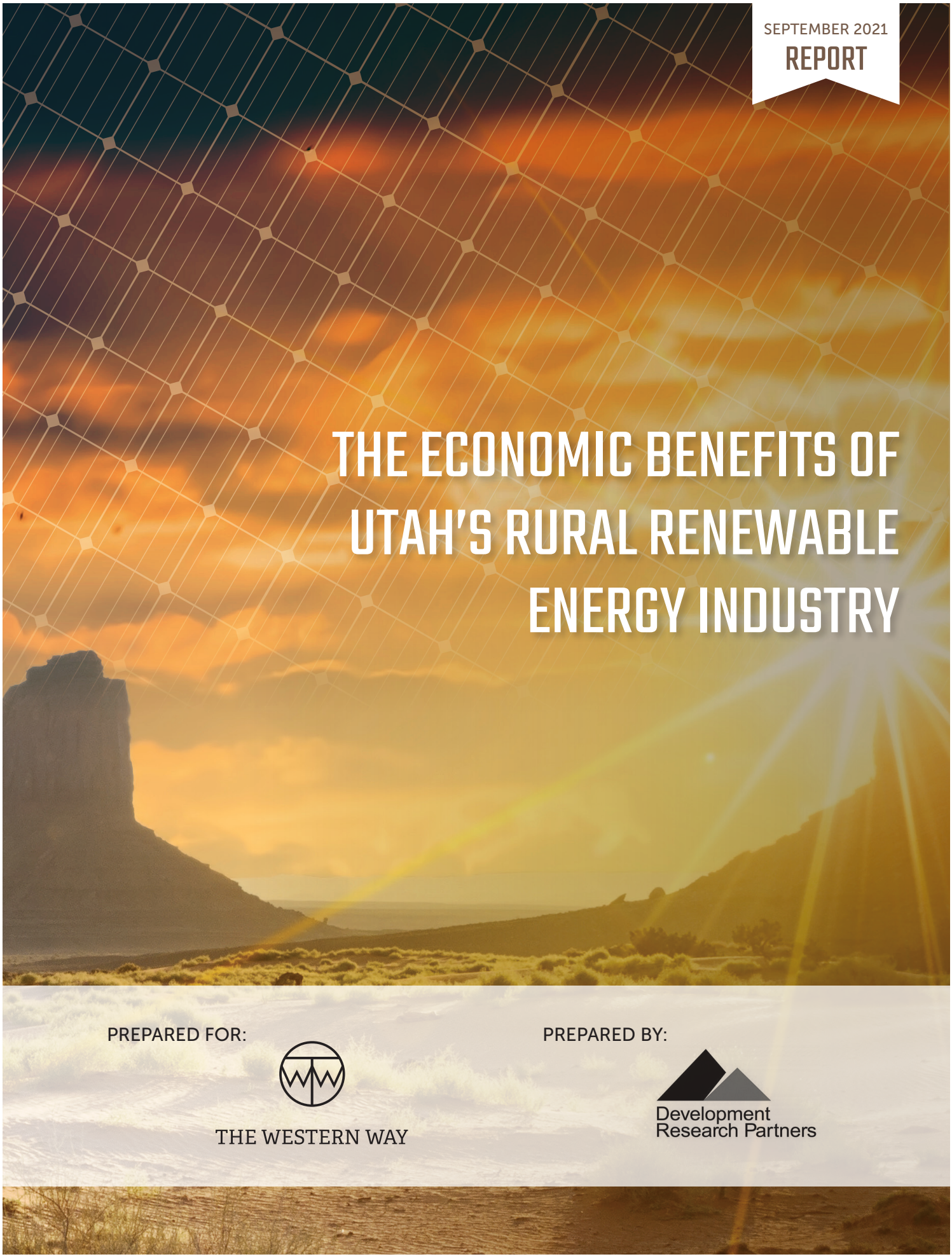


SEPTEMBER 2021

REPORT

# THE ECONOMIC BENEFITS OF UTAH'S RURAL RENEWABLE ENERGY INDUSTRY

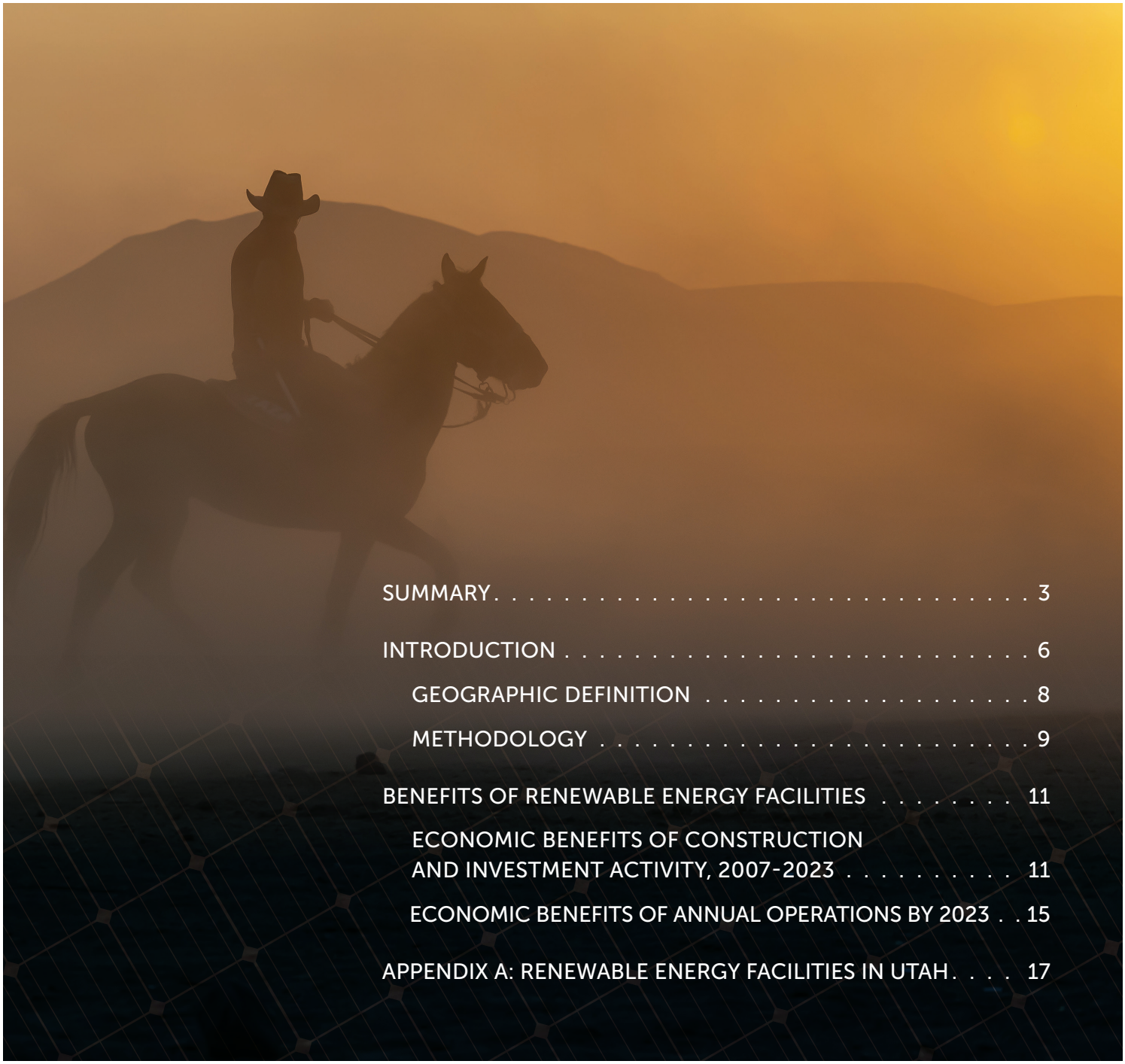
PREPARED FOR:

THE WESTERN WAY

PREPARED BY:

