

# Executive Summary

## Building the Clean Energy Economy: Jobs and Economic Development in Utah

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### Study Briefing

Energy efficiency and renewable energy are the new frontiers of the clean energy economy; with Utah's pioneering spirit, our State embodies the resourcefulness and innovation needed to thrive and prosper in this new frontier. These emerging market opportunities are increasingly important as we seek means to spur economic development, diversification and job creation.

Renewable energy and energy efficiency are critical components of Utah's energy portfolio, and the State has adopted two goals to expand the use of these resources significantly over the next several years:

- In 2006 Governor Jon Huntsman, Jr., called for a 20 percent increase in energy efficiency across all sectors by 2015;<sup>1</sup>
- In 2008 the *Energy Resource and Carbon Emission Reduction Initiative* was signed into law and established a target for Utah to derive 20 percent of its electricity sales from renewable resources by 2025.<sup>2</sup>

This study was conducted at the request of Governor Huntsman's Energy Advisor, Dr. Dianne Nielson, to analyze the net economic effects on the State of Utah if it were to achieve a 20 percent increase in energy efficiency by 2015 and 20 percent of electricity sales from renewable resources by 2020 ("20% Clean Energy Scenario"—described in further detail below).<sup>3</sup> According to this macroeconomic analysis, new investments in energy efficiency and renewable energy in the state of Utah will result in:

- 7,000 net new ongoing jobs;
- \$310 million in net new annual earnings; and
- \$300 million net annual increase in gross domestic product by state (GDPS).

For comparison, the Utah ski industry contributed about \$440 million to state GDPS in 2008.

The benefits estimated in this analysis are likely conservative because it assumes that the production and use of renewable energy and increased energy efficiency addresses only the demand within the state's borders and does not model the economic benefits if Utah becomes a leader and exporter of products, goods and services related to clean energy industries.

This study does not include an analysis of the impact to utility rates. This could be addressed in future economic analyses.

This study analyses the *net* effects on jobs and economic development as a result of achieving the 20% Clean Energy Scenario. Any job losses or shifts in economic activity that result from increased renewable energy and/or energy efficiency are discussed in the report and accounted for in the net numbers for jobs and economic development.

The 20% Clean Energy Scenario modeled in this study meets projected energy demand growth through 2020

#### Renewable Energy

Energy that is derived from natural resources that are continually replenished (renewable).

#### Energy Efficiency

Accomplishment of more work with a given quantity of energy. Energy efficiency is a resource that can be developed like any other natural resource to increase our energy capacity.

## Table ES-1. Jobs and Economic Development by 2020

Reference Scenario Compared to 20% Clean Energy Scenario

	Jobs		Earnings (\$Millions)		GDPS (\$Millions)	
	Net Total over GOPB Baseline	Net over Reference Scenario	Net Total	Net over Reference Scenario	Net Total	Net over Reference Scenario
Reference Scenario	2,800	N/A	\$160	N/A	\$280	N/A
<b>20% Clean Energy Scenario</b>	<b>6,890</b>	<b>4,100</b>	<b>\$310</b>	<b>\$140</b>	<b>\$300</b>	<b>\$20</b>

Note: All dollar amounts are 2008\$. Assumes no additional change in demand for coal mining and natural gas drilling for 20% Clean Energy Scenario as compared to Reference Scenario.

with new energy efficiency and renewable energy resources, and includes some simple cycle gas resources to balance the system. This scenario assumes that nearly all existing electricity resources currently serving Utah's customers will still be on-line in the year 2020 (see Figure ES-1).

### The New Frontier: Energy Efficiency and Renewable Energy

Utah's energy efficiency and renewable energy technical resource potential is well-beyond what is needed to achieve the state-adopted goals.<sup>4,5,6</sup>

Energy efficiency is a pervasive resource that can be "mined and developed" in every new and existing building, home, industrial operation, and government facility. Every new construction project or retrofit has the potential to increase efficiency over standard practices, which helps Utah citizens and businesses save energy and money today and into the future. These savings are reinvested into the economy and lead to more job creation and economic development.

