

an analysis of the new private investment from:

CLEAN ENERGY JOBS ACT

October 28, 2019

THE ACCELERATE GROUP

Summary

October 28, 2019

The Accelerate Group was asked to provide an analysis of the impacts of proposed Illinois energy legislation, referred to as the Clean Energy Jobs Act, on private investment and economic opportunity to the State of Illinois. The Clean Energy Jobs Act, HB3624/SB2132, was introduced by Representative Ann Williams and Senator Cristina Castro in the Illinois General Assembly in Spring 2019 and, among other details, seeks to vastly expand renewable energy development in Illinois, support vehicle electrification, energy storage development, decarbonization of the power sector, investments in fossil fuel communities, and expand energy efficiency.

This Economic Impact Report estimates the total amount of direct private investment into Illinois as leveraged by the policies in the Clean Energy Jobs Act based on the minimum targets and proposals included in the legislative proposal. This report does not attempt to calculate additional indirect or induced economic activity, including any determination of jobs or jobs created.

RESULTS

This Economic Impact Report has calculated that the Clean Energy Jobs Act will lead to **\$39 billion of direct private investment into Illinois by 2030**, above and beyond any explicit subsidy, utility expenditure, or charge to customers.

Within that overall direct private investment determination, the report estimates that \$1.5 billion per year will be invested directly into workforce and labor expenditures, with significant amount of geographic spread in those investments across the state.

Finally, the Report finds that the net gain of local and state income tax, sales tax, and property tax revenue exceeds \$6 billion over the next 20 years.

The Accelerate Group, LLC is an Illinois-based consulting firm that provides analysis and other support for energy policy, civic policy, and other initiatives. Throughout this report, The Accelerate Group uses assumptions and data compiled from sources such as the Department of Energy's National Renewable Energy Laboratory, the Energy Information Administration, published studies and reports, and other publicly-available resources. All external references are cited.

Clean Energy Jobs Act economic impacts

The Clean Energy Jobs Act will drive significant new economic benefits in the state of Illinois.

New Private Investment
into Illinois by 2030

\$39B

Total direct investments from capital and operating expenses from renewable energy development in Illinois exceeds \$39 billion over the next 10 years.

State and Local Tax
Revenue by 2040

\$6B

Sales tax payments from the purchase of goods, income tax revenue from company earnings, and property tax payments to local governments exceed \$6 billion over the next 20 years.

Average Annual Direct
Workforce Investment

\$1.5B/YR

Annual private direct local investments in installation, operations, maintenance, sales and marketing, finance, development, engineering, and other core workforce careers tops \$1.5 billion per year, not including investments in equipment and supply purchases from local businesses or indirect job impacts..

New Private Investment in Illinois

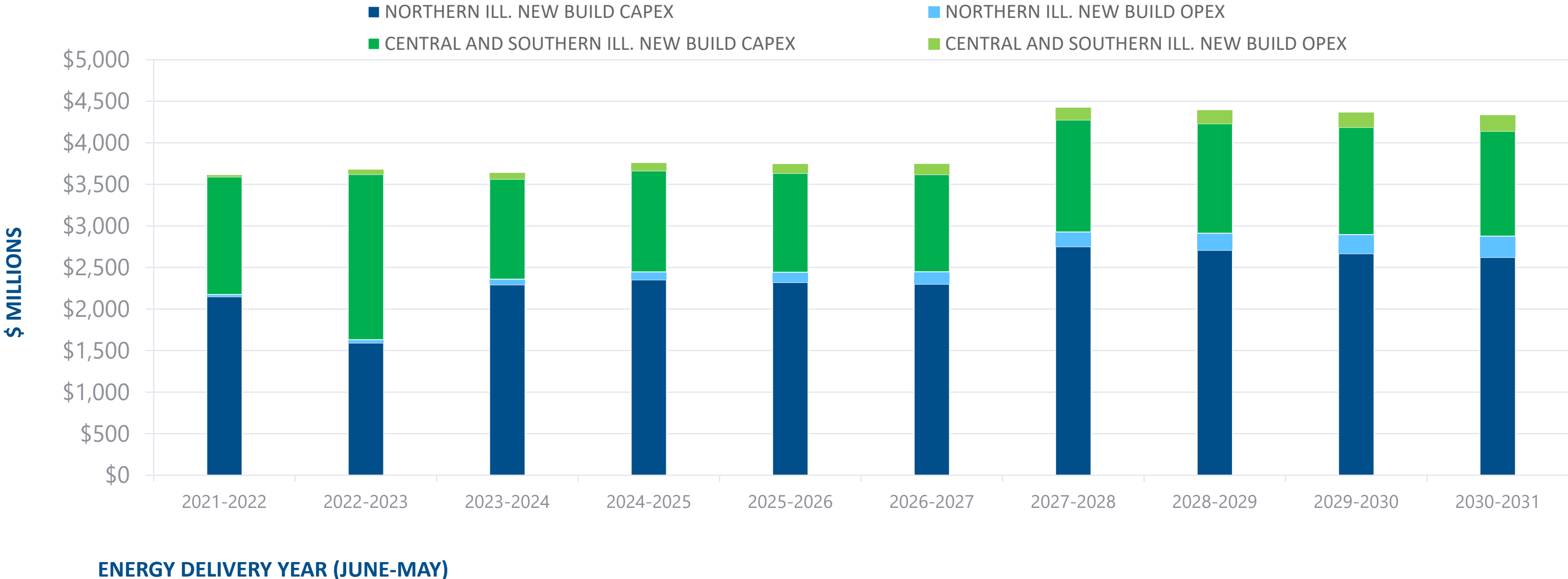
The Clean Energy Jobs Act will create \$39 billion in new private investment in Illinois by 2030, in CapEx and OpEx, with an average annual investment of \$3.9 billion/yr. The capital investment will create a steady investment in new wind turbines, solar panels, electric vehicles, battery storage, electrical infrastructure, structural components, and labor. Operating investment steadily increases over time, with greater investments in maintenance, repair, services, and integration needs.

\$37.1B

TOTAL CAPITAL EXPENDITURES BY 2030

\$2.5B

TOTAL OPERATING EXPENDITURES BY 2030



State and Local Tax Revenue

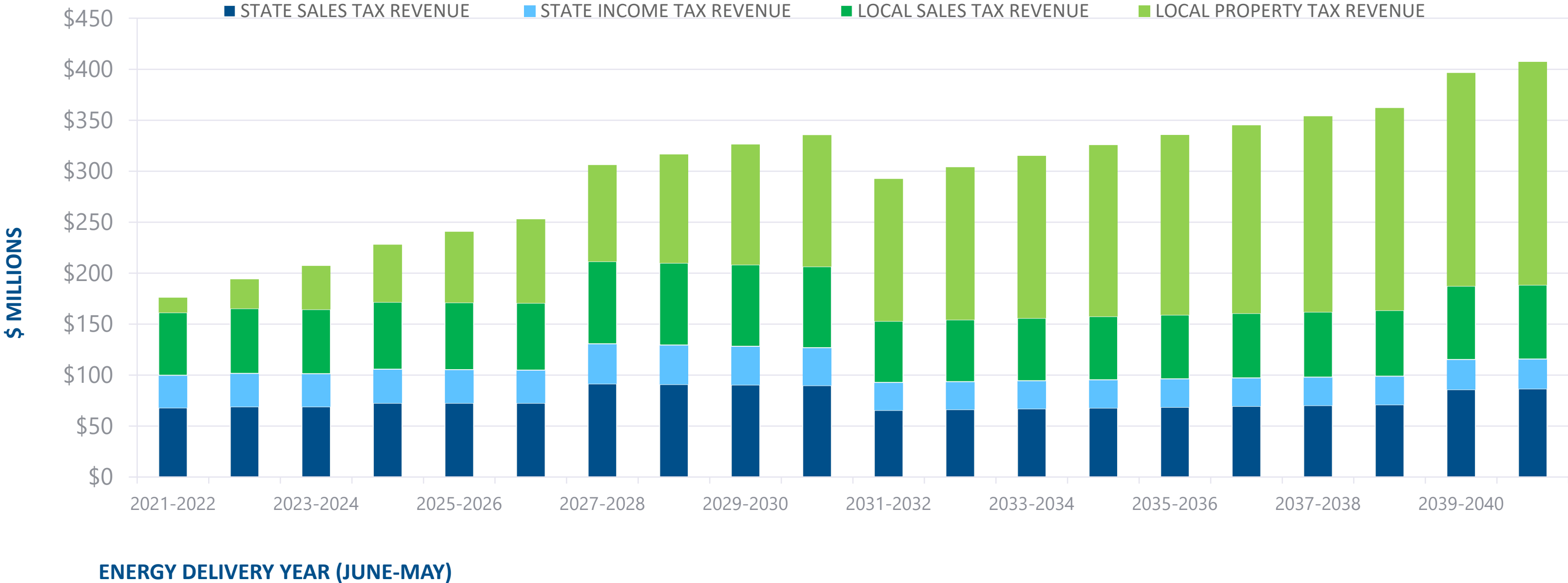
Tax payments from renewable energy developers occur in the short-term on equipment and supplies during development, in the medium term on income, and in long-term from operations costs and land-use property tax payments.

\$2.18B

DIRECT **STATE** INCOME AND SALES TAX REVENUE OVER NEXT 20 YEARS

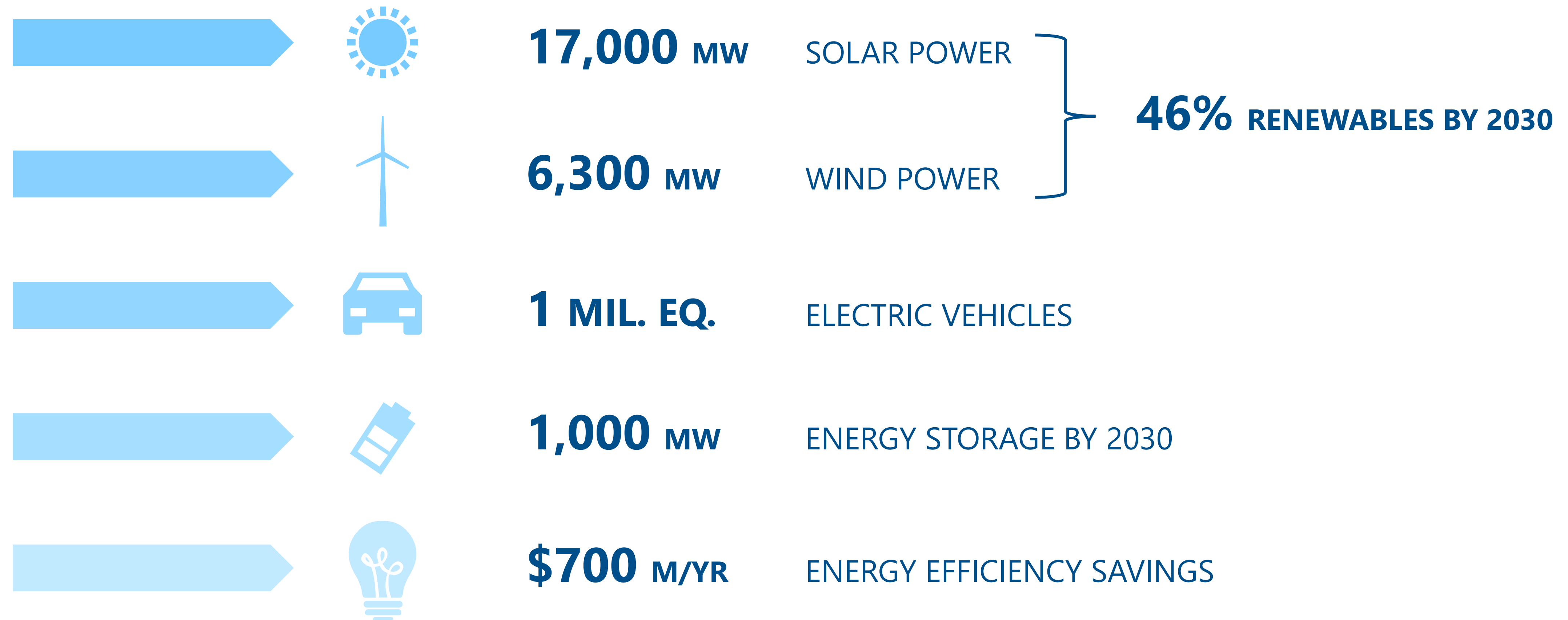
\$3.92B

DIRECT **LOCAL** SALES AND PROPERTY TAX REVENUE OVER NEXT 20 YEARS



Clean Energy Jobs Act Components

The Clean Energy Jobs Act is a wide-ranging bill that looks to make significant changes to state energy policy, that will lead to a significant amount of new renewable energy development, electric vehicle deployment, energy storage deployment, and energy efficiency savings.