Development Research Partners

# TABLE OF CONTENTS



# **RENEWABLE ENERGY** IN UTAH

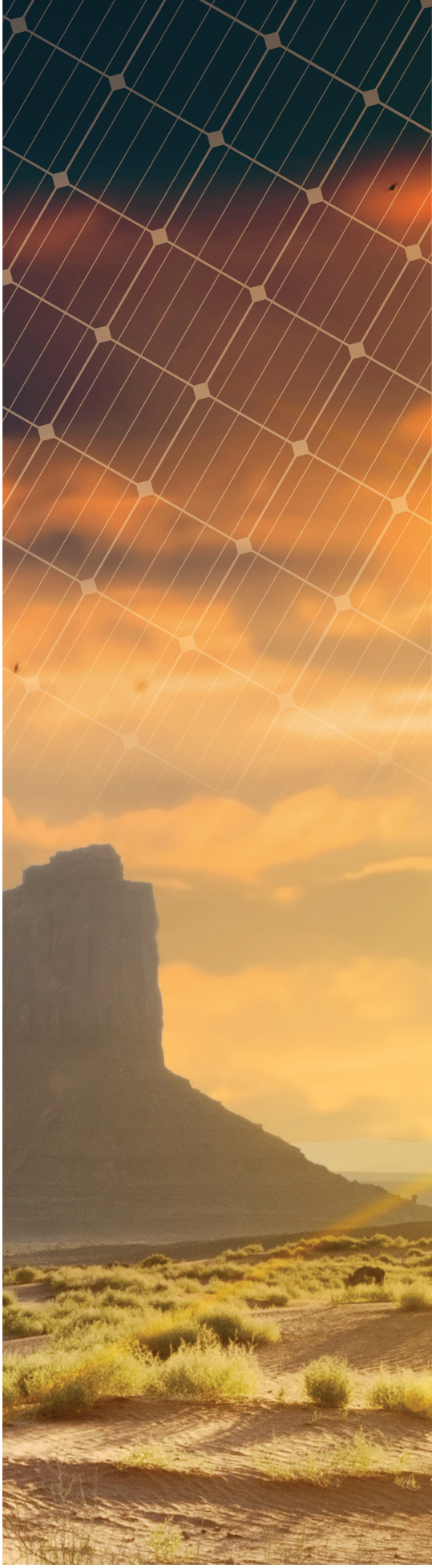
Renewable energy generation facilities are important to the economic base of communities across Utah, many of which are **LOCATED IN RURAL AREAS** of the state. Renewable energy in Utah has historically been dominated by hydroelectric power, but solar, wind, and geothermal have grown in significance over the past two decades.

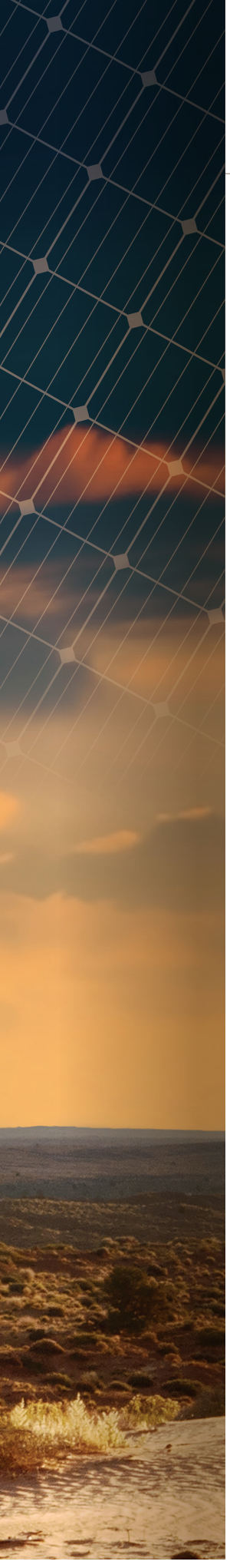
Since 2000, net electricity generation from non-hydroelectric sources in the state increased from 0.4 percent of total net generation to 8.7 percent in 2019[1]. Utah's electric generation portfolio continues to evolve as **DEMAND FOR CARBON-NEUTRAL ELECTRICITY INCREASES** and several new utility-scale renewable energy facilities, particularly solar farms, are installed in 2021 and beyond.

Since 2007, there have been **31 UTILITY-SCALE GEOTHERMAL, SOLAR, OR WIND ENERGY FACILITIES** with a total nameplate capacity of 2,275.3 megawatts (MW) installed in Utah, many of which are located in rural areas[2] of the state. For purposes of this report, the existing and planned facilities by 2023 were identified with input from The Western Way and do not reflect all renewable energy facilities across the entire state.

**TWO-THIRDS** of the installed capacity, or nearly 67 percent in 19 projects, is **LOCATED IN RURAL AREAS** of Beaver County and Iron County.

Among the 31 utility-scale projects analyzed in the report, solar represented 23 projects totaling **1,791 MW**, wind represented four projects totaling **386.5 MW**, and geothermal represented four projects totaling **97.8 MW**.





# ECONOMIC BENEFITS OF CONSTRUCTION AND INVESTMENT

$5.3B

Beyond direct output and employment, renewable facility construction and investment has supported many ancillary industries throughout Utah since 2007. Combined, the total direct and indirect benefits of renewable energy development in Utah will be an estimated **$5.3 billion in total output** ($2.3 billion direct output + $3.0 billion indirect and induced output) produced by **9,051 employees** (4,444 direct employees + 4,607 indirect employees) **earning a total of about $442.8 million** ($256.3 million direct earnings + $186.5 million indirect earnings) from 2007 to 2023.

Renewable energy development in Utah has brought significant investment to the state. From 2007 to 2023, there will be an estimated **$4.1 billion in construction and investment** in renewable energy facilities in Utah. Construction and investment activities benefit the state of Utah as developers and contractors hire labor, purchase construction materials and equipment, and invest in infrastructure.

Although many purchases of renewable energy generating equipment are made out-of-state, the state has benefited from a large percentage of the construction materials purchases, design, project management, planning, and other costs. Many materials for site preparation and construction are purchased locally. As a result, the direct economic and fiscal benefits of construction and investment in renewable energy projects in Utah will total an estimated **$2.3 billion from 2007 to 2023**.

Through 2023, thousands of workers in Utah will have benefited from work supported by renewable energy investments. An estimated **4,368 full-time equivalent construction workers** will be directly employed in the construction of the facilities from 2007 to 2023. In addition, components for a handful of geothermal facilities have either been manufactured or will be manufactured in the state. These purchases will directly employ another 76 workers through 2023.

# ECONOMIC BENEFITS OF ANNUAL OPERATIONS BY 2023

$154M

By 2023, the total direct and indirect benefits of annual renewable energy operations in Utah will be an estimated **$154.4 million in total output** ($87.8 million direct output + $66.6 million indirect and induced output) produced by **568 employees** (147 direct employees + 421 indirect employees) **earning a total of about $32.1 million** ($13.2 million direct earnings + $18.9 million indirect earnings).

Renewable energy projects will contribute an estimated **$24.6 million in annual property tax revenue** throughout Utah by 2023 and $1.0 million in state generated sales and use taxes.

The ongoing operations and maintenance of renewable facilities in Utah support long-term employment opportunities for hundreds of people in the state. By 2023, renewable facilities will support the **direct employment of an estimated 147 workers**.

By 2023, renewable energy facilities will provide farmers, ranchers, and other landowners in Utah with **$6.3 million in annual lease payments**.

These benefits are likely to occur annually assuming similar business conditions and project parameters.

