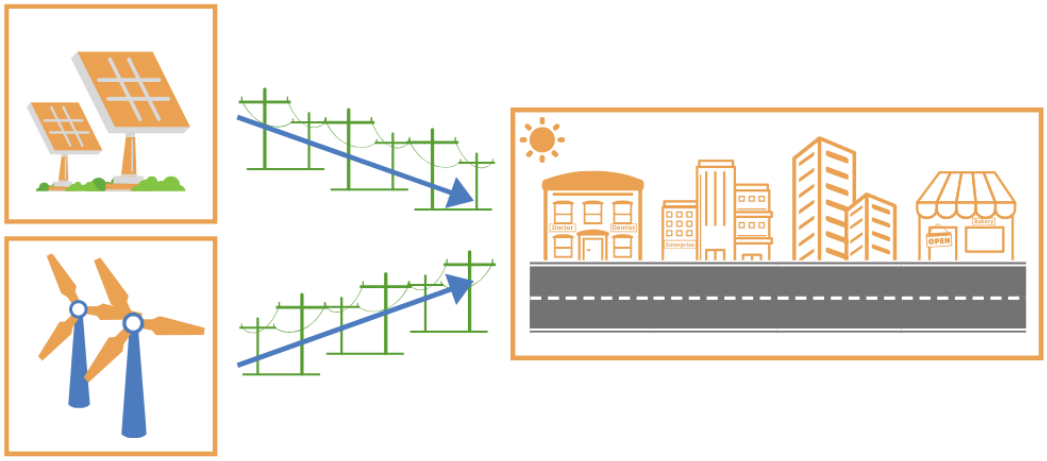
OPPORTUNITIES FOR MEETING COMMERCIAL AND INDUSTRIAL DEMAND FOR RENEWABLE ENERGY IN INDIANA

POTENTIAL INVESTMENT, JOBS, AND WAGE BENEFITS THROUGH 2030



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This report was prepared for Advanced Energy Economy by Wood Mackenzie, an independent research and consulting firm focused on the energy, chemicals and metals & mining industries. Wood Mackenzie has a track record of more than 40 years providing objective analysis and advice on energy assets, companies, and markets, giving clients in more than 80 countries around the world the insight they need to make better asset investment and portfolio allocation decisions. Wood Mackenzie's diverse, blue chip customer base includes 800+ international and national energy and metals companies, financial institutions, and governments. Wood Mackenzie works with strategy and policy makers, business development executives, market analysts, corporate finance professionals, risk teams, and investors. Wood Mackenzie has approximately 1,400 employees worldwide with primary offices in Houston, Edinburgh, London, Singapore, Dubai and Sydney.

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EXECUTIVE SUMMARY

Demand for renewable energy from commercial and industrial (C&I) customers within the United States has risen significantly over the past decade. As renewable energy technologies such as wind and solar continue to drop in price, these resources are an increasingly attractive option for companies seeking to lower costs while protecting against fluctuating fuel prices. At the same time, a growing number of companies have codified their commitment to renewable energy by setting a public sustainability and/or renewable energy target.

This report highlights the opportunity for the Hoosier State represented by this trend, demonstrating that C&I customers in Indiana could create an estimated demand for up to 3.6 gigawatts (GW) of renewable energy capacity over the next 10 years. If that demand were met with projects in Indiana, the **state could see $5.78 billion in investment and the creation of nearly 25,000 jobs** over the next decade.

C&I customers across the United States have signed agreements facilitating more than 22 GW of renewable energy to date, including more than 7 GW in 2019 alone.[1] Across the country, Wood Mackenzie estimates up to 85 GW of renewable energy demand coming from Fortune 1000 companies through 2030.[2]

While Indiana has not seen significant C&I renewable energy procurement to date, this is not a reflection of lack of cost-effective renewable energy options or low demand among C&I customers in the state. To the contrary, Indiana is home to low-cost renewable energy resources that offer the potential for cost savings. For example, the Northern Indiana Public Service Co. (NIPSCO) announced in 2018 that it would close all of its coal fleet by 2028 and replace it with a mix of wind, solar, energy storage, and demand-side resources to save consumers $4 billion. Indiana companies are also sending a clear signal that they want their electricity to come from advanced energy. In August 2019, nine leading companies with operations in Indiana issued a public letter to legislative leaders calling for more utility purchasing options for advanced energy resources.

As the cost of wind and solar continues to decline and the C&I sector turns to these resources to source its electricity needs, these positive examples create a foundation for more investment in renewable

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[1] REBA: Corporate renewable energy buyers set new record in 2019, Renewable Energy World Editors (October 2019), https://www.renewableenergyworld.com/2019/10/29/reba-corporate-renewable-energy-buyers-set-new-record-in-2019/#gref

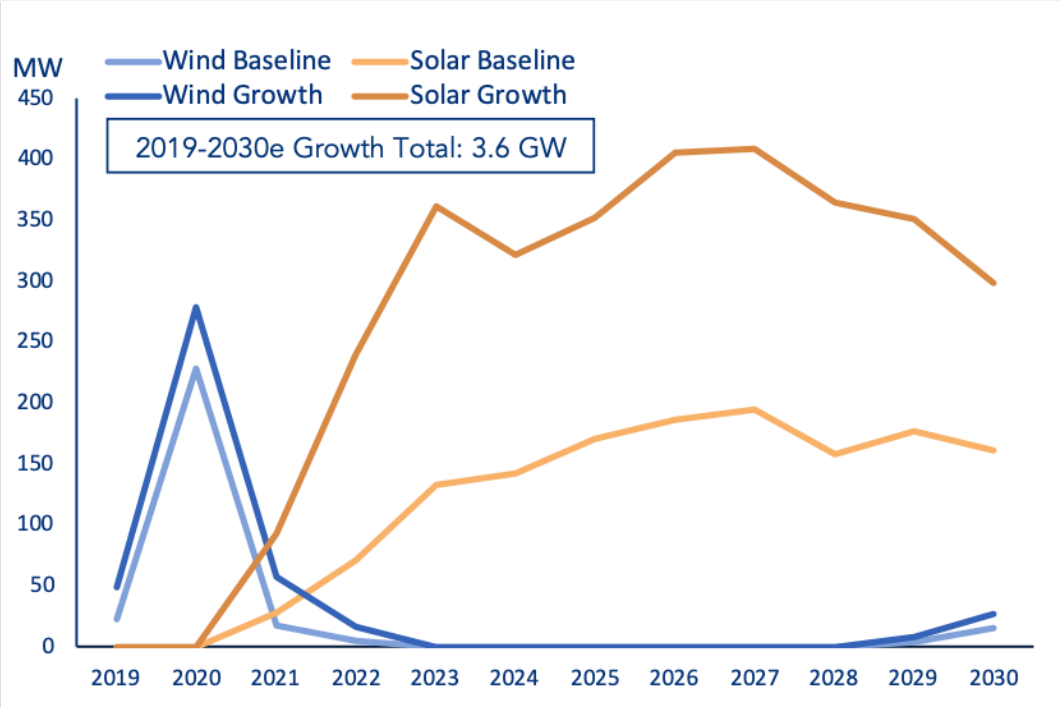
[2] For more details on the demand outlook across the US, please see Wood Mackenzie's August 2019 report: Analysis of Commercial and Industrial Wind Energy Demand in the United States.

energy to meet customer demand. Today, Indiana has the potential to stimulate significant market activity by enabling renewable energy procurement.

