

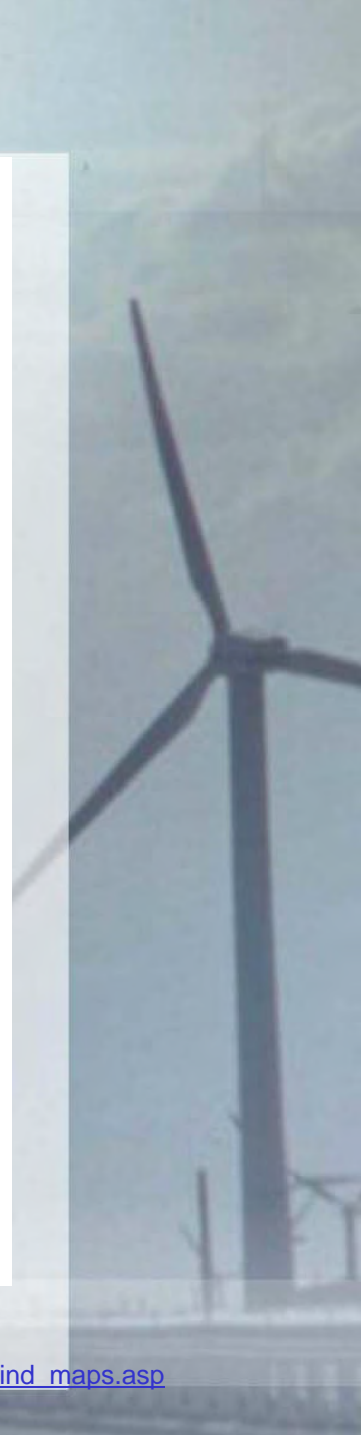
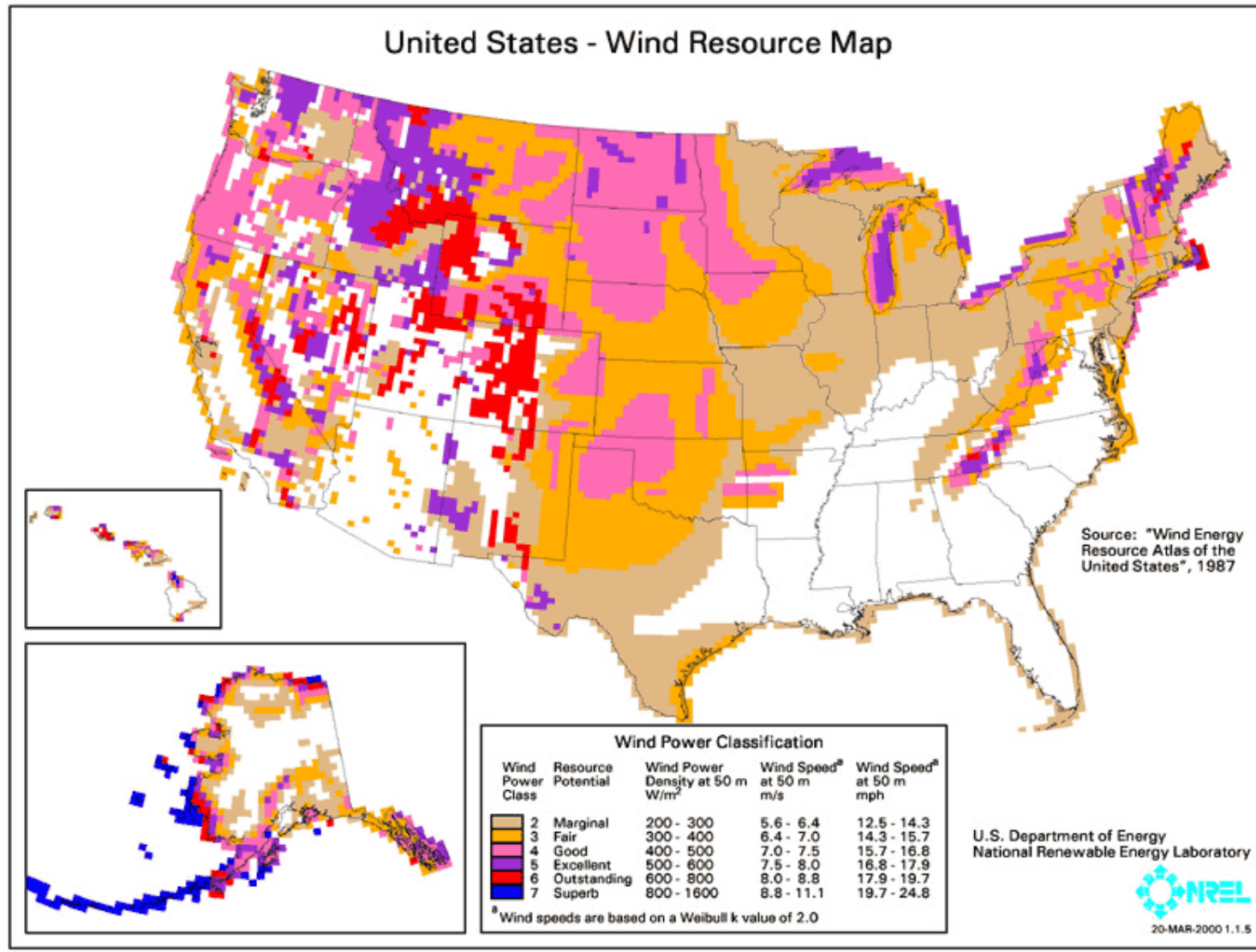