### SUMMARY OF THE ECONOMIC BENEFIT OF RENEWABLE ENERGY FACILITIES IN UTAH

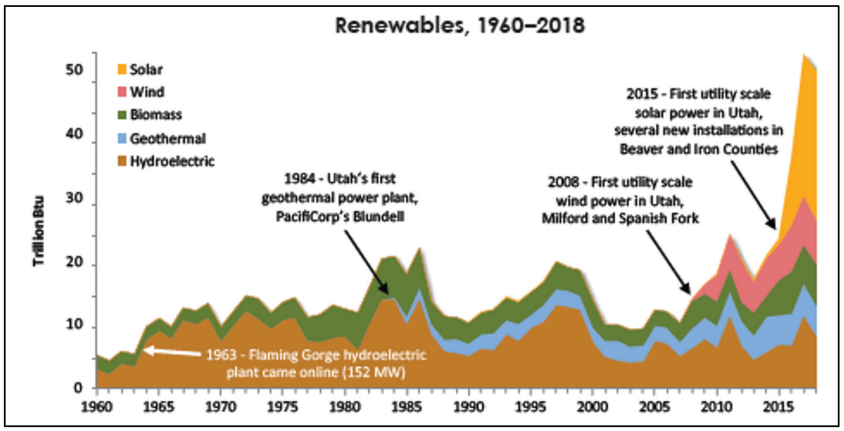
| | Direct Impact | Indirect & Induced Impact | Total Impact |
|---|---|---|---|
| Construction Activity (2007 to 2023) | | | |
| Value of Output ($M) | $2,330.9 | $2,977.8 | $5,308.7 |
| Earnings ($M) | $256.3 | $186.5 | $442.8 |
| Employment | 4,444 | 4,607 | 9,051 |
| Annual Operations and Maintenance (2023) | | | |
| Value of Output ($M) | $87.8 | $66.6 | $154.4 |
| Earnings ($M) | $13.2 | $18.9 | $32.1 |
| Employment | 147 | 421 | 568 |

# INTRODUCTION

Renewable energy generation facilities are important to the economic base of communities across Utah, many of which are located in rural areas of the state. Renewable energy in Utah has historically been dominated by hydroelectric power, but solar, wind, and geothermal have grown in significance over the past two decades. The state's high altitude, cooler temperatures, available sunshine, and affordable land have made the state a prime location for renewable energy development. Since 2000, net electricity generation from non-hydroelectric sources in the state increased from 0.4 percent of total net generation to 8.7 percent in 2019[3]. Utah's electric generation portfolio continues to evolve as demand for carbon-neutral electricity increases and several new utility-scale renewable energy facilities, particularly solar farms, are installed in 2021 and beyond.

NET ELECTRICITY GENERATION FROM NON-HYDROELECTRIC SOURCES HAVE **INCREASED FROM 0.4 PERCENT IN 2000 TO 8.7 PERCENT IN 2019**.

Utah does not have a mandated renewable energy portfolio standard, but the state does have a voluntary Renewable Portfolio Goal of 25 percent by 2025. However, over 20 Utah cities and counties adopted a goal of 100 percent net-renewable electricity by 2030, representing about 37 percent of Utah's electricity load. The Renewable Portfolio Goal, tax incentives, and other state policies have boosted renewable energy investment in the state. Concurrently, the rapidly falling cost of renewable energy technologies has also enhanced their economic viability. For instance, the average unsubsidized levelized cost of utility-scale crystalline solar photovoltaic facilities in the United States has decreased about 90 percent since 2009[4]. The intent of this study is to estimate the economic and fiscal benefits to Utah of the construction and operations of utility-scale[5] wind, solar, and geothermal generation facilities located in Utah, many of which are located in rural areas of the state through 2023.




*Source: Utah Department of Natural Resources.*

## SOLAR

Nearly 1 gigawatt of utility-scale solar in Utah was built in 2015 and 2016, more capacity than hydroelectric, geothermal, and wind combined, creating a large spike in renewable energy production in recent years. Electricity generation from all solar facilities, both small-scale and utility-scale, accounted for about 58 percent of the state's renewable generation and was 30 times greater than in 2015. At the end of 2020, Utah ranked 10th among the states in the amount of solar generating capacity, with 1,525 MW installed. The 240 MW Escalante Solar Project in Beaver County is the largest utility-scaled solar facility in Utah.

# INTRODUCTION CONTINUED

## WIND

Wind energy produced about 15 percent of Utah's renewable electricity in 2020. Utah has five wind farms operating with about 390 MW of generating capacity. Milford (306 MW), the newly built Latigo (62 MW), and Spanish Fork (19 MW) are the state's three largest wind farms.

## GEOTHERMAL

Utah is one of seven states with utility-scale electricity generation from geothermal sources. In 2020, three geothermal facilities in southwestern Utah provided about 7 percent of the state's renewable electricity generation. The state has some of the best geothermal potential in the nation, and more geothermal projects are in development.

According to the Utah Frontier Observatory for Research in Geothermal Energy (FORGE), Utah is No. 3 in the U.S. for its production of geothermal energy and provides 2.8 percent of the nation's geothermal power production. A study by the Western Governors Association esti¬mates Utah's 20-year geothermal energy development potential at 620 MW of generating capacity, which would be approximately 12 percent of Utah's estimated electrical energy consumption in 2026. The newly established FORGE is a dedicated underground field laboratory sponsored by the U.S. Department of Energy for developing, testing, and accelerating breakthroughs in Enhanced Geothermal System technologies to advance the uptake of geothermal resources around the world.

## ENERGY TRANSMISSION

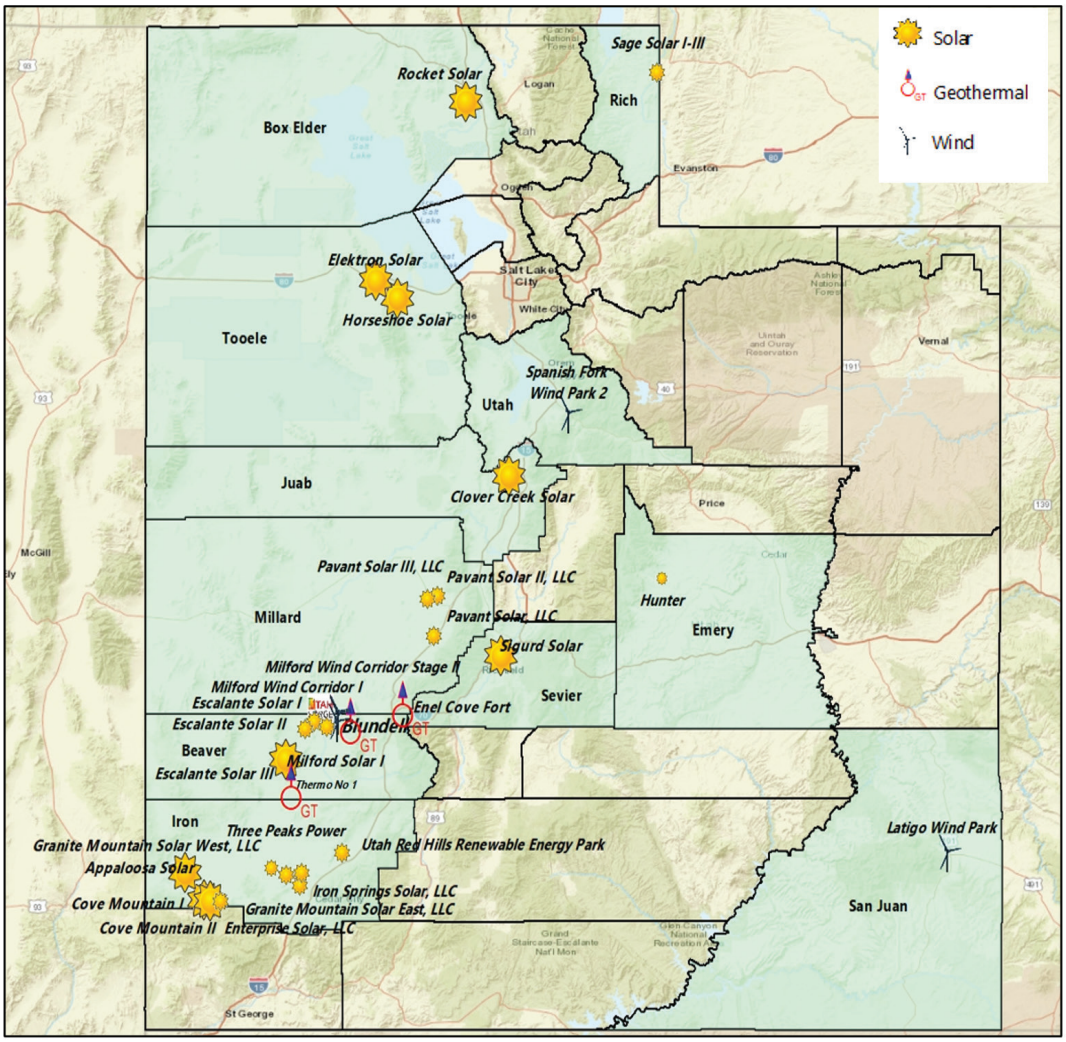
As new electric generation resources are developed throughout Utah, including both traditional and renewable energy facilities, Utah's transmission grid must expand and adapt. Modernizing the Western electricity grid with interregional electric infrastructure not only broadens efficient access to more high-quality clean power sources, but also strengthens the grid that serves everyone across the West. At the same time, constructing these interregional systems creates local jobs, boosts local tax bases, and spurs demand for local services. For example, the TransWest Express Transmission Project, or TWE Project, is a new interregional transmission system representing an approximately $1.3 billion investment in Utah. Nearly 400 miles of the TWE Project's total 732-mile route will be constructed in Utah, mostly on federal multiple-use land, plus a major High-voltage direct current terminal constructed in Millard County as part of the burgeoning Intermountain Power renewable energy hub. The TWE Project could create up to 1,300 direct construction jobs at peak, jobs that will follow the transmission line as it is built, and bring $47 million in new direct Utah sales and use tax revenue statewide. Thousands of indirect jobs will be created throughout the value chain in Utah. Annually, the TWE Project will pay local property taxes in its nine Utah host counties.