This report presents the findings of an analysis by Wood Mackenzie of the potential demand for renewable energy in Indiana from C&I customers over the next 10 years, considering both a conservative Baseline Scenario and a more aggressive Growth Scenario reflecting the upward trend in market demand. These scenarios result in an estimated demand for renewable energy from large energy users ranging from **1.7 GW to 3.6 GW over the next 10 years.**

There are currently limited options for Indiana C&I customers to meet their renewable energy demand from projects within the state. The most likely mechanism to unlock future C&I renewable energy purchases in Indiana is through renewable energy tariff offerings by utilities, as these constitute the most viable renewable energy purchasing method for C&I customers to date in states with vertically integrated electricity markets.

Figure 1: Indiana C&I renewable demand potential (MW)



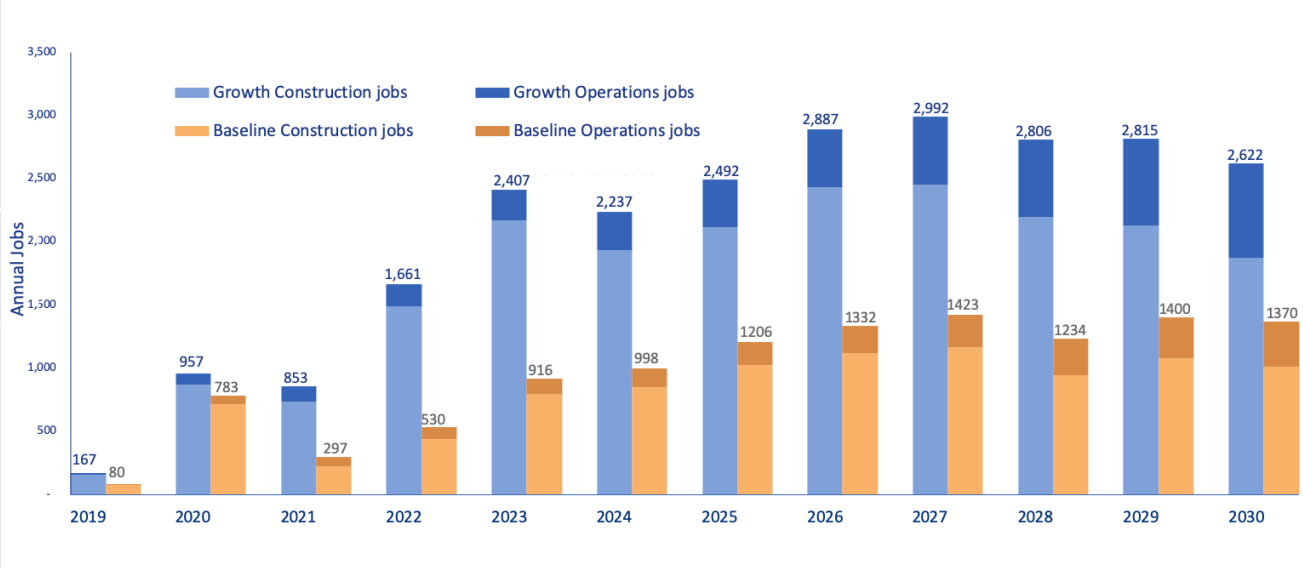
This chart shows the expected wind and solar capacity additions in both the Baseline and Growth scenarios.

By pursuing purchasing options like a renewable energy tariff for large energy users, Indiana stands to benefit economically from meeting this demand for renewable energy through the investments driven by new wind and solar projects in the state. Wood Mackenzie estimates that, under a Baseline approach, a yearly average of nearly 1,000 jobs and over $229 million in capital investment are possible from large-scale purchase of renewable energy. This amounts to a total of 11,569 jobs created and $2.75 billion in capital investment between now and 2030. Under the more aggressive Growth

Scenario, this increases to an average of 2,075 jobs per year, or 24,896 jobs created total, and nearly $482 million per year, or $5.78 billion total, in capital investment.

This report demonstrates that there is significant demand for renewable energy from the largest electricity users in Indiana and that demand will continue to grow through 2030. As Indiana expands its use of wind and solar energy to meet this demand, the state can also benefit economically by attracting thousands of full-time jobs and hundreds of millions of dollars in investment on an annual basis.

Figure 2: Indiana job creation from C&I demand



This chart shows both the Baseline and Growth scenarios. The Baseline scenario is shown in orange, while the Growth scenario is depicted in blue.

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INTRODUCTION

The market landscape for renewable energy is changing in part due to a change in customer preferences. Demand for renewable energy from commercial and industrial (C&I) customers has increased due to excellent project economics and power-price hedging opportunities afforded by wind and solar resources, whose levelized costs continue to decline. Pioneering companies like Microsoft, Google, Amazon, and Facebook have blazed a trail for companies seeking to meet ambitious sustainability targets, pumping up demand for renewables.

The increasing demand from the C&I sector paired with state-level renewable targets will likely be the prime market drivers to support continued wind and solar installations. C&I power-buying options are spreading as the financial instruments supporting the sector mature, and the rapidly falling price of renewable energy will ensure that these technologies remain competitive in the market even after federal tax credits, including the production tax credit (PTC) utilized by wind and investment tax credit (ITC) primarily utilized by solar, phase down.

Indiana is home to a diverse set of companies that are eager to source their energy from local, renewable energy projects, including corporate giants Walmart, AT&T, Verizon, and Anthem. Headquartered in Indianapolis, Anthem has committed to sourcing 100% of its electricity from renewable energy. Walmart has set a goal for 100% renewable electricity and has pledged to drive the procurement of 7 billion kilowatt hours globally by December 31, 2020.[3] Verizon wants to source 50% of its total annual electricity consumption with renewable energy by 2025,[4] and AT&T will take steps to reduce its carbon footprint tenfold by 2025.[5] Also with significant presence in Indiana, Berry Global, Best Buy, Cummins, Eli Lilly and Co., General Motors, salesforce.com, Skjodt-Barrett Foods, and Unilever have all made renewable energy commitments or voiced support for increased access to renewable energy purchasing options. Indeed, nine leading companies with operations in Indiana issued a public letter to legislative leaders in August 2019 calling for more utility purchasing options for advanced energy resources.[6]

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[3] Walmart's approach to renewable energy, https://cdn.corporate.walmart.com/eb/80/4c32210b44ccbae634ddedd18a27/walmarts-approach-to-renewable-energy.pdf

[4] Adopting an important new green energy goal (2018), https://www.verizon.com/about/sites/default/files/corporate-responsibility-report/2018/environment/renewable.html

[5] Investing in Renewable Energy (2019), https://about.att.com/csr/home/environment/renewable-energy.html

[6] Letter dated August 20, 2019 from Berry Global, Inc.; Best Buy Co., Inc.; Cummins Inc.; Eli Lilly and Company; General Motors Company; salesforce.com, inc.; Skjodt-Barrett Foods Inc.; Unilever US, Inc.; Walmart Inc.;, available at https://info.aee.net/hubfs/IN_Energy_Task_Force_Letter%208-20-19.pdf.

Companies have a variety of motivations for pursuing advanced energy—ranging from cost savings to price certainty to corporate sustainability goals—and they have varied needs when it comes to resource type, contract length, contract structure, and more. Given the growing interest in renewable energy among C&I customers, as well as among municipalities, universities, and other large customers, those states and utilities that unlock attractive renewable energy purchasing opportunities become more attractive hosts for businesses looking to expand or move their operating footprint.

