewable energy systems that generate electricity or thermal energy, electric power transmission systems, and certain leading-edge biofuel projects. Must begin construction by September 30, 2011.
- **Tax credits:**
 - Extends the Production Tax Credit for biomass and other renewable energy facilities through 2013
 - Extends the Investment Tax Credit, allowing owners of biomass and other renewable technology projects that are eligible for the PTC to use the full 30% ITC previously available only to solar facilities
 - Allows renewable energy project developers to apply for a Treasury Dept. grant equal to 30% of the cost of an eligible project if construction starts in 2009 or 2010 (in lieu of ITC)

Biomass Program

Sub-Program and Key Initiative Descriptions



Feedstock
Production

Conversion Technologies

Integrated
Biorefineries

Infrastructure



Feedstocks

Supply

2012: 130 M TPY

Costs (Dry Ton)

2012:

Herbaceous: \$51

Woody: \$62

Biochemical Conversion

Reduce the modeled processing cost of converting feedstocks to ethanol to \$0.92/gal by 2012.

Thermochemical Conversion

Reduce the modeled processing cost of converting woody feedstocks to ethanol to \$0.86/gal by 2012.

Integrated Biorefineries

Demonstrate and validate integrated biorefineries across various pathways with at least 3 plants in successful operation by 2012. Validate modeled ethanol production cost and compare to targets.

Biofuels Infrastructure

Complete standards development and testing of E15 and E20 distribution systems and vehicles. Support E85 on regional basis.

Sustainability & Analysis

Increase understanding of resources and impacts on environment and climate.
Assess extent, adequacy, and implications of resources, performance, efficiency, strategies, technologies, and impacts.

Biomass Research & Development



Biomass Program RD&D Focus:

- Advanced biofuels that reduce GHG emissions up to 90% compared to gasoline
- Advances in enzymes and catalysis
- Identification and engineering of new microorganisms
- Novel agricultural sustainability indicators
- Test ethanol blends of above 10%



Program Priority: Investing over \$1.4 billion to achieve cost competitiveness and commercialization of cellulosic and other advanced biomass feedstocks and biofuels through applied research, next generation pilot scale development, commercial scale biorefinery demonstrations and targeted infrastructure activities.

Emphasis on Sustainability

Sustainability Program Purpose:

understand and reduce the potential environmental impacts of biofuels production activities

Feedstocks

- Through a partnership with Sun Grant Initiative, use field trials to collect data on sustainability
- Work with Council for Sustainable Biomass Production to develop criteria

Land Use

- Quantify future land use impacts for various scenarios using Purdue's GTAP, ANL's GREET models
- Incorporate land use data and yield assumptions

Water

- Conduct LCA of water use in production
- Analyze regional variations due to climate & soil
- Evaluate mitigation potential of bioenergy crops

International Efforts

- Work with Conservation International to identify land and preserve best production locations
- Provide data and analysis to Roundtable on Sustainable Biofuels, Global Bioenergy Partnership, others
- Contribute to International Biofuels Forum

Leveraging--Great Lakes Bioenergy Research Center

- Biogeochemical, biodiversity, and socioeconomic responses to expansion and intensification of agriculture and silvicultural practices
- Spatially explicit land use change forecast on crop area changes

Climate Change

- GREET Model development
- EISA Lifecycle Analysis – Monitoring and improving carbon footprint of bioenergy

The goal of the sustainability efforts in the Biomass Program is to anticipate and navigate requirements and inquiries with regard to the environmental benefits and impacts of Biomass Program activities

Research, Development and Deployment to find..



Feedstocks that...

- Need minimal nutrient or water inputs
- Produce high yields
- Have a minimal land use footprint



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Conversion technologies that...

- Minimize water consumption and air pollution
- Maximize efficiency



Biorefineries

- Are completely integrated with a minimal carbon footprint
- Promote co-product utilization and fully integrated systems



Structure that...

- Has minimal greenhouse gas emissions
- Avoids negative impacts on human health



For more information...



Office of Energy Efficiency and Renewable Energy

<http://www.eere.energy.gov/>

Biomass Program

<http://www1.eere.energy.gov/biomass>

THANK YOU