FERC Initiatives & Perspectives on Transmission for Renewables

Carol Brotman White
Federal Energy Regulatory Commission

2005 EIA Midterm Energy Outlook Conference
Washington, DC
April 12, 2005

Where the Wind Resources Are



Source: U.S. Department of Energy, National Renewable Energy Laboratory

More recent State maps showing Native American lands are at: http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps.asp

Wind Energy: Where the Wind Is

Wind and the Lower 48 States

Top 20 States for Wind Potential

Rank	State	KWh (Billion)	Installed Rank, Wind
1	North Dakota	1,210	13
2	Texas	1,190	2
3	Kansas	1,070	12
4	South Dakota	1,030	18
5	Montana	1,020	negl
6	Nebraska	868	20
7	Wyoming	747	5
8	Oklahoma	725	10
9	Minnesota	657	4
10	Iowa	551	3
11	Colorado	481	9
12	New Mexico	435	6
13	Idaho	73	negl
14	Michigan	65	negl
15	New York	62	17
16	Illinois	61	16
17	California	59	1
18	Wisconsin	58	15
19	Maine	56	negl
20	Missouri	52	none

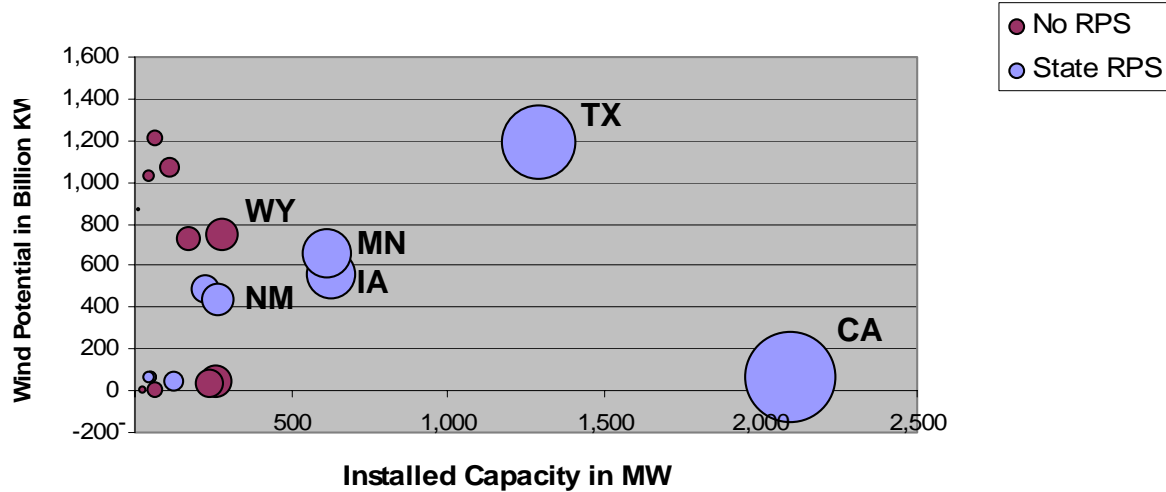
Top 20 States by Installed Wind Capacity: 2004

