Wind energy reduces environmental impacts caused by electricity generation. Unlike fossil fuels, wind energy does not generate atmospheric contaminants or thermal pollution.

It is renewable and locally available, and has become very attractive to governments, organizations, and the public.
**Sources**

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<td>OR Wetlands Geodatabase</td>
<td>OR Natural Heritage Information, Center &amp; The Wetlands Conservancy</td>
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</table>

**Methodology**

Multi Criteria Evaluation analyze suitability based on *constraints*, *standardized factors* and its weighted overlay.

*Constraints* are based on the Boolean criteria (true/false), which limit the analyses to specific regions.

*Factors* define areas or alternatives according to a continuous measure of suitability.

Factor weights was determined by the Analytical Hierarchy Process.
Study Area

Sherman County, Oregon lies between the deep canyons of the John Day River and the Deschutes River on the Columbia River Plateau in north central Oregon.

Land area: 823.2 sq Miles
Population: 1,711 (2009 estimate)

Constrains

Recreation/Scenic

There are three identified scenic resources in our study area:

State/County Parks

John Day, Hilderbrand
J.S. Burres
Deschutes- Oregon Wildlife Heritage Foundation #1
Deschutes- Hilderbrand
Deschutes River State Recreation Area
Cottonwood Canyon State Park
Journey Through Time (US-97 Sherman)
Deschutes River State Scenic Waterway
Aesthetics

Modern wind turbines of 1.5-3 MW can be seen in the landscape from 20 miles away, but as one moves away, the turbines occupy an increasingly small part of the overall view. The most significant impacts are likely to occur within the first mile from the project.

Urban/Population

Standards have been set for evaluating impacts on the human environment. Noise reduction and safety issues determine a setback of 2600 feet from the nearest residence (NAS, 2007). A buffer within that distance was set from cities and highways.
Land Use Constraints

- Union of all layers with Sherman County.
  
  Layers used:
  - BLM lands
  - Land Management
  - Land Ownership

Land Use Constraint

- Rasterize and Reclassify into usable and unusable land.
Land Use Constraint

- Final Raster.

Bats vs Wind Turbines

Thermal Infrared Video
Background

- Bat fatalities are documented at nearly every wind facility surveyed in North America
- Some sites cause the deaths of thousands of bats per year
- Exact cause is unknown, but most fatalities are migratory tree bats

Focal Species

- Silver-haired bat (*Lasionycteris noctivagans*)
- One of the top 3 species most commonly killed by wind turbines
- On the FWS “Species of Concern” list for Sherman County
Habitat Buffer

- Restricted by water sources in dry habitats
- Foraging range of 46-91 meters

Factor: Slope

According to “A Geographic analysis of wind turbine placement in Northern California” (Rodman, Meentemeyerb) study; 5 slope classes defined. Several counties (i.e. Riverside, CA) prohibit wind turbines placed on slopes greater than 25% to reduce unwanted turbulence and high construction costs.
Factor: Elevation

Wind Turbine Placement Analysis study by Washington Department of National Resources claims that high elevations preferred.

Natural breaks define classes away from steep slopes and elevation variation.

Factor: Wind Speed

Department of Energy, NREL study outlines guidelines for suitable wind standards for land based turbines at 1.5 to 3 mW, grid connected.

Based on annual average daily wind speed @ 80 meter height
Analytic Hierarchy Process (AHP)


Wind Turbine Suitability
Sherman County

Not Suitable
Least Suitable
Most Suitable

Wind Turbine Suitability Analysis: Sherman County
Wendy Berg
Zephyr Friedman-Sweater
Victor Vett
David Hall
GEO592, GEO91
March, 2011
A viewshed analysis was performed for 3 random sites within the most suitable areas. A OFFSETA field was added for simulation of wind turbine site at 200 feet height according to Oregon Columbia Plateau Ecoregion Wind Energy Sitting and Permitting Guidelines.

Conclusions

• In the MCE were used 8 constrains and 3 factors, that the most influential was wind speed.

• The 68 % of the study area is not suitable for wind turbine placement.

• The most suitable category only represent the 2.4 %. The second most suitable cover more than 21 %. Together, there are 225788.2 acres suitable for wind energy development in Sherman County .

• The most suitable areas should have aesthetic conflicts with the State Scenic Byway in some sectors. Specific measures are needed for mitigate the visual impacts.
References

- Wind Turbine Placement Analysis - Washington Department of National Resources
- County of Riverside General Plan – Hearing Draft, Land Use Element. Riverside County Integrated Project. (LU-34) Chapter 4
- http://libweb.uoregon.edu/map/gis_data/or_10mdemlist.htm