



Office of Energy Efficiency and Renewable Energy (EERE): International Activities

Dan Birns
Advisor, International Activities

Objectives of EERE International Collaboration

- Advance US global climate change, energy security and economic goals
- Accelerate clean energy innovation and cost reductions
- Transform clean energy markets in key countries, increasing the scale and speed of deployment

How does EERE achieve these goals?

Through collaboration in three areas:

- **EE & RE research, development and demonstration**
 - Primary focus on EU countries, Israel, Canada, and Japan, along with China, India, and Brazil
 - Conduct cooperative R&D to accelerate EE & RE technology innovation
 - Demonstrate near-commercial technologies
 - Leverage US investments to accelerate EERE technical and cost goals
- **Market transformation**
 - Focus on China, India, Brazil, key regional efforts
 - Analysis, expert assistance, and capacity building to support policies and programs, project development, and investment decisions
- **Global clean energy tools and analysis**
 - Tools, data and analysis to support decision making
 - Potential for ramped up efforts on GHG mitigation with key countries
 - Technology costs and performance; environmental & economic impacts; LC costs; policy impacts; analytic tools; market potential and penetration scenarios

- **Coordinate activities across EERE Programs**
 - Develop stronger cross-program activities
 - Enhance program-specific activities
- **Coordinate with DOE's Office of Policy and International Affairs (PI), and other offices within DOE**
 - Serve as primary point of contact with PI
 - Support DOE international priorities
- **Coordinate with other USG agencies**
 - Primarily State Dept, but also EPA, Treasury, Commerce, DOD
- **Represent EERE in meetings/events with representatives of foreign governments, companies, NGOs, etc.**

Key Bilateral Activities

- China
- India
- Brazil
- Israel
- EU
- Canada
- Japan
- Mexico
- Russia
- Kazakhstan

Key Multilateral Activities

- **Biofuels** – Global sustainability analysis
- **ECPA** – Energy and Climate Partnership for the Americas
- **EDIN** – Energy Development in Island Nations
- **APEC** – Asia-Pacific Economic Cooperation
- **APP** – Asia-Pacific Partnership on Clean Development & Climate
- **MEF** – Major Economies Forum on Energy and Climate
- **Climate REDI** – Renewable Energy and Efficiency Deployment Initiative
- **IPEEC** – International Partnership for Energy Efficiency Cooperation
- **IPGT** – International Partnership for Geothermal Technology
- **IEA Working Groups and Implementing Agreements**
- **IPHE** – International Partnership for the Hydrogen Economy
- **IRENA** – International Renewable Energy Agency



- **FY2009 Omnibus Appropriations Bill** included \$5M for EERE
 - \$2M for the Energy and Climate Partnership of the Americas*
 - \$2M for U.S.-Israel Cooperation*
 - \$1M undesignated
- **FY2010 Energy and Water Development Appropriations**
 - \$10M for EERE International
 - \$2M for U.S.-Israel Cooperation*
- **FY2011 Request**
 - \$25M

*Congressionally directed



Bilateral Activities

Strategic and Economic Dialogue (S&ED)

The S&ED is an umbrella mechanism for engaging China on energy and climate-related issues at the highest levels of government. In addition, DOE has an **Energy Policy Dialogue (EPD)**.

Buildings

Goal: Advance the understanding and development of green buildings, incorporate building-integrated renewable energy, approach or reach zero net energy use

- **Demonstration Projects**
 - Mayor's Training Center
 - Shanghai Energy Conservation Supervision Center
 - Beijing Olympic Village
 - Tianjin Eco-City
- **Codes, software design tools, labeling**
 - Windows and building envelope ratings, labels, and standards
 - Commercial and residential building codes
 - EnergyPlus interface for China
 - Public sector efficiency toolkit
- **Partnership building**
 - Greensburg-Sichuan cooperation on post-disaster planning and sustainable redevelopment
 - Technical assistance for establishing and maintaining the US-China Partnership for Sharing US Best Practices in Clean Urban Development, Energy and Environment
 - Other city opportunities (e.g., Shanghai-Chicago, Chicago-SF-Philadelphia, Tianjin, etc)



Industrial

Goal: Improve energy efficiency of the 1000 most energy-intensive enterprises in Chinese industry to meet China's 2010 energy intensity reduction goals

- ***Policy and comparison benchmarking study*** – Comparison of large U.S. and Chinese manufacturing plants on energy efficiency strategies, laws, policies, standards and energy management
- ***Industrial plant assessments*** – Identify greatest opportunities for improvements in energy efficiency for replication
- ***Software conversion*** – Of existing software for use by Chinese engineers in the top energy-consuming enterprises
- ***Outreach materials*** – On the *Save Energy Now* industrial efficiency program.