Approach

Data Sources and Analysis Used

RENEWABLE ENERGY

To calculate the private investment in different categories of renewable energy (Rooftop and Community Solar, Large Scale Solar, and Wind Power), the report examines the annual new build requirements of the Clean Energy Jobs Act, and calculates the total CapEx and OpEx needed to build the systems in each year of development and operation using the NREL Annual Technology Baseline¹. Further, the report determined the cost of individual components using the NREL U.S. Solar Photovoltaic System Cost Benchmark².

ENERGY STORAGE

To calculate the private investment in energy storage, the report calculated an expected amount of energy storage capacity to be deployed in each year to meet the requirements and needs of the system, and used the NREL Annual Technology Baseline CapEx calculation as well as an NREL study on Installed Cost Benchmarks for energy storage³.

ELECTRIC VEHICLES

To calculate the private investment in supporting the electric vehicle investment as a result of the Clean Energy Jobs Act, this report looked at the total capital expenditure in each year of investment under the proposed spending structure in the legislation. The total private investment includes the cost of charging station infrastructure for fleets, workplaces, residential uses and public use, as well as the marginal increase in transit electrification expenditures⁴. The total private investment does *not* include the costs of customers buying electric vehicles themselves, except for in the low-income vehicle rebate program.

1. *Annual Technology Baseline. National Renewable Energy Laboratory.*

<https://www.nrel.gov/analysis/data-tech-baseline.html>

2. *Fu, Ran, Feldman, David, and Margolis, Robert, National Renewable Energy Laboratory. 2018. U.S. Solar Photovoltaic System Cost Benchmark: Q1 2018. National Renewable Energy Laboratory.*

3. *Ardani, K., E. O'Shaughnessy, R. Fu, C. McClurg, J. Huneycutt, and R. Margolis. 2016. Installed Cost Benchmarks and Deployment Barriers for Residential Solar Photovoltaics with Energy Storage: Q1 2016. National Renewable Energy Laboratory.*

4. *Sources include:*

Electric Vehicle Supply Equipment Installed Cost Analysis: Technical Report. 2014. EPRI

Costs Associated with Non-Residential Electric Vehicle Supply Equipment. 2015. U.S. DOE

Rooftop and Community Solar

Investment analysis findings and results

The Clean Energy Jobs Act established minimum new build requirements for renewable energy of 5 million MWh of new construction delivered each year between the delivery year commencing June 1, 2021 through June 1, 2030.

Of that total, the legislation requires that 50% of the renewable energy total comes from solar photovoltaics, and a percentage of the solar development is to be procured from rooftop and community solar projects through the IPA's Adjustable Block Program. The percentage for rooftop and community solar starts at 33% of the annual requirement, which is the equivalent of 669 MW per year, and grows to 42% of the annual requirement by 2030, which is the equivalent of 827 MW per year.

The CapEx for different types of distributed solar varies significantly across project type and size, ranging from \$2.72/W for residential systems to \$1.82/W for commercial systems, for example, with an average annual price decline of 4.45% per year through 2030.

While state tax revenue holds steady in each year, local tax revenue grows from \$26 million a year to \$40 million a year as property tax payments increase from community solar deployment.

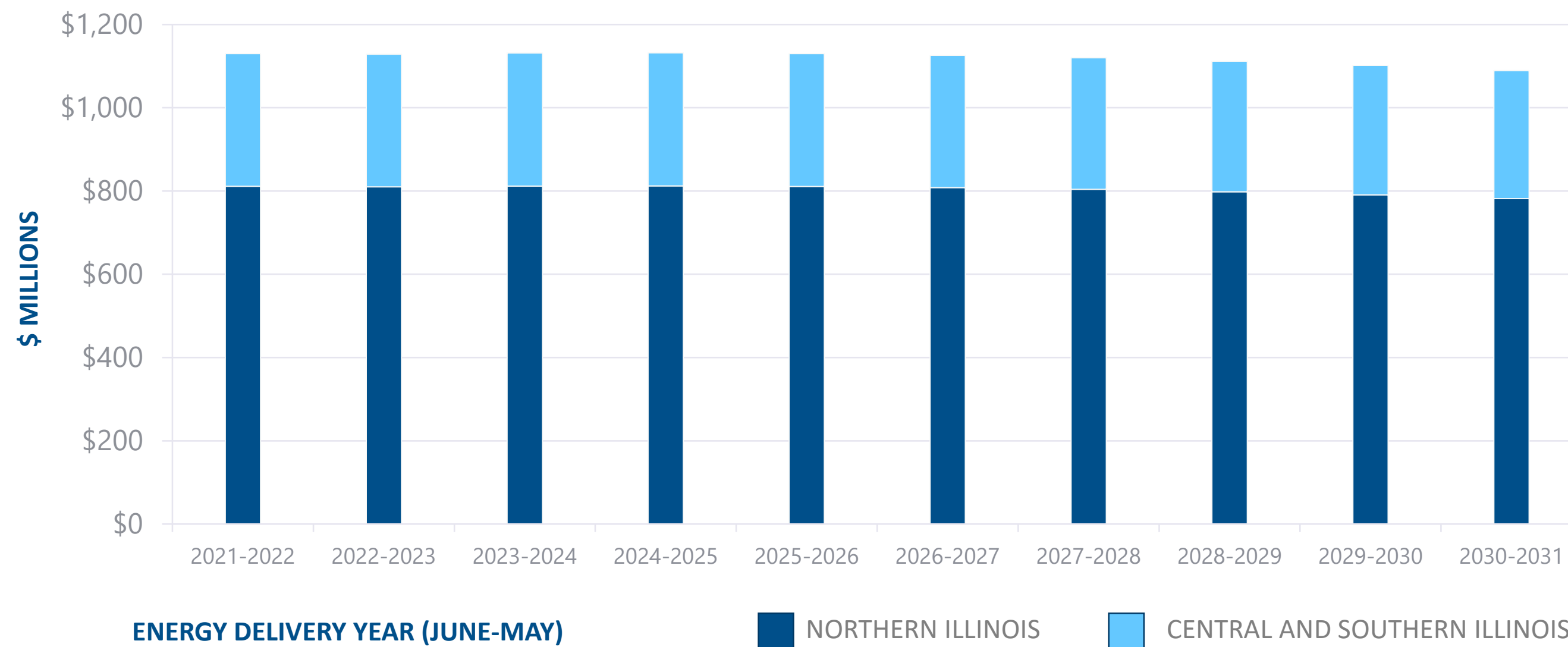
RESULTS

Year	Ann. MW Installed	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2021-2022	669 MW	\$811 m	\$319 m	\$54 m	\$27 m
2022-2023	689 MW	\$810 m	\$318 m	\$54 m	\$28 m
2023-2024	708 MW	\$812 m	\$319 m	\$54 m	\$29 m
2024-2025	728 MW	\$812 m	\$319 m	\$54 m	\$31 m
2025-2026	748 MW	\$811 m	\$319 m	\$53 m	\$33 m
2026-2027	768 MW	\$808 m	\$318 m	\$53 m	\$34 m
2027-2028	787 MW	\$804 m	\$316 m	\$53 m	\$36 m
2028-2029	807 MW	\$798 m	\$314 m	\$52 m	\$37 m
2029-2030	827 MW	\$791 m	\$311 m	\$52 m	\$39 m
2030-2031	846 MW	\$782 m	\$307 m	\$51 m	\$40 m

Rooftop and Community Solar

Rooftop and community solar make up 33-42% of the overall renewable energy portfolio in CEJA. The 25-year investments receive incentives from the Illinois Power Agency for a portion of the cost, but require significant up-front capital investment by developers.

ANNUAL NEW PRIVATE INVESTMENT IN ROOFTOP/COMMUNITY SOLAR (CAPEX + OPEX)