To date, Indiana has not taken advantage of the opportunity, and was recently ranked 28th in the nation in corporate renewable energy procurement options.[7] This low ranking is driven not by lack of resource potential, which is actually a strength for the state, particularly in regards to wind energy, but rather by lack of purchasing opportunities. Indiana is one of 15 states that currently provide little to no options to procure renewable energy through a utility.

The primary avenue for Indiana to improve its ranking is to expand a purchasing option called a renewable energy tariff (RE Tariff, or "green tariff"). Several utilities in vertically integrated markets like Indiana's have introduced RE Tariffs, which allow customers to purchase bundled renewable energy and Renewable Energy Credits (RECs) through their utility at long-term, competitive prices. While other states have pursued other solutions to enable C&I renewable energy procurement, like power purchase agreements (PPAs) or direct retail access for C&I customers, Indiana has an opportunity right now for utilities and large energy users to work proactively with one another to develop effective RE Tariffs.

This report focuses on the potential C&I demand within Indiana, a state with demonstrated demand from C&I customers, but limited access to large-scale renewable energy procurement to date. On this front, Indiana has an opportunity to become a national leader, as many RE tariff programs in other states have been underutilized. **Of the 22 GW of corporate renewable procurement across the nation, under 3 GW (less than 15%) has been procured through utility offerings.**

[7] Corporate Clean Energy Procurement Index, Retail Industry Leaders Association and Information Technology Council (January 2017), https://cleanedge.com/reports/Corporate-Clean-Energy-Procurement-Index.

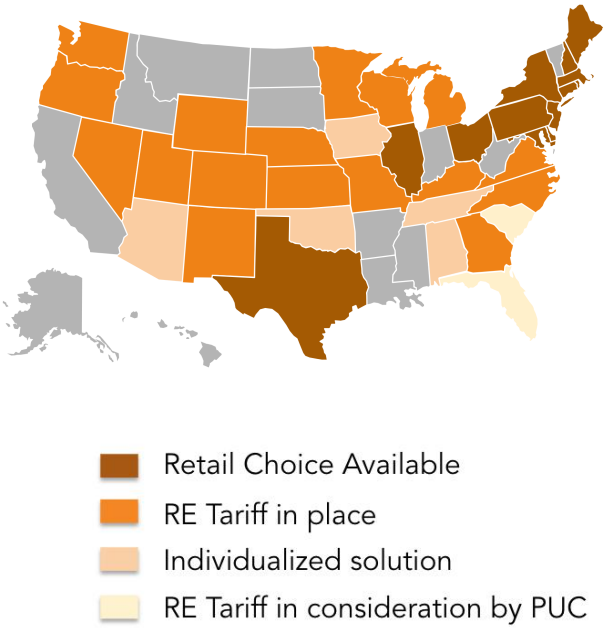


Figure 3: Renewable Energy Procurement Options

Note: A program is considered a RE Tariff for the purposes of this map if it is made available to more than one customer; note that some such programs have, to date, only met the needs of a single customer.

More information on these tariff options can be found later in the report

With strong in-state corporate demand for renewables as well as strong renewable manufacturing capabilities, Indiana has a good foundation for meeting this demand. By creating options for companies to meet their renewable energy demand with new projects built in Indiana, rather than looking elsewhere to source renewable energy, Indiana should expect to see two primary benefits.

First, by inviting private investments in renewable energy, Indiana will attract new jobs, tax revenue, and local investment while boosting energy independence through new energy infrastructure. As of 2018, the state has a strong foundation, with over 90,600 Hoosiers employed in the advanced energy industry, including more than 12,000 in the advanced electricity sector, which includes solar, bioenergy, and wind.[8] As this report shows, unlocking opportunities for customer-driven utility-scale solar and wind will allow this already growing job market to boom. In addition, the state will also benefit economically by attracting thousands of full-time jobs and billions of dollars in investment on an annual basis.

Second, by responding to corporate demand for renewable energy, Indiana would become a more attractive choice for companies with clean energy targets that are looking to move or expand. Nationally, 71 Fortune 100 companies and 215 Fortune 500 companies (43%) have set

[8] 2019 Indiana Advanced Energy Jobs Fact Sheet, Advanced Energy Economy (August 2019), https://info.aee.net/indiana-advanced-energy-jobs-facts-2019

renewable energy or sustainability commitments.[9] Meeting the demand of large C&I energy users will send a clear market signal that will help Indiana to retain existing businesses while also attracting new ones to the state. This is a valuable opportunity for Indiana to gain a competitive advantage over other states looking to attract investment by these companies.

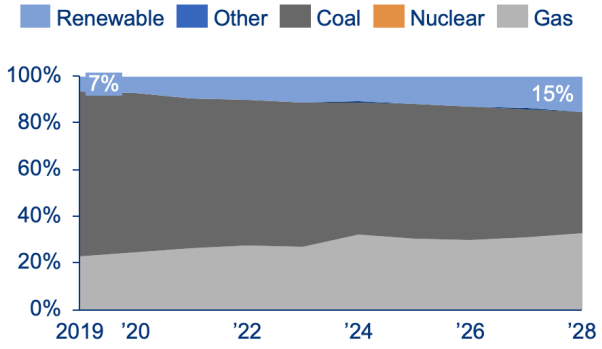
Energy is an important driver of employment in Indiana, and the procurement of renewable energy is an increasingly important driver of demand within the C&I segment in the state. The rest of this report takes a deeper look at the demand for renewable energy in the C&I sector of Indiana's customer base over the next 10 years. This outlook will be important to consider as utilities, policymakers, and other stakeholders engage on how to meet this coming demand and maximize the economic benefits of renewable energy development in the state.

Power Supply and Demand Outlook in Indiana

ELECTRICITY GENERATION SUPPLY MIX

Indiana is currently heavily reliant on fossil fuels for power generation, with coal providing about 70% of the state's net generation in 2018. This figure is expected to drop to 50% in the next decade, with the supply gap being filled by additional gas generation and renewable energy capacity.

Figure 4: Indiana power generation supply mix

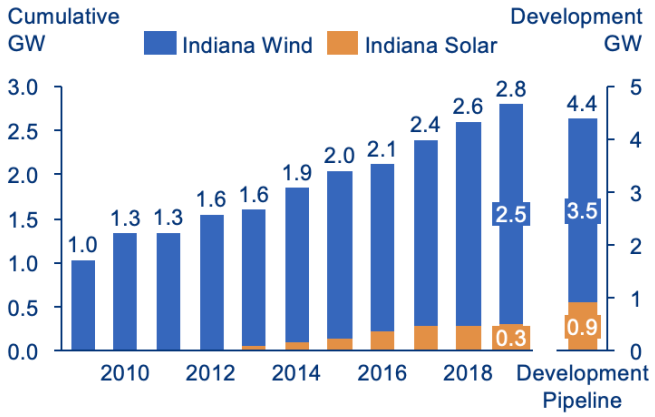


Indiana has seen a sustained increase in renewable energy capacity, as shown in Figure 5. The state also has a development pipeline of projects awaiting investment and construction that far exceeds the current installed capacity. In addition, Indiana has strong renewable energy resource potential. Wind power is especially abundant in the central and western parts of the state, and

[9] 2016 Corporate Advanced Energy Commitments, Advanced Energy Economy (December 2016), https://info.aee.net/growth-in-corporate-advanced-energy-demand-market-benefits-report

Indiana's strong corn and soybean crop yields make the state a major producer of biogas. Indiana is fifth nationally in ethanol production, at 1.2 billion gallons per year, almost 8% of the country's total, and has the sixth-largest production capacity for biodiesel, at over 100 million gallons per year. Solar resources are most available in the south of the state, with biomass and landfill gas production in the north. One large hydroelectric power plant on the Ohio River at the southeast corner of the state and one large geothermal installation in Muncie also produce electricity for the Hoosier state.[10]

