

GovEnergy 2010

Wind 101

The Wind Development Process

Sunday August 15, 2010

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The Wind Development Process

Typical Steps of the Wind Development Process

Wind Potential on Federal Lands

Barriers to Wind Development on Federal Lands

The Wind Development Process

Site Selection

Land Agreements

Wind Assessment

***Environmental
Review***

Economic Modeling

***Interconnection
Studies***

Permitting

Financing

Sales Agreements

Turbine Procurement

Construction Contracting

Operations & Maintenance

Site Selection

Basic steps to select a site:

- Prospecting – evidence of significant wind
- Transmission lines?
- Road access?
- Environmental concerns?
- Receptive community?
- PREFERABLY PRIVATELY OWNED REMOTE LAND**

Site Selection

Impact upon training

Available space

Potential interference with future expansion

Proximity to suitable electrical transmission

Slope and grade

Minimal environmental disturbance

Proximity to dust/flooding events

View from housing

Visible to visitors/passersby

Land Agreements:

Identify all the landowners for:

- Siting MET towers
- Potential built out wind farm
- Transmission access
- Adjacent to or otherwise affected by the wind farm

Terms of contracts, rights, compensation, reclamation, etc..

Environmental Review

Endangered species?

Avian studies?

- Raptors
- Migratory birds
- Bats
- Other

Communicate with interested parties

- Local, state, and federal authorities
- Local Audubon society
- Wetlands review

Environmental Review (cont.)

Visual studies

- Photosimulation
- Historical and archeological review

Communicate with interested parties

Local, state, and federal authorities

– US F&W

Local Audubon society

Permitting

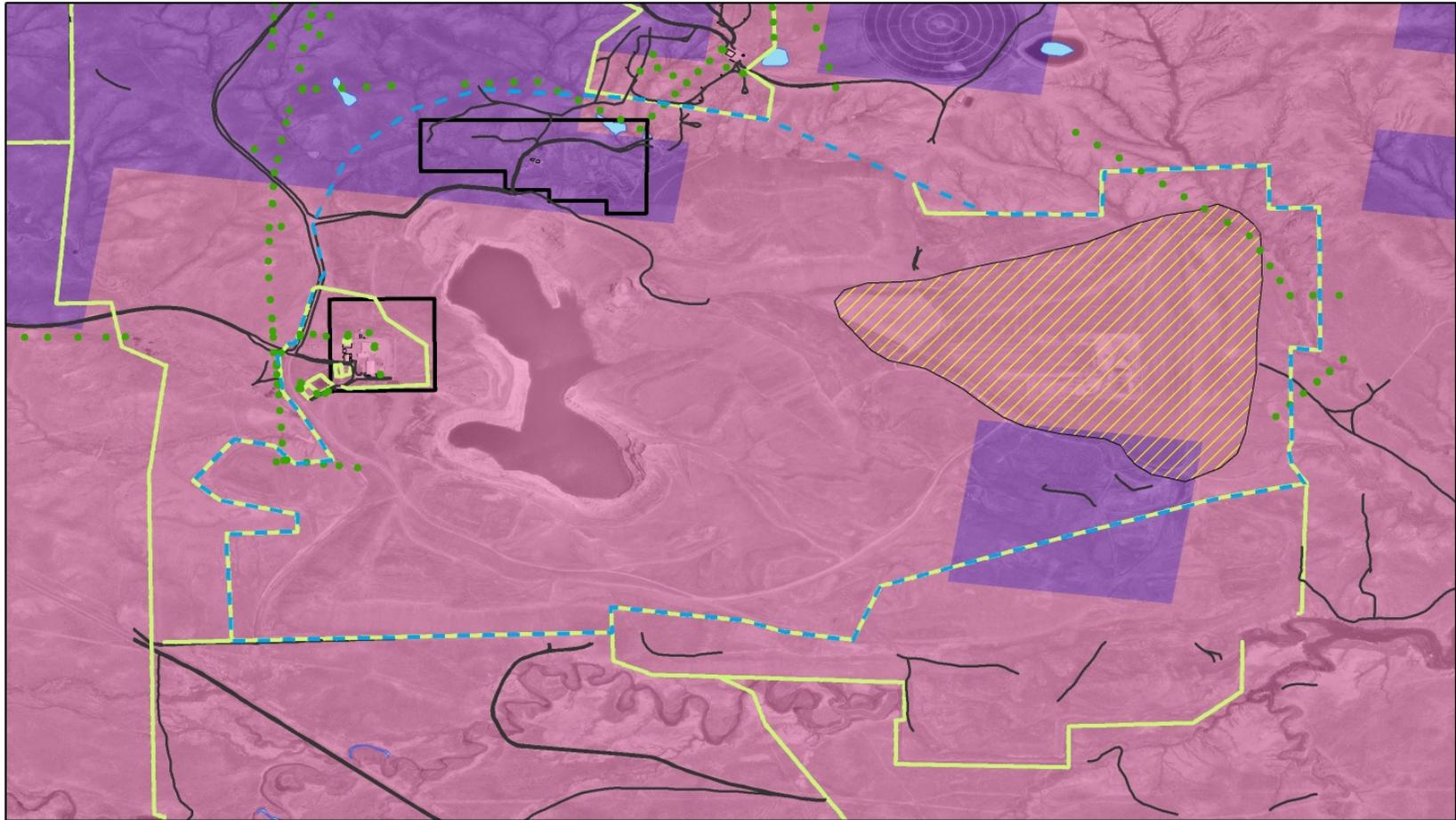
Local, State and Federal rules/laws may apply

Public land vs. Private land – different issues and development costs and timelines

Land Use Permit

Building Permit

Sample Top Pick Wind Site #1



Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m m/hr
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	> 800	> 8.8	> 19.7

^a Wind speeds are based on a Weibull k value of 2.0

Legend

— Road	▨ Tail-impoundment	▭ Property Boundary
•• Utility - Electric	▨ Building	■ Water
— Fence Boundary		- - - Estimate Site Boundary

Data received from DOE-LM Grand Junction office.