Rank	State	Wind Capacity MW	% of total	Total MW Installed
1	California	2096	4.4%	47,445
2	Texas	1293	1.5%	86,694
3	Iowa	632	7.2%	8,759
4	Minnesota	615	6.6%	9,285
5	Wyoming	285	4.5%	6,380
6	New Mexico	267	4.7%	5,697
7	Oregon	263	2.0%	12,907
8	Washington	240	0.9%	26,533
9	Colorado	229	2.4%	9,536
10	Oklahoma	176	1.1%	16,225
11	Pennsylvania	129	0.4%	29,851
12	Kansas	114	1.2%	9,295
13	North Dakota	66	1.4%	4,788
14	West Virginia	66	0.4%	16,315
15	Wisconsin	53	0.4%	12,510
16	Illinois	51	0.2%	30,141
17	New York	48	0.2%	29,720
18	South Dakota	44	1.5%	2,859
19	Tennessee	29	0.2%	17,192
20	Nebraska	14	0.3%	5,201
U.S. Total		6740	0.9%	771,437

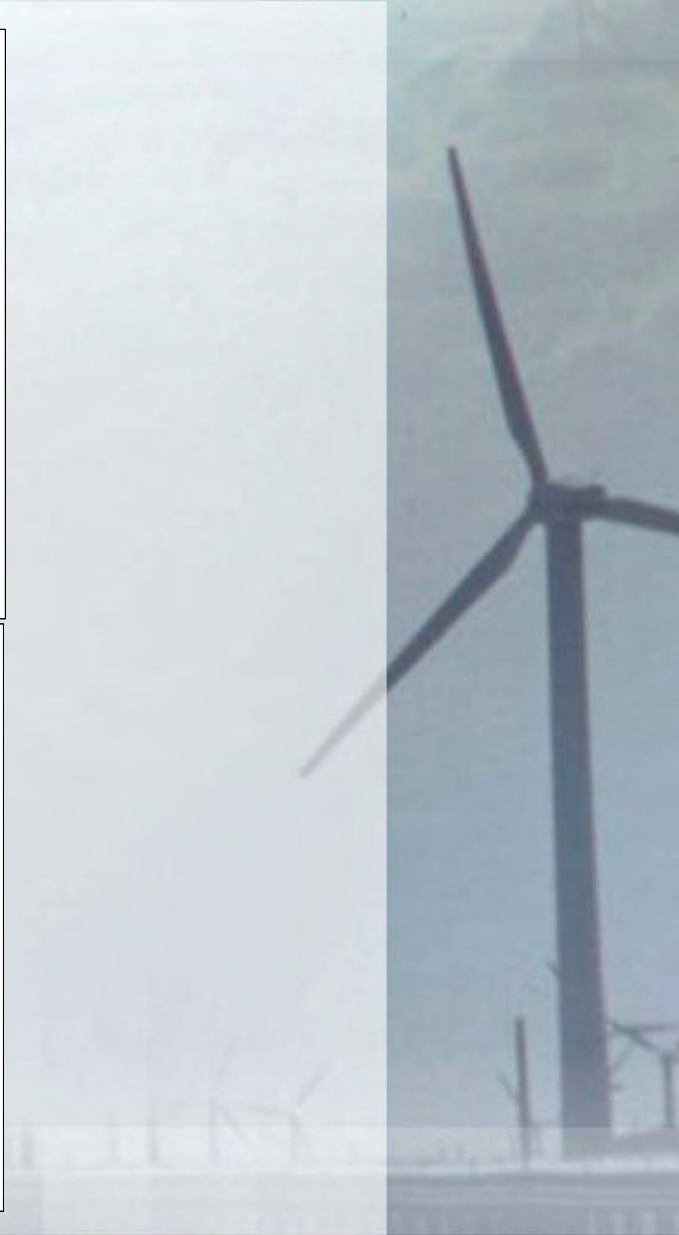
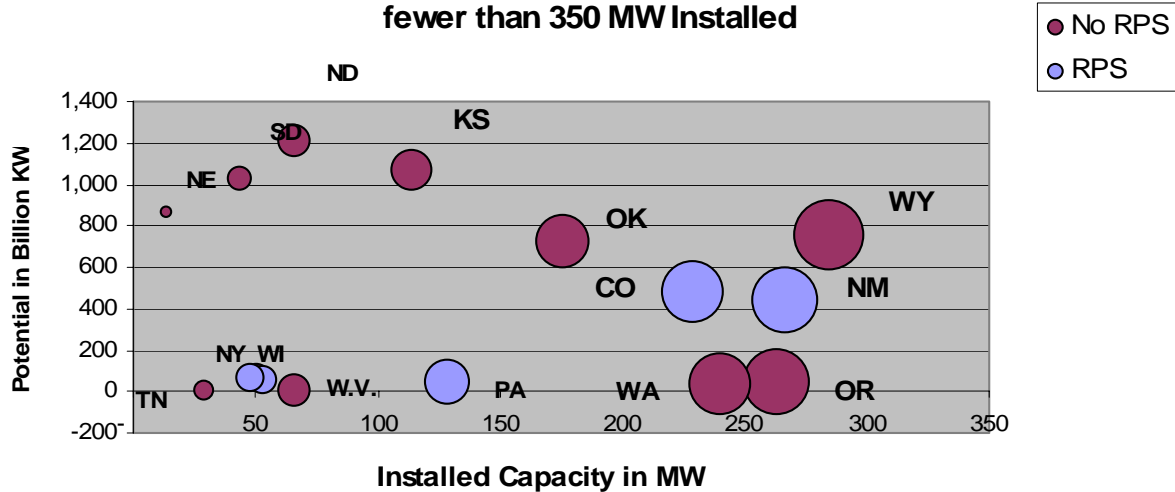
Source: FERC analysis, derived from data in: Platts *PowerDat*, American Wind Energy Association (AWEA) project database, NREL, through 2004
 Wind Energy Potential - An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, Pacific Northwest Laboratory, 1991.

Wind Capacity vs. Resource Potential:






