MAY 2023

Meta's U.S. renewable energy economic impact report

Meta

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Contents

Our portfolio of U.S. solar and wind projects spans 24 states and 74 counties

Economic Impact

To fully understand the impact of Meta's renewable energy projects on jobs and the economy, we updated our May 2021 study to estimate the total economic impacts of 86 solar and wind projects that support our U.S. data centers. The projects studied total 9,854 MW—some of which are operating today and others that will come online over the next two years—and represent an estimated $14.2 billion in initial capital investment. During construction, these renewable energy projects have supported or will support over 74,000 jobs across the country and contribute more than $7.8 billion in U.S. gross domestic product (GDP). Our portfolio of solar and wind projects spans 24 states and 74 counties, and many of these projects have benefited under-resourced communities. Of the 86 U.S. solar and wind projects in our portfolio studied, 91% are located outside of major metropolitan areas and 62% are located in counties with poverty rates above the national average.[1] The analysis showed that construction of these renewable energy projects have generated or will generate $4.8 billion of labor income for workers, and project operations will generate $87 million in annual employee compensation.

9.8GW

From wind and solar energy projects is being added to local grids across 24 states and 74 counties.

$14.2B

Total capital investment.

74,000

Total jobs supported over ten years because of project construction.

1. Major metropolitan areas are defined as metro areas with a population of one million or larger.

Executive Summary

In 2011, Meta was one of the first companies to commit to supporting its data centers with 100% renewable energy. Today, Meta has achieved this commitment and remains on track to maintain 100% renewable energy for all future data center developments and expansions. Meta's renewable energy commitment is a key component of the company's broader sustainability initiatives, including industry-leading efficient data center designs and achieving operational net zero GHG emissions.

Meta's ability to achieve this commitment is made possible by its pioneering approach to renewable energy procurement, which through year-end 2022 has resulted in 86 new solar and wind projects adding a total of 9,854 megawatts (MW) of clean electricity to the U.S. grid.

This report presents the estimated economic impacts related to the construction and operation of these projects.

Key Findings: Economic Impacts of Meta-Supported Renewable Energy Projects

- Meta-supported U.S. renewable energy projects will result in an estimated $14.2 billion in development capital expenditures, of which an estimated $4.4 billion will be sourced from within the United States.
- Meta has added new renewable energy capacity in all U.S. regions where its data centers operate.
    - State renewable energy capacity additions from Meta-supported projects range from 50 MW to over 1,100 MW.
    - The average state-level impact was 2,060 total (direct, indirect, and induced) jobs during construction, exceeding 2,000 jobs in eight states and the combined 4-state Tennessee Valley region where new projects are located.
- Development costs generate one-time economic impacts during construction and installation as well as ongoing benefits from annual operations and on-site maintenance.
    - The construction of these projects (2014-2024) have or will support over 74,000 total jobs and $7.8 billion in Gross Domestic Product (GDP) throughout the U.S. economy.
    - On average, the construction of Meta-supported projects supports 500 total jobs statewide for every 100 MW of contracted capacity.
    - By 2025, the operation of new renewable energy projects will sustain nearly 976 U.S. operations jobs and $222 million in U.S. GDP annually.

01 Economic impacts of Meta-supported U.S renewable energy projects

Photo Courtesy: NextEra Energy Resources, LLC

By 2025, Meta-supported U.S. renewable energy projects will have supported 75,000+ jobs and $8.0 billion+ in GDP throughout the U.S. economy

Meta partners with renewable energy developers to deliver solar and wind projects to support its facilities with 100% renewable energy. Meta serves as the off-taker—the party which contracts for and purchases the renewable energy produced by developers—for the renewable energy projects, while the developer constructs and operates the facilities. Without Meta's purchasing commitments, it is unlikely these projects would move forward.

Meta's executed long-term agreements to purchase renewable energy will result in 86 new solar and wind projects across 24 states. At year-end 2022, approximately 60% of the announced projects were operational. The remaining 37 projects are expected to be operational by the end of 2025.