Figure 5: Indiana renewable energy capacity



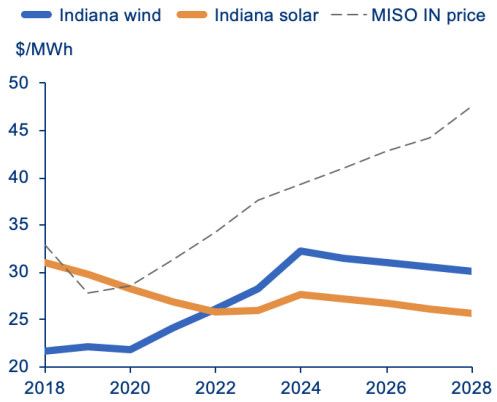
COST-COMPETITIVENESS OF RENEWABLE ENERGY TECHNOLOGIES

The significant rise in renewable energy deployment is enabled by the cost-competitiveness of these technologies in Indiana. Figure 6 illustrates the Levelized Cost of Electricity (LCOE) outlook for wind and solar technologies in Indiana. 2020 represents the last year of availability for the full value of the wind energy PTC, with the tax credit value phased out to zero by 2024. This subsidy phase-out is shown by a short-term rise in cost in Indiana.

Solar energy's cost relative to other generating technologies, on the other hand, is expected to continue dropping. Solar manufacturing economies of scale have enabled sustained cost reductions that are expected to compensate for the phase-out of the solar ITC. This expected cost reduction is the primary driver for solar displacing wind as the most prevalent form of renewable energy installed in the United States, including in Indiana.

[10] Indiana Profile Analysis, United States Energy Information Administration (May 2019), https://www.eia.gov/state/analysis.php?sid=IN

Figure 6: Indiana LCOE and wholesale price outlook



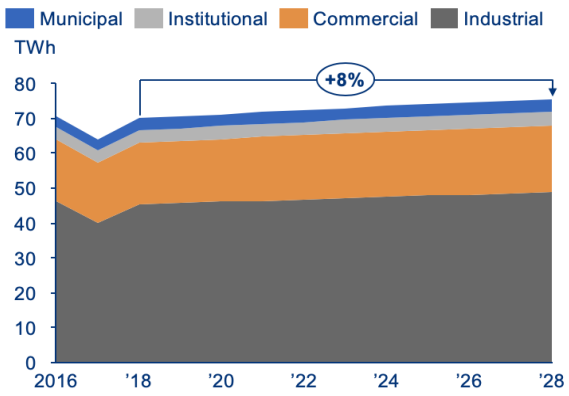
Source: Wood Mackenzie. 2019 H1 Federal Carbon Case.

The figure also illustrates the outlook for regional wholesale power pricing in the Midcontinent Independent System Operator, which Indiana is part of, relative to the LCOE position of these technologies. The prospect of higher electricity prices ensures that solar and wind will remain competitive with wholesale rates for the foreseeable future.

TOTAL ELECTRICITY DEMAND FROM C&I CUSTOMERS

Power demand from C&I customers is expected to increase in Indiana, Wood Mackenzie's analysis finds. Most C&I demand within Indiana comes from the industrial sector, driven by the state's high number of manufacturing facilities and industrial consumers. Total C&I demand in Indiana is expected to rise despite limited population growth. The next section will home in on the results of Wood Mackenzie's modeling that predicts the extent to which C&I customers will seek to meet their electricity demand with renewable energy.

Figure 7: Indiana C&I power demand



POTENTIAL RENEWABLE ENERGY DEMAND FROM C&I CUSTOMERS

Analysis and Results

BACKGROUND: DEMAND SCENARIOS CONSIDERED

To estimate potential C&I demand in Indiana, Wood Mackenzie's analysis focused on the Indiana-based operations of public and private Fortune 1000 companies. The estimated power consumption of F1000 companies represents approximately 48% of total C&I demand in the United States, and these companies are more likely than their smaller peers to set and pursue renewable energy targets. Despite a substantial uptick in renewable energy procurement over the past five years, the overall penetration of renewables in the power mix for F1000 companies remains limited at ~5%, demonstrating significant growth potential.

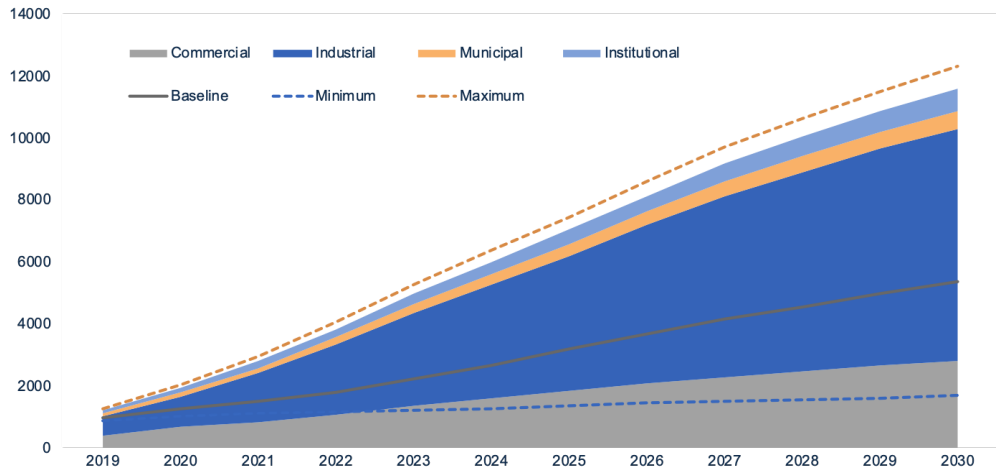
This set of companies was used to analyze expected future demand for renewable energy on the basis of the observed purchasing behavior of companies with established renewable energy targets (RETs), applied to potential future purchasing behavior of companies both with and without RETs currently. Specifically, a range of estimates of future demand was developed based on different scenarios for how renewable energy purchases would be made (i.e., from RECs only vs. bundled renewable energy plus RECs from PPAs, RE Tariffs, or similar means) and a set of sensitivities, specifically focused around the likelihood of companies setting RETs, and the adoption rates and pace of progress toward RETs.

Two main scenarios were considered in this report: a more conservative Baseline Scenario and a Growth Scenario, each reflecting different speeds of RET adoption and lower or higher average renewable energy targets, respectively. Both scenarios were modeled under the assumption that all new procurements are made via bundled renewable energy plus REC purchase from new renewable energy projects (e.g., from a utility RE Tariff) with no changes to historical purchases (as in, no conversions of REC-only purchases to bundled renewable energy plus REC purchases). Maximum and minimum demand shown in the figures reflect more and less aggressive assumptions for all the variables considered, respectively.

In the Baseline Scenario, the average RET was set at 50%, and in the Growth Scenario the average RET was set at 80%. Additionally, the Growth Scenario assumed a faster RET adoption and RET begin-year than the ones applied to the Baseline Scenario.

