Assistant Secretary Indian Affairs
Office of Indian Energy and Economic Development

Renewable Energy Program

Department of Energy
Tribal Energy Program Review
October 25 to 29, 2010

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Office of Indian Energy and Economic Development (OIEED)

Office of Indian Energy and Economic Development (IEED) seeks to spur job growth and sustainable economies on American Indian reservations.

Office of Indian Energy and Economic Development (OIEED)

OIEED BUSINESS MODEL

Indian Trust Lands Renewable Energy Potential

Resource	Number of Reservations
Wind	60
Woody Biomass	179
Waste to Energy Biomass	223
Geothermal Electric	60
Geothermal Heat	267
Hydroelectric*	6
Compressed Earth Blocks*	3
Solar**	All

*Known to DEMD
**Available everywhere

DEMD Renewable Energy Projects

47 Projects

- Wind – 8
- Solar - 5
- Geothermal
  - High temp – 5
  - Low/med temp – 2
- Hydroelectric – 9
- Tidal - 1
- Biomass
  - Woody - 4
  - Waste - 7
- Compressed Earth Blocks – 2
- Multiple Resource review - 4

EMDP 2010
Renewable Projects

23 Renewable Energy Projects funded, totaling $4.57 million

Tribe	Resource
Campo Band of Mission Indians	Wind
Catawba	Solar
Chemehuevi	Solar
Cherokee	Hydroelectric
Colville Confederated Tribes	Woody Biomass
Duckwater Shoshone	Multiple
Fond du Lac	Woody Biomass
Fond du Lac	Waste to Energy
Hoopa Valley	Hydroelectric
Hualapai	Solar
Iowa Tribe of Oklahoma	Wind

Tribe	Resource
Aroostook Band of Micmacs	Multiple
Nez Perce	Waste to Energy
Oneida	Waste to Energy
Paskenta Band of Nomlaki	Woody Biomass
Paskenta Band of Nomlaki	Waste to Energy
Passamaquoddy	Waste to Energy
Penobscot	Multiple
Forest County Potawatomi	Woody Biomass
Chippewa Cree	Hydroelectric
Ute Mountain Ute	Solar
Winnebago	Wind
Yakama	Hydroelectric

Renewable Energy

Grouped by main function -

- Community Scale (Small Scale)
  - Saving energy/money
- Industrial Scale (Medium Scale)
  - Use directly
  - Added Value
  - Job creation
- Utility Scale (Large Scale)
  - Energy sales

Community Scale (Small Scale)

- Local
- Offset energy
  - Net metering
- Money saver
- Limited jobs
- DEMD focus:
  - Compressed Earth Blocks
  - Ground source heat pumps (geothermal)

