Introduction
Remarkably, without much fanfare, the nation’s wind energy sector continues to grow, a testimony to both advances in technology and deliberate measures by policymakers to create an environment to stimulate the development of this power source. At the close of 2016, installed wind capacity in the United States exceeded 82,000 megawatts (MW), surpassing hydropower for the first time in the nation’s history. In total, installed wind energy capacity grew by 8,203 MW over the previous year and now generates about 5.5 percent of the country’s electricity, enough to power 24 million homes.

The benefits of this rapid expansion have cascaded across the American economy. According to the American Wind Energy Association, a national trade association for the U.S. wind industry, the sector supports approximately 102,500 jobs in the United States. Meanwhile, an April 2017 report from the Bureau of Labor Statistics identified the wind turbine technician as the fastest-growing job in the nation. Employment of wind turbine technicians is projected to grow 108 percent from 2014 to 2024, paralleling the growth of the wind energy sector. In 2016, more than 500 manufacturing facilities in 41 states contributed to the nation’s wind energy supply chain, supporting more than 25,000 jobs. Of these 500 manufacturing facilities, more than 100 are located in the South. Opportunities for job creation extend beyond manufacturing and include operations and logistics, data analysis, communications and safety, and technical workforce training.

Given this burgeoning sector’s ability to create jobs and provide additional energy security and independence in the United States, the often asked question regarding the viability of utility-scale wind power development depends on several factors, including quality of the available wind resources, regional market prices for electrical power, transmission capacity and accessibility, and state-specific policies. While these factors are crucial to the successful development of wind power, states with limited wind resources may benefit from expanded utilization of this renewable resource. This SLC Special Series Report, the second in a series exploring the myriad impacts of wind energy expansion in the Southern region, examines the development of the industry in Texas, Oklahoma and Virginia. Specifically, this report explores the resources, capacity and transmission; policies and incentives; and economic impacts of wind energy generation in these states, thus demonstrating the opportunities available.

Texas
Texas ranks first in the nation for both installed wind capacity and projects under construction. The state produces more wind energy than almost any country in the world. This dominance is the culmination of strategic policy decisions, a favorable transmission backdrop and a natural abundance of wind resources. By leveraging these three assets, the state has strengthened its economy and diversified its energy portfolio.
Resources, Capacity and Transmission

As Figures 1 and 2 demonstrate, the state has abundant inland and offshore wind resources. With average wind speeds of 6.5 meters per second or greater at heights of 80 meters, most of the state is suitable for wind energy development. The resource is most abundant in the panhandle and the northern portion of west Texas, where wind speeds average between 8.5 and 9.0 meters per second at heights of 80 meters, and may reach up to 9.5 meters per second. Meanwhile, offshore wind speeds range from 7.5 to 9.0 meters per second at heights of 90 meters and are particularly strong between Corpus Christi and Harlingen, where speeds average between 8.5 to 9.0 meters per second. The unique wind patterns of the Texas

*An 80-meter turbine will generate energy when wind speeds reach 3 to 4 meters per second (7 to 9 miles per hour).

Wind speed unit conversions

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Source: Wind resource estimates developed by AWS Truepower LLC for windNavigator®

Figure 1 Texas – Annual average wind speed at 80 meters
Gulf Coast offer an additional advantage. While in most areas the wind blows strongest at night, when energy consumption is low, wind along the Gulf Coast blows furiously during the middle of the day, just as consumption is peaking. With 21,044 MW of installed capacity, and a potential capacity\(^*\) of 1,347,992 MW, Texas dominates the wind energy industry. The state is home to 11,898 turbines, generating enough to power approximately 5.3 million homes.\(^7\) This accomplishment has led the state to rank first in the nation for installed wind capacity and number of turbines.\(^8\)

\(^*\) Wind power potential reflects the amount of wind power that is technologically possible to have installed in an area.
Texas’ preeminence in wind energy development is, in large measure, attributable to the fact that one of its largest and most dense wind resource areas is bisected by one of its largest electrical transmission lines. Aggressive state programs to build transmission capacity in areas most likely to stimulate wind power development attracted new investments in wind energy production and manufacturing to the state.