Wind and solar projects require significant construction and operational investment. Based on published industry data, the 86 projects included in this study will require an estimated total of $14.2 billion in initial capital investment, with a further $177 million in annual operating expenditures.[2]

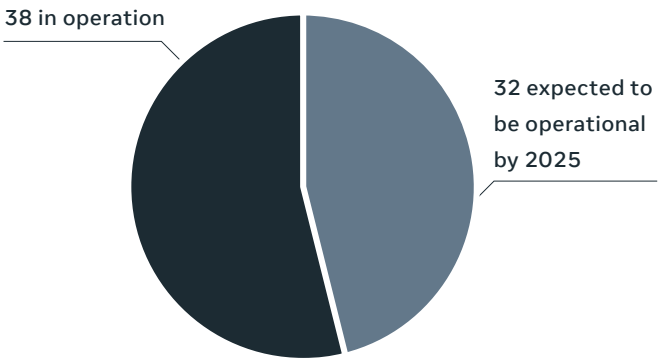
Each project generates short- and long-term economic impacts through construction and operation. Beacon Economics calculated the economic impacts generated from estimated on-site project construction and operations expenditures (direct effects), as well as the impacts of supply chain purchasing (indirect effects) and employee spending (induced effects).[3] The economic impacts were quantified by job creation, labor income, and GDP in the states where Meta-supported renewable energy projects are located and throughout the domestic supply chain.

Typical project time frame:

- Construction: 1 year (one-time)
- Operations: 15-25 years (ongoing, annual)

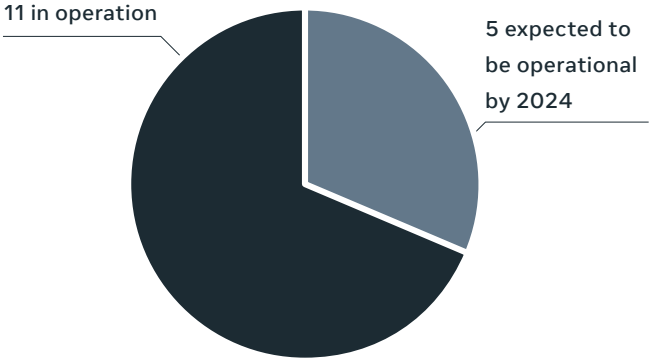
70 solar projects across 17 states

7,069 total MW



16 wind projects across 10 states

2,785 total MW



Source: Meta (analysis by Beacon Economics).

Contracted Capacity (MW) for Meta's Wind and Solar Projects

Project Type	Contracted Capacity (MW)
Wind	2,785
Solar	7,069

2. See Appendix for details on the estimation methodology.
3. Beacon Economics used IMPLAN's Multi-Regional Input-Output (MRIO) model to estimate impacts by renewable energy type for all states with renewable energy projects, as well as secondary impacts in states with no existing Meta-supported projects.

By 2024, construction will have supported over 74,000 total jobs over ten years.

The construction period includes an estimated $14.2 billion in total construction expenditures that will occur from 2014 through 2024, of which approximately $4.4 billion will be sourced within the United States. The construction costs of current and planned renewable energy projects are primarily for installation labor and materials. The expenses result in the economic impacts during the construction period:

- 270 direct, on-site jobs for every 100 MW in contracted capacity.
- 2.8 employment multiplier: 1.8 additional jobs for each on-site job.
- 750 total U.S. jobs for every 100 MW in contracted capacity.
- $583 million in state and local tax revenues from construction expenditures and related activity.

The construction of wind and solar projects supported by Meta are estimated to support 26,869 direct jobs and $1.8 billion in direct labor income over ten years. Additional impacts through the indirect (supply-chain) and induced (household spending) effects will support more than 47,000 additional jobs (averaging 4,700 jobs each year) at businesses throughout the United States.

Operations will support nearly 1,000 jobs annually.

After all the projects are operational in 2025, an estimated total of $177 million will be spent each year to operate and provide electricity to the grid. Together, the projects result in the following recurring economic impacts in a typical year:

- 6.7 employment multiplier: 5.7 additional jobs for each direct, on-site job.
- Six total U.S. jobs for every $1 million in U.S. operating expenditures.
- $49 million in annual state and local tax revenues from facility operations and related activity.