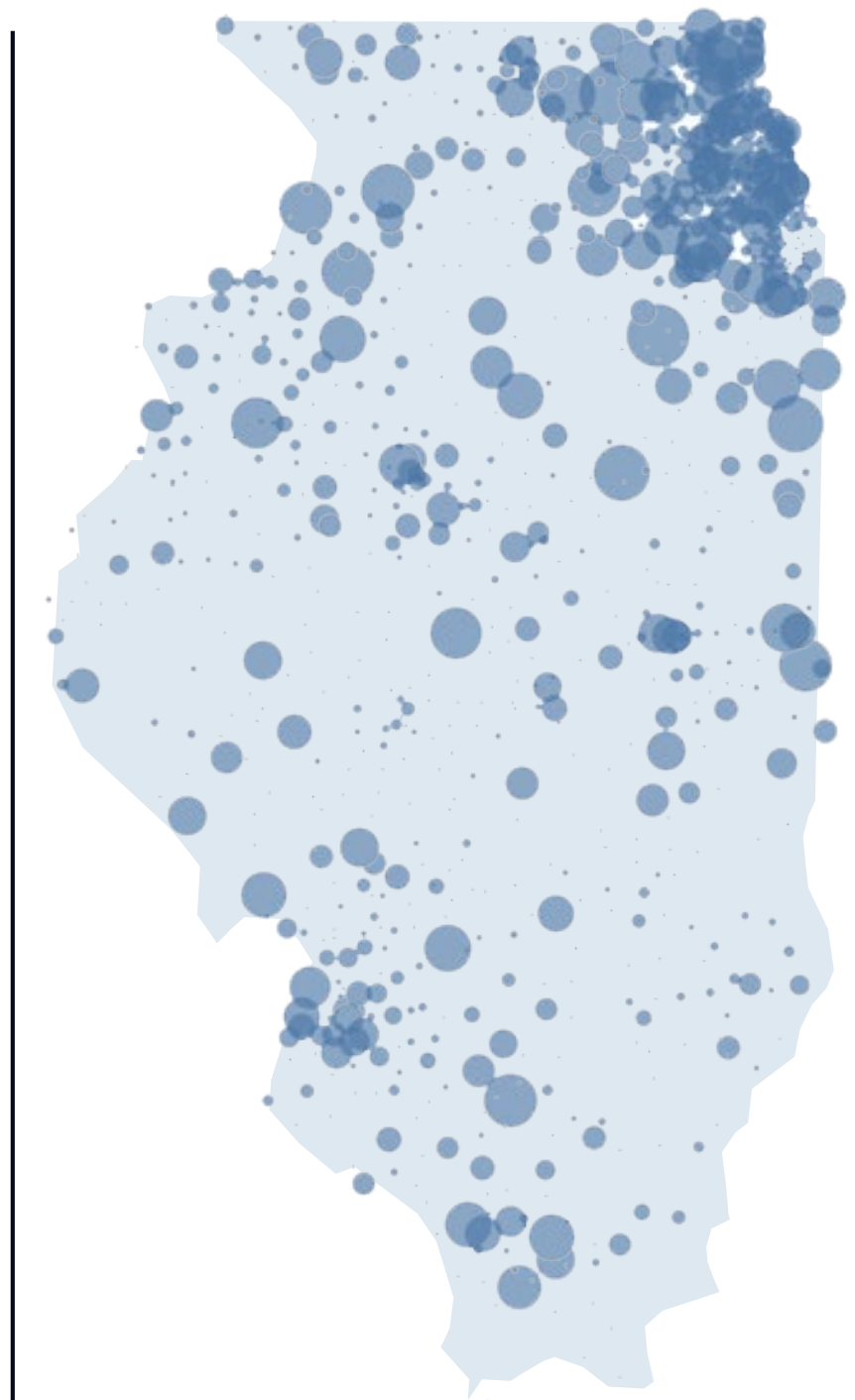


\$3.1 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ROOFTOP SOLAR IN **CENTRAL AND SOUTHERN ILLINOIS.**

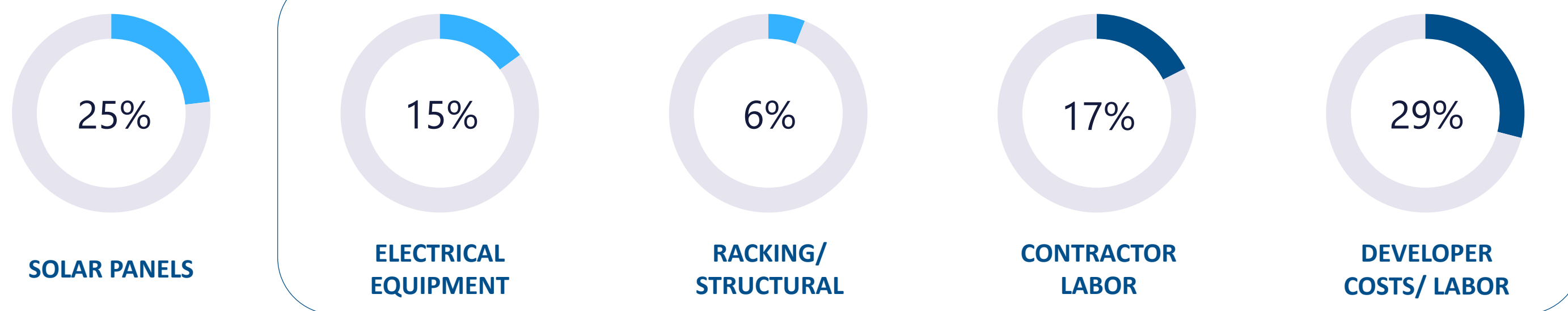
\$8.0 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ROOFTOP SOLAR IN **NORTHERN ILLINOIS.**

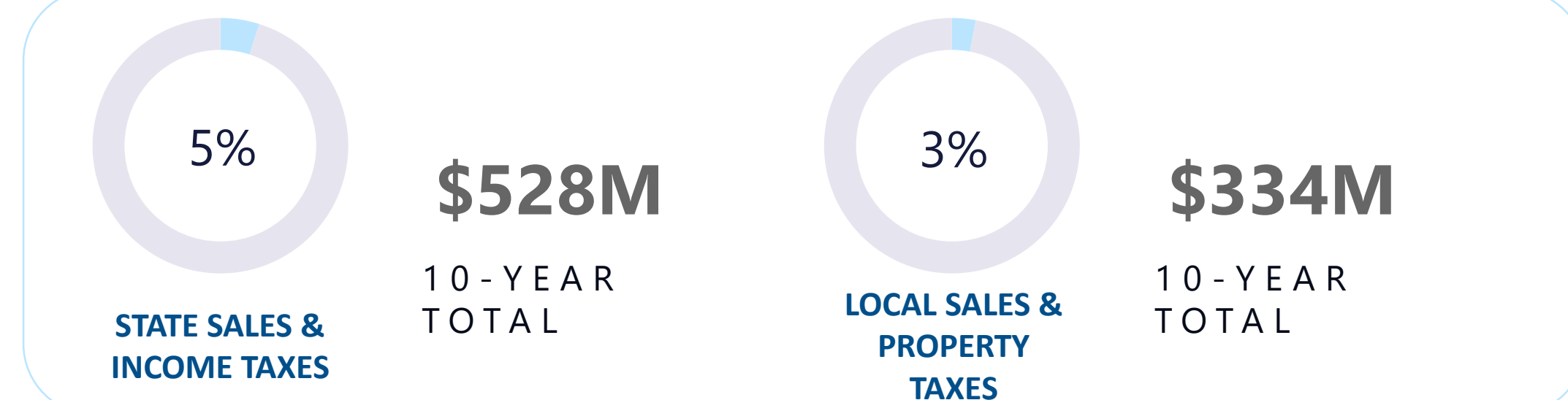


2019 PROJECTS IN DEVELOPMENT

LOCAL EXPENSES AND INVESTMENT



STATE AND LOCAL TAX REVENUE



CAPEX + OPEX

Large-Scale Solar

Investment analysis findings and results

Of the total 5 million MWh of new renewable construction in the legislation each year, 50% of that total comes from solar photovoltaics. The percentage required to come from large-scale, also known as utility-scale, solar projects starts off at 67%, or 1,024 MW per year, and declines each year to 892 MW per year as the required amount from rooftop and community solar ramps up and the projected MWh output from each MW of solar installed increases. The CapEx for large-scale solar from the annual technology baseline starts at around \$1.78/W, and is projected to decline by more than 50% by 2030.

The split between investment in Northern Illinois and Central and Southern Illinois from large-scale solar development is significantly closer than rooftop and community solar, which is mandated to follow the load levels of each region. It is projected that large-scale solar development would deploy more in Central and Southern Illinois due to the availability of land and to replace the capacity loss from the closure of coal plants.

State tax revenue slightly decreases each year as deployed solar becomes less expensive, but local tax revenue grows from \$24 million a year to \$67 million a year as property tax payments increase from solar projects.

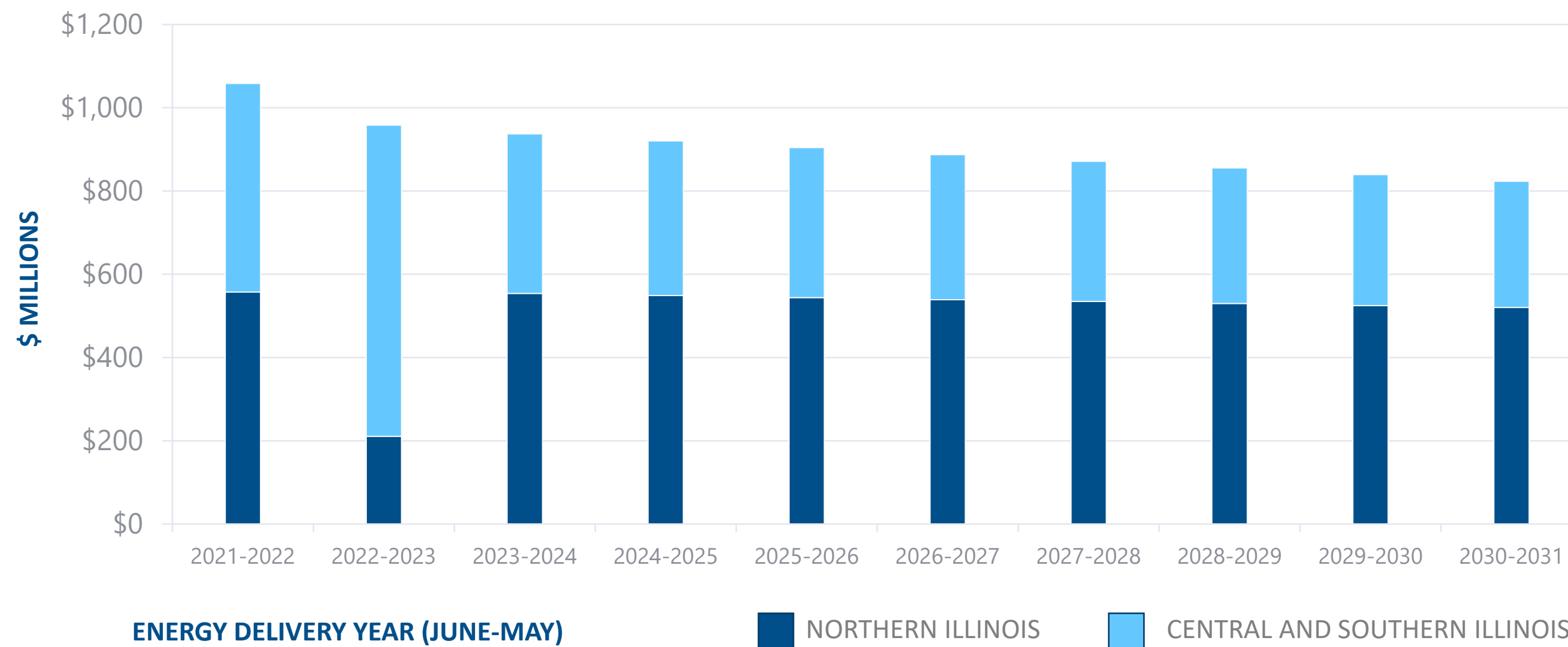
RESULTS

Year	Ann. MW Installed	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2021-2022	1,024 MW	\$557 m	\$501 m	\$40 m	\$24 m
2022-2023	976 MW	\$211 m	\$747 m	\$36 m	\$28 m
2023-2024	999 MW	\$554 m	\$383 m	\$35 m	\$34 m
2024-2025	984 MW	\$549 m	\$371 m	\$34 m	\$39 m
2025-2026	968 MW	\$544 m	\$360 m	\$33 m	\$44 m
2026-2027	953 MW	\$539 m	\$348 m	\$32 m	\$49 m
2027-2028	938 MW	\$535 m	\$336 m	\$31 m	\$54 m
2028-2029	922 MW	\$530 m	\$325 m	\$31 m	\$59 m
2029-2030	907 MW	\$525 m	\$314 m	\$30 m	\$63 m
2030-2031	892 MW	\$520 m	\$303 m	\$29 m	\$67 m

Large-Scale Solar

The goals in CEJA will create an opportunity for close to 9,500 MW of large-scale, or utility-scale, solar projects to be built by 2030, enough to power 2 million homes. The 25-year investments compete for 15-year contracts from the Illinois Power Agency.

ANNUAL NEW PRIVATE INVESTMENT IN LARGE-SCALE SOLAR (CAPEX + OPEX)