These scenarios were simulated in the model to yield estimates on the growth in C&I renewable demand and the associated growth in capital investment, jobs, and wages in Indiana over the period 2019-2030. **For a more detailed explanation on the analysis methodology employed in this report, see the Appendix.**

Figure 8: Indiana C&I renewable energy demand potential (TWh)



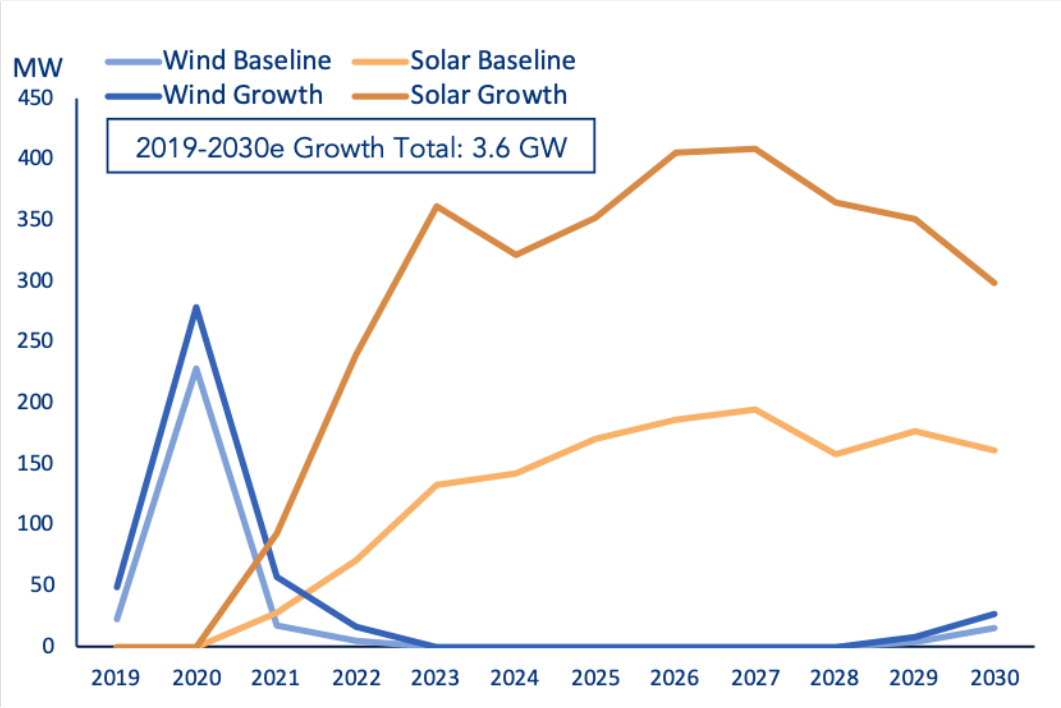
This chart shows both the Baseline and Growth scenarios. The Baseline scenario is shown by the grey line, while the Growth scenario is shown by the sum of the different sectors.

The Baseline Scenario anticipates that demand for renewable energy, measured in TWh, will grow at a 17.73% compound annual growth rate in Indiana, as illustrated in Figure 8. Under the Baseline Scenario, this becomes an aggregate of nearly 5,000 TWh by 2030, while the Growth Scenario predicts just over 10,300 TWh in total renewable energy demand potential in the C&I segment. When demand among municipal and institutional customers is added, renewable energy demand totals over 5,000 TWh in the Baseline Scenario and approximately 11,600 TWh in the Growth Scenario.

RENEWABLE ENERGY DEVELOPMENT TO MEET C&I DEMAND

Based on this analysis, Wood Mackenzie estimates that over 1.7 GW of capacity additions for renewable energy will need to materialize over the next 10 years to meet demand within the C&I segment under the Baseline Scenario. Under the Growth Scenario, this demand would grow to nearly 3.6 GW. The vast majority of these installations will be in the utility solar sector, due to rapidly increasing cost-competitiveness and substantial solar resource.

Figure 9: Indiana C&I renewable energy demand potential (MW)



This chart shows the expected wind and solar capacity additions in both the Baseline and Growth scenarios.

Current Trends: Consistent with Demand Analysis

INDUSTRIALS ARE ELECTRIFYING OPERATIONS AND HEDGING WITH RENEWABLES

Our analysis projects significant growth in demand for renewable energy among large Indiana customers. The situation on the ground corroborates this expectation of growth for industrial, commercial, and the municipal/institutional customer segments that were not included in this report. The next few sections will describe the macro-scale renewable energy trends that can be observed within these segments in Indiana.

The cost of renewable energy continues to fall, offering a tremendous long-term hedge against power price inflation for industrial users of power. The energy transition is progressing, and the electrification of transportation, HVAC, and a variety of industrial processes will increasingly focus

corporate attention on how companies procure electricity. Virtual Power Purchase Agreements (VPPAs) have been pursued by many companies with large concentrated use of power, including data centers.[11] The advent of new financial instruments to structure VPPAs are allowing smaller corporations to also participate.

Some major industrial users with headquarters or major operations in Indiana have already committed to sustainability goals but may not have local mechanisms available to purchase renewable energy. National corporations with significant presence in Indiana and stated greenhouse gas emissions reductions goals include Dow, Air Products, Westrock and Cargill. General Electric Renewable Energy recently adopted a goal to offset 100% of their operational demand with renewable energy. Fortune 1000 industrial companies with headquarters in Indiana that have emissions goals include Eli Lilly, Archer Daniels, Midland, Berry Global, and Zimmer Biomet. In 2018, Cummins signed a VPPA with an Indiana wind farm that nearly offsets the company's electricity demand in state, including the global headquarters in Columbus.

COMMERCIAL RENEWABLE DEMAND APPARENT FROM SUSTAINABILITY GOALS

Commercial companies around the world have embraced the concept of environmental stewardship and view it as a competitive differentiator for their businesses. Corporate social responsibility (CSR) teams are working to ensure that corporate business practices are well aligned with the values of their client base, thus creating positive stakeholder value through the delivery of sustainable products and services.

Many national commercial brands that have made renewable energy commitments have major operations within Indiana, including Walmart, AT&T, and Verizon. Wood Mackenzie expects that many more commercial companies in Indiana will pursue similar options to procure renewable energy to offset their emissions.

MORE CITIES IN INDIANA ARE COMMITTING TO RENEWABLES

A growing number of cities and municipalities in the state have also made commitments to reduce their carbon footprint, driven in large part by constituent pressure, including Indianapolis,

[11] Under a VPPA, a customer signs a long-term fixed or escalating price contract (as under a standard PPA), but the electricity is sold on the wholesale market rather than contracted directly by the customer. If the selling price in the wholesale market is higher than the per-kWh rate of the virtual PPA, the customer receives the difference in credit; if the wholesale price received for the renewable energy is lower, the customer pays the difference.

which has pledged to be carbon neutral by 2050,[12] and South Bend, which aims to reduce emissions 26% by 2025 and achieve carbon neutrality by 2050.[13]

Some cities may opt to meet these commitments through the use of RECs, as they are readily available, relatively inexpensive, and a simpler procurement method than contracting VPPAs. However, Indiana has many municipal utilities that may be more inclined to purchase renewable power through a VPPA, as the procurement function for bulk power already exists within these organizations, if state level policies encouraged these transactions.

INSTITUTIONAL DEMAND DRIVEN BY UNIVERSITY CLIMATE ACTION

Like cities, many institutions have been influenced by their customers, competitors, and constituents to pursue climate action and renewable energy. Major universities have been pressured by student movements that are demanding renewable energy from their institutions. As climate change awareness is peaking with younger generations, many universities also see climate leadership as a valuable recruitment tool. Major universities in Indiana have set emissions reduction goals, including Notre Dame and Indiana University. A recent announcement celebrated Notre Dame's early achievement of its goals to move entirely off coal by the end of 2020 and cut its carbon footprint by 50% by 2030.[14] Indiana University is considering revising its current goal of reducing greenhouse gas emissions 80% by 2050, to instead target 45% reduction by 2030 and full carbon neutrality by 2050.[15]

UTILITIES MOTIVATED TO INSTALL RENEWABLES AND OFFER PROCUREMENT OPTIONS TO C&I CUSTOMERS

Due to the structure of the Indiana market, local utilities are still the primary option for C&I customers to purchase renewable energy. Renewable energy purchasing options that are alternative to RECs can be supplied via RE Tariffs, community renewable installations, or other measures.

