

Renewable Energy in Utah

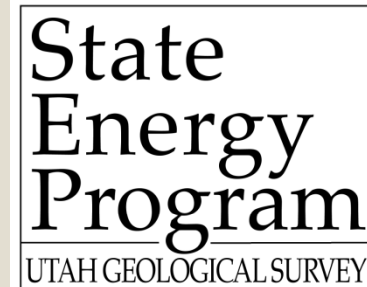


American Planning Association 2010 Annual Conference

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Today's Presentation



- **Renewable Energy Policy in Utah**
- **Utah Renewable Energy Zones Task Force**
 - ✦ **Elise Brown**
- **Current Projects**
- **Wind and Solar Ordinances**
 - ✦ **Bonnie Christiansen**
- **Question and Answer**

Policy - Incentives



- **Investment tax credits**
 - Federal tax credit – 30% of the install cost
 - ✦ No maximum
 - ✦ Parts and labor are eligible
 - State tax credit – 25% of the install cost
 - ✦ \$2,000 maximum
 - ✦ Reasonable cost limitation (State = \$10.00/watt)
 - ✦ Parts and labor are eligible

Policy - Incentives



- **Production Tax Credits**
 - based on amount of energy produced
 - available for utility scale projects
 - ✦ Utah \$0.0035/kWh (first 4 years)
 - ✦ Federal ~\$0.019 - \$0.021/kWh (first 10 years)

Policy - Incentives



- **Rebates**
 - RMP
 - ✦ Solar Rebate , \$2.00/watt (limited program)
 - Questar
 - ✦ Solar Hot Water Rebate, \$750.00/system
 - State Rebate
 - ✦ Will be announced later this month \$2.00/watt

Policy - Incentives



- Grants
 - Blue Sky Grant
 - Energy Efficiency Conservation Block Grant
 - ✦ (currently closed)
 - REAP Grant (USDA, former “Farm Bill”)
 - ✦ Roger Koon (roger.koon@ut.usda.gov)

Policy – Renewable Portfolio Standard



- Renewable Portfolio Standard (RPS)
 - Legislated requirement to meet x amount of energy portfolio by x year.
 - California's RPS = 30% by 2020
 - ✦ California bought all of the power from Milford Wind Farm & Raser Geothermal Plant
 - Utah = 20% by 2025 *"if cost effective"*
 - ✦ Referred to by many as an Renewable Portfolio Goal

Policy - Ordinances



- **Wind ordinances & solar access guarantees can encourage renewable energy development in your community.**
 - Bonnie will discuss more in depth

Utah Renewable Energy Zones Task Force





- Phase I
- Phase II
- Workgroups
- Products (policy, report & tool)



Utah Renewable Energy Zones (UREZ) Task Force



- 
- Objective: promote the development of renewable energy resources to meet the goal of 20% of Utah's electricity by 2025.
 - Joint effort between the Utah State Energy Program and the Governor's Energy Advisor's Office
- 

UREZ Phase I



- UREZ Phase I
 - Co-Chaired by
 - ✦ Dianne Nielson, Governor's Energy Advisor
 - ✦ Rick Allis, Utah Geological Survey
 - ID and map best known renewable energy zones in Utah
 - ✦ Wind
 - ✦ Solar
 - ✦ Geothermal
 - Interactive Map & Final Report Online
 - ✦ <http://geology.utah.gov/sep/>



Renewable Energy Potential in Utah



Wind ~ 9,145 MW



Solar ~ 826 GW



Geothermal ~ 1,330 MW





UREZ Phase II


- UREZ Task Force - chaired by Dianne Nielson, Phil Powlick, & Jeannie Watanabe
 - ✦ Developers
 - ✦ Utilities
 - ✦ Legislators
 - ✦ Non-profits
 - ✦ AGRC
 - ✦ Division of Public Utilities
 - ✦ SITLA
 - ✦ BLM
 - ✦ GOED
 - ✦ Open to public



UREZ Phase II



- Phase II

- 
- ID and assess transmission required to bring resources to load.
 - Further characterize Phase I zones
 - ID policy and funding barriers and pathways surrounding renewable energy development
 - Model transmission & development costs
 - ✦ From each resource to load centers in Utah and the WECC.