Biofuels

Goal: Advance biofuels production, conversion and use in China.

- ***R&D on biochemical conversion of corn stover*** -- Characterize and develop state-of-the-art technology
- ***R&D on thermochemical conversion processes including biomass gasification and pyrolysis, Fischer Tropsch and other topics***

Wind

Goal: Support the successful deployment of large-scale wind power in China through comprehensive wind analysis, policy, and integration support to help achieve China's 100GW goal and expanded 300GW scenario.

- ***100 GW Wind Scenario*** – Use basic 3Tier wind map to develop initial conceptual scenario
- ***Refinement of “geospatial supply curve” assessment and planning methodology*** – For use at provincial and regional level
- ***Analysis of Xinjiang prospect area*** – Assess wind base
- ***Consideration of wake effects in wind farms*** – Analysis and consultation to support policymaking

Transportation

Goal: Advance electric drive vehicles for China, train on modeling and tools, and expand knowledge of biofuels combustion for automotive engines.

- ***Denver-Chongqing Eco-Partnership*** – Support the Ten Year Framework of the US-China Strategic Economic Dialogue is on implementing electric and plug-in hybrid vehicles
- ***Software modeling and simulation training*** – Train engineers from MOST's China Automotive Technology and Research Center (CATARC) in the use of PSAT and GREET
- ***R&D on sprays and combustion of biofuels for transportation engines*** – Improve combustion and reduce emissions with biofuels

Memorandum of Cooperation: US-China Energy Partnership

In support of US-China bi-lateral activities, DOE and NEA developed a MOC on Renewable Energy to include:

- Road-mapping
- Policy and Finance
- Advanced Renewable Energy Technologies
- Advanced Biofuels
- Renewable Energy Deployment Solutions
- Grid Modernization
- Personnel Training
- Testing and Standards

Examples of activities:

- Renewable Energy Task Force
- Annual Renewable Energy Forum
- Advanced Renewable, Grid, and Biofuels Working Groups
- Sub-National Cooperation, i.e. city pairings

Memorandum of Cooperation: US-China Energy Partnership

In support of US-China bi-lateral activities, the United States and People's Republic of China developed an MOU on Energy Efficiency to include:

- Policy and Finance
- Industrial Energy Auditing and Benchmarking
- Building Codes, Labels and Rating Systems
- Smart Grid Development
- Consumer Product Testing and Labeling
- Personnel Training
- Demonstration Projects
- Trade and Investment Promotion

Examples of activities:

- Energy Efficiency Task Force Advisory Group
- Annual Energy Efficiency Forum
- Low Carbon Leadership Program
- Sub-National Cooperation
- Green Buildings Partnership
- Industrial Energy Partnership
- Consumer Products Work Group
- EE Trade and Investment Promotion

- Announced by Secretary Chu, Chinese Minister of Science Wan Gang, and Administrator of National Energy Administration Zhang Guo Bao in July 2009
- Goal: to facilitate joint research and development on clean energy by teams of scientists and engineers from the U.S. and China, as well as serve as a clearinghouse to help researchers in each country.
- Protocol signed and discussions underway with PI, NEA, MOST
- FOA issued and submissions being reviewed by PI for RFP in Q2 2010
- \$15M in joint funding, split evenly across three initial priority areas:
 - Building energy efficiency – EERE \$2.5M from BTP
 - Vehicle technologies – EERE \$2.5M from BTP
 - Carbon capture and sequestration – \$2.5M from FE

Buildings

Goal: Advance the understanding and development of green buildings; incorporate building-integrated renewable energy, approach or reach zero net energy use

- ***Analysis and benchmarking of commercial and residential buildings*** -- Testing equipment and building performance, support for Energy Conservation Building Code
- ***Energy simulation tools*** — Develop tools customized for Indian climate zones; work with high-impact industries (e.g. data centers, hotels) to provide design assistance and energy modeling support
- ***Building assessments and design charrettes*** for new buildings and retrofits
- ***US-India Cities Partnerships*** – Establish partnerships between US and Indian cities under the Partnership for Sharing US Best Practices in Clean Urban Development, Energy and Environment
- ***Zero energy buildings and communities*** – Provide technical assistance on demonstrating ZEBs and ZECs

Industrial

Goal: Improve energy efficiency of Indian industry

- ***Promote Save Energy Now*** – Develop outreach materials; conduct workshops and demonstrations

Geothermal

Goal: Advance the deployment of GSHPs in India

- ***Conduct training on GSHPs and introduce U.S. technologies with Commerce FCS***