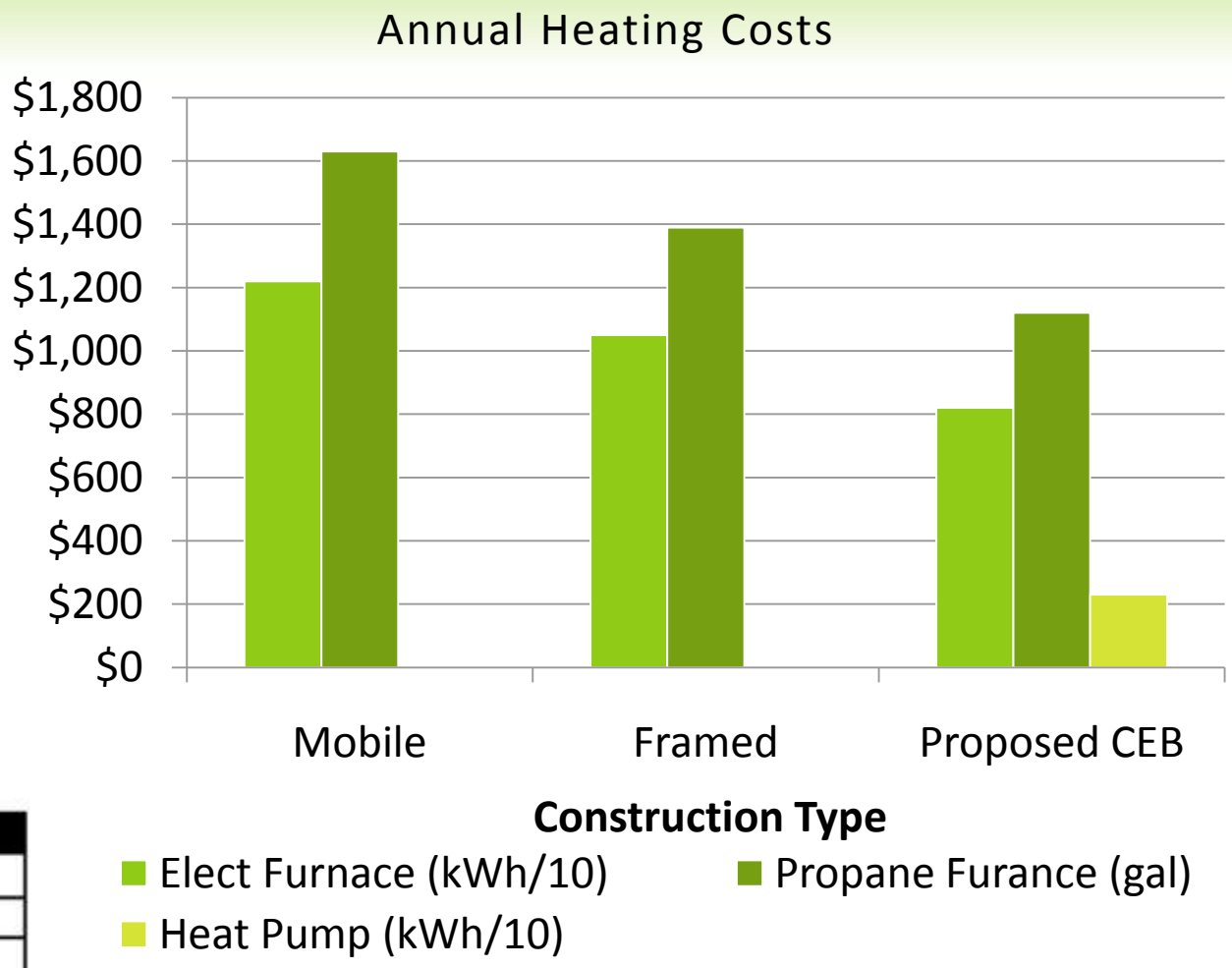
CROW CEB PROJECT

Community Scale
Crow Nation Compressed Earth Blocks

Incorporation of GSHP

Other design aspects:
- Structural Insulated Panels, Thermally Efficient Windows and Doors

Tribe partnered with OIEED's DEMD and CU-Boulder



Heating Value of Fuel		
Natural Gas	1,000	btu/ft^3
Propane	71	kBtu/gal
Fuel Oil #2	115	kBtu/gal

Industrial Scale (Medium Scale)

- Manufacturing industry would bring jobs to the Reservation
- Industry needs:
  - Inexpensive, steady electricity
  - Labor force
  - Land
- DEMD focus:
  - Biomass (woody and waste), geothermal (electric and direct heat), hydroelectric
  - Projects that have similar vision

Industrial Scale Biomass Economics

- Input parameters
  - 20 MW facility
  - Capital cost - $ 83 MM
    - $4150 / MW
  - 20% Equity
  - Green tags - $0.02/kWh
  - Tribal – No Fed/State taxes, no tax credits
  - Current average residential electric rate - $0.97/kWh

Industrial Scale Biomass Economics

Taxed business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.06	-	-	(43)
0.10	13.1	11.4	(1)
0.14	2.5	50.8	31

Tribal business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.06	-	-	(78)
0.10	-	-	(34)
0.14	11.2	17.5	11

Industrial Scale Waste to Energy Economics

- Input parameters
  - 30 MW facility
    - $5,333 / MW
  - Capital cost - $ 160 MM
  - Tipping fee – $35/ton
  - 20% Equity
  - Green tags - $0.02/kWh
  - Current avg. residential rate - $0.097/kWh
  - Tribal – No Fed/State taxes, no tax credits