THE TRANSWEST EXPRESS TRANSMISSION PROJECT REPRESENTS $1.3 BILLION INVESTMENT IN UTAH AND **COULD CREATE UP TO 1,300 DIRECT CONSTRUCTION JOBS** AT PEAK.

## GEOGRAPHIC DEFINITION

This report summarizes renewables and advanced energy employment and the benefits of renewable facilities located in Utah. According to the Office of Energy Efficiency & Renewable Energy in the U.S. Department of Energy, and for the purposes of this study, utility-scale renewable energy projects are defined as those 10 megawatts or larger. Utility-scale projects are generally associated with regulated electric utilities and independent power producers whose primary industry is electric power generation, transmission, and distribution. Utah counties in this analysis include Beaver, Box Elder, Emery, Iron, Juab, Millard, Rich, San Juan, Sevier, Tooele, and Utah counties.

Additionally, this study utilizes economic multipliers from the U.S. Bureau of Economic Analysis Regional Input-Output Modeling System II (RIMS II). Economic multipliers are geographic specific and estimate a broader level of economic activity than the initial dollars spent for construction, capital, business purchases, and employee compensation. This study estimates the multiplier benefits for the state of Utah.



# INTRODUCTION CONTINUED

## METHODOLOGY

### ECONOMIC AND FISCAL IMPACT ANALYSIS DEFINED

Economic impact analysis is the analytical approach used to assess measurable direct and indirect benefits resulting from a project over a specific time period. Only those benefits that can be measured or quantified are included. Intangible benefits, such as enhancement of community character or diversification of the job base, are not included. The economic benefits are calculated within the framework of two categories of impacts and activities, which are construction and on-going operations.

Further, the economic impact is divided into direct and indirect impacts. The direct impacts include the direct spending for construction of a renewable facility and the direct spending for the on-going operations of the facility, including employee spending. The impact of constructing utility-scale renewable energy facilities has large but temporary impacts on the affected communities during the construction period. The construction impacts include the purchase of construction materials, construction worker earnings and resulting expenditures, and the tax implications of these purchases. The impact of on-going operations and maintenance of utility-scale renewable energy facilities has an annual impact on the affected communities over the life of the project. The on-going operations impacts include annual purchases of operational materials, replacement capital purchases, land-owner payments, employment and earnings, and the tax implications of these annual expenditures. The direct economic benefits of the facilities were estimated using the Jobs and Economic Development Impacts (JEDI) models developed by the National Renewable Energy Laboratory (NREL).

The economic impact does not stop with the direct impacts as the spending patterns associated with the renewable energy facility and its employees has multiplicative impacts on the region. Therefore, multiplier analysis is used to trace the impacts on businesses, organizations, and individuals affected by the facility as this impact works its way through the economy. The indirect and induced jobs and income flows generated are estimated using the RIMS (Regional Input-Output Modeling System) II multipliers developed by the Bureau of Economic Analysis of the U.S. Department of Commerce. This is the standard methodology for conducting multiplier analysis. The total economic benefits will be discussed in terms of the direct and indirect values of gross output, payroll or earnings, and employment in the specified region.

# INTRODUCTION CONTINUED

Fiscal impact analysis is used to assess the direct public revenues and public costs resulting from a project over a specific time period. A project may generate a broad array of public revenues ranging from sales/use tax, property tax, franchise fees, licenses and permits, and other charges for services. In turn, the local government provides a variety of public services such as police protection, public works, community social and recreational programs, and community development services, to name a few. This report includes a limited fiscal impact analysis, including estimates of direct sales/use tax revenue and property tax revenue generated only.

## PROJECT PARAMETERS AND STUDY VARIABLES

Development Research Partners utilized several sources of data for this study including company announcements, the State of Utah, Lazard, the National Renewable Energy Laboratory, the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the U.S. Energy Information Administration. Development Research Partners made every attempt to collect the necessary information and believe the information used in this report is from sources deemed reliable but is not guaranteed. Some numbers in the study may not add exactly due to rounding, this analysis estimates the economic and fiscal benefits in nominal dollars.

## ECONOMIC BENEFITS OF CONSTRUCTION AND INVESTMENT ACTIVITY, 2007-2023

Since 2007, there have been 31 utility-scale geothermal, solar, or wind energy facilities with a total nameplate capacity of 2,275.3 megawatts (MW) installed in Utah, particularly in rural areas[6] of the state. For purposes of the report, only those wind, solar, and geothermal projects that were greater than 10 megawatts were analyzed. A detailed list of all renewable energy projects in Utah are included in Appendix A. Two-thirds of the installed capacity, or nearly 67 percent in 19 projects, is located in rural areas of Beaver County and Iron County (Table 2).