Biofuels – MOU with MNRE

Goal: Conduct joint R&D with Indian government and local partners on second generation cellulosic ethanol and biodiesel; provide technical assistance to development of pilot plants

- ***Cellulosic ethanol pilot plant*** – Design layout, capacity, feedstock flexibility, process integration considerations, supporting infrastructure
- ***LCA of jatropha biodiesel for road transportation*** – Evaluate environmental impact and identify opportunities to reduce impact
- ***Algae resource assessment*** – Evaluate climate conditions, nutrient availability, water resources, land characteristics, infrastructure, labor availability

Solar – MOU with MNRE

Goal: Advance the deployment of solar technologies in India

- ***Extend solar resource assessment to all of India*** – Validate satellite data with ground data
- ***Identify optimal sites*** – In terms of technical and economic potential, including rural villages
- ***Promote Solar Cities partnerships*** – between US and Indian cities

Wind – MOU with MNRE

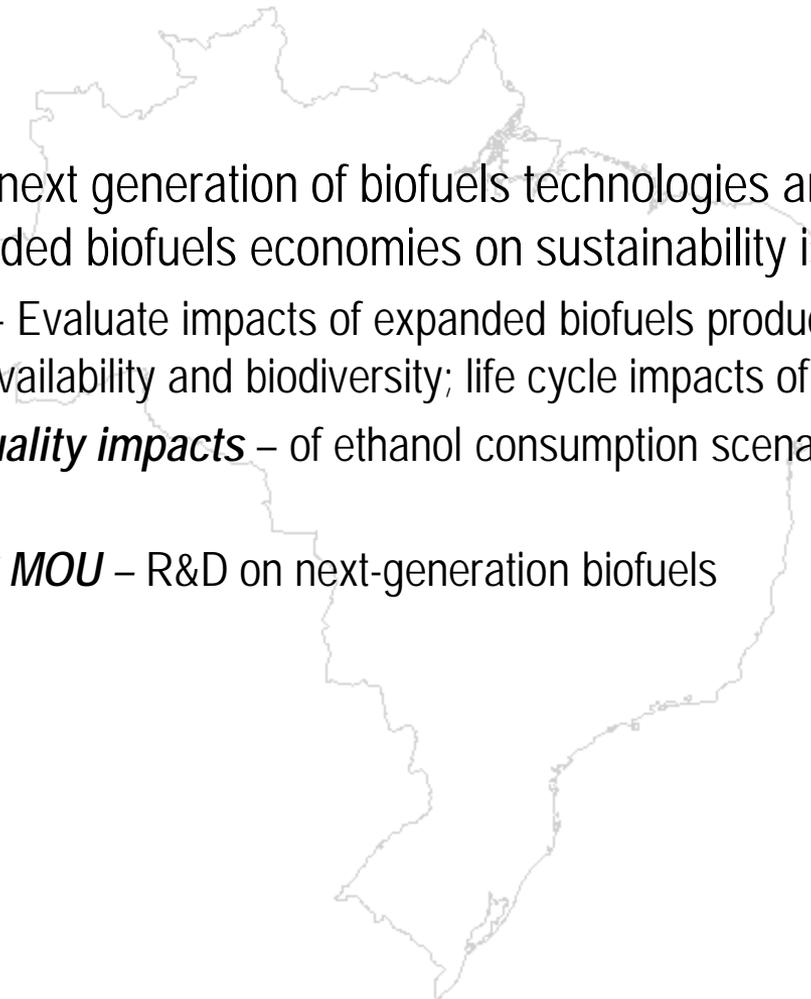
Goal: Advance the deployment of wind technologies in India

- ***Low-wind turbine technology and materials*** – share DOE/NREL experience, including standards and certification

Biofuels

Goal: Advance the next generation of biofuels technologies and better understand the impact of expanded biofuels economies on sustainability issues

- ***Sustainability*** – Evaluate impacts of expanded biofuels production and use on land, water use and availability and biodiversity; life cycle impacts of integrated biorefinery
- ***GHG and air quality impacts*** – of ethanol consumption scenarios using the GREET model
- ***NREL-CENPES MOU*** – R&D on next-generation biofuels



Goal: Conduct joint R&D on cutting-edge clean energy technologies, successfully commercialize technologies