Indiana utilities have recently made commitments to increasing their use of renewable energy resources. Duke Energy, a major utility active in Indiana, has recently pledged to reduce its

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[12] Indy mayor vows city will act on climate change, Sarah Bowman (September 2017), https://www.indystar.com/story/news/2017/09/15/indy-mayor-vows-city-act-climate-change/663771001/

[13] City Releases Climate Action Plan, SouthBendIN.gov (November 2019), https://southbendin.gov/2019/11/04/city-releases-climate-action-plan/

[14] Notre Dame ceases to burn coal, a year ahead of schedule, Marissa Gebhard (October 2019), https://news.nd.edu/news/notre-dame-ceases-to-burn-coal-a-year-ahead-of-schedule/

[15] Better management of building energy usage to reduce greenhouse gas emissions, Office of Sustainability: Sustain IU, https://sustain.iu.edu/commitment/energy/index.html

carbon emissions 50% by 2030 and be net-zero carbon by 2050.[16] This will likely entail installing more renewables in their service territories, in addition to early retirement of fossil fuel plants. In its October 2018 Integrated Resource Plan, the Northern Indiana Public Service Com. (NIPSCO) proposed to retire the bulk of its remaining coal generation by 2023 and the rest by 2028. NIPSCO plans to replace the capacity with renewables paired with storage and demand-side management techniques, which their analysis showed was the most economic option for its ratepayers. In October 2019, NIPSCO announced a Request For Proposals for 300 MW of wind and 2,300 of solar and solar-plus-storage projects.[17] In December 2019, Indianapolis Power & Light proposed the early retirement of 630 MW of coal generation.[18]

Even in the absence of voluntary commitments, the Indiana Utility Regulatory Commission (IURC) has clearly signaled to utilities that renewable energy resources are cost-effective when compared to traditional fossil fuel infrastructure. In April 2019, the IURC rejected Vectren's proposal for a new 850 MW combined cycle natural gas plant because the utility did not adequately consider other cost-effective alternatives, including renewable energy sources.[19] This decision is likely to influence future proposals in Indiana in favor of renewable projects.

Likewise, C&I customers in Indiana have begun to call on utilities to offer more renewable energy buying options. In August 2019, nine leading companies with Indiana operations signed a letter to the 21st Century Energy Policy Development Task Force calling for more voluntary renewable energy purchasing options in the state. Specifically, the companies said "in order for Indiana to stay competitive and to attract businesses, the Task Force should include a focus on examining the existing barriers to economic development and renewable energy deployment via utility purchasing options, which allow companies to contract for or purchase the output of renewable energy directly through their local utility."[20]

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[16] Duke Energy Aims to Achieve Net-Zero Carbon Emissions by 2050, Duke Energy (September 2019), https://news.duke-energy.com/releases/duke-energy-aims-to-achieve-net-zero-carbon-emissions-by-2050

[17] NIPSCO to replace coal with 2.3 GW of solar, storage in latest RFP (October 2019), https://www.utilitydive.com/news/nipsco-to-replace-coal-with-23-gw-of-solar-storage-in-latest-rfp/564427/

[18] Indianapolis Power & Light announces early retirement for 2 coal units, but NGOs eye bigger target (December 2019), https://www.utilitydive.com/news/indianapolis-power-light-announces-early-retirement-for-2-coal-units-but/568750/

[19] Denied: Indiana Utility Regulatory Commission rejects Vectren's power plant proposal (April 2019), https://www.courierpress.com/story/news/local/2019/04/24/utility-commission-rejects-vectren-natural-gas-power-plant-indiana-posey-county-a-b-brown/3553798002/

[20] See *supra* n.6.

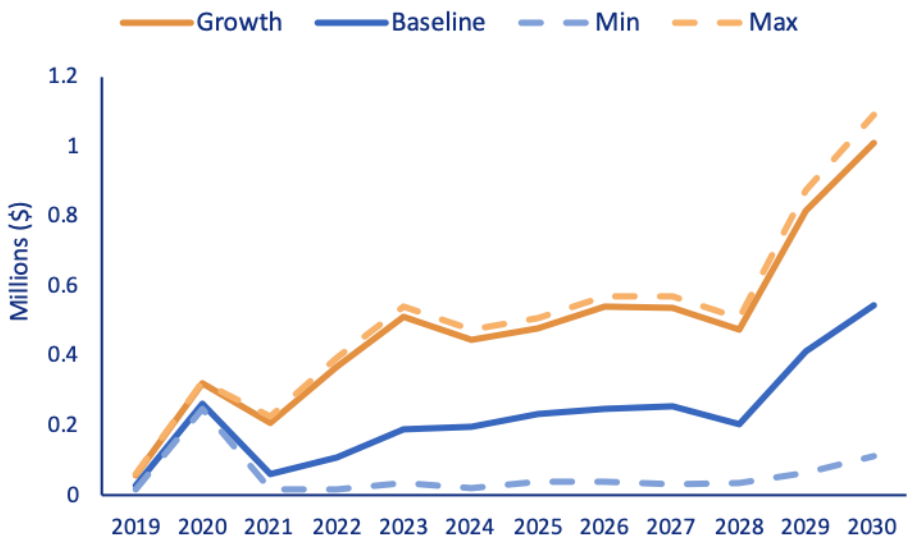
Benefits from Meeting Potential Renewable Energy Demand

TOTAL CAPITAL INVESTMENT FROM PROJECT DEVELOPMENT

To fulfill the projected C&I renewable energy demand identified in Wood Mackenzie's analysis, significant capital investments would be required. Figure 10 shows the potential capital investment if the demand is satisfied with local renewable energy projects in Indiana.

Total capital investment from 2019 to 2030 in Indiana is expected to be **$2.75 billion under the Baseline Scenario, and $5.78 billion under the Growth Scenario**. Most of the investment will be in solar, as there is little expected wind development in Indiana after 2020 due to less attractive economics.

Figure 10: Indiana capital investment



JOBS AND WAGES FROM CONSTRUCTION AND OPERATION

Renewable energy development creates a wide variety of short-term jobs affiliated with project development including supply chain logistics and Engineering, Construction and Procurement (EPC). Longer-term jobs are also created related to manufacturing, operations, maintenance, and asset management.

