

# Utah's Clean Energy Future: Resource Potential and Associated Economic Benefits

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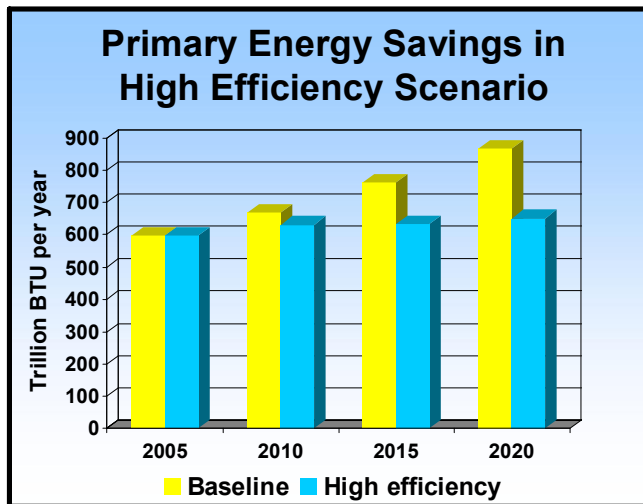
***Utah's Clean Energy Future is Now.***

*Utah has tremendous potential to save energy and money through energy efficiency and significant potential to generate clean renewable energy. Clean energy fosters new economic development opportunities across the state, especially in Utah's rural communities.*

*With government leadership, collaborative efforts among public and private entities, and a shared vision, Utah citizens and businesses can reap the benefits of Utah's clean energy resources — today, tomorrow, and for future generations.*

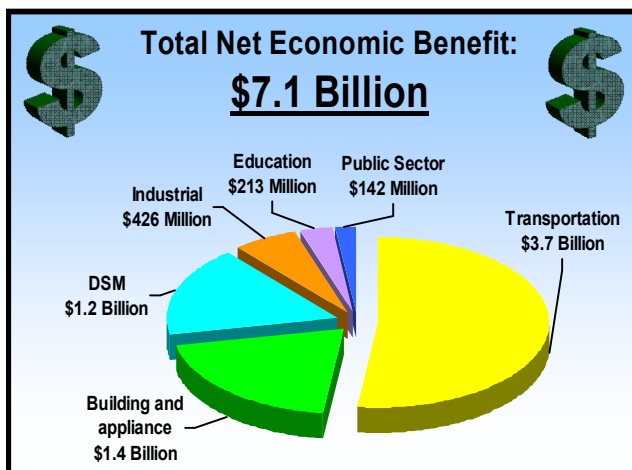
## Energy Efficiency

- Energy efficiency is a high priority energy resource for Utah
- As Utah's energy demand continues to grow at a rate of more than 3 percent per year, energy efficiency and conservation are fundamental to meeting our energy needs in a clean, reliable, and cost-effective manner.
- In April 2006, Utah Governor Jon Huntsman, Jr. committed to increasing energy efficiency statewide by 20% by 2015.



Utah Primary Energy Savings, High Efficiency Scenario (20% by 2015) as compared with Baseline; Source: Utah Energy Efficiency Strategy Report, 2007.

- Achieving the Governor's goal would provide Utah businesses and consumers the following benefits:<sup>1</sup>
  - A net economic benefit of over \$7 billion
  - Create 15 new Utah jobs for every \$1 million spent on energy efficiency<sup>2</sup>
  - Save over 3 billion gallons of water per year
  - Reduce 7.9 million metric tons of CO<sub>2</sub> annually
  - Save 217.4 trillion BTUs of energy per year by 2015.



Total Net Economic Benefit for Utah, based on achieving 20% by 2015 goal. Source: Utah Energy Efficiency Strategy Report, 2007.