Industrial Scale Waste to Energy Economics

Taxed business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.04	19.8	0.4	(12)
0.06	8.2	25.2	9
0.08	1.7	47.3	27

Tribal business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.04	17.0	2.7	(17)
0.06	6.3	18.7	16
0.08	4.1	32.5	30

Industrial Scale

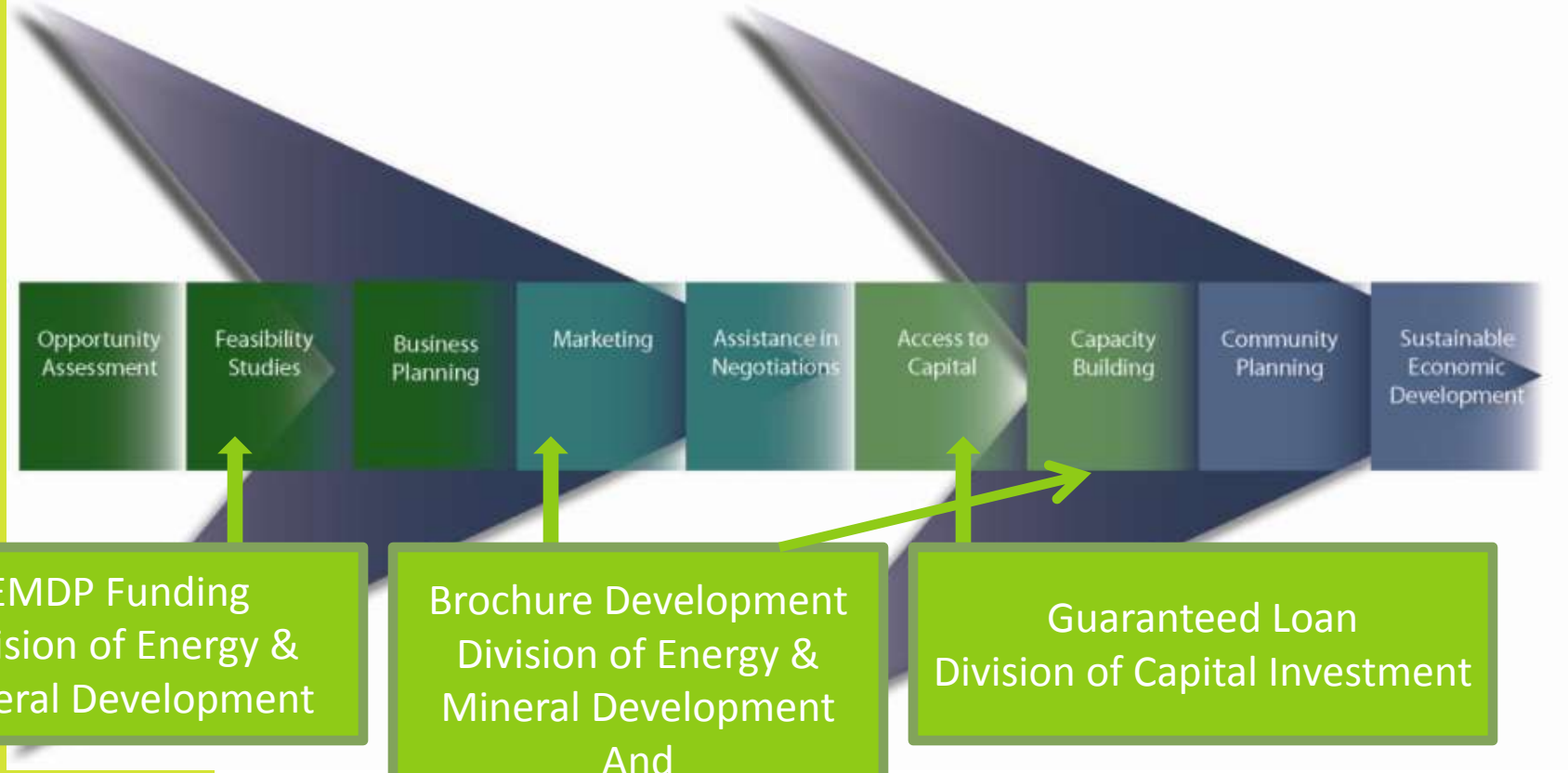
DEMD Assistance

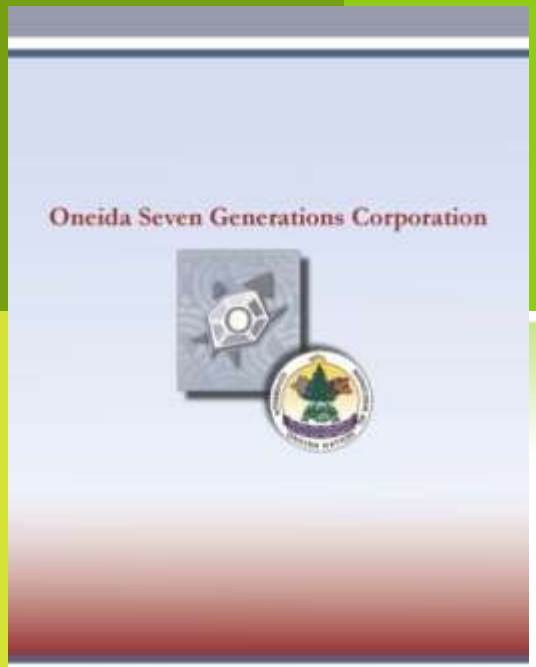
- Resource determination
- Marketing brochure development
  - Currently – Oneida, Colville, Fond du Lac, Metlakatla
- Connect a Tribe with a company that fits the Tribe's business model

Oneida Nation Energy Recovery Facility

- Oneida Seven Generations Corporation