- 4 Working Groups to complete these tasks

- Economic, Transmission, Zone ID, Policy & Funding

UREZ Phase II



- Expected finish date – May 2010
- If you want to be a part of UREZ email:
 - elisebrown@utah.gov or call (801) 538-8652
- Report and model will be available at:
 - <http://geology.utah.gov/sep>

Utah Solar Energy Projects



- Solar

- ✦ PV – Photovoltaic: Roof top panels
- ✦ CSP – Concentrating Solar Power: Utility scale
- ✦ Solar Thermal: Collects and transfers heat



- Aprox. ~ 1 MW installed on rooftops (distributed energy)
- Hill Air Force Base 220 kilowatt (kW) system
 - ✦ Dept. of Defense directive to become more energy independent
 - ✦ energy security, independence, environmental benefits
- Schools: SLCC, Milford, Entheos Academy,...
 - ✦ USEP \$3 million contract for schools (41)
- Utility Scale farms (CSP) on horizon
 - ✦ land leases on Mormon Mesa, and SITLA & BLM lands for solar projects



Utah Geothermal Energy Projects



- Geothermal: baseload renewable energy
- 43 MW developed
 - Blundell Bottom Cycling
 - ✦ 38 MW, expanding
 - Cove Fort
 - ✦ Recommissioning
 - Orrin G. Hatch Geo. Plant
 - ✦ 10 MW
 - Green houses (distributed)
 - Home heating (distributed)



Utah Wind Energy Projects



- Wind
- Large Scale Projects:
 - Camp Williams Nat. Guard = 2 turbines, 1 MW
 - Spanish Fork = 9 turbines, 19 MW
 - Milford Phase I = 97 turbines 203 MW
Phase II = 200 MW; Full build-out 1,000 MW
 - Anemometer Loan Program
interest and Land Lease Applications
- Small Scale Projects/Wind for Schools:
 - Milford High School, Beaver County 2.4 kW
 - Milford Elementary, Beaver County 2.4 kW
 - Three Peaks Elementary, Iron County 2.4 kW
 - Cyprus High School, Salt Lake County 2.4 kW



Renewable Energy Supports Utah's Goals and is an Economic Driver



- 2008: the U.S. wind energy industry invested approximately \$17 billion into the U.S. economy and employed approximately 85,000 people (up from 50,000 in 2007)
- 2007: Renewable energy and energy efficiency industries represented \$1.04 trillion in U.S. revenue in 2007, more than the combined sales of the three largest U.S. corporations - Wal-Mart, ExxonMobil, and General Motors (\$905 billion).¹
- Utah Wind Projects:
 - Spanish Fork Wind Park: \$74,000 in annual land lease payments to the landowners of the project site, approximately \$112,000 per year in new property taxes for Utah County, \$84,000 per year accruing to the Nebo School District
 - Milford Wind Farm: \$30 million for Utah based businesses, \$86 million in direct, induced and indirect economic benefits

Local Governments are Instrumental



- State and local policies are instrumental to attracting and spurring developments of all kinds
- Tasked with striking a delicate balance between multiple interests and community values
- Ordinances → Real projects → opportunities/revenues for landowners, schools, counties, and new jobs.
- Cumbersome, confusing, and/or restrictive policies often deter interest from prospective businesses and result in lost opportunities.
- Reasonable ordinances can attract business and support responsible development.

Renewable Energy Ordinances



- **SJR1** – Charged the USEP with holding consensus-building stakeholder meetings to produce model ordinances, as the USEP deemed necessary for:
 - Hydroelectric – process in place, rarely residential, water already highly regulated in Utah
 - Biomass – one model will not fit all types
 - Geothermal – process is already in place, usually not on city or county lands
 - Solar – consult USEP, SLC and SL County
 - Wind – model ordinance produced

Solar Ordinance Process



- Held Solar Working Group Meeting.
 - Scoping
 - 4 scenarios given to breakout groups
 - ✦ HOA
 - ✦ Historical Districts
 - ✦ Trees
 - ✦ Shading by structures
 - Could not agree on language or methods.



Solar Ordinance Process



- List of questions and topics for planners to consider.
 - Historical districts.
 - Jurisdiction over Home Owners Associations?
 - How will the right be transferred from property owner to property owner upon sale?
 - Who will pay for tree trimming if the tree that is shading is on neighbor's property.
 - Who has the right to the sun if upon installation there is no shade, but later there is due to vegetation?

Solar Ordinance Process



- Salt Lake City & Salt Lake County are both Solar America Cities as designated by the U.S. Department of Energy.
- Commissioned study for best practices in solar ordinances.