TABLE 1: SELECTED UTAH RENEWABLE ENERGY FACILITIES

| Plant Name | County | Technology | Operating Year | Nameplate Capacity (MW) |
|---|---|---|---|---|
| Blundell | Beaver | Geothermal | 2007 | 44.8 |
| Spanish Fork Wind Park 2 | Utah | Wind | 2008 | 18.9 |
| Milford Wind Corridor I | Beaver | Wind | 2009 | 203.5 |
| Thermo No. 1 | Beaver | Geothermal | 2010 | 14.0 |
| Milford Wind Corridor II | Beaver | Wind | 2011 | 102.0 |
| Enel Cove Fort | Beaver | Geothermal | 2013 | 25.0 |
| Utah Red Hills Renewable Energy Park | Iron | Solar Photovoltaic | 2015 | 80.0 |
| Pavant Solar I, LLC | Millard | Solar Photovoltaic | 2015 | 50.0 |
| Escalante Solar I, LLC | Beaver | Solar Photovoltaic | 2016 | 80.0 |
| Escalante Solar II, LLC | Beaver | Solar Photovoltaic | 2016 | 80.0 |
| Escalante Solar III, LLC | Beaver | Solar Photovoltaic | 2016 | 80.0 |
| Enterprise Solar, LLC | Iron | Solar Photovoltaic | 2016 | 80.0 |
| Granite Mountain Solar East | Iron | Solar Photovoltaic | 2016 | 80.0 |
| Granite Mountain Solar West | Iron | Solar Photovoltaic | 2016 | 50.4 |
| Iron Springs Solar LLC | Iron | Solar Photovoltaic | 2016 | 80.0 |
| Three Peaks Power | Iron | Solar Photovoltaic | 2016 | 80.0 |
| Pavant Solar II, LLC | Millard | Solar Photovoltaic | 2016 | 50.0 |
| Pavant Solar III, LLC | Millard | Solar Photovoltaic | 2016 | 20.0 |
| Latigo Wind Park | San Juan | Wind | 2016 | 62.1 |
| Sage Solar I-III | Rich | Solar Photovoltaic | 2019 | 57.6 |
| Frontier Observatory for Research in Geothermal Energy (FORGE) | Beaver | Geothermal | 2020 | 14.0 |
| Milford Solar I | Beaver | Solar Photovoltaic | 2020 | 128.0 |
| Cove Mountain I | Iron | Solar Photovoltaic | 2021 | 58.0 |
| Cove Mountain II | Iron | Solar Photovoltaic | 2021 | 122.0 |
| Clover Creek Solar | Juab | Solar Photovoltaic | 2021 | 80.0 |
| Sigurd Solar | Sevier | Solar Photovoltaic | 2021 | 80.0 |
| Rocket Solar | Box Elder | Solar Photovoltaic | 2022 | 80.0 |
| Horseshoe Solar | Tooele | Solar Photovoltaic | 2022 | 75.0 |
| Hunter Solar | Emery | Solar Photovoltaic | 2023 | 100.0 |
| Appaloosa Solar | Iron | Solar Photovoltaic | 2023 | 120.0 |
| Elektron Solar | Tooele | Solar Photovoltaic | 2023 | 80.0 |
| Total | | | | 2,275.3 |

*Sources: U.S. Department of Energy, Energy Information Administration; S&P Global Corp.; and The Times News.*

Utah is a prime location for solar energy with 1,791 MW of installed capacity in 23 projects in photovoltaic solar facilities by 2023 (Table 3). Note that existing and planned facilities by 2023 were only established for select renewable facilities in Utah and not for the entire state. Additionally, the interest in solar, particularly on the State of Utah School and Institutional Trust Lands Administration (SITLA) lands has grown exponentially in the last few years. Beyond the projects noted on the list, SITLA currently has an additional 16 leases covering 20,000 acres with a planned 1,600 MW of solar capacity. Several of those leases have secured Interconnection Agreements and are in the final stages of engineering, and securing and negotiating Power Purchase Agreements.

Wind represents 386.5 MW in four projects and geothermal represents 97.8 MW in four projects. Most of the existing renewable facilities in Utah, particularly in rural areas, were built after 2015. Indeed, 74 percent of the existing facilities and 76 percent of nameplate capacity was and will be constructed from 2016 to 2023. Only one of Utah's existing facilities in this study was built prior to 2007, the Blundell geothermal plant that has been operating since 1984[7].

Renewable energy development in Utah has brought significant investment to the state. From 2007 to 2023, there will be an estimated $4.1 billion in construction and investment in renewable energy facilities in Utah. Construction and investment activities benefit the state of Utah as developers and contractors hire labor, purchase construction materials and equipment, and invest in infrastructure.

**TABLE 2: SELECTED UTAH ENERGY FACILITIES BY COUNTY**

| County | Facilities | Installed Capacity |
|---|---|---|
| Beaver | 10 | 698.2 |
| Box Elder | 1 | 80.0 |
| Emery | 1 | 80.0 |
| Iron | 9 | 494.1 |
| Juab | 1 | 128.0 |
| Millard | 3 | 260.0 |
| Rich | 1 | 80.0 |
| San Juan | 1 | 80.0 |
| Sevier | 1 | 75.0 |
| Tooele | 2 | 220.0 |
| Utah | 1 | 80.0 |
| Total | 31 | 2,275.3 |

*Source: U.S. Department of Energy, Energy Information Administration.*

**TABLE 3: SELECTED UTAH RENEWABLE ENERGY FACILITIES BY TECHNOLOGY**

| Technology | Facilities | Installed Capacity |
|---|---|---|
| Geothermal | 4 | 97.8 |
| Solar Photovoltaic | 23 | 1,791.0 |
| Wind | 4 | 386.5 |
| Total | 31 | 2,275.3 |

*Source: U.S. Department of Energy, Energy Information Administration.*

FROM 2007 TO 2023, THERE WILL BE AN ESTIMATED **$4.1 BILLION IN CONSTRUCTION AND INVESTMENT IN RENEWABLE ENERGY FACILITIES IN UTAH**.

## DIRECT ECONOMIC AND FISCAL BENEFITS

- A large amount of the costs associated with renewable energy facilities is for energy generating equipment such as solar modules, heat collection elements and exchangers, turbines, and generators. Based on estimates derived from NREL's JEDI models, and adjusting for cost reductions when necessary, an estimated $1.6 billion was spent on purchases of major generating equipment (Table 4). While most of the equipment was manufactured by companies located outside of the state, Utah benefited from a portion these purchases. The direct economic benefit in Utah from purchases of major generating equipment in the state for renewable energy facilities was an estimated $35.1 million from 2007 to 2023 (Table 5).

**TABLE 4: RENEWABLE ENERGY FACILITY CONSTRUCTION ACTIVITY IN UTAH, 2007 TO 2023**

| | Total |
|---|---|
| **Construction Activity ($ in millions)** | |
| Major Equipment | $1,618.9 |
| Construction Materials | $639.8 |
| Design, Engineering, Planning, Other Costs | $1,504.4 |
| Wages and Salaries | $228.2 |
| Employee Benefits | $99.5 |
| **Total** | **$4,090.8** |
| Construction Employees (FTE) | 4,606 |

- Although many purchases of renewable energy generating equipment are made out-of-state, the state has benefited from a large percentage of the construction materials purchases, design, project management, planning, and other costs. Many materials for site preparation and construction are purchased locally. Based on state spending estimates in the JEDI models, the direct economic benefit to Utah from 2007 to 2023 for purchases of construction materials, design, engineering, planning, and other costs was $2 billion (Table 5).

- An estimated 4,606 full-time equivalent construction workers[8], earning $327.7 million in wages and employee benefits were employed at the 31 renewable energy facilities constructed from 2007 to 2023, or an average of about 380 workers per year (Table 4). Based on estimates of local labor from the JEDI model and state wage levels, the direct economic benefit to Utah for renewable energy projects was an estimated $250.8 million in earnings[9] for 4,368 workers (Table 5).

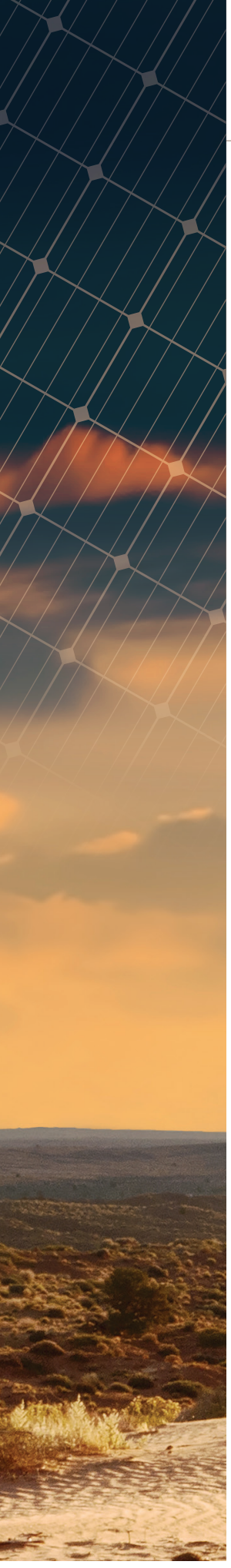
**TABLE 5: DIRECT ECONOMIC BENEFIT OF RENEWABLE ENERGY FACILITY INVESTMENTS IN UTAH, 2007 TO 2023**

| | Estimated Utah |
|---|---|
| **Direct Economic Benefits ($ in millions)** | |
| Major Equipment | $35.1 |
| Construction Materials | $591.0 |
| Design, Engineering, Planning, Other Costs | $1,418.6 |
| Wages and Salaries | $216.4 |
| Employee Benefits* | $34.4 |
| **Total Construction Benefits** | **$2,295.5** |
| Construction Employees (FTE) | 4,368 |
| **Direct Fiscal Benefits ($ in millions)** | |
| Sales and Use Tax | $35.4 |
| **Total Economic and Fiscal Benefits** | **$2,330.9** |