Construction period impacts at a glance: 2014–2024 (ten years)

74,489

Total jobs

$4.8B

In labor income

$7.9B

In U.S. GDP

Total annual operations impacts at a glance: 2025+

976

Total jobs

$87M

In labor income

$222M

In U.S. GDP

Economic Impacts for U.S. Solar and Wind Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Number of Jobs; Millions of 2023 Dollars

	Construction (Cumulative)				Operations (Annual from 2025+)			
	Jobs (Worker Years)	Labor Income	GDP	Output	Jobs	Labor Income	GDP	Output
Direct	26,869	$1,761	$2,635	$4,434	145	$22	$95	$177
Indirect	25,324	$1,841	$2,987	$6,467	462	$43	$88	$183
Induced	22,296	$1,239	$2,232	$3,932	368	$22	$39	$68
Total	**74,489**	**$4,841**	**$7,854**	**$14,833**	**976**	**$87**	**$222**	**$429**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

Tax Impacts for U.S. Solar and Wind Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Millions of 2023 Dollars

	Construction (Cumulative)	Operations (Annual)
State & Local Taxes	$583	$49
Federal Taxes	$992	$11
Total Tax Revenues	**$1,575**	**$60**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model.
Note: Figures may not appear to sum due to rounding. Amounts reflect total estimated tax revenues generated through the direct, indirect, and induced economic effects and include taxes paid by businesses and households.

Solar projects account for 7,069 MW of renewable project capacity, or 72% of the portfolio of Meta's long-term agreements

Over the last decade, U.S. employment in solar energy fields has doubled nationally—totaling more than 255,000 in 2021—driven by 3.5 times growth in installation and project development employment since 2011[4]

4. Interstate Renewable Energy Council, National Solar Jobs Census 2021. 2022.

Construction will support over 19,000 direct, on-site jobs.

The construction period includes an estimated $10.0 billion in construction expenditures with approximately $3.2 billion that will be sourced locally[5] These expenditures will result in 610 total U.S. jobs for every 100 MW in contracted capacity.

- For select projects, Meta-supported projects go against national trends and target domestic equipment supply chains to boost local manufacturing industries.
- Meta-supported solar construction has an employment multiplier of 2.3 total jobs for every on-site construction job.
- Average of $143 million in estimated capital investment per project.

Including direct, indirect (supply chain), and induced (household spending) impacts, solar projects will generate an estimated nearly $8.6 billion in gross economic output during construction, supporting 43,160 jobs (worker years or one-year jobs) and $2.8 billion in labor income over eight years (2017-2024).

43,160

Total jobs from construction activities—including direct on-site and multiplier effects (2017-2024)

$2.8B

Total labor income from construction activities

$4.6B

In total U.S. GDP from construction activities

5. The domestic supply chain for wind power equipment (e.g. turbines and posts) is more mature than for solar equipment (e.g. PV modules). A greater share of solar project expenditures are estimated to be for imported equipment.

Operations of solar plants will support 120 direct, on-site operations jobs, each earning over $150,000 annually in wages and benefits.[6]

The operations period includes an estimated $112 million in operating expenditures that support ongoing annual impacts, including $60 million in total labor income and $143 million in total U.S. GDP.

- Meta-supported solar projects have a total estimated capacity of 7,069 MW, with an average capacity of 100 MW per project.
- In total, the 70 solar projects included in this study will require $112 million in annual operating expenditures—averaging $1.6 million per project. This includes onsite employees, vendor payments, and supplies.
- Based on industry data, utility-scale solar operations require approximately 1 job per $1 million in sales, on average. Utility-scale solar operations are generally more labor intensive than wind projects, requiring more operations jobs per MW.[7]

Nationwide, construction of the included solar projects will generate an estimated $882 million in federal, state, and local taxes during the eight-year study period, including revenues related to indirect and induced economic activity. On an annual basis, solar plant operations will generate over $38 million in federal, state, and local taxes paid by businesses and households in the direct, indirect, and induced economic effects.

7,069

Total MW capacity across solar projects

660

Annual operations jobs (2025+)

6. The previous study on Meta-supported renewable energy projects was done with 2018 multipliers for projects that were coming online between 2019-2025 due to limited data availability. After 2018, employment multipliers per million significantly dropped on a nationwide level due to reductions in levels of proprietor employees, thereby dropping overall direct employee multipliers while increasing output per worker.