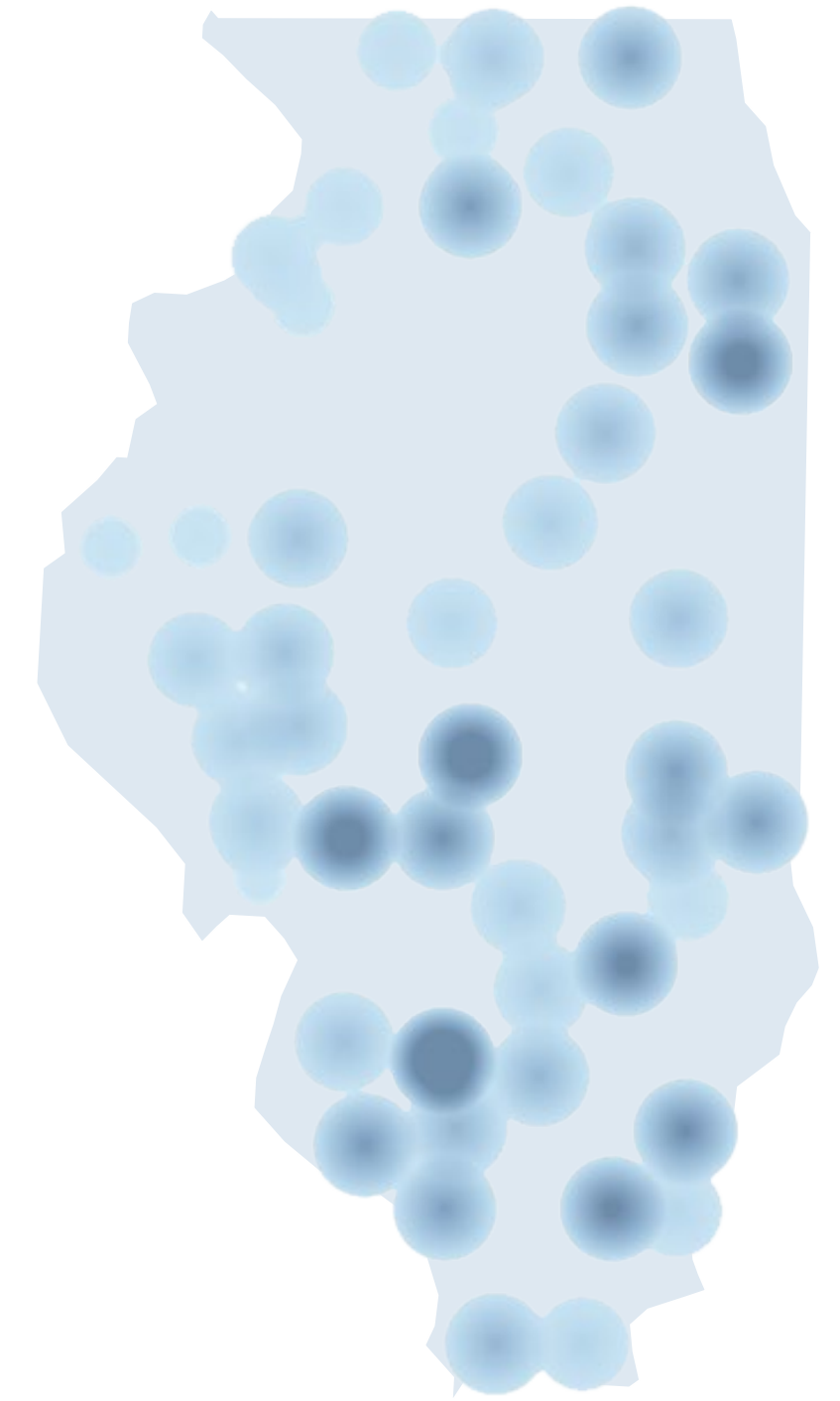


\$4.0 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN LARGE-SCALE SOLAR IN **CENTRAL AND SOUTHERN ILLINOIS.**

\$5.0 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN LARGE-SCALE SOLAR IN **NORTHERN ILLINOIS.**

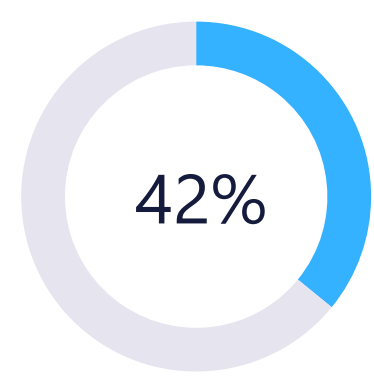


PROJECTS IN DEVELOPMENT

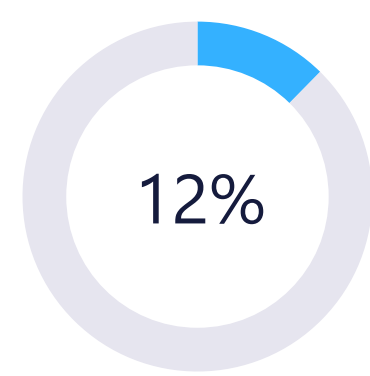
LOCAL EXPENSES AND INVESTMENT

STATE AND LOCAL TAX REVENUE

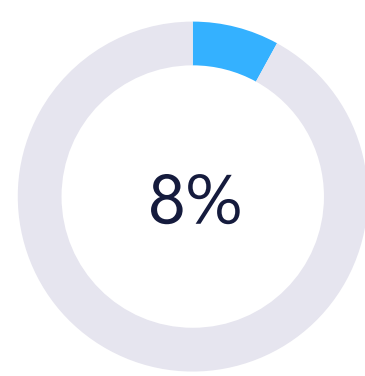
CAPEX + OPEX



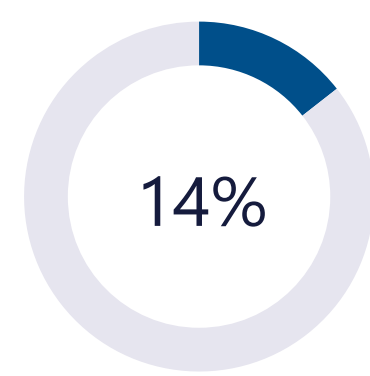
SOLAR PANELS



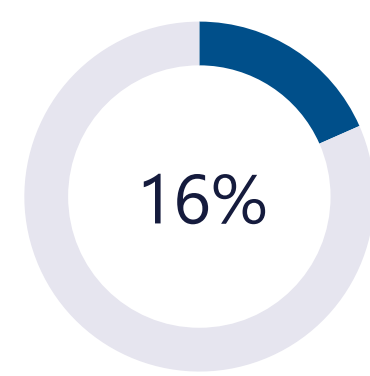
ELECTRICAL EQUIPMENT



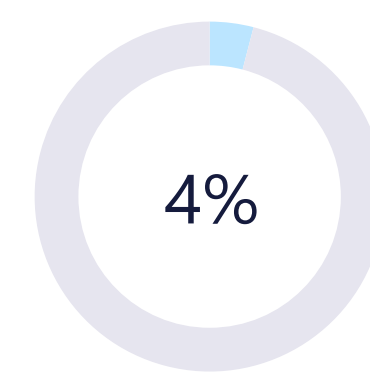
RACKING/ STRUCTURAL



CONTRACTOR LABOR



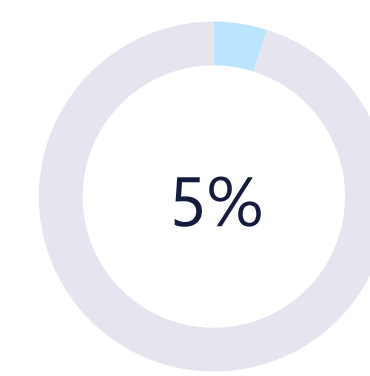
DEVELOPER COSTS/ LABOR



STATE SALES & INCOME TAXES

\$330M

10-YEAR TOTAL



LOCAL SALES & PROPERTY TAXES

\$461M

10-YEAR TOTAL

Wind Power

Investment analysis findings and results

Of the total 5 million MWh of new renewable construction in the legislation each year, 50% of that total comes from wind power projects. Based on market trends, it is not anticipated that any smaller-scale wind power projects would be economically viable, and one-hundred percent of wind power projects resulting from the Clean Energy Jobs Act will be larger-scale wind farms.

The CapEx for wind power projects averages around \$1.52/W, through 2030, with minimal price declines, and about a 10% variability in cost for projects based on their geographic region.

The split between investment in Northern Illinois and Central and Southern Illinois from wind power development is similarly close. Similar to large-scale solar development, it is projected that wind power development would deploy more in Central and Southern Illinois due to the availability of land and to replace the capacity loss from the closure of coal plants. However, the stronger wind resources are located closer to northern and northwest Illinois.

State tax revenue slightly increases each year as additional operating expenditures, maintenance, and replacement become expenses for wind farms, and local tax revenue grows significantly from \$25 million a year to \$81 million a year as property tax payments increase.

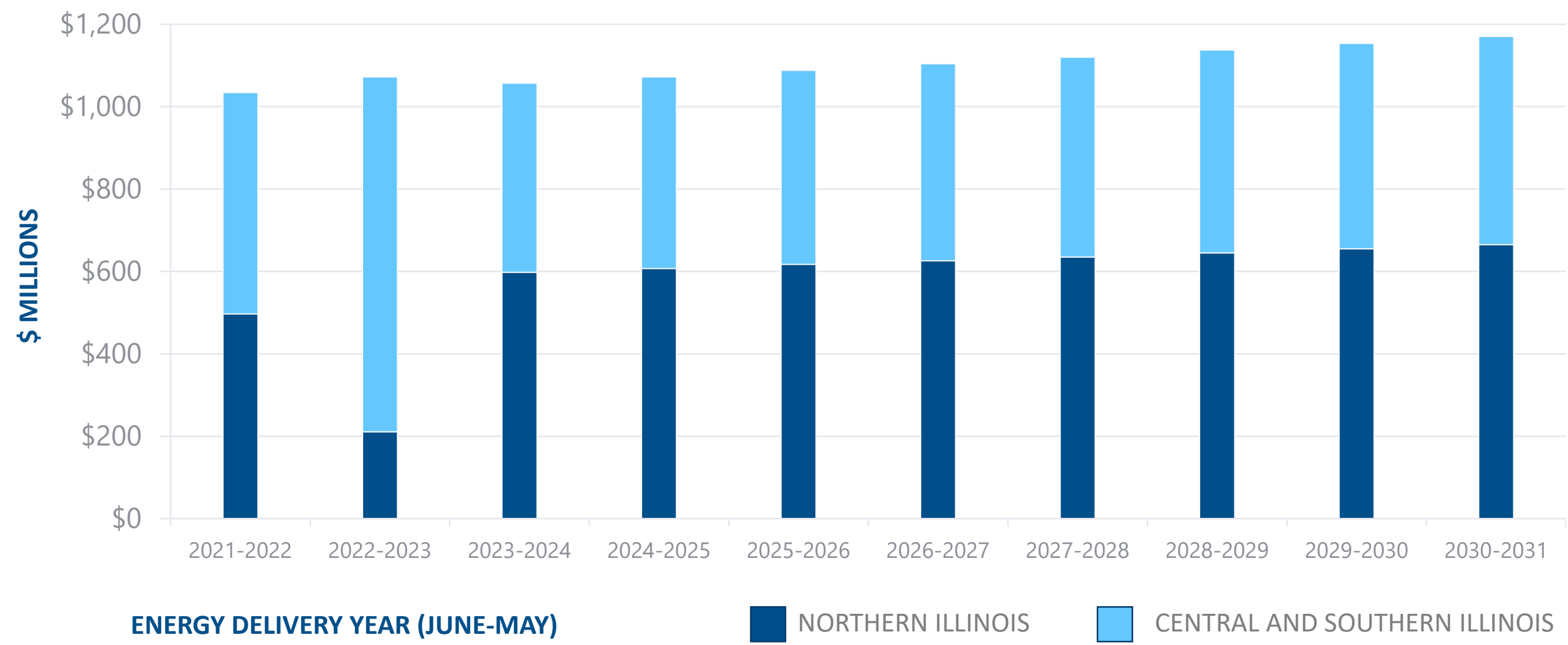
RESULTS

Year	Ann. MW Installed	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2021-2022	654 MW	\$497 m	\$537 m	\$4 m	\$25 m
2022-2023	659 MW	\$211 m	\$861 m	\$5 m	\$33 m
2023-2024	639 MW	\$598 m	\$459 m	\$6 m	\$39 m
2024-2025	634 MW	\$607 m	\$465 m	\$7 m	\$46 m
2025-2026	629 MW	\$617 m	\$471 m	\$8 m	\$52 m
2026-2027	624 MW	\$626 m	\$478 m	\$9 m	\$58 m
2027-2028	620 MW	\$635 m	\$485 m	\$10 m	\$64 m
2028-2029	616 MW	\$645 m	\$492 m	\$10 m	\$70 m
2029-2030	611 MW	\$655 m	\$498 m	\$11 m	\$76 m
2030-2031	607 MW	\$665 m	\$505 m	\$12 m	\$81 m

Wind Power

The goals in CEJA will create an opportunity for close to 6,300 MW of large-scale, or utility-scale, wind projects to be built by 2030, enough to power 3 million homes. The 25-year investments compete for 15-year contracts from the Illinois Power Agency.