- 5 MW power plant,
  - 150 tons/day MSW
  - Potential to expand to 20 MW
- Pyrolysis/Gasification
- Recycling
- 30 Full time jobs
- Break ground this fall

Oneida Energy Recovery Facility
OIEED Assistance



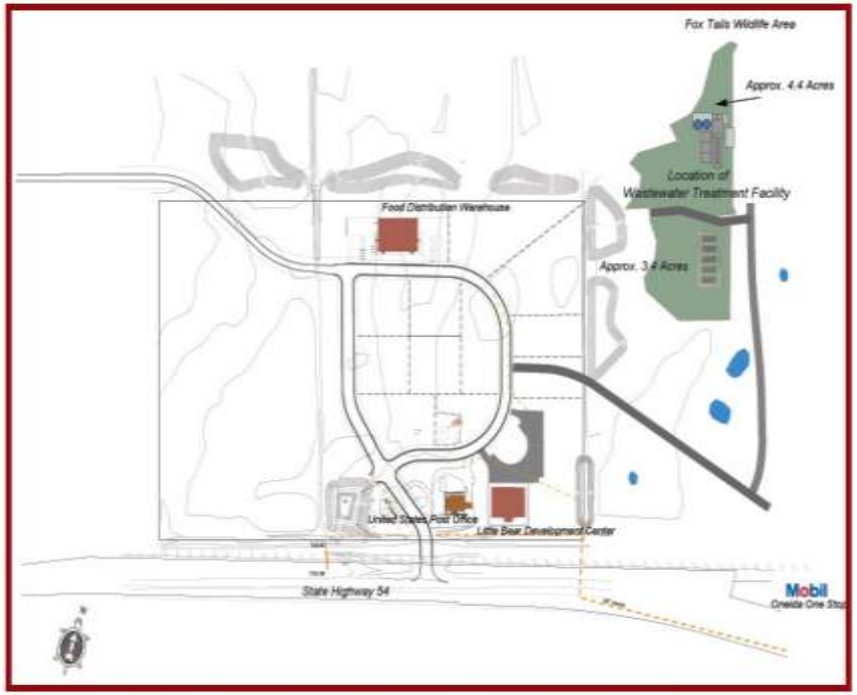


Oneida Nation Marketing to Industry

Business Advantages

- Located adjacent to the Green Bay metropolitan area
- There is an international seaport within 6 miles that serves domestic and foreign trade
- Close proximity to airport and rail lines
- Easy highway access corridors to Milwaukee, Chicago, Minneapolis, and beyond
- Significant tax advantages
- History of successful business endeavors
- Labor force available