7. 2018-2021 IMPLAN Multipliers. https://implan.com/

Economic Impacts for U.S. Solar Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Number of Jobs; Millions of 2023 Dollars

	Construction (Cumulative)				Operations (Annual)			
	Jobs (Worker Years)	Labor Income	GDP	Output	Jobs	Labor Income	GDP	Output
Direct	19,064	$1,241	$1,926	$3,207	120	$18	$60	$112
Indirect	11,640	$863	$1,464	$3,215	286	$27	$56	$114
Induced	12,456	$676	$1,232	$2,161	254	$15	$27	$47
Total	**43,160**	**$2,781**	**$4,622**	**$8,583**	**660**	**$60**	**$143**	**$273**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

Tax Impacts for U.S. Solar Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Millions of 2023 Dollars

	Construction (Cumulative)	Operations (Annual)
State & Local Taxes	318.4	30.2
Federal Taxes	563.7	8.2
Total Tax Revenues	**882.1**	**38.4**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model.
Note: Figures may not appear to sum due to rounding. Amounts reflect total estimated tax revenues generated through the direct, indirect, and induced economic effects and include taxes paid by businesses and households.

Wind projects account for 2,785 MW of renewable project capacity, or 28% of the portfolio of Meta's long-term agreements

In 2021, the wind electric power sector provided just over 120,000 jobs across a variety of sectors in the U.S. economy, an increase of 2.9% from 2020.[8] Over one third of these jobs—roughly 43,000—represented construction employment.[9]

8. U.S. Department of Energy, 2022 United States Energy & Employment Report. 2023. https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20National%20Report_1.pdf
9. U.S. Department of Energy, 2022 United States Energy & Employment Report. 2023. https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20National%20Report_1.pdf

Construction will support over 7,800 direct, on-site jobs.

The construction period includes an estimated $4.2 billion in construction expenditures with approximately $1.2 billion that will be sourced locally.[10] These expenditures will result in 1,124 total jobs throughout the U.S. for every 100 MW in contracted capacity.

- Major wind system components are also often manufactured domestically, and a strong domestic equipment supply chain exists for items such as towers, blades, and turbines. In 2021, these and other wind-related manufacturing sectors supported over 23,600 jobs, and the sector was anticipated to grow by 4% in 2022.[11]
- Meta-supported wind construction has an employment multiplier of 4 total jobs for every on-site construction job.[12]
- Average of 174 MW and $260 million in estimated capital investment per project.

Including direct, indirect (supply chain), and induced (household spending) impacts, wind projects will generate an estimated $6.3 billion in gross economic output during construction, supporting 31,328 jobs (worker years) and $2.1 billion in labor income from 2014 through 2023.

31,328

Total jobs from construction activities—including direct on-site and multiplier effects (2017-2023)

$2.1B

Total labor income from construction activities

$3.2B

In total U.S. GDP from construction activities

10. The domestic supply chain for wind power equipment (e.g. turbines and posts) is more mature than for solar equipment (e.g. PV modules). A greater share of wind project expenditures are estimated to be sourced domestically.
11. U.S. Department of Energy, 2022 United States Energy & Employment Report. 2023. https://www.energy.gov/sites/default/
12. The construction of wind energy projects is generally more labor intensive relative to solar and requires 1.6 times the number of direct construction jobs per MW of installed capacity.

Operations of wind plants will support 25 direct, on-site operations jobs, each earning over $161,000 annually in wages and benefits.[13]

Annual operations will require an estimated $66 million in operating expenditures, including $4 million in total labor income and $35 million in total regional GDP.

- Meta-supported wind projects have a total estimated capacity of 2,785 MW, with an average capacity of 174 MW per project.
- Wind operations require approximately one job for every $2 million in sales, on average.
- In total, the 16 wind projects included in this study will require $66 million in annual operating expenditures—averaging $4.1 million per project. This includes onsite employees, vendor payments, and supplies.

Nationwide, construction of the included wind projects will generate an estimated $693 million in federal, state, and local taxes during the ten-year study period, including revenues related to indirect and induced economic activity. On an annual basis, wind plant operations will generate $22 million in federal, state, and local taxes paid by businesses and households in the direct, indirect, and induced economic effects.