**Energy Efficiency is a smart investment that pays off.**  
**Energy efficiency means using less energy for the same service (e.g. more efficient homes, buildings, lighting, appliances).**

<sup>1</sup> All figures are based on achieving a 20% increase in energy efficiency across all sectors by 2015; \$7 billion represents net economic benefit over the life of energy efficiency measures implemented 2007-2015; water, CO<sub>2</sub> and BTU figures reflect savings per year in 2015 for measures implemented 2007-2015. Source: Gellar, Howard, S. Baldwin, P. Case, K. Emerson, T. Langer, and S. Wright. *Utah Energy Efficiency Strategy: Policy Options*. October 2007. URL: [http://energy.utah.gov/energy/utah\\_energy\\_efficiency\\_strategy.html](http://energy.utah.gov/energy/utah_energy_efficiency_strategy.html)

<sup>2</sup> Consultation with John A. "Skip" Laitner, American Council for an Energy Efficient Economy (ACEEE), February 21, 2007.



Spanish Fork Wind  
Project Construction  
Photo Credit:  
Utah Clean Energy, 2008

**Wind energy provides new economic development, local jobs, and a new cash crop for rural communities.**

## Wind Energy

- Wind is one of the fastest growing energy resources in the world
- Is a cost-effective energy resource competitive with conventional resources
- A square mile of land can support approximately 10– 20 MW of development, with the majority of land still available for traditional uses (i.e. farming, ranching, etc.)
- Wind is a price stable resource that helps mitigate risk of volatile fuel costs and future carbon regulation
- It provides economic development and new jobs in rural communities

### Benefits of Utah's First Commercial-Scale Wind Power Plant in Spanish Fork (Utah County)<sup>3</sup> - 18.9 Megawatts (MW)

**Power Production:** An estimated 55,000 megawatt-hours annually, equivalent to *powering over 6,100 average Utah homes per year*

**Land Lease Payments:** \$74,000 in annual land lease payments to the landowners of the project site

**Property Tax Revenue:** Approximately \$112,000/year in new property taxes for Utah County (paid by the developer)

**Benefits to Nebo School District:** \$84,000 annually paid to school district

**State Economic Impacts & Jobs (Construction):** Over \$3.9 million in state economic activities; about \$1.29 million in salaries and wages would be generated for approximately 36 job opportunities (direct, indirect, and induced).

**New Jobs (Long-term):** 7 new jobs (direct, indirect, induced)

### Additional Utah Wind Projects

- Camp Williams, Utah National Guard (Utah County) – 1 MW
- Milford Wind Corridor – 200 MW (Phase 1), under development by First Wind (Beaver and Millard Counties)
- Milford High School and Milford Elementary – Wind for Schools (Beaver County)
- Three Peaks Elementary – Wind for Schools (Iron County)