- ***Competitive Solicitation through BIRD*** – Binational Industrial Research and Development Foundation (BIRD) will conduct a competitive solicitation, with private cost-share, for cooperative research, development, deployment, and demonstration projects. Projects selected at the working group meeting on 11/5/2009 include: solar micro-turbine, Smart Grid, building-integrated photovoltaics, and biocatalysts for biodiesel production.
- ***Algal Biomass*** – LCA of algal biomass; develop novel extraction methods; analyze cost-effectiveness of fossil power plant carbon recycling through open ponds; analyze production processes; and assess cost-effectiveness of using algae as a gasification and/or pyrolysis feedstock; with Seambiotic
- ***Vehicles*** – PHEV battery testing; with Better Place, Renault-Nissan, New Deal Designs, NREL, and the Technion– Israel Institute of Technology

The U.S. Canada Clean Energy Dialogue established during President Obama's visit to Ottawa on February 19, 2009 involves cooperation on the following technology areas:

- CCS
- Smart Grid
- Clean Energy Research and Development
 - Develop a Clean Energy RD&D Collaboration Framework and a technology "roadmap" to identify and describe the technology and associated R&D pathways that would allow Canada and the United States to meet our respective 2050 GHG reduction
 - increased levels of collaborative research, development, and demonstration among laboratories, industry and academia
 - Help create a single North American market for clean energy technologies, achieved where possible through compatible codes, standards and incentives

Japan

- METI Minister Nikai met with S1 on May 5, 2009, to discuss increased bilateral cooperation. S1 presented a list of 89 areas that DOE labs were interested in exploring with their Japanese counterparts. PI is currently developing a research trip to visit Japanese labs

Mexico

- The U.S.-Mexico Bilateral Framework on Clean Energy and Climate Change was launched by President Obama on April 16th. EERE participation will include collaboration on grid-integrated wind development

Russia

- Discussions ongoing

Kazakhstan

- Discussions ongoing

Multilateral Activities

Energy & Climate Partnership for the Americas (ECPA)

Goal: To increase cooperation within the Western Hemisphere on energy and climate issues to enhance U.S. energy security, reduce global greenhouse gas emissions, and build stronger relationships with our neighbors through:

- **Public Policy**
- **Capacity Building**
- **Developing the Clean Energy Private Sector**
- **Current projects underway:**
 - Chile– Renewable Energy Center and CSP project
 - Peru– Energy Efficiency Center
 - Mexico– Wind Energy
 - Caribbean– Low-Carbon Communities in the Caribbean
 - Costa Rica– Energy Efficiency Center
 - Dominica– Small Wind



Energy Development in Island Nations (EDIN)



- EDIN helps islands across the globe adopt energy efficiency measures and deploy renewable energy technologies
- Partnership began officially in August 2008, with Iceland, New Zealand and U.S. (DOE/EERE) as founding members
- EDIN will build upon the HCEI model of transforming an island to a clean energy economy through technical, financial and policy assistance.
- April 2009 – EDIN announced three pilots projects
 - U.S. will work with U.S. Virgin Islands towards clean energy goals
 - Iceland will assist Dominica with harnessing its geothermal resources
 - New Zealand will conduct a survey of geothermal potential in numerous Pacific islands



- **Asia-Pacific Economic Cooperation**
 - DOE (PI-Yoshida) recently assumed leadership of Energy Working Group
 - U.S. chairs Expert Group on Renewable Energy Technologies (EGNRET) and the Task Force on Biofuels; also participates in Expert Group on Energy Efficiency and Conservation (EGEEC) and Expert Group on Energy, Data and Analysis (EGEDA)

- **Asia-Pacific Partnership on Clean Development and Climate**
 - EERE participates in Buildings & Appliance Task Force (BATF) and Renewable Energy & Distributed Generation (REDG) Task Force and the Cement, Steel, and Aluminum Task Forces
 - APP Ministerial meeting agreed to strengthen APP and align it more closely with related climate efforts

Major Economies Forum (MEF) on Energy & Climate

- Launched by President Obama in March 2009
- Purpose is to:
 - help generate the political leadership necessary to address climate change at the UN negotiations in Copenhagen in December
 - advance concrete initiatives and joint ventures that increase the supply of clean energy while cutting greenhouse gas emissions
- MEF countries have agreed to take the lead on developing a series of Technology Action Plans (TAPs), which were released prior to Copenhagen.
 - **Advanced Vehicles:** Canada
 - **Bio-energy:** Brazil and Italy
 - **CCS:** UK and Australia
 - **EE:** [United States](#)
 - **HELE Coal:** India and Japan
 - **Smart Grid:** Italy and Korea
 - **Solar:** Germany and Spain
 - **Wind:** Germany, Spain, Denmark

- Announced by Secretary Chu in Copenhagen at the international climate negotiations on December 14, 2009
- Climate REDI will accelerate the deployment of renewable energy and energy efficient technologies in developing countries to:
 - Reduce greenhouse gas emissions
 - Fight energy poverty
 - Improve public health