2,785

Total MW capacity across wind projects

316

Annual operations jobs (2024+)

13. The previous study on Meta-supported renewable energy projects was done with 2018 multipliers for projects that were coming online between 2019-2025 due to limited data availability. After 2018, employment multipliers per million significantly dropped on a nationwide level due to reductions in levels of proprietor employees, thereby dropping overall direct employee multipliers while increasing output per worker.

Economic Impacts for U.S. Wind Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2024

Number of Jobs; Millions of 2023 Dollars

	Construction (Cumulative)				Operations (Annual)			
	Jobs (Worker Years)	Labor Income	GDP	Output	Jobs	Labor Income	GDP	Output
Direct	7,805	$520	$709	$1,227	25	$4	$35	$66
Indirect	13,683	977	1,523	3,252	176	16	33	67
Induced	9,840	563	1,000	1,771	114	7	12	21
Total	**31,328**	**$2,060**	**$3,232**	**$6,250**	**316**	**$27**	**$80**	**$155**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

Tax Impacts for U.S. Wind Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2024

Millions of 2023 Dollars

	Construction (Cumulative)	Operations (Annual)
State & Local Taxes	$264	$19
Federal Taxes	$428	$3
Total Tax Revenues	**$693**	**$22**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model.
Note: Figures may not appear to sum due to rounding. Amounts reflect total estimated tax revenues generated through the direct, indirect, and induced economic effects and include taxes paid by businesses and households.

02
Regional Impacts

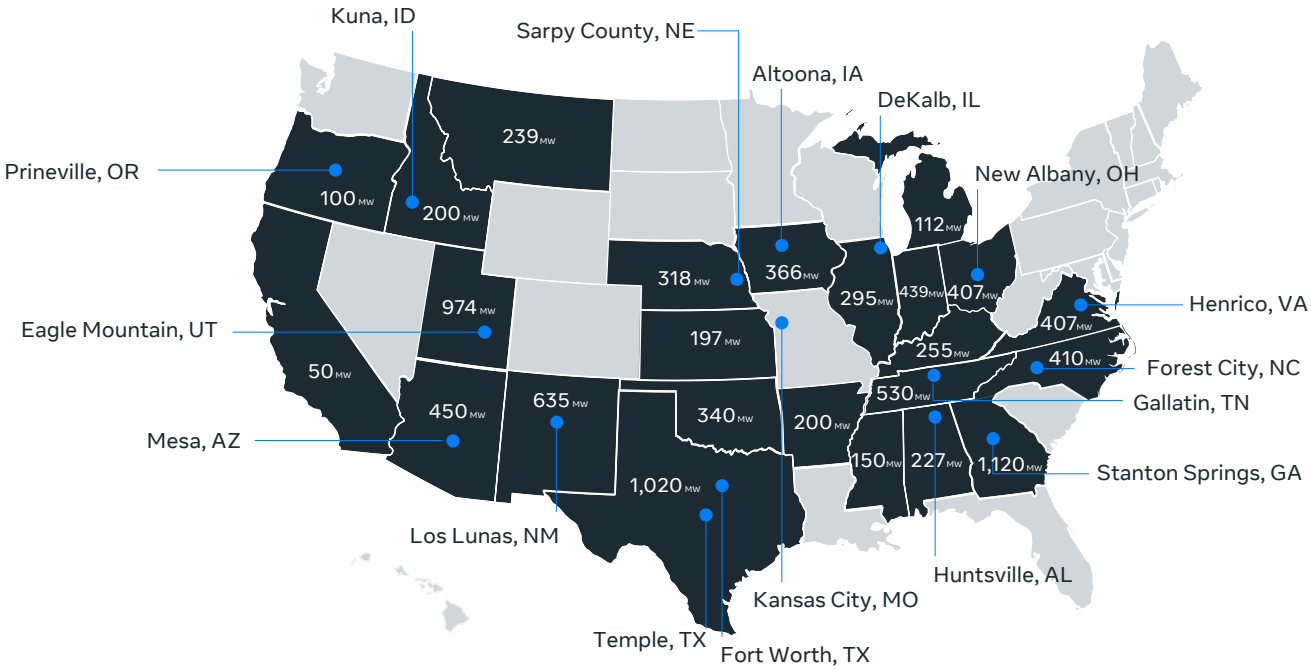
Photo Courtesy: NextEra Energy Resources, LLC