Camp Williams Wind  
Turbine Photo Credit:  
Mark Maziarz, 2006



Milford Elementary School Wind Project;  
Photo Credit: Southwest Wind, 2007



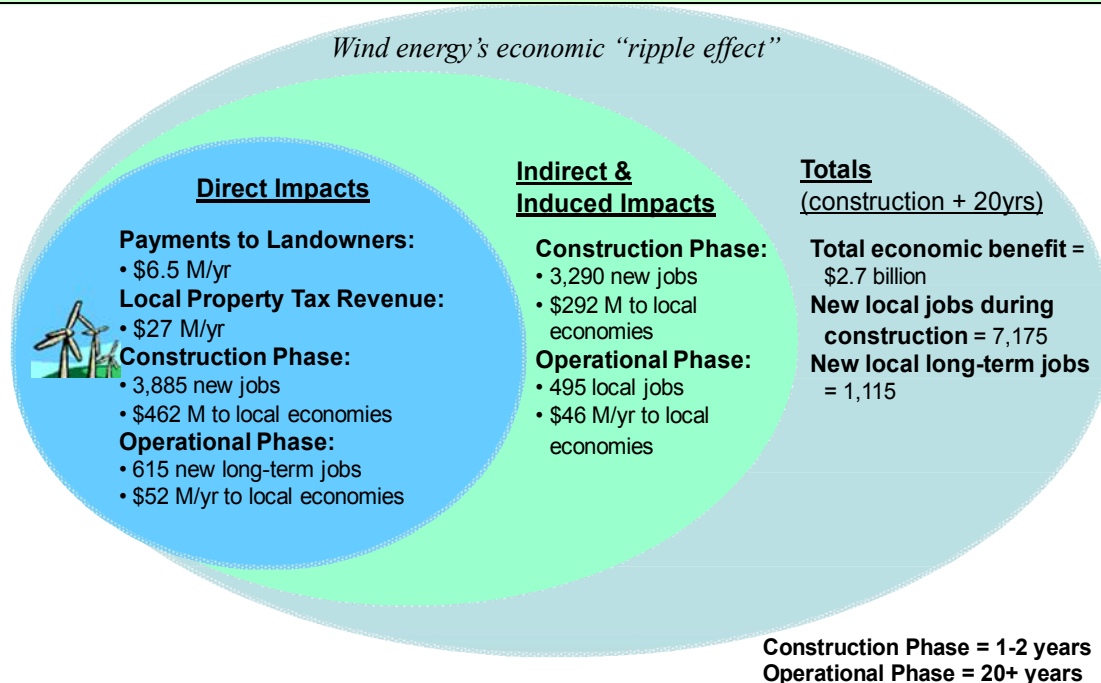
Residential Wind in Circleville, Utah

<sup>3</sup> Preliminary figures from *Generating Economic Development from a Wind Power Plant in Spanish Fork Canyon, Utah: A Case Study and Analysis of State-Level Economic Impacts*, a joint study of the National Renewable Energy Laboratory and the Jon M. Huntsman School of Business, Utah State University. Authors: Sandra Reategui, Cathy L. Hartman, Ph.D., Edwin R. Stafford, Ph.D.. 2008.

## Utah's Technical Wind Potential and Economic Benefits

Utah's technical wind potential is estimated at nearly 2,500 Megawatts<sup>4</sup>, which represents over \$2.7 billion in net economic benefits and over 1,100 new long-term jobs in communities across the state (see Figure 1 below),<sup>5</sup> while providing enough power for 660,000 average Utah homes per year.

**Figure 1 - Statewide Economic Impact Potential from 2,449 MW Wind Development**  
From the US Department of Energy 20% Wind Vision



## Got Wind?

If you think your County has a good wind resource, you can:

1. Check **Utah's Wind Maps and Wind Data** [geology.utah.gov/sep/wind/maps.htm](http://geology.utah.gov/sep/wind/maps.htm) (Please note: Utah's wind data is constantly being updated and revised, so don't be discouraged if your area is not on the map.)
2. Contact the **Utah State Energy Program** [geology.utah.gov/sep/](http://geology.utah.gov/sep/); (801) 538-4798
3. Apply for the **State Wind Anemometer Loan Program** [geology.utah.gov/sep/wind/anemometer\\_data/index.htm](http://geology.utah.gov/sep/wind/anemometer_data/index.htm); (801) 538-4798
4. Contact a **wind energy consultant or developer** [geology.utah.gov/sep/wind/development/index.htm](http://geology.utah.gov/sep/wind/development/index.htm)
5. Download the **Utah Wind Guide for County Commissioners** [www.eere.energy.gov/windandhydro/windpoweringamerica/filter\\_detail.asp?itemid=1386](http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=1386)
6. Download the **Small Wind Guide from the Department of Energy** [www.eere.energy.gov/windandhydro/windpoweringamerica/small\\_wind.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/small_wind.asp)
7. Contact **Utah Clean Energy** [www.utahcleanenergy.org](http://www.utahcleanenergy.org)
8. Join the **Utah Wind Working Group** contact Denise at [dbeaudoin@utah.gov](mailto:dbeaudoin@utah.gov)
9. See back page for additional resources.

<sup>4</sup> Estimates based on data compiled from wind developers, the Utah Geological Survey State Energy Program, and the National Renewable Energy Laboratory. Excludes sensitive lands, national and state parks, etc.

<sup>5</sup> National Renewable Energy Laboratory, Wind Powering America Program. *Utah Economic Impacts from the 20% Wind Vision (2,449 MW new Utah wind development)*. U.S. Department of Energy, Energy Efficiency and Renewable Energy Technologies Program. 2007.