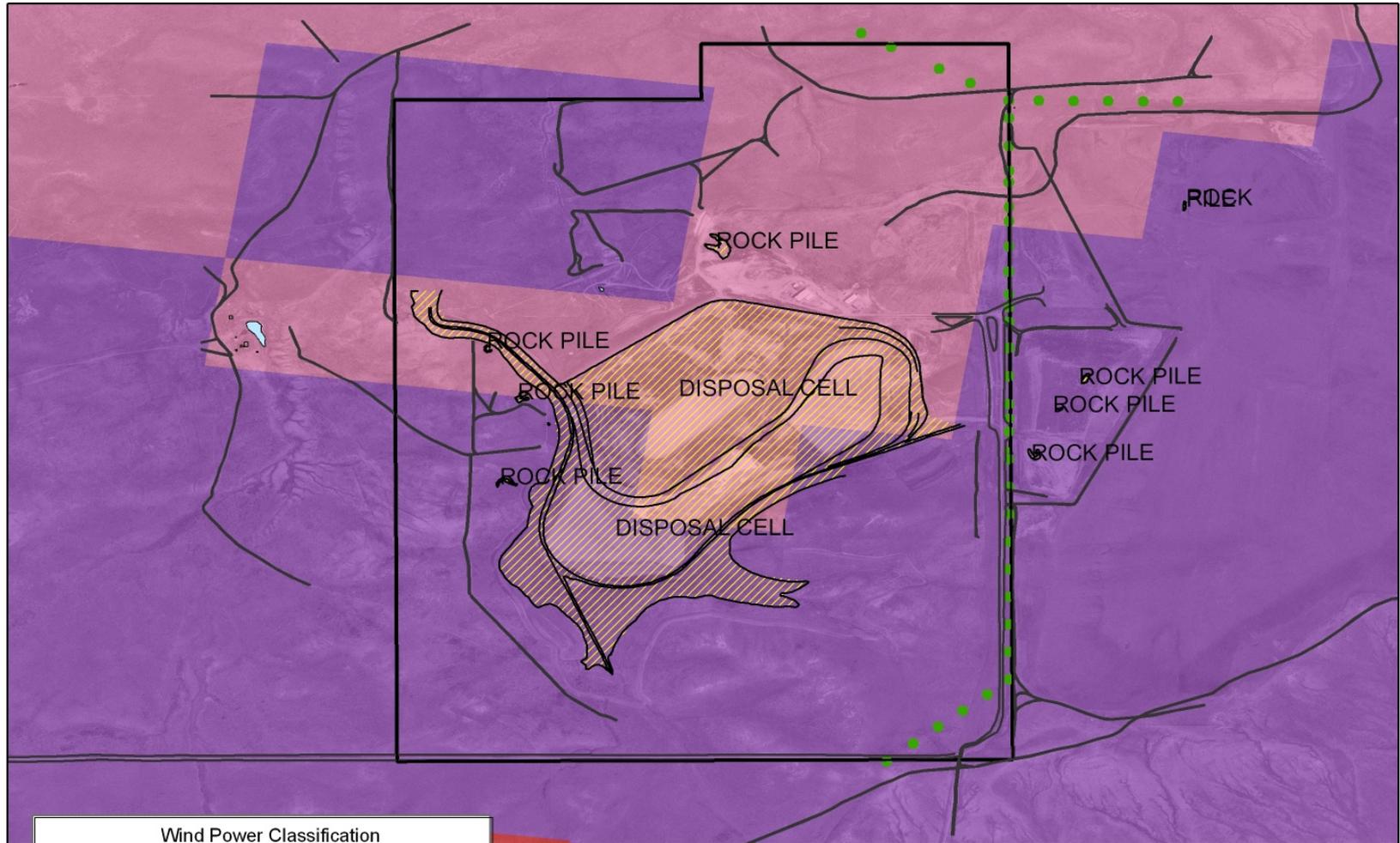
NREL Estimate of Wind Resource

- Wind Resource Data
- GIS Capabilities

Site # 1

	Installation capacity	Estimated capacity factor	Estimated annual energy
	[MW]	[%]	[MWh/yr]
Site #1	32.5	35-38%	99.6 - 108.2

Sample Top Pick Wind Site #2



Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m m/hr
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	> 800	> 8.8	> 19.7

^a Wind speeds are based on a Weibull k value of 2.0

Legend

— Road	Rock Pile/Disposal Cell	Property Boundary
• • Utility - Electric	Building	Water

Data received from DOE-LM Grand Junction office.

Site # 2

NREL Estimate of Wind Resource

- Wind Resource Data
- GIS Capabilities

	Installation capacity	Estimated capacity factor	Estimated annual energy
	[MW]	[%]	[MWh/yr]
Site # 2	16	38-41%	53.3 - 57.5

Questions ??

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