ANNUAL NEW PRIVATE INVESTMENT IN WIND POWER (CAPEX + OPEX)

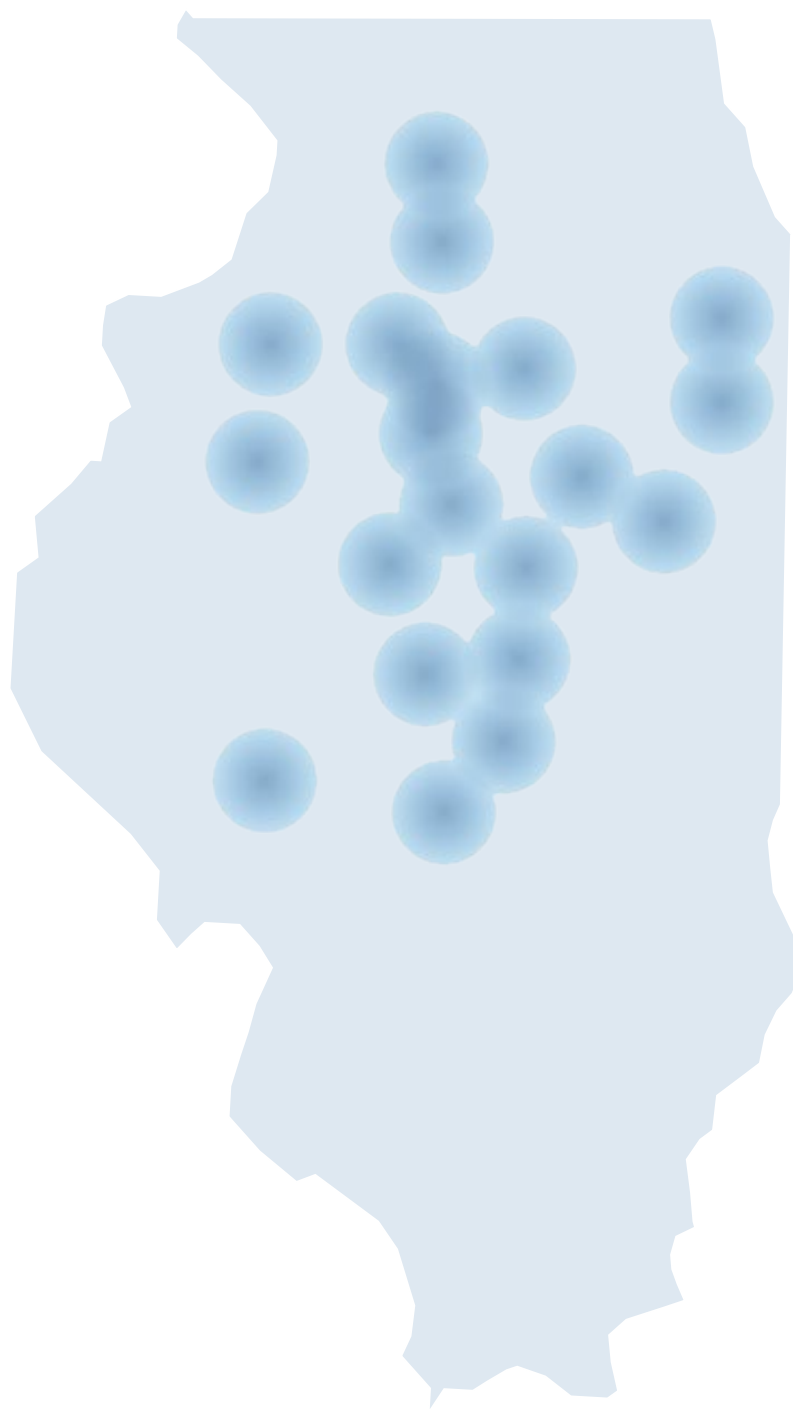


\$5.2 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN WIND POWER IN **CENTRAL AND SOUTHERN ILLINOIS.**

\$5.7 BILLION

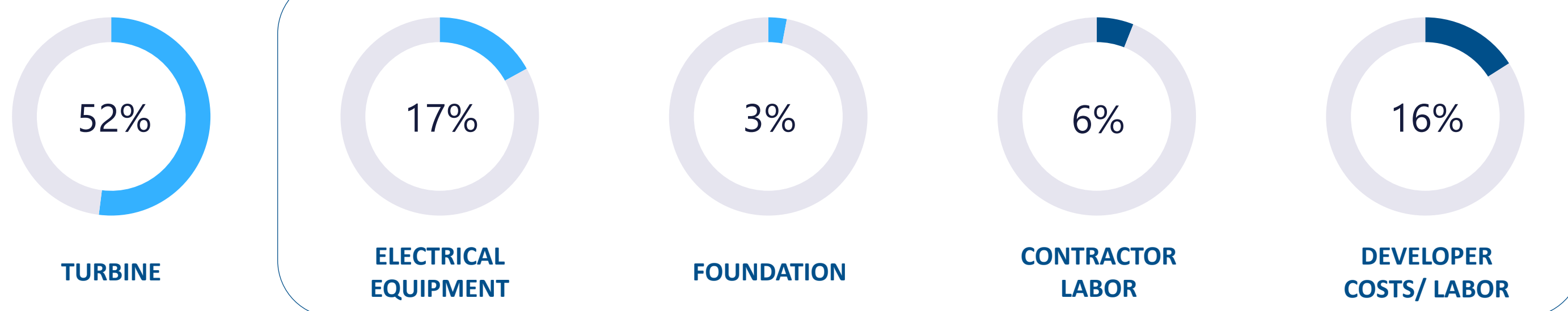
10-YEAR TOTAL PRIVATE INVESTMENT IN WIND POWER IN **NORTHERN ILLINOIS.**



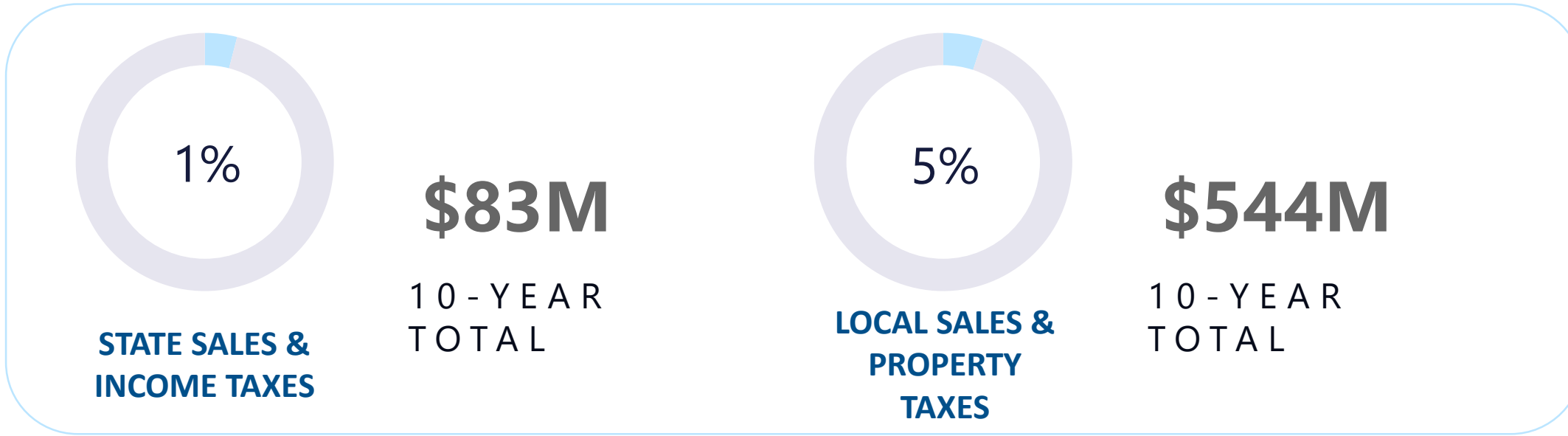
PROJECTS IN DEVELOPMENT

CAPEX + OPEX

LOCAL EXPENSES AND INVESTMENT



STATE AND LOCAL TAX REVENUE



Electric Vehicles

Investment analysis findings and results

Clean Energy Jobs Act investments in transportation electrification fall into three primary categories:

- a) EV Access for All spending that includes rebates for vehicle purchase for low-income residents, electric car sharing programs, and last-mile electric shuttles serving transit deserts.
- b) Spending to support Medium- and Heavy-Duty electrification, with a specific investment focus on public transit bus electrification. This also includes government and private fleet electrification
- c) Mass market charging infrastructure to support optimized charging in homes, workplaces, on the go, and includes investments in DC fast charging.

The investments in electric vehicle infrastructure are pretty flat over time, and are projected to be allocated between Northern Illinois and Central and Southern Illinois in a 72%/28% split. The CapEx for electric vehicles charging infrastructure can vary significantly from \$500-\$2,700 for a residential installation, to \$3,000-\$4,000 for some workplace or fleet charging stations, to \$100,000 or more for a transit bus or heavy-duty vehicle.

Private investment calculations do not include the private purchase of vehicles (other than those through the low-income vehicle rebate), or the direct cost of programs if not accompanied by additional private investment.

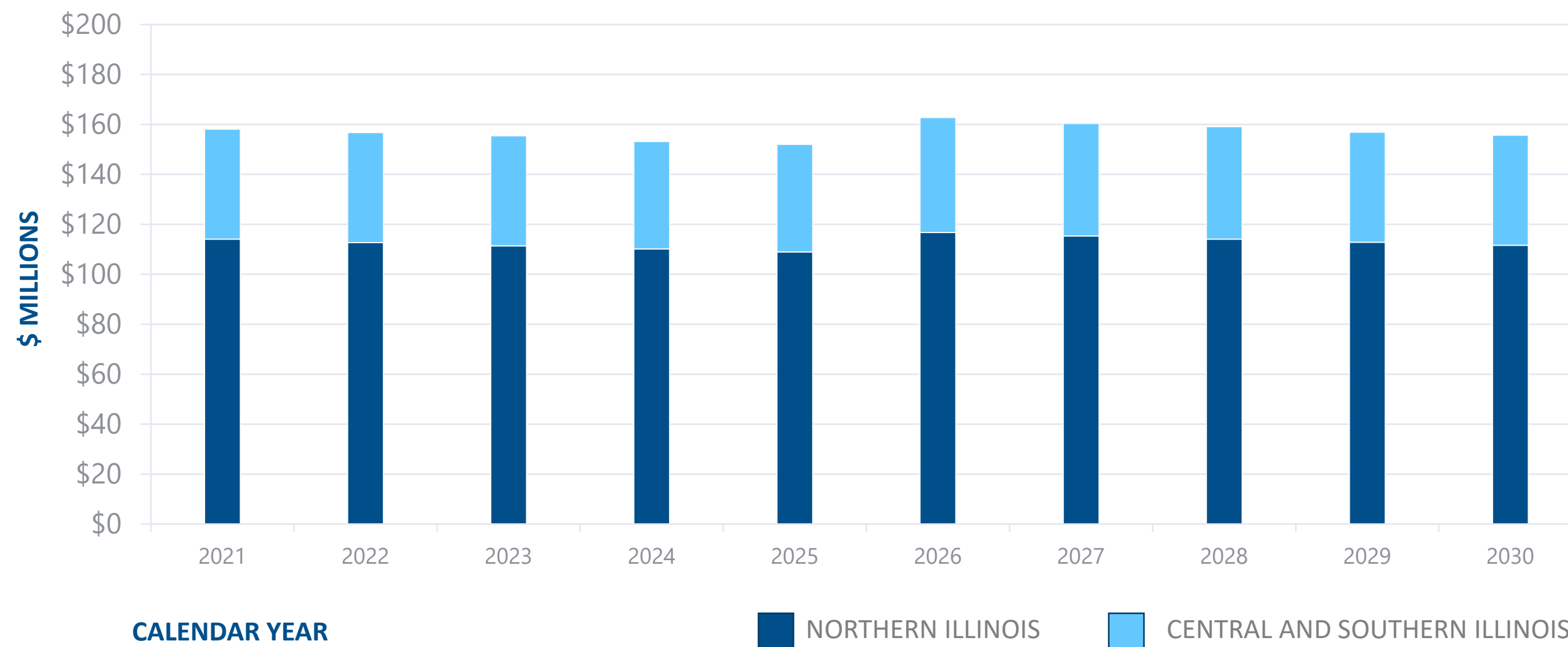
RESULTS

Year	Vehicles Supported	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2021	57,000	\$114 m	\$44 m	\$2 m	\$1 m
2022	113,000	\$113 m	\$44 m	\$2 m	\$1 m
2023	169,000	\$111 m	\$44 m	\$2 m	\$1 m
2024	224,000	\$110 m	\$43 m	\$2 m	\$1 m
2025	279,000	\$109 m	\$43 m	\$2 m	\$1 m
2026	335,000	\$117 m	\$46 m	\$2 m	\$1 m
2027	390,000	\$115 m	\$45 m	\$2 m	\$1 m
2028	445,000	\$114 m	\$45 m	\$2 m	\$1 m
2029	500,000	\$113 m	\$44 m	\$2 m	\$1 m
2030	554,000	\$112 m	\$44 m	\$2 m	\$1 m

Electric Vehicles

The beneficial electrification components of CEJA will remove the equivalent of 1 million gasoline and diesel vehicles from the road, with a focus on medium- and heavy-duty vehicles, fleet electrification, and programs for low-income communities.