## Solar Energy

- One of the fastest growing energy resources in the world
- Provides inexhaustible clean energy and electricity
- Can be easily integrated within our transmission constrained areas
- Helps mitigate fuel volatility and future carbon regulation
- Provides valuable peak power and can reduce need for new peaking capacity

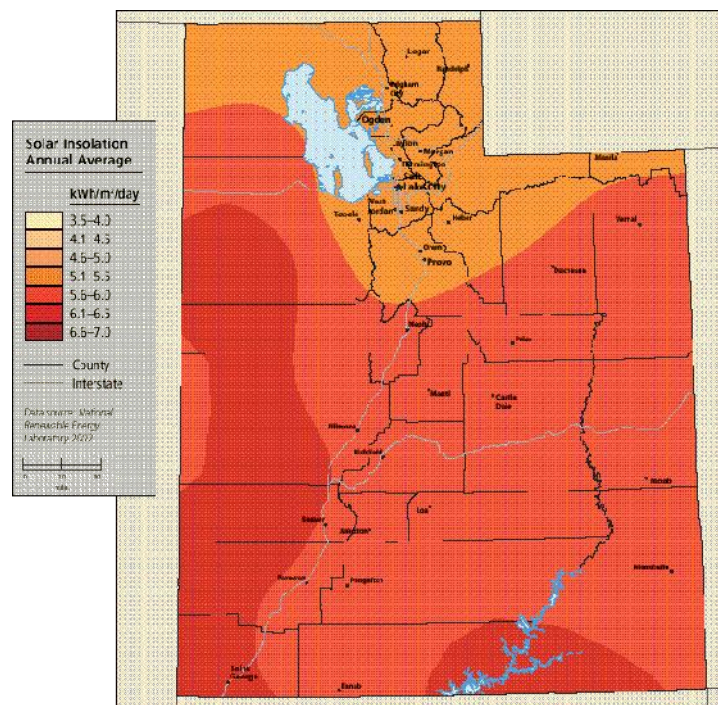
## Utah's Technical Solar Potential and Economic Benefits

### Solar Photovoltaic (PV)

- Utah's technical potential for roof-top Solar PV in 2010 is 5 Gigawatts (GW) or 5,000 Megawatts<sup>6</sup>
  - 5 GW could produce 8.18 million Megawatt hours of electricity per year
  - Enough solar energy to power nearly 1 million Utah homes for a year
- State, Federal, and Utility Incentives are available for solar technologies. See Resources on back page for more details.



5-kW Solar PV System Installation on St. George City Power Building (Washington County)  
Photo Credit: Utah Clean Energy, 2007



Utah's Solar Insolation Annual Average (kwh/m2/day) Source: Western Resource Advocates, Renewable Energy Atlas of the West, 2004.

<sup>6</sup> Chaudhari, M.; Frantzis, L.; Hoff, T.E., "PV Grid Connected Market Potential in 2010 under a Cost Breakthrough Scenario," prepared by Navigant Consulting for The Energy Foundation, September, 2004.

## Concentrating Solar Power (CSP)

- Utah's CSP potential is estimated to be 456,000 MW, which would generate over 1 million Gigawatt hours (GWh) per year.<sup>7</sup>
  - This is equivalent to the electricity demand of over 100 million homes, **or over 40 times Utah's current electricity demand.**
- If Utah were to build 1000 MW of Concentrating Solar, the state could reap the following economic benefits:<sup>8</sup>
  - \$2 - 4 billion private investment in State
  - 3,000 to 4,000 construction jobs
  - 250 permanent solar plant jobs, many in rural areas
  - \$1.0 billion increase in state tax revenues



CSP Dish, Photo credit Sandia National Labs

### What would a 100 MW Concentrating Solar Power plant mean for your County's economy?

Construction	1,016 jobs
Operation	38 jobs
Average Wage	\$45,800
Private Investment	\$370 million
30-Year Tax Gain	\$200+ million

Based on studies from CA, NM, and NV; based on deploying a 100 MW CSP plant.<sup>9</sup>

**"I'd put my money on the sun and solar energy. What a source of power!"**

**-Thomas Edison**



(Left) Trough Solar System; (Right) Power Tower CSP System Photo Credits: Sandia National Laboratories

<sup>7</sup> Mancini, Dr. Thomas. Sandia National Laboratories, United States Department of Energy Efficiency and Renewable Energy. *Concentrating Solar Power* (presentation). Utah Energy Forum, Salt Lake City. November 30 2007.