Figure 11: Indiana job and wage creation

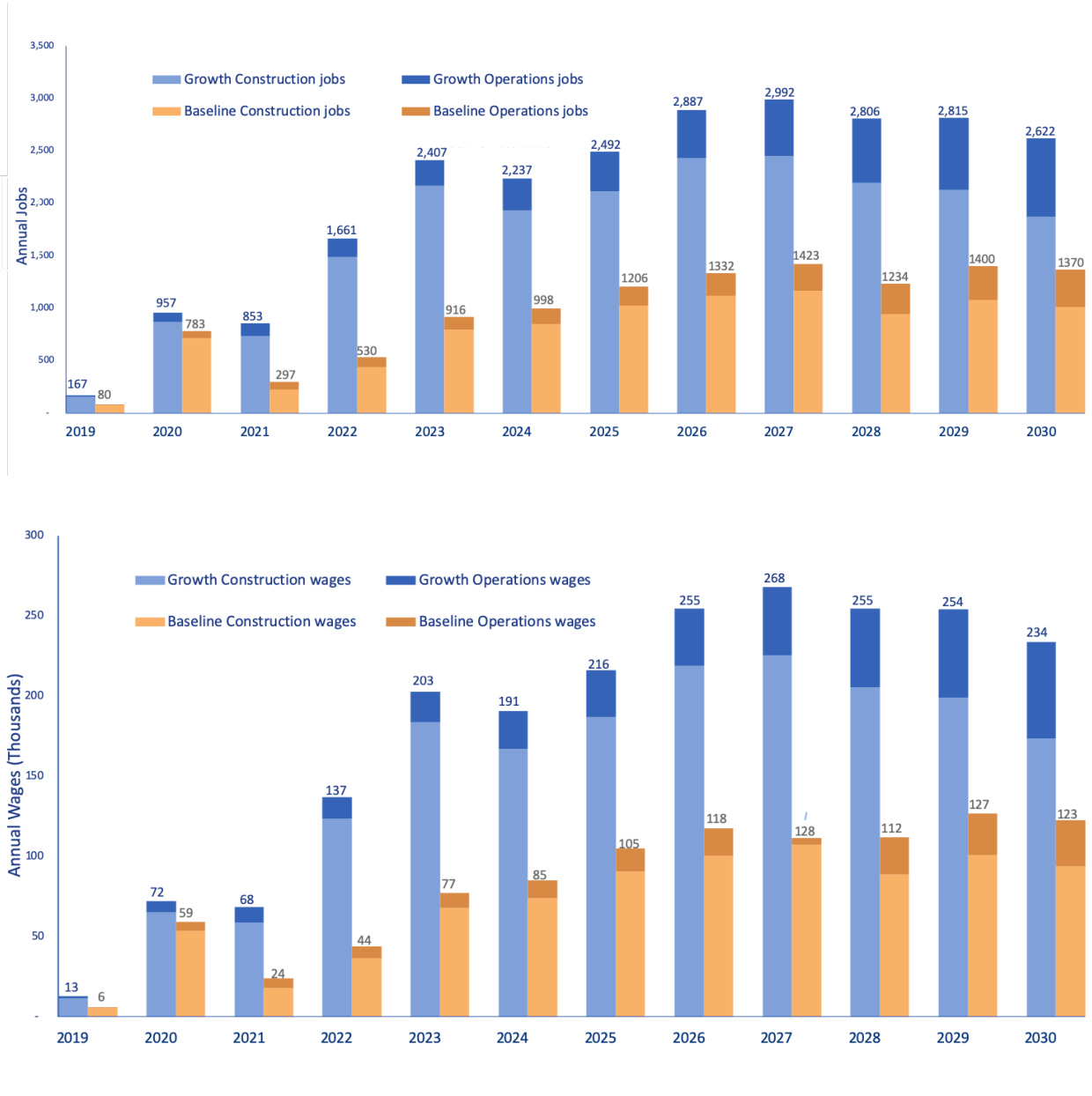


Figure 11 shows the forecasted annual job creation and associated wage growth from renewable energy development in Indiana.

If Indiana is able to localize supply for the demand available within the C&I segment, the state will see significant benefits for the state's economy. Wind and solar projects will generate both

temporary construction jobs, often installers and associated contract roles, and full-time jobs in project operation and maintenance.

Wood Mackenzie estimates that, under the Baseline Scenario, an average of over 964 jobs per year – 177 full-time operations jobs and 787 temporary construction jobs – could be created in the state from the large-scale development of renewable energy to meet C&I demand. This totals 11,569 jobs created over the period 2019 to 2030. Under the Growth Scenario, this grows to an average of over 2,075 jobs annually (364 full-time operations jobs and 1,711 temporary construction jobs) with a total of 24,896 jobs over the study period. Total estimated wage creation by renewable energy development in Indiana will be between $1 billion and $2.2 billion for the respective scenarios.

CONCLUSION

Given its ample solar and wind resources and projected C&I renewable demand, Indiana is primed for a renewable energy transition that will yield both economic and environmental benefits. Given the growing interest in renewable energy among commercial and industrial customers, as well as among municipalities, universities, and other large customers, states and utilities that unlock attractive renewable energy purchasing opportunities are better hosts for businesses looking to expand or move their operating footprint.

Across the United States, vertically integrated markets have not yet taken full advantage of offering renewable energy projects to customers. However, there are many solutions to pick from to close the gap. In states like Indiana, customers rely on utility partners to meet their renewable energy goals through cost-effective, local projects that do not entail undue financial risk. States just starting on this journey can find that other states have already uncovered many important best practices, and it is possible to learn from and customize many elements of successful solutions and programs in use elsewhere.

Moving forward, Indiana utilities and policymakers have the opportunity to improve and expand opportunities for renewable energy procurement, whether the options are in the form of renewable energy tariffs, community solar projects, or other purchasing schemes. Indiana will be able to unlock billions of dollars in capital investment and tens of thousands of jobs that will result, in addition to satisfying the needs of the business community.

APPENDIX: ANALYSIS METHODOLOGY

Analyzing the Renewable Energy Demand of the F1000

DEFINING THE TARGET POPULATION AND SCOPE

The scenario modeling for this analysis projected estimates in demand for the Fortune 1000 companies. First, in order to better understand the potential renewable energy demand of the F1000, procurement preferences were analyzed from over 400 US-based companies reporting into the Carbon Disclosure Project (CDP) 2018 Climate Change Survey, 80% of which are counted within the aforementioned F1000 population. The CDP was chosen over other reporting entities due to the significant electricity use within this target population; for example, companies reporting to RE100, another group of companies with public RETs, only represents ~15% of total U.S. C&I demand. Buyer behavior within the group of companies reporting to CDP was analyzed and segmented and then used to predict behavior of the full F1000.

Among the full CDP population, only 14% have a defined renewable energy target (RET), equal to a total electricity demand of approximately 45 TWh once accounting for existing renewables procurement in the form of RECs, PPAs, RE Tariffs, and other methods. A majority of companies within the CDP have put forth GHG reduction goals instead of RETs. It is feasible that companies with a GHG target but without an established RET may seek to reduce their emissions through the purchase of renewables for the same reasons that a company would set and make progress toward a RET. Corporate emissions reduction goals are generally segmented by the type of GHG emission as scope 1, 2 or 3 (see below); this analysis is focused on Scopes 1 and 2 because these are directly linked to electricity use and therefore can be addressed through renewable energy purchases.

Figure 12: Emissions scopes considered

Emission Category	Description	Considered?
Scope 1	Direct emissions from burning of fuels by the emitter	Yes
Scope 2	Indirect emissions from electricity consumed and purchased by the emitter	Yes
Scope 3	Indirect emissions produced by the emitter activity but owned and controlled by a different emitter	No

TRANSLATING KNOWN BEHAVIOR TO FUTURE ACTIVITY

Companies in the CDP database were categorized by industry, geography, and credit-worthiness. The total future electricity demand, emissions reductions goals, and known direct VPPAs were forecasted for all CDP companies. This analysis was then extended to other companies in the F1000 based on the segmentation completed from the CDP database. The credit-worthiness of each of the F1000 companies was analyzed to examine capability to procure renewables, and these companies were subsequently assigned grades of 1-10 on their corporate goals for renewables (considering the target start year, percent renewables, and target adoption rate).