The nation’s energy grid is divided into three sections: the Eastern Interconnection, Western Interconnection and the Texas Interconnection. As such, in terms of transmission, Texas enjoys a unique competitive advantage: its own electric grid. The Eastern and Western Interconnections each cover approximately half the country, divided by the Rocky Mountains, and connect states with transmission cables spanning entire regions. The Texas Interconnection, however, exists only in Texas.

The Electric Reliability Council of Texas (ERCOT) serves as an independent system operator, managing the flow of electrical power to 24 million customers, representing approximately 90 percent of the state’s electrical load. The council manages an electric grid that connects more than 46,500 miles of transmission lines and more than 570 generation units. Although the state does have linkages to the Eastern Interconnection and others, it remains outside of federal regulation. This unique environment has led to robust transmission development in the state, in part because new transmission investments are largely managed in-state, in contrast to the protracted negotiations and regulatory approvals that often delay transmission projects that cross state lines.

In 2005, the Texas Legislature approved Senate Bill 20, which instructed the Public Utility Commission of Texas (PUCT) to consult with ERCOT, designate transmission for Competitive Renewable Energy Zones (CREZ) throughout the state, and craft a plan to increase the state’s renewable energy transmission capacity in a beneficial and cost-effective manner. Designed to direct transmission expansion to the state’s most productive wind energy resources, the implementation of CREZ added more than 18,500 MW of wind energy generation capacity to Texas’ grid while ameliorating technical issues such as curtailment and transmission congestion. The $6.8 billion undertaking was borne by ratepayers in the state through a statutory rate recovery mechanism. The success of Texas’ wind energy industry, fostered in part by the CREZ process, provides other states seeking to increase the production and use of renewable energy within their borders a possible path forward.

### Policies and Incentives

By leveraging abundant resources and combining appealing financial incentives with a favorable regulatory environment, Texas has attracted and retained more wind energy development than any other state in the nation. An energy-producing behemoth, Texas also has a long history of using market-based systems to achieve progress, which may attract more private investors. An early adopter of renewable portfolio standards (RPS), the state also has benefitted from a stable regulatory environment and targeted financial incentives, positioning itself as the indisputable leader in wind energy production.

In 1999, the Legislature enacted Senate Bill 7, relating to electric utility restructuring. As part of the bill, PUCT was instructed to establish and administer a renewable energy credits trading program. That same year, PUCT adopted a rule setting the state’s renewable portfolio standard and creating the trading program. Subsequent rule amendments set the standard at its current level of 5,880 MW of renewable energy installed by 2015, increasing to 10,000 MW by 2025. The state surpassed its 2025 goal in 2009, with an installed capacity of more than 10,069 MW at the time.

Investments by wind energy producers with operations in Texas also may qualify for a state franchise tax exemption. Transmission congestion occurs when demand for electricity outstrips the immediate supply, sending prices higher as the grid strains to deliver power from other, often more expensive, power sources and locations.

Texas Utilities Code §36.053(d) states that “if the [PUCT] issues a certificate of convenience and necessity … to facilitate meeting the goal for generating capacity from renewable energy technologies …, the commission shall find that the facilities are used and useful to the utility in providing service … and are includable in the rate base.”

The franchise tax is Texas’ equivalent of a corporate tax.
Section 171.056 of the Texas Tax Code provides franchise tax exemptions for corporations and limited liability companies engaged solely in the business of manufacturing, selling or installing solar energy devices. In this context, “engaged solely” applies to all the entity’s activities, not just the activities in the state. Although the code specifically refers to solar energy, the office of the state comptroller has long-interpreted this exemption as extending to wind energy devices. Given that there is no cap on the exemption, it remains an extremely attractive incentive for the wind energy industry.

In addition to the franchise tax exemption, Texas offers a franchise tax deduction for wind energy devices. The state tax code provides a deduction for the amortized cost of a solar energy device from a company’s taxable capital or 10 percent of the amortized cost from the company’s taxable income. As with the franchise tax exemption, wind energy qualifies as “solar energy.”