Top 20 States by Installed Capacity



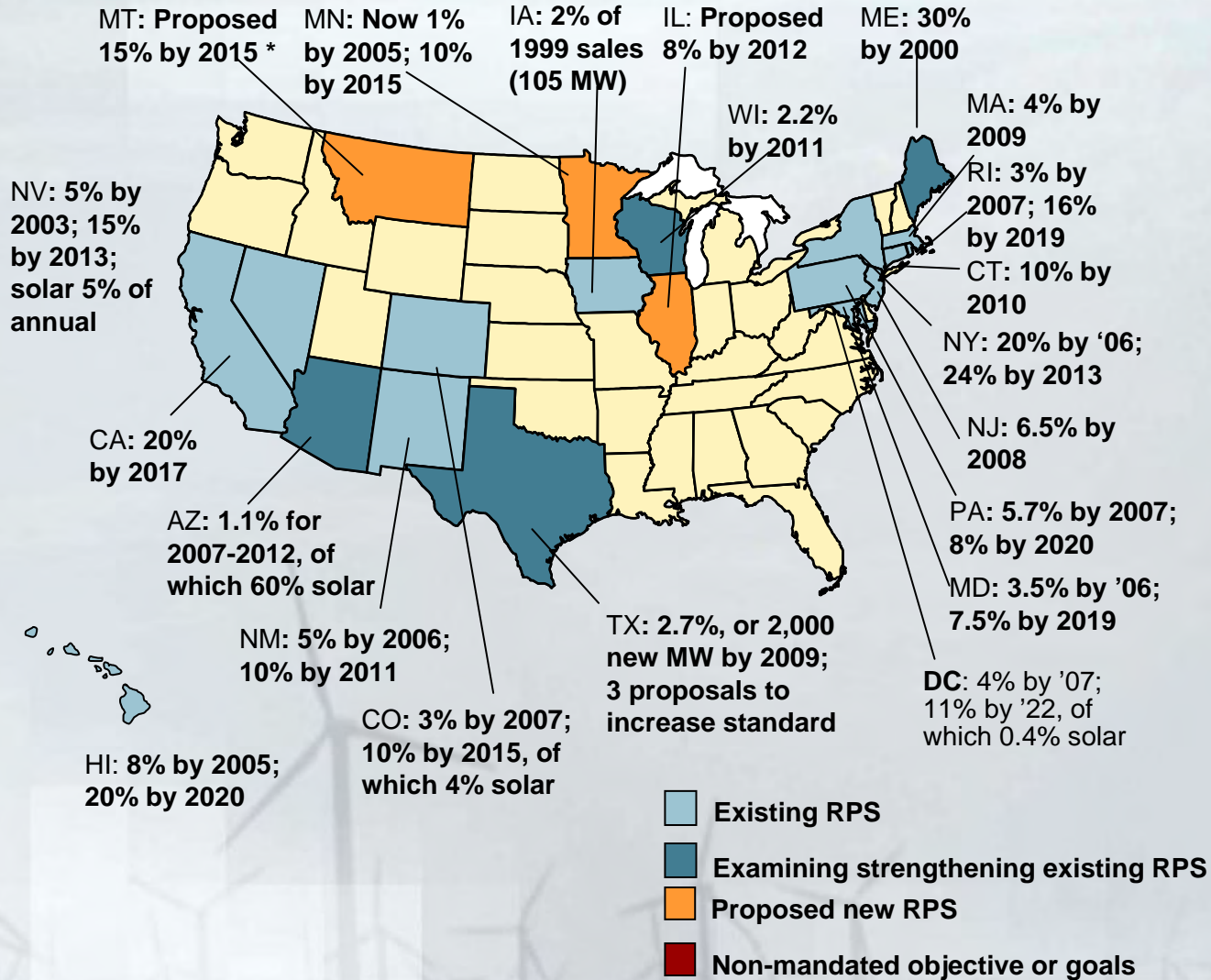
Inset: less than 1400 MWh potential, fewer than 350 MW Installed



Wind Energy: Drivers

-  **Renewable Portfolio Standards in 18 States and D.C. – all include wind**
-  **Production Tax Credit renewal**
-  **Environmental rules**
-  **Technological Advances**
-  **Fuel costs**

Wind Energy: State RPS Requirements



Wind Energy: Challenges & Opportunities

 **Siting and transmission:** optimal renewable resources usually not near transmission or load

 **FERC policies can advance State initiatives and public desires:**

 **Grid Interconnection**






 **Transmission Services**

 **Encouraging wind infrastructure development**

Wind Energy: Challenges

- **Transmission expansion**
- **FERC's 888 *pro forma* transmission tariff creates challenges for non-traditional generation, especially intermittent resources like wind.**
 - **Imbalance penalties**
 - **Point-to-Point transmission service:**
 - **Choices include long-term firm or non-firm**
 - **Wind needs something in between**
- **Interconnection Requirements**
- **Capacity value**