ANNUAL NEW PRIVATE INVESTMENT IN ELECTRIC VEHICLES (CAPEX)

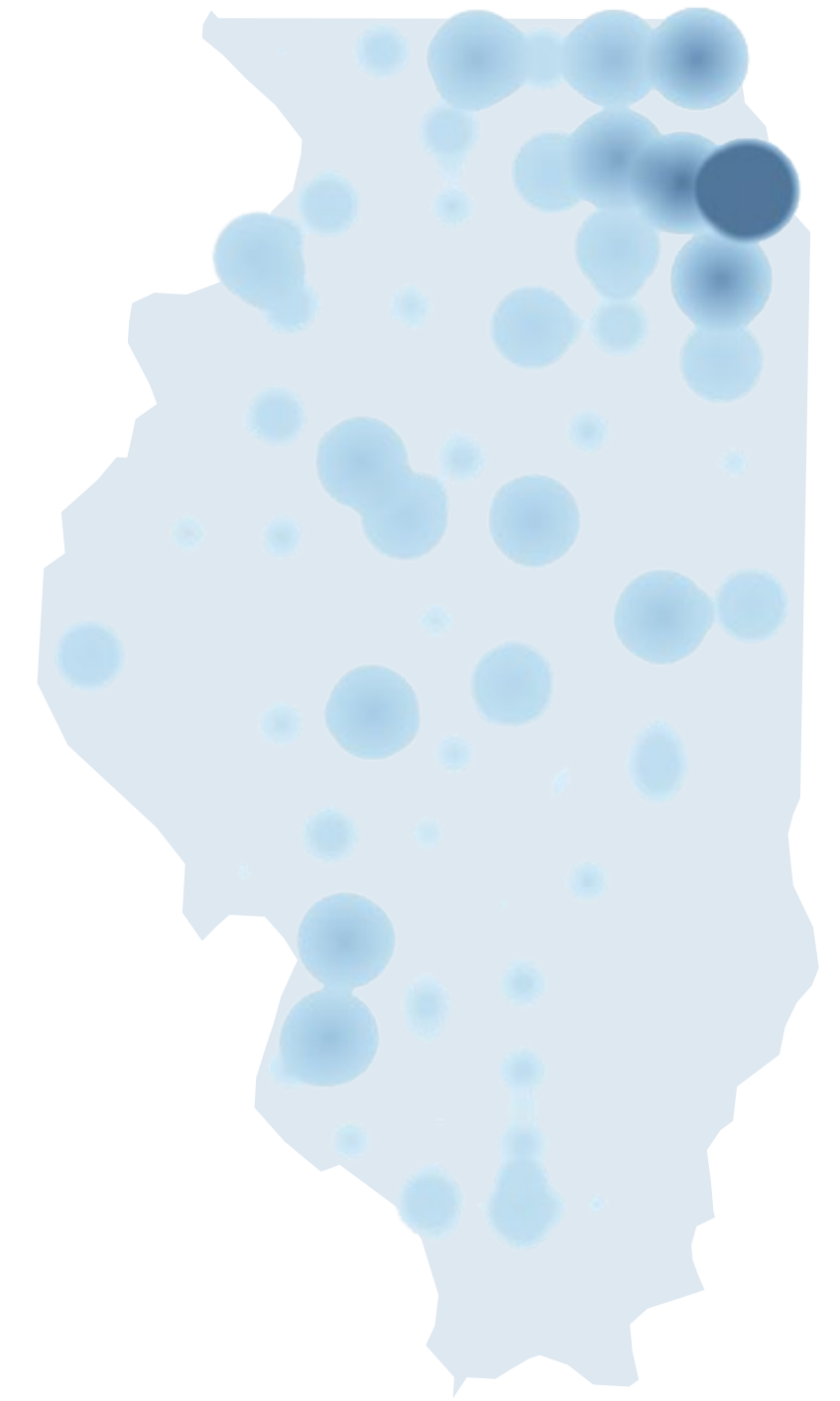


\$441 MILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ELECTRIC VEHICLES IN **CENTRAL AND SOUTHERN ILLINOIS.**

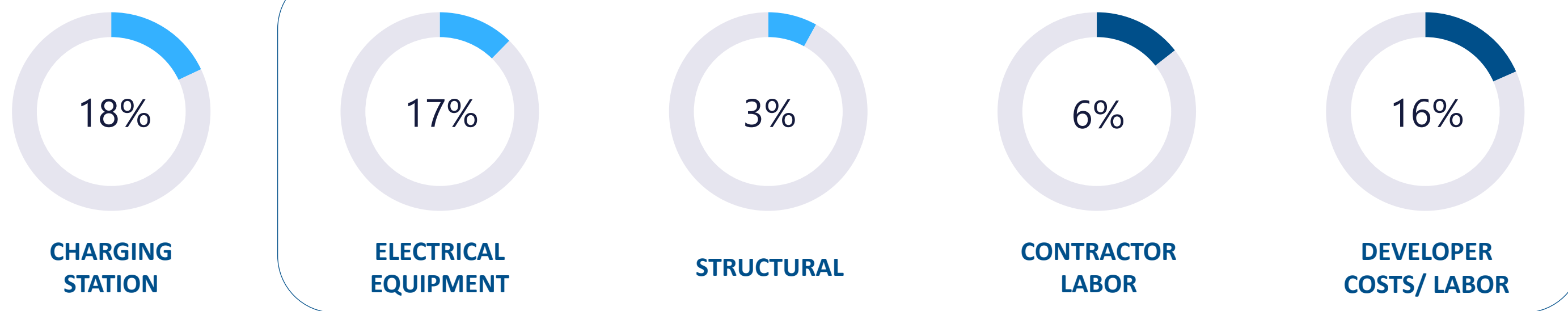
\$1.1 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ELECTRIC VEHICLES IN **NORTHERN ILLINOIS.**

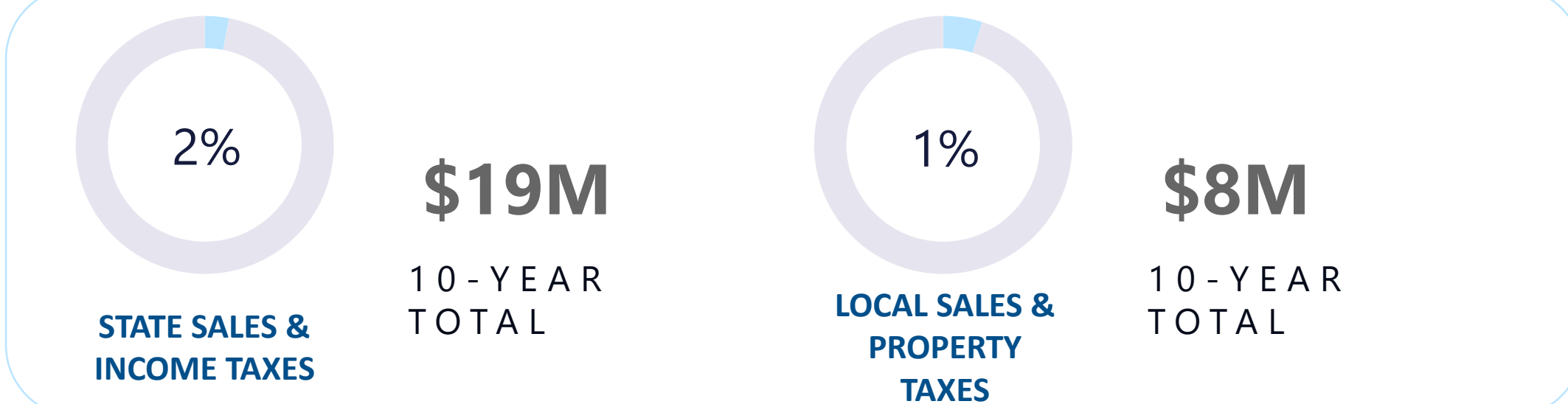


PROJECTED INVESTMENT AREAS

LOCAL EXPENSES AND INVESTMENT



STATE AND LOCAL TAX REVENUE



CAPEX (RESI.)

Energy Storage

Investment analysis findings and results

The Clean Energy Jobs Act would support the development of energy storage on the electric grid to serve a variety of functions, including: a) providing peak reduction or demand response in a capacity market, b) supporting the cost-effective integration of renewable energy, and c) providing distribution grid services to support reliability and reduce customer costs.

In modeling the amounts of energy storage sited on customer premises to serve these needs, the report analyzed the amount of high generation hours that could be shifted to higher load hours, and projected a need of 1,400 MW of energy storage, with close to 30% of that need in Central and Southern Illinois, and the remainder in Northern Illinois.

The investments in energy storage are not needed immediately, and ramp up dramatically post-2026 in the analysis, when energy storage costs are projected to have decreased by greater than 30%. Still, the projected cost of a 6 kWh residential storage system adds \$1,500/kWh to the cost of a residential solar system.

The majority of the costs for residential energy storage systems are not the battery cells themselves, but the inverters, balance of system costs, labor, and back-office costs.