Wind Ordinance Process



- **Determined that model wind ordinance was needed**
 - **Used SJR1 language as a strawman**
 - **Involved diverse stakeholders including local government, utility companies, wind industry, wildlife representation, citizens, Utah Wind Working Group**
- Rocky Mountain Power
 - PacifiCorp
 - Utah League of Cities and Towns
 - Utah Association of Counties
 - Bat Conservation Network
 - Division of Wildlife
 - American Wind Energy Association
 - Utah Clean Energy
 - Wasatch Wind
 - Wind Powering America
 - Governor's Energy Advisor Office
 - Governor's Office of Planning and Budget
 - Governor's Office of Economic Development
 - Utah Wind Working Group (290 Individuals)
 - Cities and Counties (213)

Wind Ordinance Process



- Some responses were questions – not implemented, but answered.
 - 75 comments total.
 - ✦ Many were implemented
 - ✦ Others resulted in answers (if in the form of a question)
 - ✦ Some were implemented by way of a narrative introduction to the model ordinance.
- Utah's Model Wind Ordinance:
http://geology.utah.gov/sep/wind/wind_ordinance.htm
- The Utah Model Wind Ordinance is a *model* ordinance. The finer points can be decided at a city/county level.

Model Wind Ordinance



- Proactive rather than reactive
- Addresses all types of wind: residential and commercial
- Allows governments not to have to “reinvent the wheel”
- Helps save time and resources for all involved
- Addresses compatibility with existing land uses
- Addresses local and environmental concerns up front
- Public participation and consensus building
- Address issues of sound, safety, aesthetics

Best Practice: Aesthetics



- Beauty is in the eye of the beholder
- Require conditional use permits for special character districts (i.e., historic areas or scenic by-ways)
- Require regular maintenance & up-keep
- Neutral colors that blend with environment
- Restrict advertising
- Stipulations for removal and land reclamation if abandoned/inoperable after 24 months



Best Practice: Height



- Height = Wind quantity & quality (wind speed cubed)
 - Height impacts project feasibility
- Vertical distance minimizes sound at ground level
- Total Height (ground to blade tip)
 - Small Wind: one acre or less 80 feet, greater than one acre 200 feet
 - Commercial Wind: not to exceed 600 feet
 - Met towers range from 20 to 80 meters
- Ground clearance of moving parts: 15 feet
- Consider exemptions from existing height limitations

Medium and Commercial-Scale Wind



- Reliable range of 14-30 mph winds
- Open spaces most desirable
- Proximity to transmission and distribution
- Capital intensive developments involving long-term contracts
- Require wind resource assessment (anemometers)
- Designed to stop at extreme wind speeds (~ 50 mph)



Best Practice: Sound



- Not to exceed “nuisance noise” levels
- Limit to 60 dBa as measured from nearest inhabitable structure (not property line)
- Allow exceptions for unusual conditions, such as storms (i.e., 10 dB > ambient noise level)
- Acoustical studies unnecessary (and expensive) for small wind



Best Practice: Sound



- Usually masked by ambient sounds (i.e., wind, traffic)
- Modern turbines much quieter
- Exponentially quieter with distance (i.e. at 200 ft, only $\frac{1}{4}$ the intensity as at 100 ft)
- A commercial wind farm at 750 to 1,000 feet is ~45 dBa (Background noise in a house ~ 50 dB(A))
- Hear for yourself – visit Spanish Fork!
- Beware of web myths, pseudo-science, and misinformation

Source: American Wind Energy Association

Best Practice: Safety



- Compliance with all applicable local/state/federal codes (safety, electrical, construction, etc.)
- Limit access to authorized personnel only; no climbing apparatus external of the tower within 10 feet of ground.
- Require safety and utility signage
- Setback: 110% of height from top of rotor (blade) from all inhabited structures (not owned by property owner), overhead utility lines, property lines, and public roads and right-of-ways
- Keep in mind: turbines don't jump

Best Practice: Safety



- Engineered Structures, just like lamp posts, which are allowed in parking lots near cars & people
- Structural failure is extremely unlikely
 - Trees more likely to fall
- Setback distances address this issue

Best Practice: Setbacks



- 110% of total extended height of tower + blades from property lines, inhabitable structures not owned by property owner, public rights-of-way, and utility transmission lines
- Alternative compliance – allow for exceptions
 - Adjacent owners sign agreement
- Remember what setbacks are applied for telephone/light poles? Flag poles?