Wind Energy: FERC Initiatives

-  **FERC Staff Paper: “Assessing the State of Wind Energy in Wholesale Electricity Markets”**
-  **Technical Conference, “Assessing the State of Wind Energy in Wholesale Electricity Markets”, Denver, Colorado, 12/1/04**
-  **Potential reforms to Order 888**
-  **New Transmission Services Workshop with BPA and WECC, Portland, Oregon, 3/16-17/05**
-  **NOPR, “Interconnection for Wind and Other Alternative Technologies”, 1/19/05 -- Grid Code**

FERC Initiatives: Integrating Wind into the Market

 **Imbalance reform**

 **Available and Efficient Transmission Services**

FERC Initiatives: Interconnection for Wind Energy

 **NOPR Issued January 19, 2005 ***

 **Key issues:**

 **Low Voltage Ride Through (LVRT)**

 **SCADA – Communications Protocol**

 **Reactive Power: + / - 0.95 power factor**

 **Queuing and Self-Study**


 **Transition period**

 **Accurate Forecasting**

* Appendix G: Interconnection for Wind and other Alternative Technologies, NOPR, January 24, 2005; 18 CFR Part 35
NOPR requirements for wind generation of 20 MW and above

FERC Initiatives: Interconnection for Wind Energy

Reliability issues for Wind: September 2004 Technical Conference

 Low Voltage Ride Through (LVRT)

 SCADA – Communications Protocol

 Reactive Power: + / - 0.95 power factor







 Queuing and Self-Study

 Transition period

 NOPR Issued January 19, 2005 *

* Appendix G: Interconnection for Wind and other Alternative Technologies, NOPR, January 24, 2005; 18 CFR Part 35
NOPR requirements for wind generation of 20 MW and above

FERC sees Opportunities – Other Issues

-  **Transmission Access Queue Alternatives**
-  **Rate Pancaking**
-  **FERC's Transmission Planning Provisions**
-  **Working with the States**
-  **Tribal Consultation**
-  **Capacity Value for Wind Resources**

Background on FERC wind initiatives

■ “Assessing the State of Wind Energy in Wholesale Electricity Markets” (Docket No. AD04-13-000)

■ Staff paper: <http://www.ferc.gov/legal/ferc-regs/land-docs/11-04-wind-report.pdf>

■ Technical Conference, Denver Colorado, December 1, 2004: event details and related files, including agenda, conference comments, and post-conference comments received:

<http://www.ferc.gov/EventCalendar/EventDetails.aspx?ID=1368&CalType=%20&CalendarID=116&Date=12/29/2004&View=List>

■ Notice requesting post-Technical Conference comments:

<http://www.ferc.gov/EventCalendar/Files/20050104162105-ad04-131.pdf>

■ Agenda for Technical workshop focusing on new wholesale electric transmission services, Portland, Oregon, March 16 – 17, 2005:

<http://www.ferc.gov/EventCalendar/Files/20050310173523-AD04-13-000.pdf>

■ <http://www.ferc.gov/EventCalendar/Files/20050406174633-sunshine.pdf>

■ Proposed Rule for Wind Interconnection, (Docket No. RM05-4-000)

■ Press release: <http://www.ferc.gov/press-room/pr-current/01-19-05-wind.asp>

■ Notice of Proposed Rulemaking (NOPR): <http://www.ferc.gov/whats-new/comm-meet/011905/E-1.pdf>

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 (202) 502-6363 or matthew.deal@ferc.gov (imbalances, tariff reform)

 Jeffery Dennis, Office of General Counsel

 (202) 502-6027 or jeffery.dennis@ferc.gov
(Interconnection)

 OMOI Enforcement Hotline:(888) 889-8030