Oneida Business Park



Oneida Business Park Business Development Location. Drawing courtesy OSGC

Utility Scale (Large Scale)

- Power plant
- Produce and sell electricity
- Makes money
- Limited jobs
- DEMD focus:
  - Wind Atlas
    - Potential Wind Forums
    - Current Projects in negotiations
  - Solar Atlas

Utility Scale Wind Economics

- Input parameters
  - 150 MW facility
  - Capital cost - $ 375 MM
    - $2500 / MW – (with eff. $7500 / MW)
  - Replacement Costs (yr 15) – $188 MM
  - 20% Equity
  - Green tags - $0.02/KWh
  - Current avg. residential rate - $0.097/KWh
  - Tribal – No Fed/State taxes, no tax credits
  - 33% capacity factor

Utility Scale Wind Economics

Taxed business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.10	14.4	-	(54)
0.12	12.1	5.7	(16)
0.15	2.9	25.0	36

Tribal business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.10	-	-	(100)
0.12	13.8	4.0	(52)
0.15	11.2	14.9	19

Utility Scale Solar Economics

- Input parameters
  - 3.5 MW facility
  - Capital cost - $ 23 MM
    - $6571 / MW
  - Replacement Costs (yr 15) – $4.6MM
  - 20% Equity
  - Green tags - $0.02/kWh
  - Current avg. residential rate - $0.097/kWh
  - Tribal – No Fed/State taxes, no tax credits
  - 16% efficient

Utility Scale Solar Economics

Taxed business

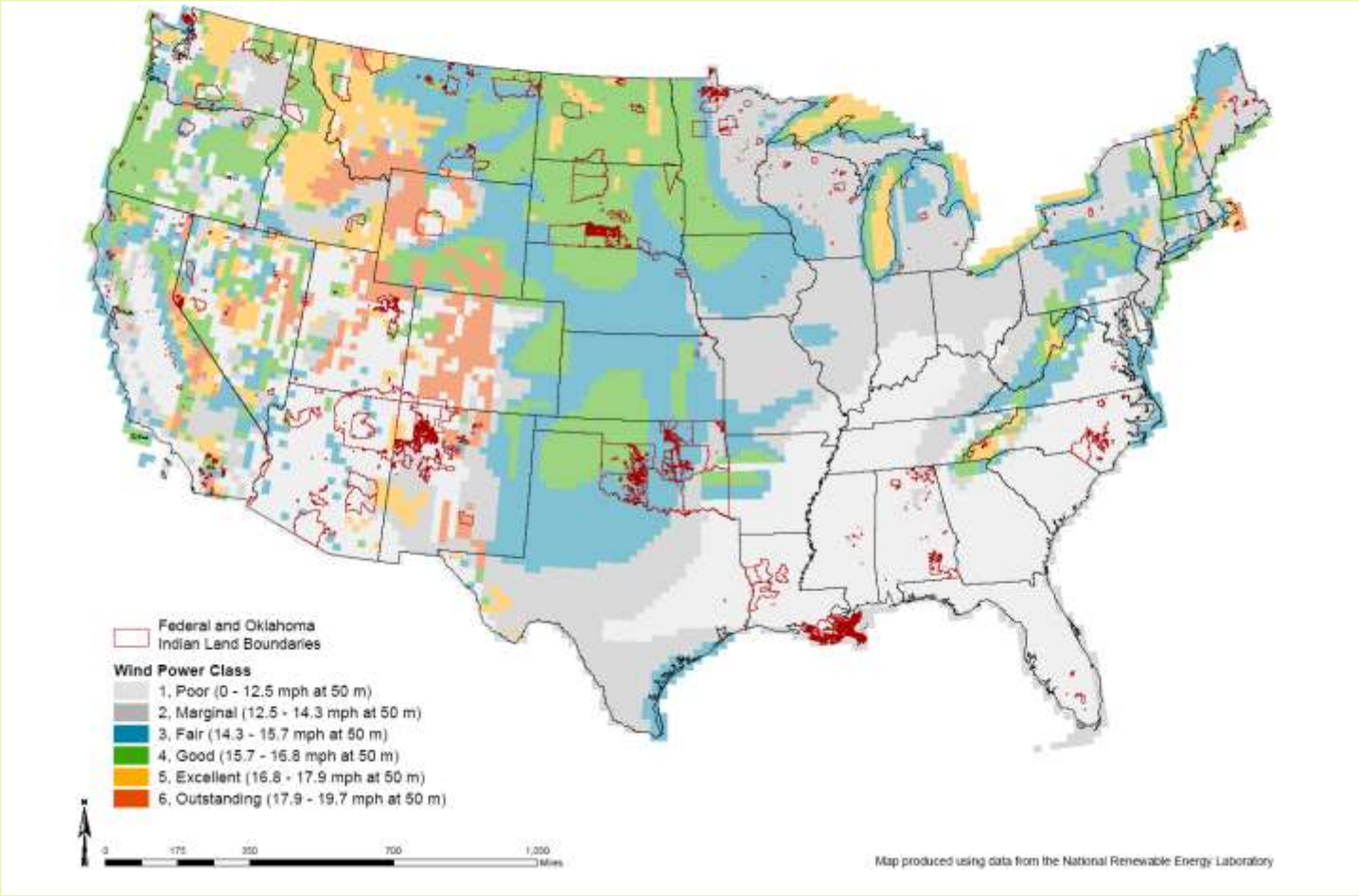
Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.20	-	-	(8)
0.30	18.7	1.5	(4)
0.50	3.9	20.2	2