**Direct benefit estimated for Utah includes adjustment for the percent of employee benefits likely spent locally.*

- In Utah, the purchase or lease equipment used to generate electricity from renewable resources is exempt from state sales and use tax. However, there are some business overhead expenses and other additional costs that are subject to sales and use tax such as back office expenses, office supplies, and marketing costs, among others. Based on Utah's sales and use tax rate of 4.85 percent, estimated purchases of business overhead expenses and other additional costs, the direct fiscal benefit to Utah for renewable energy projects was an estimated $35.4 million from 2007 to 2023 (Table 5).

- In total, the direct economic and fiscal benefits of construction and investment in renewable energy projects in Utah from 2007 to 2023 was an estimated $2.3 billion (Table 5).



BY 2023, RENEWABLE ENERGY INVESTMENT IN UTAH WILL HAVE SUPPORTED **$5.3 BILLION IN ECONOMIC ACTIVITY** IN THE STATE PRODUCED BY 9,051 WORKERS.

## DIRECT, INDIRECT, AND INDUCED ECONOMIC BENEFITS

- Based on the industry relationships revealed through the RIMS II multipliers for the construction and manufacturing industries in Utah, $2.3 billion of direct spending in the state supported an estimated $3.0 billion in additional output in all industries throughout Utah. This includes the value of the local spending by the construction workers (the induced impact) and of the local supplier companies and their employees (the indirect impact) (Table 6).
- The production of the $3.0 billion in additional output in all industries throughout Utah required an estimated 4,607 workers, referred to as the indirect workers. These workers had estimated earnings of about $186.5 million (the indirect earnings) (Table 6).
- Therefore, the total direct and indirect benefits of the renewable energy development in Utah was an estimated $5.3 billion in total output ($2.3 billion direct output + $3.0 billion indirect and induced output) produced by 9,051 employees (4,444 direct employees + 4,607 indirect employees) earning a total of about $442.8 million ($256.3 million direct earnings + $186.5 million indirect earnings) from 2007 to 2023 (Table 6).

**TABLE 6: TOTAL ECONOMIC BENEFIT OF RENEWABLE ENERGY FACILITY INVESTMENTS IN UTAH, 2007 TO 2023**

| | Direct Impact | Multiplier | Indirect & Induced Impact | Total Impact |
|---|---|---|---|---|
| Construction Activity | | | | |
| Value of Output ($M) | $2,295.8 | 2.2842 | $2,948.3 | $5,244.1 |
| Earnings ($M) | $250.9 | 1.7106 | $178.3 | $429.2 |
| Employment | 4,368 | 2.0139 | 4,429 | 8,797 |
| Manufacturing | | | | |
| Value of Output ($M) | $35.1 | 1.8414 | $29.5 | $64.6 |
| Earnings ($M) | $5.4 | 2.5191 | $8.2 | $13.6 |
| Employment | 76 | 3.3636 | 178 | 254 |
| Total Economic Benefit | | | | |
| Value of Output ($M) | $2,330.9 | | $2,977.8 | $5,308.7 |
| Earnings ($M) | $256.3 | | $186.5 | $442.8 |
| Employment | 4,444 | | 4,607 | 9,051 |

*Source: Development Research Partners, based on multipliers for Utah from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Input-Output Modeling System (RIMS II), 2012 U.S. Benchmark I-O Data and 2019 Regional Data.*
*Calculation Note: Direct x Multiplier = Total Impact*
*Total Impact - Direct Impact = Indirect & Induced Impact*
*Numbers may not add exactly due to rounding.*

- Construction benefits are temporary, occurring only during construction. The analysis does not indicate whether the direct and indirect employees were residents of Utah or whether they were nonresidents that commuted into the state.

## ECONOMIC BENEFITS OF ANNUAL OPERATIONS BY 2023

The economic and fiscal benefits of the renewable energy operations are derived from sales of energy, which in turn fund business purchases such as equipment, parts, operational materials, leases, taxes, and labor. Several of the renewable energy projects in the state transmit and sell energy outside of the state. For example, the Milford Wind Corridor facility in Beaver County is Utah's largest wind energy project, with a combined 306 MW of installed capacity, and provides electricity to California. This project supports local jobs and taxes with dollars coming from outside of Utah. The on-going annual operations of renewable energy facilities in Utah benefit the state through employment, maintenance purchases, and other operating costs. These benefits will ramp up as the state adds capacity through 2023.

### DIRECT ECONOMIC AND FISCAL BENEFITS

- Based on estimates derived from the JEDI models and current levelized costs, annual purchases of materials and equipment for the state's renewable energy facilities will be an estimated $29.8 million by 2023 (Table 7). Estimates for future facilities are based on current costs and do not factor in projected price changes.
- Many renewable energy projects lease land from governments and private landowners. The vast majority of solar and wind energy projects in Utah are leased from private landowners and SITLA. Several of the state's geothermal facilities are leased from both the U.S. Bureau of Land Management and private landowners. Based on estimates from the JEDI models, company announcements, and public data, lease payments for renewable energy facilities will be an estimated $6.3 million each year by 2023 (Table 7).
- Other costs associated with operations and maintenance of the state's renewable energy facilities will be an estimated $9.7 million by 2023 (Table 7).
- Renewable energy facilities provide on-going employment in Utah, particularly to rural counties across the state. By 2023, an estimated 147 full-time equivalent employees will be employed at Utah's renewable energy facilities. Compensation for these employees will be an estimated $16.4 million in wages and employee benefits. Compensation includes wages and salaries, employee benefits that contribute to worker earnings such as supplemental pay, and employee benefits that have minimal local impact such as retirement contributions (Table 7).

**TABLE 7: DIRECT ECONOMIC AND FISCAL BENEFITS OF ANNUAL OPERATIONS OF RENEWABLE ENERGY FACILITIES IN UTAH***

| | Estimated Utah |
|---|---|
| **Direct Economic Benefits ($ in millions)** | |
| Materials and Equipment | $29.8 |
| Landowner Payments | $6.3 |
| Other Costs | $9.7 |
| Wages and Salaries | $11.4 |
| Employee Benefits | $5.0 |
| **Total Operations Benefits** | **$62.2** |
| Employees (FTE) | 147 |
| **Direct Fiscal Benefits ($ in millions)** | |
| Property Tax | $24.6 |
| Sales and Use Tax | $1.0 |
| **Total Economic and Fiscal Benefits** | **$87.8** |

**Includes estimates of currently operating facilities and prospective facilities through 2023.*

BY 2023, RENEWABLE ENERGY FACILITIES IN UTAH WILL SUPPORT **$154.4 MILLION IN ANNUAL ECONOMIC ACTIVITY** IN THE STATE PRODUCED BY 568 WORKERS.