Meta U.S. renewable energy projects strengthened regional job markets with an average of 1,120 construction jobs in 24 states

Meta-supported renewable energy capacity additions range from 50 MW to over 1,100 MW per state. Every 100 MW of new capacity supported an average of 500 total jobs statewide. Project construction supported more than 2,000 jobs in eight states and the combined TVA region. The top three states accounted for 32% of MW and 29% of the estimate direct jobs impact from project construction—Georgia (1,120 MW; 2,732 on-site jobs), Texas (1,020 MW; 2,849 on-site jobs), and Utah (974 MW; 2,256 on-site jobs).

The construction and operation of Meta-supported projects generates economic activity across the U.S.—even in states without projects—through the domestic supply chain. These secondary impacts will support an estimated $5.9 billion in cumulative economic output over the ten-year construction period and $94 million in economic output annually from ongoing operations. This residual is shown as the “rest of U.S.” total in the following tables.

Meta Contracted Capacity Through Year-End 2022



Meta Data Center location

Direct Economic Impacts for U.S. Wind and Solar Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Number of Jobs; Millions of 2023 Dollars

	Construction (Cumulative)				Operations (Annual)			
	Worker Years	Labor Income	Value Added	Economic Output	Jobs	Labor Income	Value Added	Economic Output
Alabama	537	$34	$50	$90	4	$0.6	$1.7	$3.6
Arizona	872	$56	$102	$153	7	$1.3	$4.1	$7.1
Arkansas	649	$33	$48	$86	3	$0.4	$1.5	$3.0
California	117	$9	$15	$22	1	$0.2	$0.6	$0.9
Georgia	2,732	$175	$301	$468	20	$2.6	$9.0	$17.8
Idaho	412	$23	$39	$63	3	$0.4	$1.2	$2.9
Illinois	800	$60	$91	$145	3	$0.5	$4.0	$6.9
Indiana	873	$58	$86	$181	6	$0.8	$3.7	$7.5
Iowa	1,412	$88	$111	$197	4	$0.4	$4.8	$8.6
Kansas	454	$29	$43	$76	2	$0.3	$2.2	$4.6
Kentucky	688	$42	$67	$137	4	$0.6	$2.1	$3.8
Michigan	297	$20	$33	$50	1	$0.2	$1.4	$2.6
Mississippi	773	$37	$52	$97	2	$0.5	$1.4	$2.4
Montana	530	$34	$44	$83	2	$0.3	$2.6	$5.6
Nebraska	884	$47	$56	$124	2	$0.4	$5.5	$7.5
New Mexico	1,907	$119	$181	$307	14	$1.4	$5.7	$12.7
N. Carolina	1,537	$90	$122	$225	12	$1.2	$4.1	$7.1
Ohio	1,251	$89	$120	$202	5	$0.9	$3.3	$5.5
Oklahoma	849	$56	$66	$120	4	$0.5	$3.6	$8.0
Oregon	372	$30	$36	$64	2	$0.3	$0.9	$1.7
Tennessee	1,338	$97	$108	$191	9	$1.1	$4.5	$8.2
Texas	2,849	$216	$301	$472	14	$2.2	$10.1	$20.5
Utah	2,256	$157	$301	$455	15	$3.3	$10.0	$16.4
Virginia	2,479	$161	$262	$427	14	$1.8	$7.2	$12.6
Rest of U.S.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
U.S. Total	**26,869**	**$1,761**	**$2,635**	**$4,434**	**152**	**$22.4**	**$95.2**	**$177**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

Total Economic Impacts for U.S. Wind and Solar Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Number of Jobs; Millions of 2023 Dollars