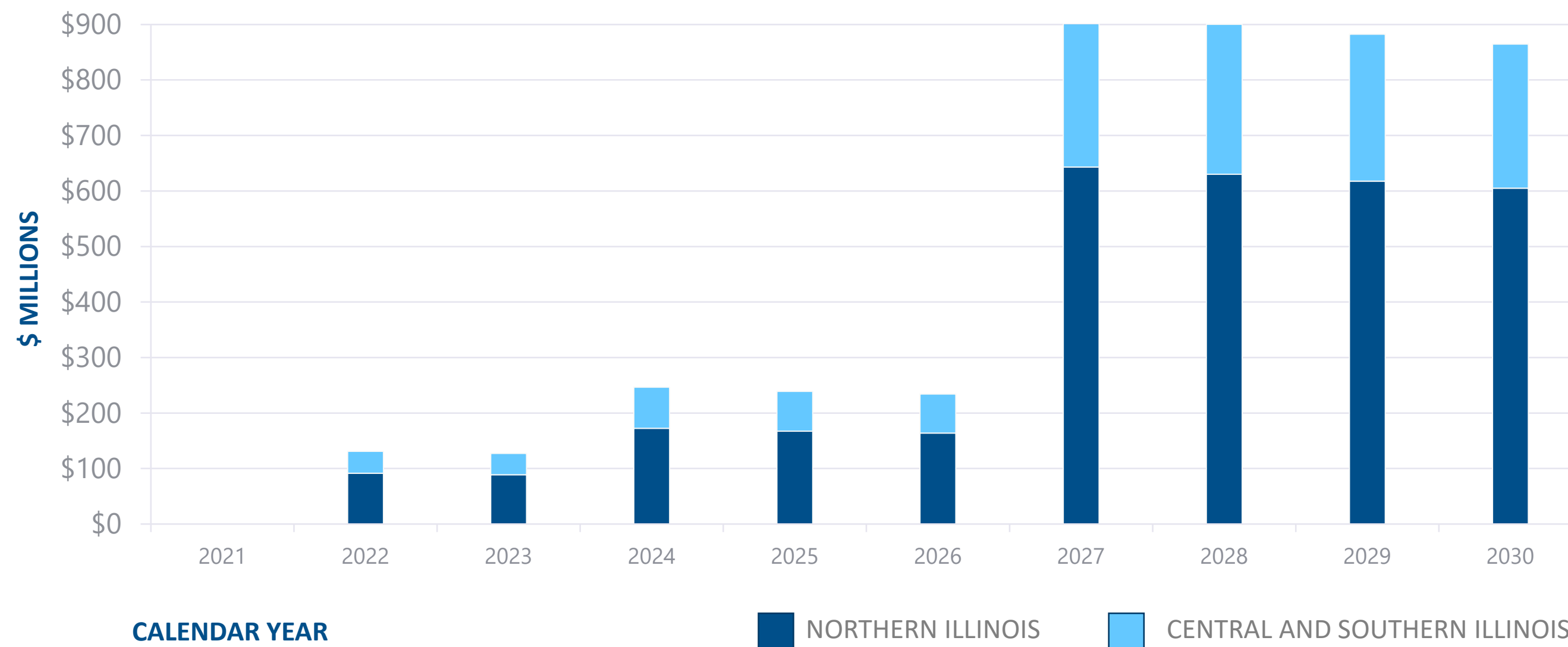
RESULTS

Year	New MW	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2021					
2022	35	\$92 m	\$39 m	\$5 m	\$3 m
2023	35	\$89 m	\$38 m	\$5 m	\$3 m
2024	70	\$173 m	\$74 m	\$9 m	\$5 m
2025	70	\$167 m	\$72 m	\$9 m	\$5 m
2026	70	\$164 m	\$70 m	\$9 m	\$5 m
2027	280	\$643 m	\$276 m	\$35 m	\$20 m
2028	280	\$630 m	\$270m	\$34 m	\$20 m
2029	280	\$618 m	\$265 m	\$34 m	\$20 m
2030	280	\$605 m	\$259 m	\$33 m	\$19 m

Energy Storage

CEJA includes opportunities for energy storage, such as batteries, to reduce peak load, help integrate renewable energy, and provide reliability and other grid services. It is projected that CEJA leads to the development of 1,425 MW of battery storage by 2030.

ANNUAL NEW PRIVATE INVESTMENT IN ENERGY STORAGE (CAPEX)

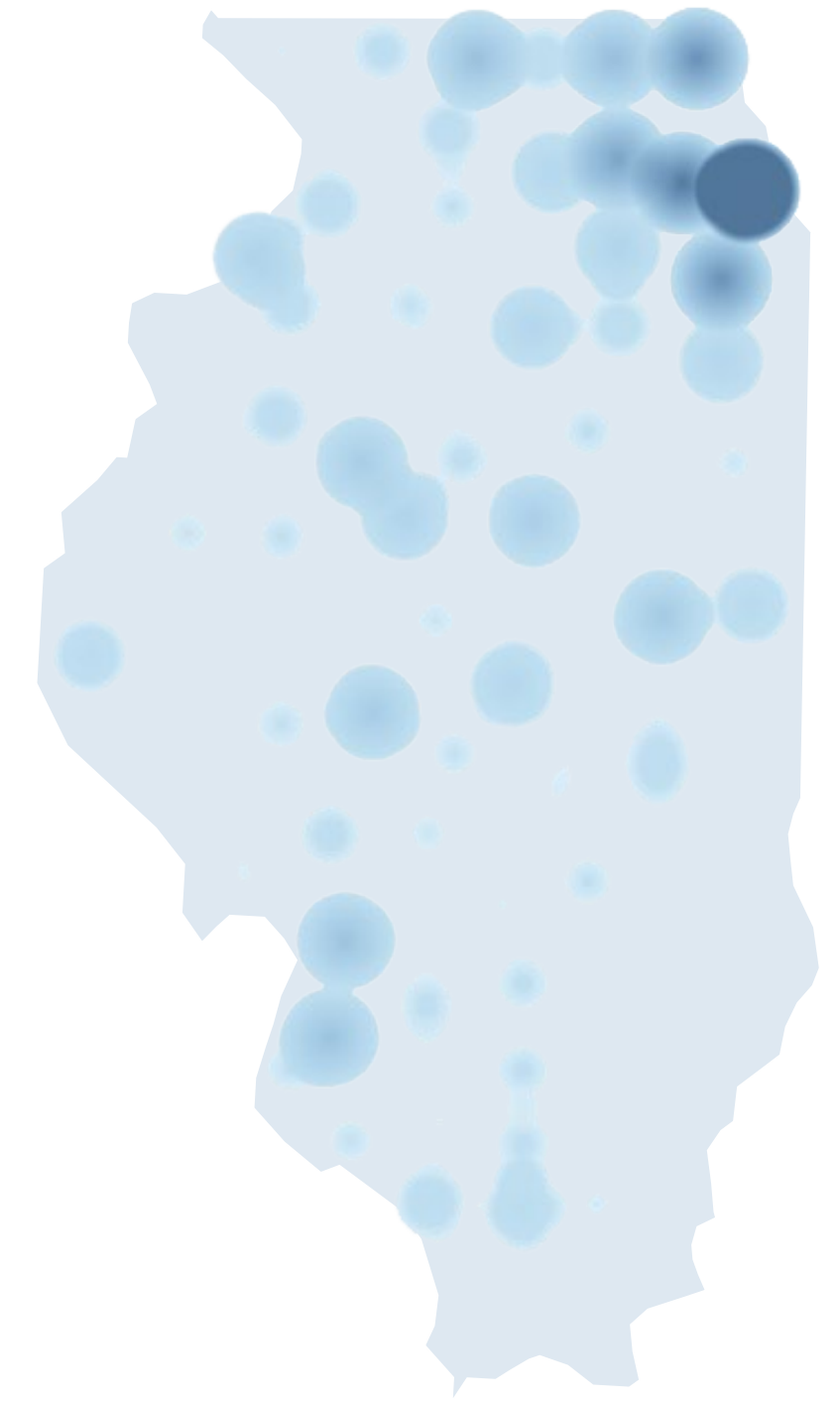


\$1.4 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ENERGY STORAGE IN **CENTRAL AND SOUTHERN ILLINOIS.**

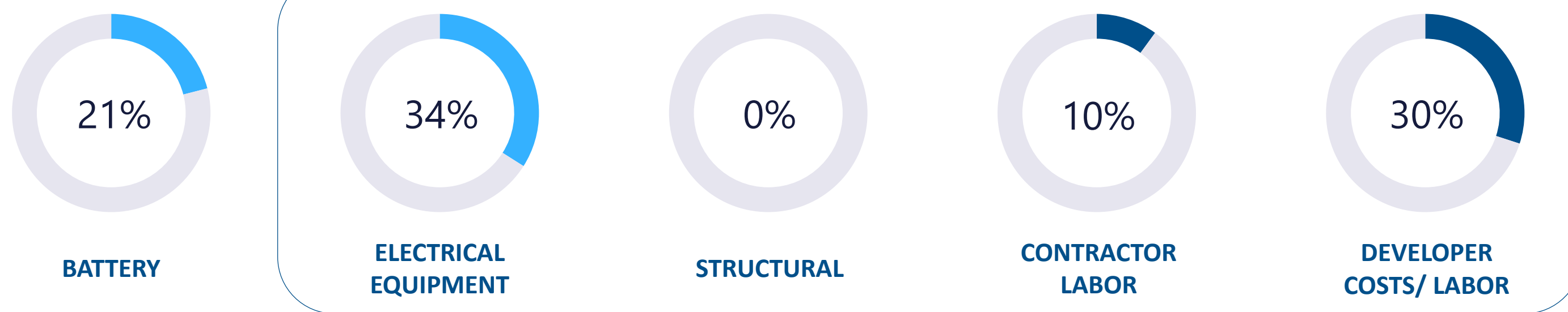
\$3.2 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ENERGY STORAGE IN **NORTHERN ILLINOIS.**

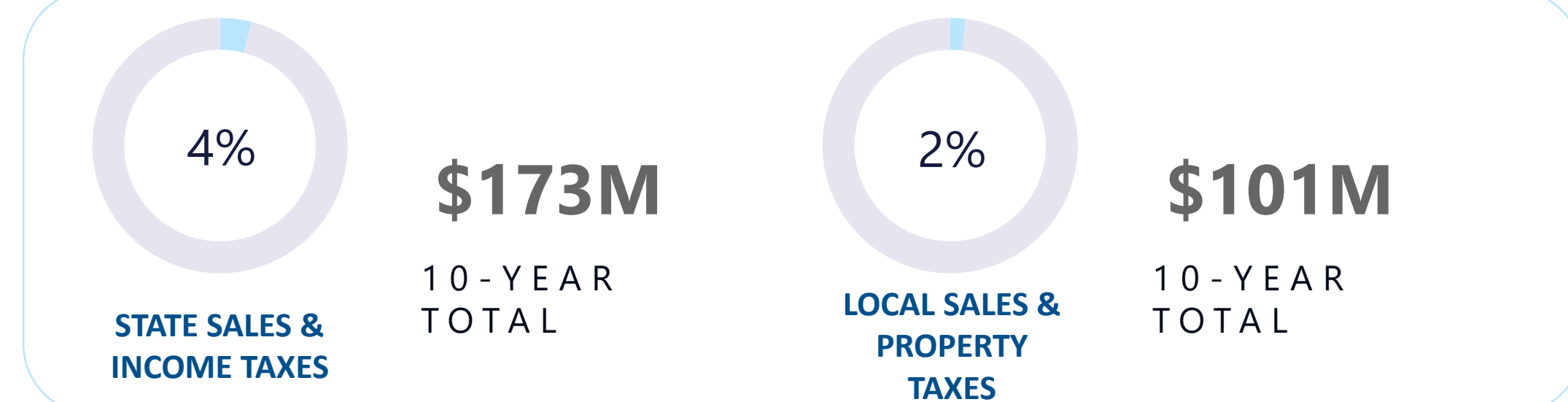


PROJECTED INVESTMENT AREAS

LOCAL EXPENSES AND INVESTMENT



STATE AND LOCAL TAX REVENUE



CAPEX + OPEX

Energy Efficiency

Investment analysis findings and results

The Clean Energy Jobs Act would expand the gas utility energy efficiency programs to triple the amount of savings achieved, with a requirement that 50% of program spending be on whole building programs or measures that reduce heating needs, including insulation, air sealing, duct sealing, demand control ventilation in commercial buildings, and advanced thermostats. There is a reduced reliance on rebates for heating equipment in the revised programs. Further, a minimum of 20% of program investment is required for low-income single-family or multi-family programs.

It is projected that new gas efficiency programs would total \$301 million statewide, generating a total of \$241 million in annual private investment on top of the program spending¹. It is assumed for this analysis that low-income programs do not include a customer private investment.

A significant portion of energy efficiency spending is on labor for the residential, commercial and industrial retrofit programs, comprising 60% of total costs².

