Tribal Energy Program
2008 Annual Review

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November 17, 2008
Major NREL Technology Thrusts

**Supply Side**
- Wind Energy
- Solar Photovoltaics
- Concentrating Solar Power
- Solar Buildings
- Biomass Power
- Biofuels
- Geothermal Energy
- Hydrogen
- Superconductivity
- Distributed Power

**Demand Side**
- Hybrid Vehicles
- Fuels Utilization
- Buildings Energy Technology
- Federal Energy Management
- Advanced Industrial Technologies

**Cross Cutting**
- Basic Energy Science
- Analytical Studies
- International Programs
- Tribal Energy Program
Renewable Resource Options

Geothermal

Biomass

Solar

Hydro

Wind
Renewable Technology Options

Power

Direct Use

Remote Homes

Stock Watering

CS Power & Heat

Buildings

Biomass Heat, Power & Fuels

Small Wind

Diesel Hybrids

Big Wind

Small Hydro
Energy Efficiency

Energy Star Appliances

Refrigerators – Half as much energy

Clothes Washers – Save up to $110 per year

Oil & Gas Boilers – Save up to 10%

Programmable Thermostats – Save up to $100 per year

Efficient Lighting

If every American changed out 5 lights, we’d save $6 billion/year and the equivalent of 21 power plants.
“Whole Buildings” Strategy:
Existing R&D programs, building technologies, and components tied together by Systems Integration and Computerized Design Tools.

Passive Solar Strategies
- Siting and orientation, glazing size and location, and shading strategies contribute to a passive solar, or "climate-responsive," building.

Advanced Technologies
- Energy-saving appliances, advanced energy controls and thermostats, efficient heating and cooling systems, photovoltaics, and solar water heating systems.

Energy-Efficient Materials
- Superior building materials, including high-efficiency windows, insulation, brick, concrete masonry, and interior finish products.
Wind Turbine Sizes and Applications

Small (≤10 kW)
- Homes
- Farms
- Remote Applications (e.g. water pumping, telecom sites, icemaking)

Intermediate (10-250 kW)
- Village Power
- Hybrid Systems
- Distributed Power

Large (250 kW – 2+ MW)
- Central Station Wind Farms
- Distributed Power
Tribal Wind Monitoring Sites

- 20m WPA Monitoring Completed
- 20m WPA Anemometer
- 50m WPA Anemometer
- 50m TEP Anemometer
Solar
Geothermal Options
Biomass & Bioenergy Flows

Biomass
- Stalks & straws
- Harvest residues
- Forest slash
- Forest harvest for energy plantations
- Process residues
  - Black liquor
  - Sawdust
  - Bark

Biomass Products
- Pulp
- Paper
- Lumber
- Plywood
- Cotton
- Fiber

Crops, Animals
- Process residues
  - Dung
  - Bagasse

Materials
- MSW clean fraction
- Yard trimmings
- Constr. & demolition
- Wood
- Non-recyclable organics

Consumers
- Energy services
  - Heat
  - CHP
  - Electricity
- Biofuels
  - Charcoal
  - Biogas
  - Ethanol

Food

Biomass & Bioenergy Flows: Innovation for Our Energy Future
Bioenergy Opportunities

Heat

Power

Fuels
Bioenergy Project Requirements

- Energy Markets
  - High Capacity Factor
  - High Availability
  - Competitive Investment Cost

- Conversion Technology
  - Technically Proven

- Feedstock Supply
  - Sustainable Resource

- Renewable
  - Long term Agreements
  - Competitive Prices

- Success
  - Environment
  - Economic
  - Social
Small & Micro Hydro
Power Options

http://hydropower.inl.gov/prospector/
We Live in a Changing World

GLOBAL WARNING
BULLETINS FROM A WARMER WORLD

American Indians
Rekindling the Spirit

Plus
Treasures from a Civil War Wreck
Badgers with Attitude

Heating Up...

Melting Down...
CORN

DAILY Cash - Nearby Futures Contract
(September 2006 - Present time)
5 Year Copper Spot

USD / lb

www.kitco.com
Silicon Metal - 98.5% FOB North America
5 Years - $/LB

Metalprices.com

Tribal Energy Security => Tribal Sovereignty

General Council

Tribal Council

Legal
- Sovereignty, Codes & Standards, Contracts, Legal Authority

Environment
- Earth, Air, Water, Parks, Open Space, Wildlife & Plants

Financing
- Local Resources, Federal Grants, "Green Tag" Sales Partnerships

Community Energy Use & Growth
- Residential, Commercial, Industrial Loads

Technology
- Energy Resources, Technology Options

Power Markets
- On-Site Energy Displacement, Merchant Power Sales, "Green Tag" Sales

Tribal Champion Or Team

Strategic Plan

Projects
These 3-1/2 days provide a unique opportunity to learn from your colleagues.

Enjoy the presentations. 
Listen attentively. 
Have some fun. 
Bring home some new ideas.
County-Level Map of the 2008 US presidential election results
http://www-personal.umich.edu/~mejn/election/2008/

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