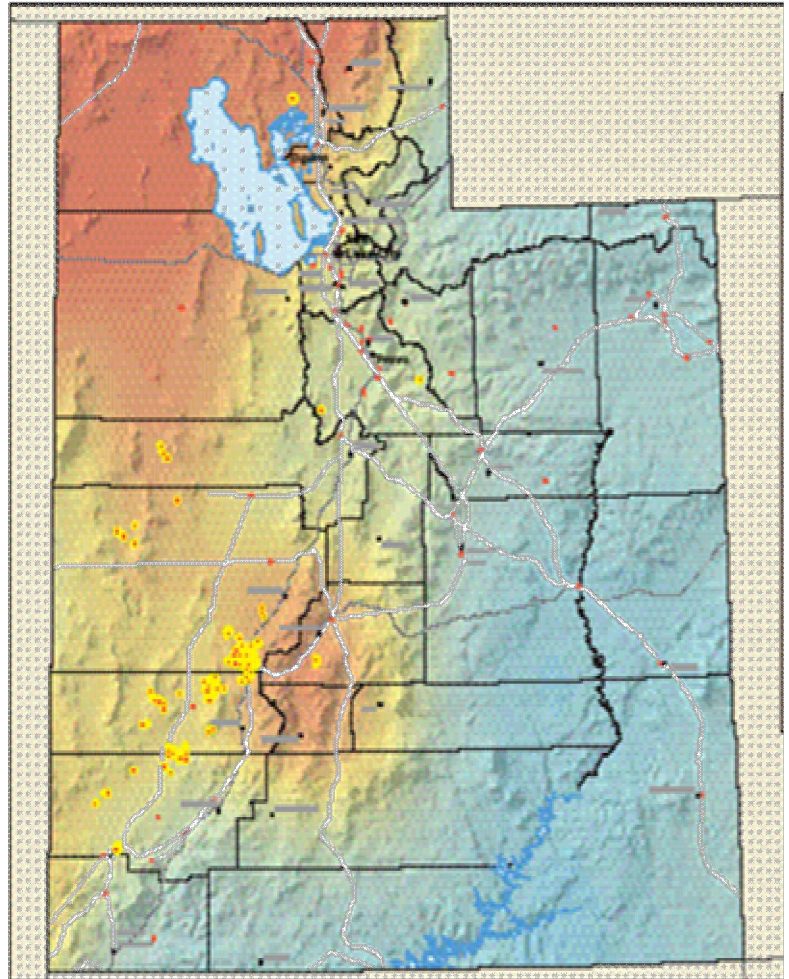
<sup>8</sup> Ibid.

<sup>9</sup> Ibid.

## Geothermal

- Utah's geothermal electricity resource potential is estimated to be 200 MW (near-term/near market) to 600 MW (long-term).<sup>10</sup>
- Utah currently has only has 37 MW of geothermal electricity developed.
- 230 MW of Geothermal Electricity Development in Utah would provide:<sup>11</sup>
  - \$780 million total Investment
  - Electricity for 172,500 homes or 690,000 people
  - Prevent 1.7 million tons of CO<sub>2</sub>
  - A savings of 910 million gallons of water that conventional steam plants use for "make up" water
- Utah's 230 MW potential if developed would represent approx 978 full time jobs or approx 3,680 person years of work, representing a 30-year economic output of \$3.4 billion.
- The *Western Governors Clean and Diversified Energy Initiative Geothermal Task Force Report* states that almost 13,000 megawatts of geothermal energy that can be developed on specific sites in West within a reasonable timeframe. Of these, 5,600 megawatts are considered by the geothermal industry to be viable for commercial development within the next 10 years, i.e. by about 2015.

### Utah's Geothermal Potential Map



**Key:** High - Red; Medium - Yellow; Low - Blue

Source: Western Resource Advocates, Renewable Energy Atlas of the West, 2004.



Geothermal Plant

Photo Credit: Ormat Technologies, Inc.