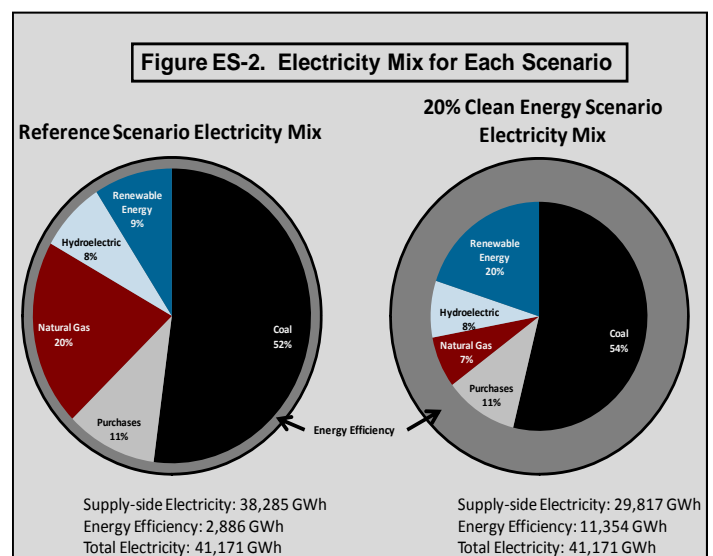
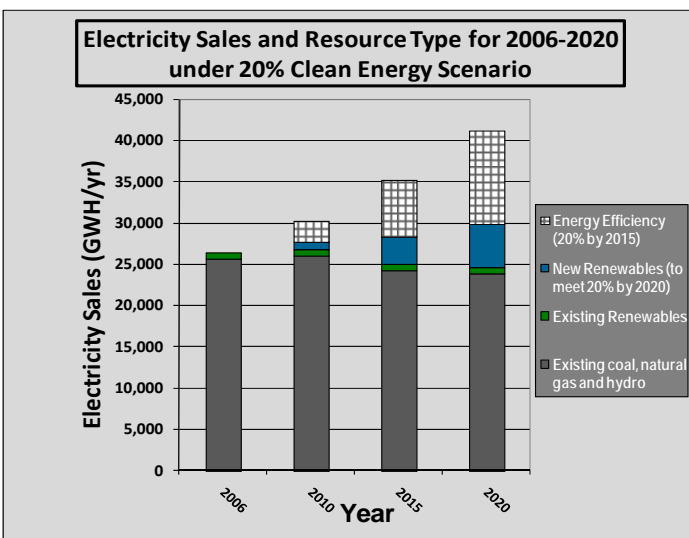
Renewable energy resources complement and help diversify Utah's existing electricity resources while creat-

ing new opportunities for jobs and economic development, especially in Utah's rural communities. The renewables modeled in this study are predominantly wind and geothermal, with some solar and biomass resources.

### Scenarios Modeled and Evaluated

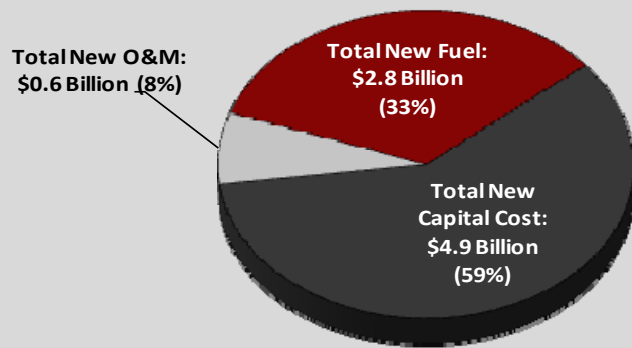
This study models two distinct energy portfolio scenarios in the year 2020 (see Figure ES-2).<sup>7</sup>

- Reference Scenario:** This scenario reflects the expected economic impact of the 2007 utility resource planning documents and objectives. It is based closely on PacifiCorp's 2007 new electricity resource planning documents<sup>8</sup> and treats the entire state of Utah as if it followed PacifiCorp's electricity plan through the year 2020.<sup>9</sup> This scenario develops new natural gas plants, 9 % renewable energy by 2020 (mostly out of state wind) and a modest amount of energy efficiency through utility demand side management (DSM) programs. This scenario also assumes a continuation of Questar Gas' energy efficiency programs at 2007 funding levels.