Property owners who utilize wind power for on-site energy production and use also may be eligible for a property tax exemption. Nearly 40 years ago, state voters approved a constitutional amendment that allowed the Legislature to extend a property tax exemption for wind-powered energy devices for on-site generation. Specifically, property owners receive an exemption only for the increase in their property value that is attributable to the implementation of wind power. In addition to this property tax exemption, wind industry projects also may qualify for property tax incentives under the Texas Economic Development Act and the Property Redevelopment and Tax Abatement Act. Of note, as of September 1, 2017, new wind energy devices installed on land within 25 nautical miles of a military aviation facility are not eligible to receive property tax exemptions.

In addition to financial incentives aimed at encouraging robust wind energy development, Texas also has a favorable regulatory environment. With a centralized energy grid, streamlined permitting system, and a business-friendly siting environment, the development of wind energy projects is comparatively simple.

Texas imposes very few regulatory hurdles on wind energy development. Because of its centralized energy grid, new energy investments and transmission buildouts largely are managed in-state. As previously mentioned, Texas’ energy grid, unlike those of the other mainland states, is not regulated by the federal government. Because the other 47 contiguous states exist on larger interconnections, new wind energy generation projects often must undergo lengthy permitting processes. Texas’ independence from this system allows developers to avoid many of these regulatory obstacles. Furthermore, state, county, and local governments do not regulate the siting of wind energy projects, and the state Parks and Wildlife Department is not required to review or permit new projects, further simplifying the development process.

**Economic Impact**

The wind industry in Texas has fostered robust economic growth—both direct and indirect. Supporting up to 23,000 total jobs, with a total capital investment of $38 billion in 2016, the thriving industry supports the state’s manufacturing sector, provides land lease payments to property owners, and contributes to low residential and industrial power rates.

Texas is home to 41 manufacturing facilities contributing to the wind energy supply chain, many of which create components for projects within the state. In 2016, Texas ranked second in the nation for the number of facilities manufacturing subcomponents of utility-scale wind turbines. Also in 2016, the state welcomed a new major component manufacturing facility, the nation’s first since 2013; GRI Renewable Industries in Amarillo, Texas, manufactures turbine towers.

Texas leads the nation in wind industry employment. To support this growing workforce, many of its technical and four-year colleges offer degrees and certificates related to the wind industry, including turbine service technicians, wind energy project managers, engineers...
and operations managers. According to the U.S. Bureau of Labor Statistics, Texas employs 1,440 wind turbine service technicians, with the average technician making approximately $53,650 annually.23

The industry also supports landowners, most of whom are in rural parts of the state. Annual land lease payments for wind energy production are estimated to exceed $60 million.24 For many struggling farmers and ranchers, the boom in this industry has provided regular income that has allowed them to retain their land and keep it in the family.25 As an example, after leasing land to a wind energy company, a rancher in Sweetwater may expect to receive approximately $10,000 per turbine, annually.26

Finally, the wind energy industry contributes to a benefit that almost all residents enjoy: low power rates. Residential power rates are approximately 10 percent lower than the national average, with industrial power rates at approximately 20 percent below the national average.27 The growing presence of wind energy in Texas has driven down wholesale power prices, which ERCOT tracks by the minute. Bursts of wind power occasionally put real-time power prices into the negatives—essentially, free power—a boon for Texas customers but frustrating for merchant power operators. Wind energy pushed real-time prices of electricity into the negatives for 130 hours in 2016, more than double the 50 hours in 2015.28

Oklahoma

The state is a leading producer of wind energy. With expanding capacity and abundant resources, the wind industry in Oklahoma contributes to lower utility rates, provides funding for public education, supports economic development and produces lease payments for land owners.

Resources, Capacity and Transmission

As Figure 3 demonstrates, the state has abundant wind resources. With average wind speeds of 6.5 meters per second or greater at heights of 80 meters, most land is suitable for wind development. The resource is most abundant in the western panhandle, where speeds can reach an average of between 8.5 and 9.0 meters per second at heights of 80 meters. Since 2002, Oklahoma has grown from having no utility-scale wind energy production to 6,645 MW of installed wind capacity at the end of 2016, with a potential capacity of 359,435 MW. The state is home to nearly 3,400 wind turbines, generating enough energy to power approximately 1.8 million average U.S. homes.29 This growth has led the state to rank third in installed wind capacity and fourth in the number of turbines in 2016,30 trailing only Texas (21,044 MW) and Iowa (6,974 MW) for installed wind capacity.31