- Renewable energy projects will contribute an estimated $24.6 million in annual property tax revenue throughout Utah's selected counties by 2023. All taxable property in Utah is valued at 100 percent of its fair market value, based on its location. Property tax benefits support counties, schools, health districts, fire departments, and other special districts. The significant amount of property tax revenue associated with the state's renewable energy projects funds needed infrastructure in rural areas of the state, reduces dependence on state school financing, and enables many communities to initiate revitalization projects. Property taxes represent a cost of business for generating renewable energy (Table 7).
- While Utah exempts the purchase or lease of equipment and materials used to generate electricity from renewable resources from the state sales and use tax, a small portion of ongoing operating expenses generate sales and use tax that benefits state and local governments. Based on estimated purchases for the facilities, the direct fiscal benefit to Utah for renewable energy projects will be an estimated $1 million by 2023 (Table 7).
- In total, the direct economic and fiscal benefits of annual operations for renewable energy projects in Utah will be an estimated $87.8 million by 2023 (Table 7).

## DIRECT, INDIRECT, AND INDUCED ECONOMIC BENEFITS

- Based on the industry relationships revealed through the RIMS II multipliers for industries benefiting from the business spending in Utah, $87.8 million of direct output will likely support an estimated $66.6 million in additional output in all industries throughout Utah by 2023. This includes the value of the local spending by the employees (the induced impact) and of the local supplier companies and their employees (the indirect impact) (Table 8).
- The production of the $66.6 million in additional output in all industries throughout Utah will require an estimated 421 workers, referred to as the indirect workers. These workers will have estimated earnings of about $18.9 million (the indirect earnings) (Table 8).
- Therefore, the total direct and indirect benefits of annual renewable energy operations in Utah is an estimated $154.4 million in total output ($87.8 million direct output + $66.6 million indirect and induced output) produced by 568 employees (147 direct employees + 421 indirect employees) earning a total of about $32.1 million ($13.2 million direct earnings + $18.9 million indirect earnings) by 2023 (Table 8).
- These benefits are likely to occur annually assuming similar business conditions and project parameters.

**TABLE 8: TOTAL ECONOMIC BENEFIT OF ANNUAL OPERATIONS OF RENEWABLE ENERGY FACILITIES IN UTAH***

| | Direct Impact | Multiplier | Indirect & Induced Impact | Total Impact |
|---|---|---|---|---|
| Operations and Maintenance | | | | |
| Value of Output ($M) | $87.8 | 1.7587 | $66.6 | $154.4 |
| Earnings ($M)** | $13.2 | 2.4261 | $18.9 | $32.1 |
| Employment | 147 | 3.8635 | 421 | 568 |

**Includes estimates of currently operating facilities and prospective facilities through 2023.*

***Direct earnings estimate includes adjustment for the percent of employee benefits likely spent locally.*

*Source: Development Research Partners, based on multipliers for Utah from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Input-Output Modeling System (RIMS II), 2012 U.S. Benchmark I-O Data and 2019 Regional Data.*

*Calculation Note: Direct x Multiplier = Total Impact*

*Total Impact - Direct Impact = Indirect & Induced Impact*

*Numbers may not add exactly due to rounding.*

# APPENDIX A

## APPENDIX A: UTAH RENEWABLE ENERGY FACILITIES BY 2023

| Plant Name | County | Technology | Operating Year | Nameplate Capacity (MW) |
|---|---|---|---|---|
| ***Biomass*** | | | | |
| Trans-Jordan Generating Station | Salt Lake | Biomass | 2009 | 4.5 |
| Blue Mountain Biogas | Beaver | Biomass | 2012 | 3.2 |
| ***Geothermal*** | | | | |
| Blundell | Beaver | Geothermal | 2001 | 44.8 |
| Thermo No 1 | Beaver | Geothermal | 2010 | 14.0 |
| Enel Cove Fort | Beaver | Geothermal | 2013 | 25.0 |
| Frontier Observatory for Research in Geothermal Energy (FORGE) | Beaver | Geothermal | 2020 | 14.0 |
| ***Heat Recovery*** | | | | |
| Veyo Heat Recovery Project | Washington | Heat Recovery | 2016 | 9.5 |
| ***Hydroelectric*** | | | | |
| Pioneer | Weber | Hydroelectric | 1897 | 4.0 |
| Ephraim Hydro 1 | Sanpete | Hydroelectric | 1906 | 0.2 |
| Weber | Weber | Hydroelectric | 1911 | 3.8 |
| Pleasant Creek Lower Unit | Sanpete | Hydroelectric | 1913 | 0.2 |
| Beaver Lower Hydro 1 | Beaver | Hydroelectric | 1914 | 0.3 |
| Gunlock | Washington | Hydroelectric | 1917 | 0.5 |
| Sand Cove | Washington | Hydroelectric | 1920 | 0.5 |
| Uintah | Uintah | Hydroelectric | 1920 | 1.2 |
| Lower Monroe | Sevier | Hydroelectric | 1928 | 0.3 |
| Pleasant Creek Upper Unit | Sanpete | Hydroelectric | 1931 | 0.2 |
| Hyrum | Cache | Hydroelectric | 1931 | 0.5 |
| Upper Monroe | Sevier | Hydroelectric | 1940 | 0.3 |
| Payson | Utah | Hydroelectric | 1941 | 0.4 |
| Yellowstone | Uintah | Hydroelectric | 1941 | 0.9 |
| Beaver Middle Hydro 2 | Beaver | Hydroelectric | 1942 | 0.5 |
| Hobble Creek | Utah | Hydroelectric | 1950 | 0.3 |
| Center Creek | Iron | Hydroelectric | 1951 | 0.6 |
| Red Creek | Iron | Hydroelectric | 1955 | 0.6 |
| Gateway | Weber | Hydroelectric | 1958 | 4.0 |
| Box Elder | Box Elder | Hydroelectric | 1961 | 0.5 |
| Monroe Pumping Station | Sevier | Pumped Storage/Hydroelectric | 1981 | 0.1 |
| Lower Boulder | Garfield | Hydroelectric | 1983 | 1.2 |
| Ephraim Hydro 3 | Sanpete | Hydroelectric | 1984 | 2.6 |
| Quail Creek | Washington | Hydroelectric | 1985 | 2.3 |
| Logan Hydro II | Cache | Hydroelectric | 1986 | 6.2 |
| Gunlock Hydro | Washington | Hydroelectric | 1987 | 0.4 |
| Spring Creek | Utah | Hydroelectric | 1987 | 0.5 |
| Ephraim Hydro 4 | Sanpete | Hydroelectric | 1989 | 0.1 |