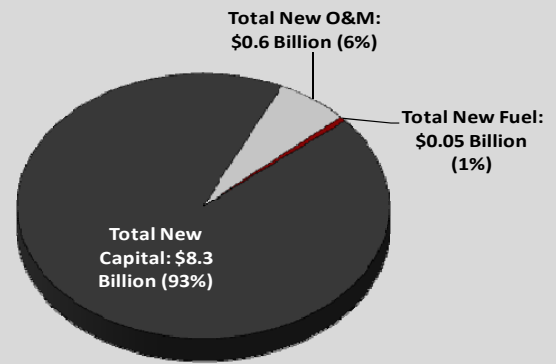
Black circle: Total energy needed by 2020 (41,171 GWh); pie chart: supply-side resources and percentages; gray ring: energy efficiency. Drawn to scale.

**Figure ES-3. Reference Scenario: Approximate Investment Costs for New Resources (Utah's Share, 2007-2020)**



**Figure ES-3.** Investment Costs for the Reference Scenario. The amounts presented are Utah's share of the cost of the investment since the Reference Scenario was based on a regional planning document.

**Figure ES-4. 20% Clean Energy Scenario: Approximate Investment Costs for New Resources (Utah's Share, 2007-2020)**



**Figure ES-4.** Investment Costs for the 20% Clean Energy Scenario. The amounts presented are Utah's share of the cost of the investment to directly compare with the Reference Scenario.

- 20% Clean Energy Scenario:** This scenario represents increased renewable energy and energy efficiency measures above the Reference Scenario, wherein renewable energy represents 20 percent of Utah electricity sales in 2020 and energy efficiency is increased by 20 percent by 2015. Those energy efficiency investments are extended to the year 2020. Only a portion of the energy efficiency measures in this scenario come from utility DSM programs; the additional energy efficiency improvements come from other measures, such as building efficiency upgrades and lamp and appliance standards. Electricity savings are approximately three times higher than the Reference Scenario, and the natural gas savings are approximately six times higher. This scenario also assumes no additional change in demand for coal mining and natural gas drilling for the 20% Clean Energy Scenario as compared to the Reference Scenario since coal generation remains online and regional demand for natural gas should offset decreased Utah demand.

The job creation resulting from the above scenarios are compared to a baseline scenario (herein referred to as **GOPB Baseline**). The GOPB Baseline is the anticipated employment by sector in 2020, as projected by the Governor's Office of Planning and Budget (GOPB), and reflects anticipated changes in the structure of Utah's economy over time.

### Utah's Economy in 2020

The input-output model used in this analysis is the IMPLAN (IMPact analysis for PLANning) Model which captures economic activities as a ratio of the total change in economic activity in the region relative to the direct change in one or more sectors.

The results presented in this study are the single year (2020) impact from full implementation of the scenarios modeled, not the cumulative total of all impacts realized over the fourteen-year period 2007-2020.

The analysis of the year 2020 captures the following: construction-related impacts associated with developing projects in and around the year 2020; the impacts of on-going operation and maintenance of projects installed from 2007-2020; and the energy *savings* from energy efficiency measures installed from 2007-2020.

### Renewable Energy and Energy Efficiency Create Jobs and Stimulate New Economic Development

As Table ES-1 shows, the 20% Clean Energy Scenario provides a net increase in jobs, earnings, and GDPs over the Reference Scenario, stimulating new economic development for Utah.

#### Jobs

The 20% Clean Energy Scenario is estimated to create nearly 7,000 net ongoing jobs by 2020 above the GOPB Baseline Scenario, led by the construction and service industries, but also includes a variety of high-tech jobs

*"Energy is a critical component in sustaining Utah's vibrant economic growth and preserving our unparalleled quality of life. With just the right blend of ambition, brain power and diverse natural resources, Utah stands ready to lead the charge in energy efficiency, renewable and alternative energy development and new and innovative technologies."*

-Governor Jon M. Huntsman, Jr.

such as engineers, technicians, installers and electricians. The net increase above the Reference Scenario is over 4,000 jobs.

### Earnings

The 20% Clean Energy Scenario provides net annual earnings of \$310 million by 2020. The net increase over the Reference Scenario is over \$140 million.

### Gross Domestic Product by State (GDPS)

In the 20% Clean Energy Scenario, Utah's annual GDPS is estimated to increase by about \$300 million by 2020. This compares with the Utah Ski industry, which contributed about \$440 million to state GDPS in 2008, suggesting that the renewable energy and energy efficiency sectors can play a substantial role in Utah's economy in the near future. The net annual increase in GDPS above the Reference Scenario is expected to be \$20 million by 2020.