<sup>10</sup> Thompson, Paul. Ormat Technologies, Inc. *Geothermal Development in Utah: The Reality of Today and the Promise of Tomorrow* (presentation). Utah Energy Forum, Salt Lake City. November 30 2007.

<sup>11</sup> Ibid.

## Biomass Energy

- Biomass power is the use of plant and animal based materials to generate electricity and fuels. Utah's best biomass potential lies in gasification, anaerobic digestion, pyrolysis, and small, modular systems.
- Utah's biomass resource potential could yield 1 million MWh/yr.<sup>10</sup>
- Biomass applications include: anaerobic digesters (biodigesters); lignocellulosic biomass - corn stover, straw, or wood; and forest, mill and agricultural residues, urban wood wastes, and dedicated energy crops, and animal manures.

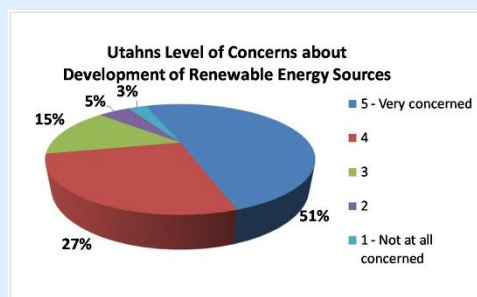
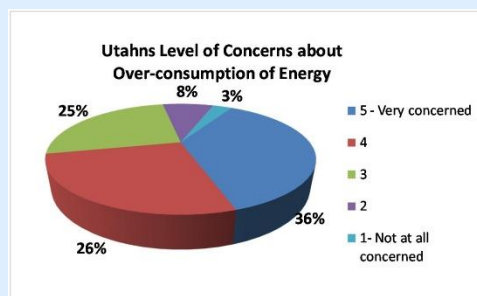
### Energy Issues Rank #1 Among Utah Voter Priorities in 2008

Utahns care about energy. The Utah Foundation's *2008 Utah Priorities Survey: The Top Issues and Concerns of Utah Voters for the 2008 Election*, found that the top 5 issues of interest to Utahns in 2008 are:

1. Energy Issues, Including Utility & Gasoline Prices
2. K-12 Education
3. Taxes and Government Spending
4. Healthcare
5. Immigration

"Over-consumption of energy" and "development of renewable energy sources" were highly rated topics for Utahns (see charts at right).

Source: Utah Foundation, *2008 Utah Priorities Survey*, March 2008  
Charts based on the 92% of respondents who ranked "energy issues" as 3 or above on a scale of concern.



#### Resources:

- [American Solar Energy Society www.ases.org](http://www.ases.org)
- [American Wind Energy Association www.awea.org](http://www.awea.org)
- [Energy Efficiency Working Group](mailto:williamchatwin@utah.gov) contact William Chatwin at [williamchatwin@utah.gov](mailto:williamchatwin@utah.gov)
- [Geothermal Working Group](mailto:ROBERTBLACKETT@utah.gov) contact Robert Blackett at [ROBERTBLACKETT@utah.gov](mailto:ROBERTBLACKETT@utah.gov)
- [Solar Working Group](mailto:elisebrown@utah.gov) contact Elise Brown at [elisebrown@utah.gov](mailto:elisebrown@utah.gov)
- [Southwest Energy Efficiency Project www.swenergy.org](http://www.swenergy.org)
- [U.S. Department of Energy's Wind Powering America Program www.eere.energy.gov/windandhydro/windpoweringamerica](http://www.eere.energy.gov/windandhydro/windpoweringamerica)
- [Utah Clean Energy www.utahcleanenergy.org](http://www.utahcleanenergy.org)
- [Utah Geological Survey State Energy Program www.geology.utah.gov/sep](http://www.geology.utah.gov/sep)
- [Utah Governor's Office www.energy.utah.gov](http://www.energy.utah.gov)
- [Western Resource Advocates www.westernresourceadvocates.org](http://www.westernresourceadvocates.org)
- [Wind Working Group](mailto:dbeaudoin@utah.gov) contact Denise at [dbeaudoin@utah.gov](mailto:dbeaudoin@utah.gov)