Tribal business

Electricity $/kWh	Payback Yrs	ROR %	NPV @12% $ MM
0.20	-	-	(11)
0.30	-	-	(7)
0.50	11.8	13.7	1

Native American Wind Resource Atlas

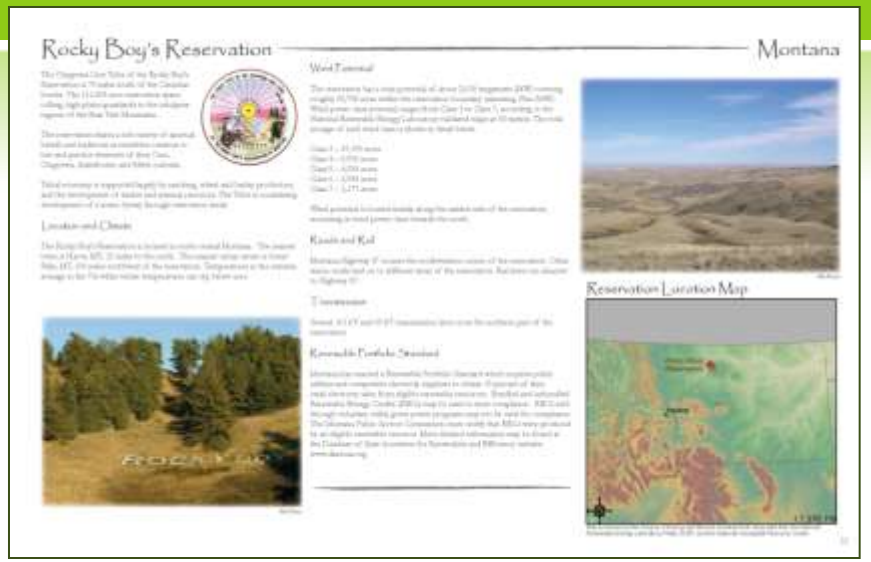
Objective: Assist Tribes in the promotion of Indian lands for commercial wind development

