Assessing the Wind Energy Potential on the University of Idaho Campus

Kelly Moore

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Several different types of Alternative Power Sources

Photovoltaic Panels -- PV's

Low Head Hydro

Vertical Axis Wind Turbine

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English 317 Technical Writing

UI Sustainability Center

Wind Energy

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U of I commitment to Sustainablility

- Climate Initiative by Western Governors Association
- Architecture 2030 Challenge
- 2010 Imperative
- Tallories Declaration
- Sustainable Idaho Committee
- U of I Sustainable Center

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Goal of UI is to be Carbon Neutral

By

2030

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Why Wind Energy?

Along with PVs and Geothermal
the only carbon neutral power source

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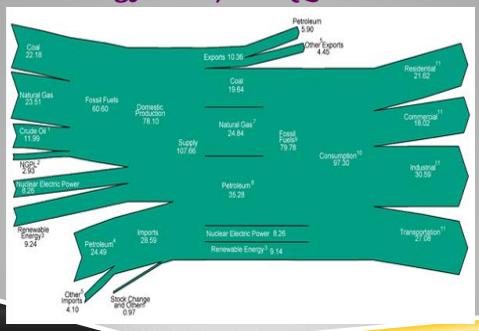
Total Energy Flow, 2011(Quadrillion Btu)



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U.S. uses
97,300,000,000,000 BTUs
of Energy per year

By comparison a gas hot water heater uses 40,000 BTUs

Renewable Energy Production is only
9%
of Total Consumption

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Project Advisors

Department of Mechanical Engineering

John C. Crepeau, Ph.D, P.E. Dept. Chair
Tao Xing, Ph.D. Project advisor

Department of Architecture

Bruce Haglund Professor
Phillip G. Mead Associate Professor

U of I Facilities
Eugene P. Gussenhoven, MCE , Director of Utilities and Engineering
Brian Johnson: Asst.Vice President – Facilities
Mike Holthaus: Facilities

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Instrumentation Package

Wind Vane

Anemometer

Data Logger

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The data logger takes a sample every second

Data collected for One Calendar Year

Over 2 Million Data Points will be collected

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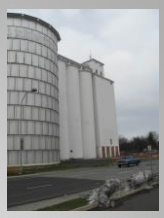
Equipment Locations

Theophilus Tower

U of I Chilled Water Tower
At Golf Course



Anderson's Grain Elevators

U of I Farm

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Wind Power and the Velocity of the Wind

$$Wind\ Power = \rho * A * v3 * Cp$$

Where

Density of air= ρ

Swept Area of Rotor=A

Wind Speed or Velocity=v

Power Coefficient = Cp

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A German physicist Albert Betz concluded in 1919 that no wind turbine can convert more than 16/27 (59.3%) of the kinetic energy of the wind into mechanical energy turning a rotor.

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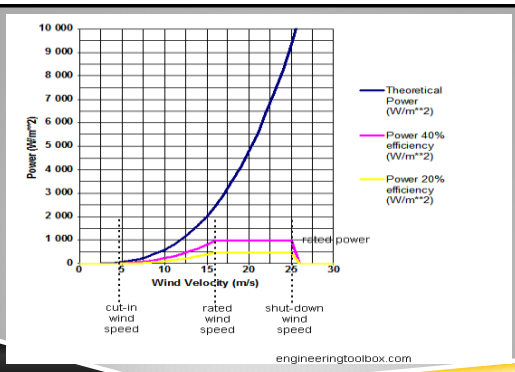

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Wind Turbine Types

Horizontal Axis Wind Turbine (HAWT)

Vertical Axis Wind Turbine (VAWT)

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Vertical Axis Wind Turbine (VAWT)

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Vertical Axis Wind Turbine (VAWT)

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Horizontal Axis Wind Turbine (HAWT)

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A wind-driven electricity generator without moving mechanical parts is adorning the lawn of Delft University of Technology, The Netherlands. The Electrostatic Wind-Energy Converter (EWICON) could unobtrusively function in an urban landscape.

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U of I Wind Assessment Outcomes

- What is the wind potential on the U of I Campus
- What Turbines might be deployed
- What building on Campus could Turbines be deployed on
- What would the potential Energy Savings be

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UI Sustainability Center

Every year UISC awards $9,000 in grants to fund student-led projects that advance campus sustainability. Grants are available to any U-Idaho undergraduate, graduate, or law student. Requests for Student-Led Grants are posted in August

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Conservation is not just about critters

But it is because we are critters too

Conserve by using less

Remember to

Think Sustainably

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