### Investments

The 20% Clean Energy Scenario will require an estimated investment of \$8.9 billion over the 14-year period (2007 – 2020), or \$500 million more than the Reference Scenario (see Figures ES-3 and ES-4). Since the Reference Scenario was based on a regional planning document, the amounts quoted here are Utah's share of the cost of the investments for both scenarios in order to facilitate direct comparisons between the two scenarios. The 20% Clean Energy Scenario invests approximately 93 percent in up-front capital investments, with only 1% invested in ongoing fuel costs. The Reference Scenario will require an estimated investment of \$8.4 billion over the 14-year period, with 33 percent invested in ongoing fuel costs. Both scenarios invest approximately 6-8 percent of total costs on operations and maintenance.

Future economic analyses could evaluate the different costs and risks associated with different investment strategies (i.e. more up-front capital with no ongoing fuel cost for clean energy resources versus lower up-front capital but ongoing fuel costs for traditional resources).

### Conclusions

For a similar level of investment, the 20% Clean Energy Scenario results in nearly 7,000 net new ongoing jobs, net increased annual earnings of \$150 million and a net annual increase in GDPS of \$20 million. The increase in

jobs is due to the capital intensive renewable energy resources; the local job creation of designing, building and retrofitting energy efficient homes and businesses; and the advantages of keeping money in the local economy through energy savings and local energy resource development. Furthermore, the 20% Clean Energy Scenario provides a hedge against volatile fuel costs and future risks and uncertainties in a rapidly changing energy market.

This study presents a modest share of Utah's potential for new clean energy development, suggesting that the 20% Clean Energy Scenario is an excellent first step in meeting Utah's growing energy demand while mitigating risks to Utah businesses and citizens.

A pioneering spirit, leadership and aggressive programs and policies to advance energy efficiency and renewable energy will help make Utah a leader in the new clean energy economy, while generating new high-quality jobs and new economic development in Utah's rural and urban areas.

#### Notes:

<sup>1</sup> Governor Huntsman's Utah Policy to Advance Energy Efficiency in the State. [www.energy.utah.gov/energy/governors\\_priorities/utah\\_policy\\_to\\_advance\\_energy\\_efficiency\\_in\\_the\\_state.html](http://www.energy.utah.gov/energy/governors_priorities/utah_policy_to_advance_energy_efficiency_in_the_state.html)

<sup>2</sup> Reference Utah Code 54-17-602; The target was established for Utah's municipal, investor-owned, and cooperative utilities to provide 20 percent of their adjusted retail sales from qualifying non-carbon based energy resources by 2025, if cost-effective.

<sup>3</sup> It is recognized that the renewable goal is 20 percent renewable energy by the year 2025. The year 2020 was selected as the model year for this study to coincide with energy efficiency data from the Utah Energy Efficiency Strategy Report which extends to 2020. Furthermore, the Utah electricity projected sales growth and capacity requirement data from PacifiCorp's 2007 IRP process extends to the year 2017 and therefore required extrapolating three years to 2020, rather than eight years to 2025.

<sup>4</sup> Rich Brown, Sam Borgeson, Jon Koomey, Peter Biermayer, "U.S. Building-Sector Energy Efficiency Potential," September, 2008. <http://enduse.lbl.gov/info/LBNL-1096E.pdf>

<sup>5</sup> Jason Berry, David Hurlbut, Richard Simon, Joseph Moore, Robert Blackett, "Utah Renewable Energy Zones Task Force Phase I Report: Renewable Energy Zone Resource Identification," December, 2008.

<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.

<sup>7</sup> Energy Strategies assisted with the initial development and review of the inputs and scenarios analyzed in this study. Inputs were peer-reviewed by numerous Utah and national energy stakeholders whose feedback was greatly appreciated.

<sup>8</sup> 2007 PacifiCorp Integrated Resource Plan, <http://www.pacificorp.com/File/File74765.pdf>, <http://www.pacificorp.com/File/File74766.pdf> and 2007 PacifiCorp Integrated Resource Plan Update, <http://www.pacificorp.com/File/File82304.pdf>

<sup>9</sup> PacifiCorp serves roughly 80 percent of the state. The remainder is serviced by other public and private utilities such as Murray City Power and Garkane Power.

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