In this way, behavior among F1000 companies with RETs was used to extrapolate future action by companies that have not yet set a RET, but may nonetheless have future demand for renewable energy. For companies who lacked corporate targets, their grades were based off of industry-specific peer companies and stated sustainability commitments. The sum of known demand (from existing targets) and projected demand (from the analysis described above) results in the total projected demand, which is subject to different sensitivities, described below.

Scenarios

A series of scenarios were built into the analysis to account for potential changes in future buying behavior of companies with known RETs as well as for the rest of the companies considered in this analysis. First, the analysis considered how future purchases would be made, and second, the analysis incorporated different assumptions regarding how aggressively companies would adopt and achieve RETs.

RENEWABLE ENERGY CREDIT (REC) VS. VIRTUAL PPA OR RENEWABLE ENERGY TARIFF

Companies have options when it comes to renewable energy procurement, with direct implications for the demand for new renewable energy capacity. Specifically, C&I renewable energy demand will directly result in deployment of new renewable energy when companies purchase renewable energy from PPAs or RE Tariffs. This analysis considered two key variables:

- REC-only share of future renewable energy procurement: As noted previously, 68% of total procurement to date has been executed by means outside of a PPA. However, companies have shown a preference to switch from REC purchases to purchasing options that are more impactful, such as PPAs and RE Tariffs. This variable defines what portion of a company's renewable energy procurement in the future will come from non-PPA sources.

- Conversion of REC-only procurements: This variable expands the total available market opportunity for new renewable energy by allowing for conversion of old RECs to PPA- and RE Tariff-sourced renewable energy

A full list of the defined scenarios is shown in Figure 13 below. Both the Baseline and the Growth Scenarios in this report used Scenario D and assumed that all new procurements are made via PPA or RE Tariff with no changes to historical compliance. It is important to note that Indiana-based companies currently lack options to pursue renewable energy through PPA/RE Tariff purchases. However, this analysis projects demand and therefore did not consider the current policy landscape as a limitation. Given the growing preference among C&I customers for direct purchases through PPAs and RE Tariffs over unbundled RECs, Scenario D was deemed most realistic.

Figure 13: REC conversion strategy scenarios

Scenario	Description	Considered
A	Assuming historical average non-PPA share for future procurement; no changes to historical compliance	Minimum
B	Assuming reduction of non-PPA share by 25% for future procurement; no changes to historical compliance	No
C	Assuming reduction of non-PPA share by 50% for future procurement; no changes to historical compliance	No
D	Assuming all new procurements are made via PPA or RE Tariff; no changes to historical compliance	Baseline and Growth Scenarios
E	Assuming all new procurements are made via PPA or RE Tariff and 25% of historical non-PPA/RE Tariff purchases are converted to PPA/RE Tariff by end of 2028	No
F	Assuming all new procurements are made via PPA or RE Tariff and 50% of historical non-PPA/RE Tariff purchases are converted to PPA/RE Tariff by end of 2028	No
G	Assuming all new procurements are made via PPA or RE Tariff and all historical non-PPA/RE Tariff purchases are converted to PPA/RE Tariff by end of 2028	Maximum

SENSITIVITY TO RENEWABLE ENERGY TARGETS AND ADOPTION RATES

In addition to considering different options for companies to meet their RETs, the Wood Mackenzie analysis has a number of assumptions on how aggressively companies will set and pursue these targets.

Specifically, the analysis considered the beginning adoption year for renewable energy targets and the speed at which targets are met. These factors significantly impact the timing that

renewables are being procured and installed. These factors are adjusted independently in Figure 14.

Sensitivities to the analysis are governed by the following key variables:

- **Target rating (TR):** The ability for a company to implement a defined RET is largely predicated upon its operating scale and financial strength. As a proxy, the analysis applies the company's credit rating to define a TR. Companies with higher credit ratings receive a higher TR. Companies with a lower TR will not be eligible for a RET.

- **Adoption rating (ADR):** To translate the findings from the CDP population with a RET to Fortune 1000 population without a RET, the buying behavior and climate reduction activities from CDP companies was aggregated by business sector into an ADR and then applied to non-CDP F1000 companies in that same sector. A higher ADR reflects a company's presence in an industry that is strongly engaged in the fight against climate change and/or is highly exposed to power price increases.

- **Average rating (AVR):** Simply the average of the TR and ADR, which is used as a proxy to account for both the company's unique financial characteristics as well as the needs and ambitions of its peer group towards decarbonization. The first three variables listed above are the key inputs into analyses that define the following key outputs that will define a non-CDP company's RET.

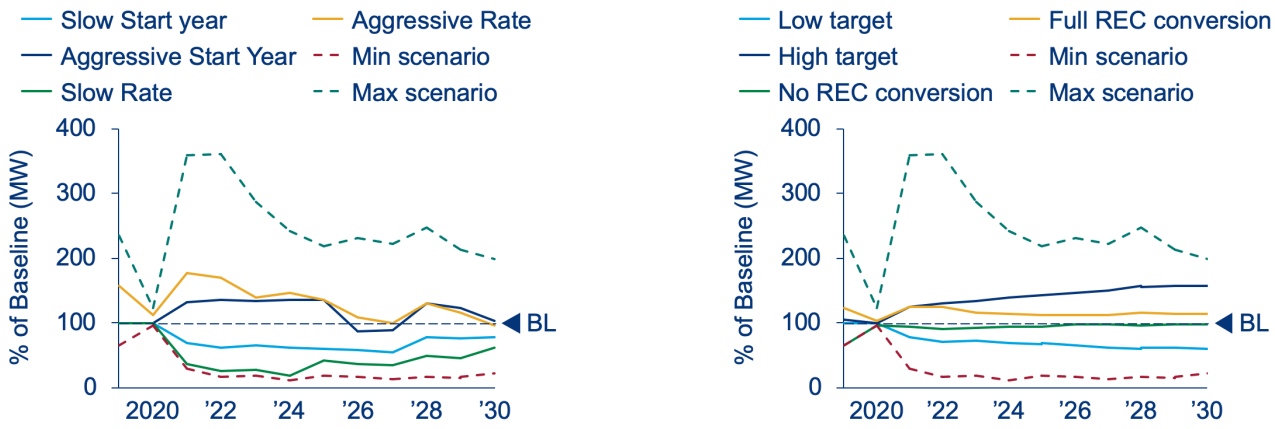
- **RE target adoption:** Defined as the number of years it takes for a company to implement a RET. An individual company's year of adoption is governed by the AVR and applied against target adoption scenarios.

- **RE target year:** Defined as the total number of years allowed by a company to achieve its stated RE target following adoption. An individual company's target year is based on its TR and is modified according target-year scenarios.

- **RE target extent:** The total average percentage of the F1000's electricity and Scope 2 emissions to be addressed via renewables. An individual company's target extent is adjusted off this average baseline based on their TR and chosen target extent scenario.

Together with the renewable energy purchase scenarios described above, these adoption targets inform the range of possible results (shown independently in Figure XX, below). In the Baseline Scenario, the average RET extent was set at 50%, and in the Growth Scenario, the average RET extent was set at 80%. Additionally, the Growth Scenario assumed a faster RET adoption and RET begin year than the standard ones applied to the Baseline Scenario.

Figure 14: Indiana sensitivity charts



The chart on the left shows sensitivity to renewable target levels and REC strategy; the chart on the right shows sensitivity to the renewable target start and ramp rate. The Baseline Scenario used in this report is denoted "BL" in both charts.