RESULTS

Year	North. Ill. (CapEx + Opex)	Cent./South. Ill. (CapEx + Opex)	State Tax Revenue	Local Tax Revenue
2020				
2021				
2022	\$194 m	\$46 m	\$5 m	\$4 m
2023	\$194 m	\$46 m	\$5 m	\$4 m
2024	\$194 m	\$46 m	\$5 m	\$4 m
2025	\$194 m	\$46 m	\$5 m	\$4 m
2026	\$194 m	\$46 m	\$5 m	\$4 m
2027	\$194 m	\$46 m	\$5 m	\$4 m
2028	\$194 m	\$46 m	\$5 m	\$4 m
2029	\$194 m	\$46 m	\$5 m	\$4 m
2030	\$194 m	\$46 m	\$5 m	\$4 m

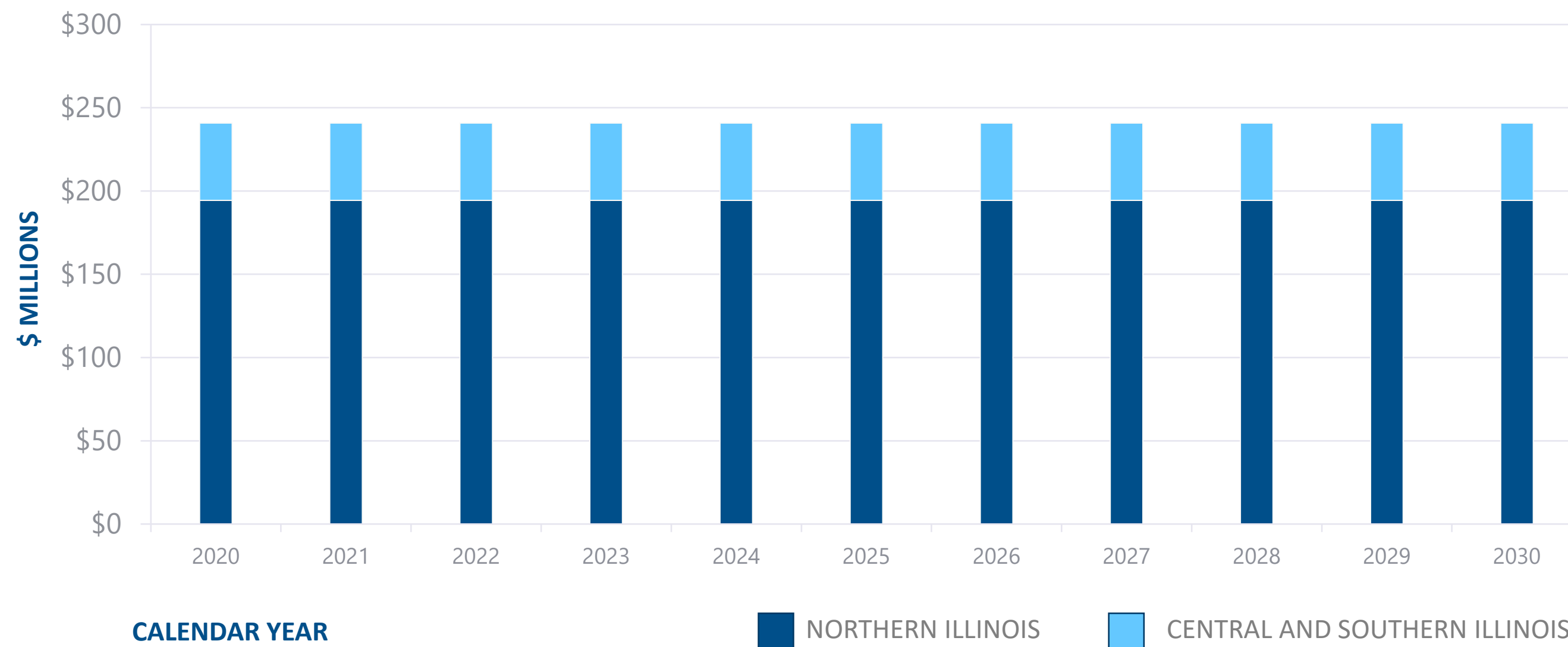
1. Neme, C. *Analysis of Gas Efficiency Provisions*. 2019. Energy Futures Group.

2. Based on Stanton et al *Economic Impacts of NRDC Carbon Standard*. 2013. Synapse Energy Economics, Inc.

Energy Efficiency

CEJA expands gas utility energy efficiency programs to create significant savings, with a focus on home retrofits, commercial retrofits, and investments that have long-term savings and rely more on labor and repairs than equipment purchases.

ANNUAL NEW PRIVATE INVESTMENT IN ENERGY EFFICIENCY (CAPEX)

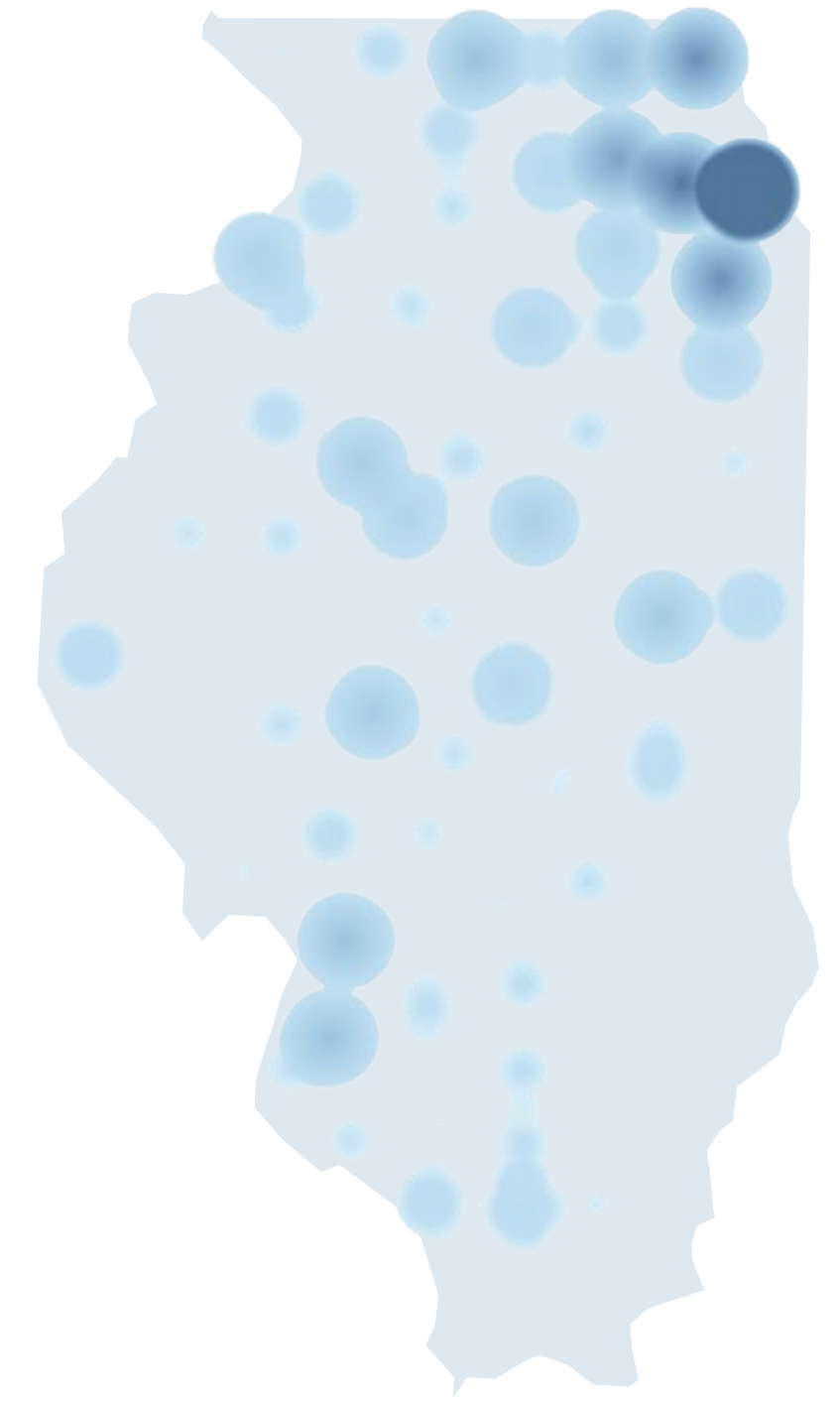


\$0.5 BILLION

10-YEAR TOTAL PRIVATE INVESTMENT IN ENERGY EFFICIENCY IN **CENTRAL AND SOUTHERN ILLINOIS.**

\$2.1 BILLION

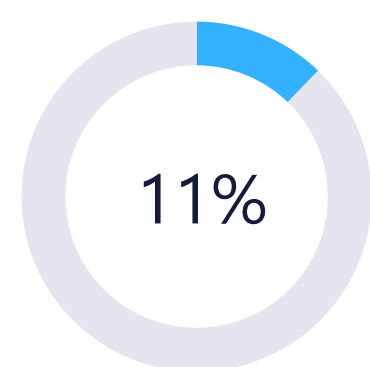
10-YEAR TOTAL PRIVATE INVESTMENT IN ENERGY EFFICIENCY IN **NORTHERN ILLINOIS.**



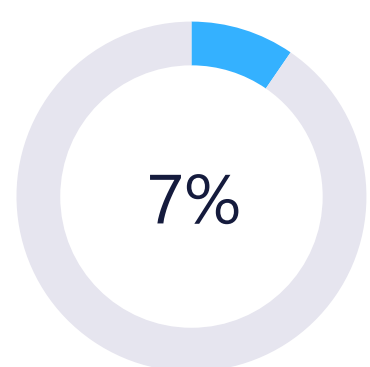
PROJECTED INVESTMENT AREAS

LOCAL EXPENSES AND INVESTMENT

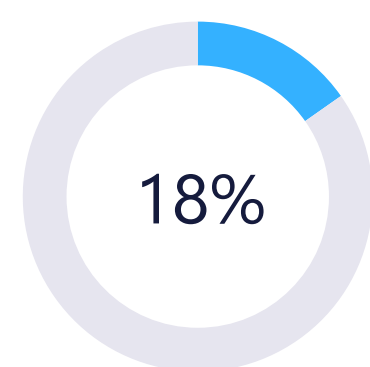
CAPEX + OPEX



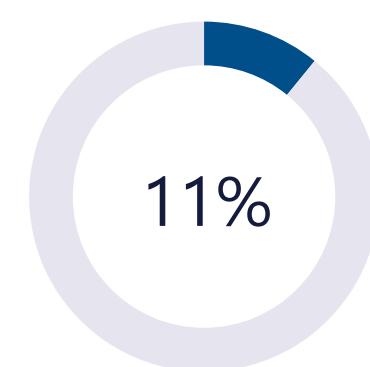
HVAC + TECHNOLOGY



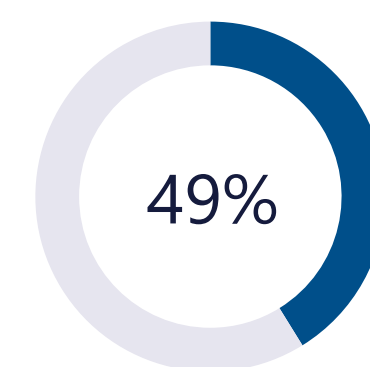
INDUSTRIAL MACHINERY



OTHER MATERIALS

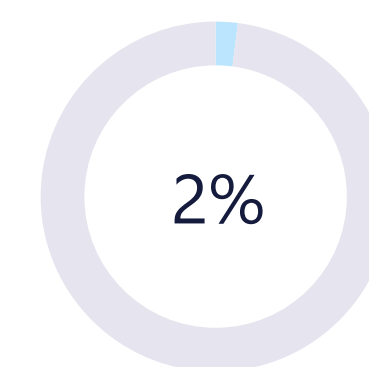


RESIDENTIAL MAINTENANCE/REPAIR



NON-RESIDENTIAL MAINTENANCE/REPAIR

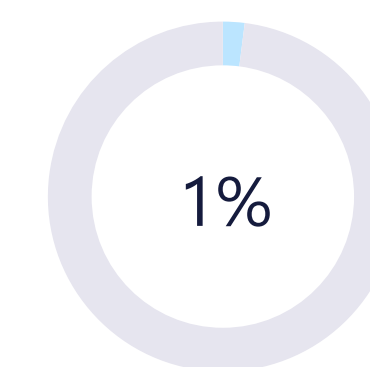
STATE AND LOCAL TAX REVENUE



STATE SALES & INCOME TAXES

\$50M

10-YEAR TOTAL



LOCAL SALES & PROPERTY TAXES

\$40M

10-YEAR TOTAL

THE ACCELERATE GROUP

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