With the most sought-after wind resources located in the sparsely populated western panhandle, wind development in the state is not limited by resources but, rather, transmission capacity.32 In 2010, the Legislature declared a public interest in the development of the state’s wind energy sector and transmission grid.33 The Legislature directed the Oklahoma Corporation Commission (the state’s regulatory agency for fuel, oil and gas, public utilities, and transportation industries) to work with Southwest Power Pool (the regional power provider, serving approximately 546,000 square miles within 14 states) to develop a plan to expand transmission capacity.34

In its 2015 Electric System Planning Report, the state Corporation Commission found that new transmission lines and electrical substations will be necessary to meet the state’s energy needs, especially as new wind facilities are added.35 Furthermore, a 2015 report from the U.S. Department of Energy (DOE) on transmission congestion in the United States found that the Midwest region—which includes the SLC state of Oklahoma—has significant transmission congestion due to increasing wind generation that cannot be delivered from the western side to more distant, eastern loads. This problem is exacerbated by the lack of transmission lines in renewable-rich areas.36

Despite these challenges, the state’s wind transmission infrastructure has improved steadily. Between January 1, 2014, and December 31, 2016, seven transmission upgrades from wind-related facilities were put into service.37 During that same period, 67 agreements for generation interconnection upgrades for wind farms were executed and placed in service.38
Two currently planned projects could dramatically increase wind transmission capacity. The first, Wind Catcher Energy Connection, is a joint venture by two American Electric Power utility subsidiaries: Public Service Company of Oklahoma and Southwestern Electric Power Company. The $4.5 billion infrastructure investment aims to bring wind power from Oklahoma to more than 1.1 million energy customers in the South. The proposed project includes a 2,000 MW wind farm in the Oklahoma Panhandle and a dedicated transmission line to move electricity to customers in Louisiana, Arkansas, Texas and Oklahoma. The connection has been approved in Oklahoma, but also must receive approval from the Federal Energy Regulatory Commission and regulators in the three other states.

The second project targets acute grid congestion in the northwestern portion of the state. Oklahoma Gas & Electric, a utility company serving more than 750,000 customers in Oklahoma and western Arkansas, has proposed the Windspeed II transmission line. The project,
scheduled for completion by early 2018, comprises a 126-mile, 345-kilovolt transmission line between Woodward and a substation northwest of Oklahoma City. 40,41

Policies and Incentives

In addition to the abundant resources, favorable renewable energy policies and regulations have further encouraged wind development in Oklahoma. Targeted financial incentives, paired with a stable regulatory environment, have created a hospitable climate for the development of wind energy.

Beginning in the mid-1980s, the Legislature approved a series of financial incentives benefitting the fledgling wind industry. Though no longer active, three incentives served as important catalysts for wind development: a property tax exemption and tax credits for small wind turbine manufacturers and zero-emission facilities.

Property Tax Exemption

In 1985, voters approved State Question Number 588, amending the state constitution to create a five-year ad valorem property tax exemption for new, expanded or acquired manufacturing facilities of a “qualifying manufacturing concern.” Recognizing the imminent loss of revenue for counties where these facilities would be sited, the amendment also directed the Legislature to create a means of reimbursing local and county governments for loss of revenue caused by the exemption. In response, the Legislature created an Ad Valorem Reimbursement Fund which receives 1 percent of total state income tax revenue received. Counties containing property subject to the five-year exemption can apply for reimbursements through the fund.

To qualify for the exemption, a wind facility had to demonstrate a net increase in annualized payroll of at least $250,000 in counties with a population of 75,000 or less, or at least $1 million in counties with a population of more than 75,000. However, wind energy generators were exempt from these payroll requirements if they could demonstrate a net increase of at least $250,000 in annualized payroll at the facility or a net increase of $2,000,000 or more in capital improvements while maintaining or increasing payroll.