Climate REDI includes four initial activities:

- Solar and LED energy access program (SLED)
- Super-efficient Equipment and Appliance Deployment (SEAD)
- Clean Energy Information Platform (CEIP)
- Scaled-up Renewable Energy Program (SREP)

Program	Description	Coverage	Approach
SLED	Solar and LED energy access program	Off-grid Renewables	Quality Assurance, Labeling, Buy-down
SEAD	Super-efficient Equipment and Appliance Deployment	Efficiency	Minimum Efficiency Standards, Labeling, Buy-down
CEIP	Clean Energy Information Platform	All Renewables and Efficiency	Online information platform for sharing policy best practices and technical resources and coordinating deployment activities
SREP*	Scaled-up Renewable Energy Program	Grid-connected Renewables	Capacity Building and Financing

* Under the World Bank's Strategic Climate Fund

- High-level forum for discussion, consultation and information exchange with other countries regarding energy efficiency measures
- Secretariat hosted at IEA
- Countries join on a voluntary basis and participate in specific annexes that reflect each country's greatest interests
- Launched on May 24, 2009 at the G8 Energy Ministerial in Rome
- Initial Work Plan may include:
 - Summary of National Energy Efficiency Action Plans
 - Inventory of Multilateral International Energy Efficiency Initiatives
 - Assessment of Energy Efficiency Financing Mechanisms
 - Sustainable Buildings Network (SBN)
 - Establishment of Energy Management Action Network (EMAC) for Industrial Energy Efficiency
 - Improving public and private sector methods for Measuring and Verifying Energy Efficiency Improvements
- EERE Representative to IPEEC – David Rodgers

- Officially established January 26, 2009
 - Headquartered in Abu Dhabi, United Arab Emirates
 - 141 signatories (as of January 26, 2010)
- IRENA aspires to become the main driving force for promoting a rapid transition towards the widespread and sustainable use of renewable energy on a global scale
- In 2010, with an adopted budget of \$13.7 million, IRENA will focus on:
 - Building a network of international renewable energy experts
 - Mapping global renewable energy potential
 - Building a comprehensive database of renewable energy policies
 - Advising its members regarding successful policies and financial schemes to promote renewable energy, as well as capacity building and training programs



International Partnership for Geothermal Technology (IPGT)

- IPGT Charter signed August 28, 2008
- Initial Participating Members:
Australia, Iceland, U.S.
- Accelerate the development of
advanced geothermal technologies
- Exchange of information on best
practices and lessons learned
- Identify and avoid blind alleys
- Maximize efforts, limit duplication



International
Partnership for
Geothermal
Technology

- Mechanism for pooling resources to foster the research, development and deployment of clean energy technologies.
- EERE RE and EE programs participate in dozens of IAs*:
 - **OBP** – production, conversion, systems analysis, biorefineries
 - **BTP** – solar heating & cooling, heat pumps, appliances
 - **Geothermal** – EGS, advanced drilling
 - **Wind & Water Power** – testing and evaluating ocean energy systems, wind energy systems
 - **Hydrogen** – integrated systems analysis, safety, biohydrogen, advanced fuel cells
 - **Industrial** – drying and dewatering, membranes, process integration, district heating and cooling
 - **VTP** – energy conservation & emissions reduction in combustion, advanced materials, advanced fuels, HEVs, EVs
 - **Solar** – PV power systems, solar power and chemical energy systems

*Partial list

- IPHE is an in-kind government partnership that facilitates international collaboration activities to enhance development of hydrogen and fuel cell technologies.
 - Steering Committee (SC) = Policy Level, Chaired by Germany
 - Implementation – Liaison Committee (ILC) = Technical Level, Chaired by UK and France
 - Secretariat = Germany lead with U.S. website support
- IPHE is expanding its focus to include fuel cells for stationary, portable, and material handling applications
- IPHE recently changed its name to “International Partnership for Hydrogen and Fuel Cells in the Economy” and admitted South Africa as its 18th member.
- 2010 Meetings
 - Essen, Germany in May 2010
 - Shanghai, China, in October 2010
- Recent and Upcoming Activities
 - U.S. hosted meeting in December 2009
 - Released Communiqué on global opportunities for hydrogen and fuel cells (available on the IPHE website at <http://www.iphe.net>)
 - Sponsoring IPHE workshop on hydrogen infrastructure in Sacramento, CA in Feb 2010
 - Sponsoring IPHE Global Student Competition in Essen Germany in May 2010

Thank you!

For more information, contact:
daniel.birns@ee.doe.gov