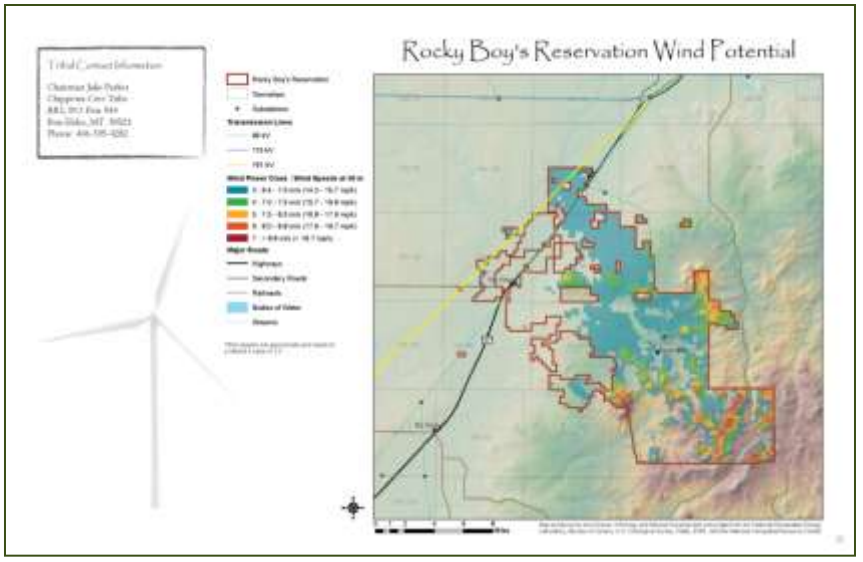


Class 3 and higher NREL wind data overlaying Indian Reservation lands

Native American Wind Resource Atlas Included Information

- General text on the Reservation and Tribe
- Publicly available
  - Reservation boundary
  - Wind resource
  - Existing transmission lines
  - Digital elevation model
  - Location map
  - Contact information
- Proprietary
  - Only included at the request of the Tribe
  - Project specific information





Wind Atlas Marketing

Washington International Renewable Energy Conference

- March 2008
- 246 exhibitors, 5,000 registrants

Wind Power 2008

- June 2008
- 776 exhibitors, 13,000 registrants

RETECH Conference

- February 2009
- 140 exhibitors, 3,000 registrants

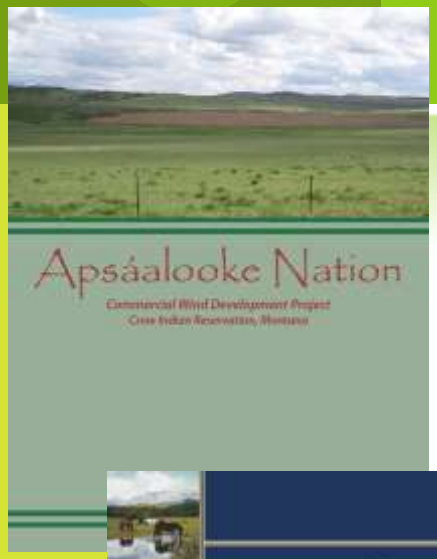
Wind Power 2009

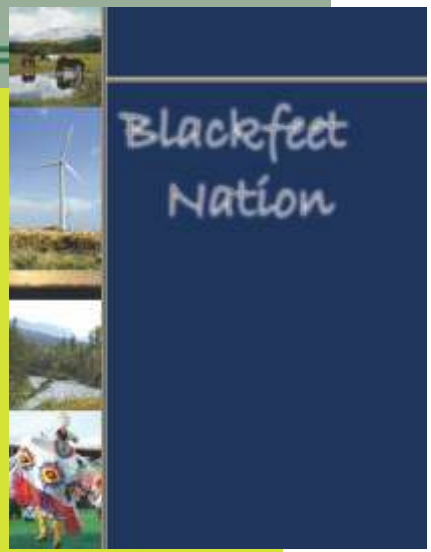
- May 2009
- 1,280 exhibitors, 23,000 registrants

Wind Power 2010

- May 2010
- 1,400 exhibitors, 20,000 registrants

Commercial Wind Forum





- Tribal representatives present their ideas on an ideal partnership
- Commercial wind developers present information on their company and initial plans for development in a one-on-one setting with Tribal representatives
- DEMD aids Tribe with development of commercial wind prospectus and supplementary maps

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