Wildlife Considerations: Birds

- Altamont Pass, CA issue (1980s)
- Avoid migratory corridors
- Audubon Society endorses wind when sited properly
- FACT: No documented avian mortality cases with small wind
- Migratory bird and impact studies are performed for all commercial sites on Federal Land.
- Best practice: Large wind farms should be subject to local wildlife office inspection and approval.
- Invite public comment



Wildlife Considerations: Sage Grouse



- Studies suggest that Sage Grouse avoid vertical structures
- Sage Grouse is expected to be listed as threatened or endangered in 2009.
- Many studies underway, we will know more next year.
- Best practice: 4 miles from any identified lek, OR line of sight.
Utah Division of Wildlife.
- www.fws.gov/mountain-prairie/species/birds/sagegrouse



Wildlife Considerations: Bats



- Recent studies show that increased number of bat mortalities have been found at large scale wind farms (largely in the southeast)
- Current Biology article found barotrauma
- More studies are underway, ecosystem effects are unclear
- Anabat meters now being used in commercial wind studies
- Wind Turbine Guideline Advisory **Committee Bats and Wind Energy** looking closely at this issue



Anemometer Towers



- Critical for assessing wind resource and obtaining state wind data
- 20 meters to 80 meters (100 meter towers are available)
- Temporary structure (6 months – 3 years)
- State Energy Program Anemometer Loan Program – website



Red Herring Issues



- **“Ice throw”**
 - Risk < Getting struck by lightning
- **“Shadow Flicker”: rotor shadows from slower (large) blades**
 - Extremely uncommon in Utah (lower latitude), only certain times of day at certain times of the year
 - Setbacks or vegetative buffers mitigate, if not entirely eliminate, this potential nuisance, especially at U.S. latitudes.
 - Shadow flicker calculator
www.windpower.org/en/tour/env/shadow/hadowc.htm
 - Strobe rates are much faster than large wind turbine blades are able to rotate; no connection to epilepsy

Red Herring Issues



- “Wind Turbine Syndrome”
 - Response - Wind Turbine Sound and Health Effects: An Expert Panel Review:
http://www.windpoweringamerica.gov/filter_detail.asp?itemid=2487
 - ✦ The sounds emitted by wind turbines are not unique
 - ✦ No evidence that audible sounds or sub-audible sounds from turbines have any direct adverse physiological effects
 - ✦ Ground-borne vibrations from wind turbines are too weak to be detected by, or to affect , humans

Renewable Energy



- Local economic development, Revenues for Counties and School Districts, Jobs
- Self sufficiency, energy independence
- Price-stable (no volatile fuel costs)
- Diversify energy portfolio, reduce risk
- Low-maintenance and reliable energy
- Inexhaustible resource
- Conserves energy resources for future generations
- Clean Energy

Resources for Local Government

American Planning Association. "Planning and Zoning for Renewable Energy." PAS Info Packet, 2008.

American Wind Energy Association "Wind Energy Siting Handbook" www.awea.org/sitinghandbook

American Wind Energy Association website, small wind section. www.awea.org/smallwind

Cooper, C. and Pitt, D. "Taking the Red Tape out of Green Power." Network for New Energy Choices, 2008 (forthcoming, 2008).

Heller, E. "Zoning and Permitting Standards for Urban Wind Turbines." Zoning Practice, July 2008 (forthcoming, 2008).

Interstate Renewable Energy Council www.irecusa.org

National Renewable Energy Laboratory (DOE) www.nrel.gov

RENEW Wisconsin small wind toolbox. www.renewwisconsin.org/wind/windtoolbox.html

Sagrillo, M. and Green, J. "Why Turbine Height Matters." National Renewable Energy Laboratory, 2007.

Stimmel, R. "In the Public Interest: How and Why to Permit Small Wind Turbines." American Wind Energy Association, 2008 (forthcoming, 2008).

Rhoads-Weaver, et al. "Small Wind Siting and Zoning Study: Development of Siting Guidelines and a Model Zoning By-Law for Small Wind Turbines." American Wind Energy Association, 2006.

Rogers, et al. "Wind Turbine Acoustic Noise." University of Massachusetts at Amherst. Amended 2006.

Utah Clean Energy www.utahcleanenergy.org

Utah State Energy Program geology.utah.gov/sep

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- Mark Mazriaz
- NREL/Department of Energy
- Rob Adams
- Robin Wilson, personal collection
- Ryan Robinson, Spanish Fork Aerial Shot
- Utah Clean Energy
- Utah State Energy Program



Thank you! Questions?



Please contact us for further information or to get involved:

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Property Value



- **Studies inconclusive**
- **Anecdotal evidence that values increase**
- **Compare with windmills: historical icon**
- **Local economic development from wind projects may help increase property values or balance impacts**
- **No clear evidence that being within view of turbines depresses value over the long-term**