	Construction (Cumulative)				Operations (Annual)			
	Worker Years	Labor Income	Value Added	Economic Output	Jobs	Labor Income	Value Added	Economic Output
Alabama	967	$59	$95	$178	17	$1.4	$3.5	$7.3
Arizona	1,643	$101	$180	$302	32	$3.1	$7.6	$13.8
Arkansas	1,374	$54	$88	$168	13	$1.0	$2.8	$5.7
California	209	$16	$27	$42	4	$0.5	$1.1	$1.9
Georgia	4,957	$320	$562	$957	82	$7.1	$17.8	$35.0
Idaho	716	$38	$65	$119	13	$1.0	$2.5	$5.6
Illinois	1,518	$110	$178	$301	20	$2.2	$7.3	$12.9
Indiana	1,855	$119	$187	$391	28	$2.3	$7.0	$14.0
Iowa	2,507	$146	$206	$392	24	$1.8	$8.1	$15.4
Kansas	810	$52	$81	$153	16	$1.3	$4.4	$9.5
Kentucky	1,375	$81	$132	$278	14	$1.3	$3.5	$6.7
Michigan	510	$32	$53	$88	10	$0.9	$2.7	$5.4
Mississippi	1,287	$61	$95	$190	10	$0.9	$2.3	$4.6
Montana	880	$54	$76	$146	20	$1.5	$4.9	$10.9
Nebraska	1,649	$90	$130	$271	16	$1.5	$7.6	$11.4
New Mexico	3,313	$187	$313	$579	50	$3.8	$11.1	$24.8
N. Carolina	2,792	$162	$248	$466	30	$2.9	$7.4	$13.5
Ohio	2,398	$158	$243	$432	23	$2.4	$6.0	$10.8
Oklahoma	1,558	$95	$132	$257	31	$2.4	$7.6	$16.9
Oregon	725	$54	$75	$137	7	$0.7	$1.7	$3.3
Tennessee	2,465	$168	$226	$415	34	$3.0	$8.0	$15.3
Texas	5,482	$378	$574	$998	91	$8.5	$22.1	$44.4
Utah	4,291	$278	$516	$873	68	$7.2	$18.0	$31.6
Virginia	4,261	$275	$473	$815	44	$4.4	$13.0	$23.1
Rest of U.S.	24,946	$1,752	$2,900	$5,885	277	$24.1	$44.7	$85.1
U.S. Total	**74,489**	**$4,841**	**$7,854**	**$14,833**	**976**	**$87.1**	**$222.5**	**$428.6**

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

Total State and Local Tax Impacts for U.S. Wind and Solar Projects Supported by Meta's Portfolio of Long-Term Agreements: 2014–2025

Millions of 2023 Dollars

	Construction (Cumulative)	Operations (Annual)
Alabama	5.6	0.9
Arizona	11.0	1.5
Arkansas	7.0	0.9
California	1.9	0.3
Georgia	29.6	4.8
Idaho	4.0	0.6
Illinois	11.3	2.0
Indiana	11.3	1.4
Iowa	13.7	2.2
Kansas	4.5	1.1
Kentucky	10.4	0.7
Michigan	10.9	0.6
Mississippi	7.6	0.6
Montana	7.3	1.2
Nebraska	9.3	4.2
New Mexico	26.8	1.7
North Carolina	15.9	2.4
Ohio	15.7	1.1
Oklahoma	7.1	1.1
Oregon	5.1	0.4
Tennessee	12.4	2.1
Texas	26.8	4.9
Utah	29.5	2.9
Virginia	31.0	3.9
Rest of U.S.	267.0	5.7
U.S. Total	582.8	49.4

Source: Beacon Economics estimates using the IMPLAN multi-region input-output economic model. | Note: Figures may not appear to sum due to rounding.

03
Appendix

Appendix: Technical Notes

The appendix provides additional information about the study's data sources, assumptions, and approach.

Meta enters into long-term agreements that support the development of new renewable energy projects to support its data center operations with 100% renewable energy, establishing predictable electricity costs and revenues over a fixed period for the developer. Meta provided Beacon Economics with information about the size of its commitments and the U.S. location for each of the 86 projects that currently serve its U.S. data centers.

Project development supports direct economic activities, including construction and provision of equipment and ongoing operations. Overall project costs (construction and operations) were estimated using historical data and trends from publicly available sources.