# APPENDIX A

## APPENDIX A: UTAH RENEWABLE ENERGY FACILITIES BY 2023 CONTINUED

| Plant Name | County | Technology | Operating Year | Nameplate Capacity (MW) |
|---|---|---|---|---|
| | ***Hydroelectric Cont'd*** | | | |
| Manti Lower | Sanpete | Hydroelectric | 1989 | 1.0 |
| Pine View Dam | Davis | Hydroelectric | 1991 | 1.8 |
| Beaver Upper Hydro 3 | Beaver | Hydroelectric | 1992 | 0.7 |
| Logan Hydro III | Cache | Hydroelectric | 1992 | 1.4 |
| Pleasant Creek Unit 3 | Sanpete | Hydroelectric | 1993 | 0.2 |
| Pleasant Creek Unit 4 | Sanpete | Hydroelectric | 1993 | 1.3 |
| Pine Valley | Washington | Hydroelectric | 1995 | 0.6 |
| Causey | Weber | Hydroelectric | 1998 | 2.1 |
| Bartholomew | Utah | Hydroelectric | 2001 | 1.0 |
| Stairs | Salt Lake | Hydroelectric | 2001 | 1.0 |
| Snake Creek | Wasatch | Hydroelectric | 2001 | 1.2 |
| Lake Creek Dam | Wasatch | Hydroelectric | 2001 | 1.5 |
| Manti Upper | Sanpete | Hydroelectric | 2001 | 1.6 |
| Brigham City | Box Elder | Hydroelectric | 2001 | 1.8 |
| Granite | Salt Lake | Hydroelectric | 2001 | 2.0 |
| Upper Beaver | Beaver | Hydroelectric | 2001 | 2.5 |
| Spanish Fork | Utah | Hydroelectric | 2001 | 3.6 |
| Boulder | Garfield | Hydroelectric | 2001 | 4.2 |
| Echo Dam | Summit | Hydroelectric | 2001 | 4.4 |
| Deer Creek | Wasatch | Hydroelectric | 2001 | 4.8 |
| Little Cottonwood | Salt Lake | Hydroelectric | 2001 | 4.8 |
| Olmstead | Utah | Hydroelectric | 2001 | 10.3 |
| Cutler Hydro | Box Elder | Hydroelectric | 2001 | 30.0 |
| Flaming Gorge | Daggett | Hydroelectric | 2001 | 151.8 |
| Wanship | Summit | Hydroelectric | 2002 | 1.9 |
| Causey | Weber | Hydroelectric | 2002 | 2.1 |
| Jordanelle Dam Hydroelectric Project | Wasatch | Hydroelectric | 2017 | 13.0 |
| Olmsted Hydroelectric Powerplant Replacement Project | Utah | Hydroelectric | 2018 | 11.2 |
| | ***Solar*** | | | |
| St. George Solar (SunSmart) | Washington | Solar | 2008 | 0.2 |
| Layton Solar | Davis | Solar | 2009 | 0.2 |
| Greenville Solar Plant | Beaver | Solar | 2015 | 2.2 |
| South Milford Solar Plant | Beaver | Solar | 2015 | 2.9 |
| Beryl Solar Plant | Iron | Solar | 2015 | 3.0 |
| Fiddler's Canyon 1 | Iron | Solar | 2015 | 3.0 |
| Fiddler's Canyon 2 | Iron | Solar | 2015 | 3.0 |
| Cedar Valley Solar Plant | Iron | Solar | 2015 | 3.0 |
| Buckhorn Solar Plant | Iron | Solar | 2015 | 3.0 |
| Milford Flat Solar Plant | Beaver | Solar | 2015 | 3.0 |
| Granite Peak Solar Plant | Beaver | Solar | 2015 | 3.0 |

# APPENDIX A

## APPENDIX A: UTAH RENEWABLE ENERGY FACILITIES BY 2023 CONTINUED

| Plant Name | County | Technology | Operating Year | Nameplate Capacity (MW) |
|---|---|---|---|---|
| | ***Solar Cont'd*** | | | |
| Pavant Solar, LLC | Millard | Solar | 2015 | 50.0 |
| Utah Red Hills Renewable Energy Park | Iron | Solar | 2015 | 80.0 |
| Weber State University - Davis Campus Solar | Davis | Solar | 2016 | 1.3 |
| Quichapa 3 | Iron | Solar | 2016 | 3.0 |
| Quichapa 1 | Iron | Solar | 2016 | 3.0 |
| Quichapa 2 | Iron | Solar | 2016 | 3.0 |
| Fiddler's Canyon 3 | Iron | Solar | 2016 | 3.0 |
| Laho Solar Plant | Beaver | Solar | 2016 | 3.0 |
| Milford 2 | Beaver | Solar | 2016 | 3.0 |
| Pavant Solar III LLC | Millard | Solar | 2016 | 20.0 |
| Pavant Solar II LLC | Millard | Solar | 2016 | 50.0 |
| Granite Mountain Solar West | Iron | Solar | 2016 | 50.4 |
| Enterprise Solar, LLC | Iron | Solar | 2016 | 80.0 |
| Escalante Solar I LLC | Beaver | Solar | 2016 | 80.0 |
| Escalante Solar II LLC | Beaver | Solar | 2016 | 80.0 |
| Escalante Solar III LLC | Beaver | Solar | 2016 | 80.0 |
| Granite Mountain Solar East | Iron | Solar | 2016 | 80.0 |
| Iron Springs Solar LLC | Iron | Solar | 2016 | 80.0 |
| Three Peaks Power | Iron | Solar | 2016 | 80.0 |
| Tooele Army Depot Solar Project | Tooele | Solar | 2017 | 1.5 |
| Bloomington Solar Project | Washington | Solar | 2018 | 3.0 |
| Sage Solar I-III | Rich | Solar | 2019 | 57.6 |
| Milford Solar I | Beaver | Solar | 2020 | 128.0 |
| Cove Mountain I | Iron | Solar | 2021 | 58.0 |
| Clover Creek Solar | Juab | Solar | 2021 | 80.0 |
| Sigurd Solar | Sevier | Solar | 2021 | 80.0 |
| Cover Mountain II | Iron | Solar | 2021 | 122.0 |
| Horseshoe Solar | Tooele | Solar | 2022 | 75.0 |
| Elektron Solar | Tooele | Solar | 2023 | 80.0 |
| Hunter Solar | Emery | Solar | 2023 | 100.0 |
| Appaloosa Solar | Iron | Solar | 2023 | 120.0 |
| | ***Wind*** | | | |
| Spanish Fork Wind Park 2 LLC | Utah | Wind | 2008 | 18.9 |
| Milford Wind Corridor I LLC | Beaver | Wind | 2009 | 203.5 |
| Milford Wind Corridor Stage II LLC | Beaver | Wind | 2011 | 102.0 |
| Tooele Wind Project | Tooele | Wind | 2016 | 1.7 |
| Latigo Wind Park | San Juan | Wind | 2016 | 62.1 |
| **Total** | | | | **2,561.5** |

*Sources: U.S. Department of Energy, Energy Information Administration; S& P Global Corp.; and The Times News.*

## ABOUT THE WESTERN WAY:

The Western Way is a nonprofit organization urging Western conservative leaders to acknowledge actual environmental challenges and deliver efficient, pro-market solutions. The Western Way engages policy makers across the Interior Rocky Mountain West region of our country to provide proactive and constructive solutions that grow our economy and benefit the environment. The Western Way works with leaders from Arizona, Colorado, Idaho, Montana, Nevada, Utah, and Wyoming. To learn more and to stay up to date with The Western Way, please visit http://www.thewesternway.org.

## ABOUT RESEARCH DEVELOPMENT PARTNERS:

Development Research Partners specializes in economic research and analysis for local and state government and private sector businesses. Founded in 1994, Development Research Partners combines extensive experience in real estate economics and economic development to provide clients with insightful and strategic consulting services in four areas of expertise: Economic and Demographic Research, Industry Studies, Fiscal and Economic Impact Analysis, and Real Estate and Public Finance Economics.

Patricia Silverstein, President & Chief Economist
Lisa Strunk, Senior Economist
10184 West Belleview Avenue, Suite 100 Littleton, Colorado 80127
www.DevelopmentResearch.net

1 Energy Information Administration, State Energy Data System. 2 The rural facilities in this analysis were identified with input from The Western Way and do not necessarily align with rural areas as defined by population or other factors. 3 Energy Information Administration, State Energy Data System. 4 Unsubsidized levelized cost of energy quantifies the net present value of the cost of a facility over its lifetime including initial capital investment and on-going operations. Reference Lazard's Levelized Cost of Energy Analysis – Version 14.0. https://www.lazard.com/media/451419/lazards-levelized-cost-of-energy-version-140.pdf. 5 According to the Office of Energy Efficiency & Renewable Energy in the U.S. Department of Energy, and for the purposes of this study, utility-scale renewable energy projects are defined as those 10 megawatts or larger. Utility-scale projects are generally associated with regulated electric utilities and independent power producers whose primary industry is electric power generation, transmission, and distribution. 6 The rural facilities in this analysis were identified with input from The Western Way and do not necessarily align with rural areas as defined by population or other factors. 7 Due to the difficulty of estimating geothermal costs in 1984, the economic benefits of the Blundell geothermal facility are excluded from this analysis. However, the analysis includes the benefits of an expansion of the plant's capacity in 2007. 8 A full-time equivalent worker is defined as one person working full time for one year. 9 Earnings represent employee compensation that directly benefits the local economy including wages and salaries and a portion of employee benefits. This includes items such as paid leave, supplemental pay, and a portion of insurance benefits. Employee benefits excluded from the direct benefit are Social Security, Medicare, unemployment insurance, and retirement, among other things.