- Solar installed cost and operations cost trends ($/watt DC) came from Berkeley Lab's 2020 update of utility-scale solar data and trends.[14] On average, in the United States in 2019, costs were $1,173/ kW for project development and $16/kW for operations. AC nameplate capacity was converted to DC estimated capacity using an Inverter Loading Ratio (ILR) of 1.3.
- Wind installed cost and operations cost trends data ($/kW) came from the Berkeley Lab's 2020 update of land-based wind technology data and trends. [15] Adjustments were made to reflect regional differences and project size reported by Berkeley Labs. On average, in the United States in 2019, costs were $1,465/kW for project development and $34/kW for operations.
- Battery storage costs came from the NREL's 2020 Annual Technology Baseline report, based on the 4-hour, moderate scenario costs for battery construction and fixed operations and maintenance.[16] On average, in the United States in 2018, costs were $1,325/kW for project development and $31/kW for operations.
- For projections for installed costs and operations for 2020 and beyond, an assumed average annual cost reduction of 3.9% for solar and 1.8% for wind was applied based on NREL's 2020 Annual Technology Baseline reports.[17]
- All costs are expressed in 2023 dollars.[18]

14. Berkeley Lab, Utility-Scale Solar, 2022 Edition. 2023. https://emp.lbl.gov/utility-scale-solar
15. Berkeley Lab, Wind Energy Technology Data Update, 2020. 2023. https://eta.lbl.gov/publications/wind-energy-technology-data-update
16. NREL, 2020 Annual Technology Baseline (ATB). 2023. https://atb-archive.nrel.gov/electricity/2020/data.php
17. NREL, 2020 Annual Technology Baseline (ATB). 2023. https://atb-archive.nrel.gov/electricity/2020/data.php
18. GDP deflators used from the Office of Management and Budget. Gross Domestic Product and Deflators used in the Historical Tables (1940 - 2028). 2023. https://www.whitehouse.gov/wp-content/uploads/2023/03/hist10z1_fy2024.xlsx

Engineering characteristics (e.g., construction materials, labor, and equipment cost shares) were derived from default values from NREL's JEDI unpublished versions of their solar model and from their Wind Model (JEDI Land-Based Wind Model rel. W6.28.19). The JEDI default data rely on historical trends on solar and wind equipment imports except when a project developer provided specific local purchase information. For example, solar modules were assumed to be imported unless specific local purchase information was provided.

Additional economic activity throughout the economy results from the direct activities (indirect and induced effects).

- Indirect or supply chain effects include industries that sell to other businesses. During the construction phase, sales include building components, concrete, screws, nuts, bolts, machinery and equipment rental, and engineering and related services. During the operations phase, sales include water, sewage and other systems, and business-related services.
- Induced or household purchase effects include industries that sell to households, including retailers, grocery stores, and personal services. Induced effects occur during construction and operations phases.

Indirect and induced effects are quantified using the IMPLAN input-output (I-O) economic model, expressed as economic multipliers. IMPLAN's economic multipliers describe the rates of change for economic indicators. A typical example is an employment multiplier that describes the total jobs generated because of 1 job in the target industry. If an employment multiplier is 2x, every direct job supports 2 jobs in the total economy: the original job and 1 additional job.

The analysis evaluated economic impacts using U.S. and state multipliers. The U.S. economic impact results used the national economic multipliers that include trade and income interactions among all U.S. states. Separate model runs used state-specific economic multipliers that account for cross-state differences in the direct labor and intermediate use within a given IMPLAN sector. State-level analyses only capture the impacts of activity that occurs within state boundaries. Therefore, state-level multipliers do not account for the trade between states that is captured by using national economic multipliers. As a result, the sum of state-level impacts for states with projects will not equal

the nationwide impact total.

The reader should be aware of the following model limitations when interpreting the economic impact results:

- Differences in the U.S. and state-level economic impact totals: The U.S. economic impact totals account for the additional economic ripple effects across all states associated with trade between states. State economic multipliers only capture within-state economic activity and do not account for interstate trade flows. As a result, state-level totals provide a lower bound estimate of the full state-level economic impact.
- Project cost estimates: Project development and operations costs were estimated based on published industry benchmarks and publicly available government renewable energy statistics. Actual investment for each project will vary by specific engineering characteristics, size, and regional differences in labor and material costs.
- Input-output model limitations and assumptions:
  - Job impacts are reported by work location, which may or may not reflect worker residence location.
  - In most cases, supply chain impacts associated with solar and wind equipment purchases are based on historical industry data in each state and the United States. The developer provided equipment sourcing information for several Georgia projects.
  - Worker productivity and wages were based on IMPLAN model data and reflect historical state and industry averages.

Meta