The Ad Valorem Reimbursement Fund provided reimbursements of nearly $134 million in ad valorem taxes to counties from 2004 to 2014.42 According to the state Tax Commission, exemptions of wind developers comprised half of the $64 million in claims made in 2013.43 In 2015, lawmakers enacted Senate Bill 498, which ended the property tax exemption for wind energy generators, effective January 1, 2017. However, projects in commercial operation by December 31, 2016, still will receive the exemption for the full five-year period. By ending the exemption for wind energy generators, the state anticipates saving approximately $500 million over 10 years.44

Tax Credit for Small Wind Turbine Manufacturers

To encourage wind manufacturing, the Legislature approved Senate Bill 1451 in 2001, creating an income tax credit for manufacturers of advanced small wind turbines. To qualify, manufacturers had to operate within the state and have the capacity to manufacture products for small wind turbines. The credit amount was determined by the square footage of the rotor-swept area* of advanced small wind turbines manufactured, and recipients were required to demonstrate their economic development investments exceeded the amount of credit claimed. The initial credit equaled $25 per square foot produced in 2003, $12.50 per square foot produced in 2004, and $6.25 per square foot in 2005. The law was later amended to extend the amount and timeline of credit availability, increasing the credit to $25 per square foot produced from 2005–2012. Unused credits were transferrable for 10 years after the qualification year.45

Tax Credit for Zero-Emission Facilities

Also in 2001, Senate Bill 440 created an income tax credit for electric energy generated at zero-emission facilities, beginning January 1, 2003. To qualify, a production capacity of 1 MW or greater was required. The legislation implemented a variable credit structure, based on the operational date of a given facility. Facilities placed into operation between June 4, 2001, and January 1, 2007, were eligible for the following credits:

* Rotor-swept area refers to the area of the circle created by the blades as they sweep through the air.
Electricity generated between January 1, 2003 and January 1, 2004: $0.0075 per kilowatt-hour (kWh); Electric energy generated between January 1, 2004 and January 1, 2007: $0.0050 per kWh; and Electricity generated between January 1, 2007, and January 1, 2012: $0.0025 per kWh. Facilities placed into operation between January 1, 2007, and January 1, 2021, qualify for a credit of $0.0050 per kWh of electricity generated. Credits earned prior to January 1, 2014, are transferable for 10 years past the qualification year and, at a taxpayer’s request, the Tax Commission is directed to refund 85 percent of the value of credits earned before January 1, 2014.

House Bill 2298 of 2017 amended the tax credit for electricity generated by wind, ending the credit for facilities placed in operation after July 1, 2017. In her 2017 news release, Governor Fallin praised the wind industry’s growth, noting that the “zero-emissions tax credit was key to the growth of wind energy in Oklahoma, and I’m grateful to the industry for their ambitious successes, as well as their willingness to work with the state to address our challenging budgetary circumstances.” While these incentives are no longer available to the wind industry in Oklahoma, the industry may qualify for other general incentives, such as a manufacturing sales tax exemption and the Investment/New Jobs Tax Credit.

**Economic Impact**

Oklahoma’s vast wind resources stimulate economic development in a variety of ways. The industry supports up to 9,000 jobs, provides lease payments to landowners, increases revenue for local schools through ad valorem tax payments and sustains seven manufacturing facilities. While these facilities supply components for projects across the country, they also support the industry’s growth within the state. Pelco Structural, located in Claremore, has a $300 million contract to manufacture steel towers for the Plains and Eastern Clean Line Transmission Project. As a result, the company expects to hire as many as 130 new employees.

The deployment of wind power also stimulates indirect job creation and other economic development opportunities. The town of Pryor, Oklahoma, has experienced these benefits first hand. In 2012, Google announced a second data center at Pryor’s Mid America Industrial Park. The data center is powered by wind energy and represents a $2 billion investment in the community, including more than $1.5 million in science and technology grants; free public Wi-Fi; workforce development grants; and technology resources for nonprofits. Google employs approximately 400 people at the facility, 70 percent of whom are hired from the local area.

Equipment installed in wind energy projects, including wind farms, represents a significant increase in the taxable property base. A 2015 review of tax records found that in-state wind energy projects created a $3.3 billion increase in the tax base and ad valorem tax revenues. The same study found that, from 2004 to 2014, wind energy systems delivered approximately $134 million to counties, through indirect payments from the Ad Valorem Reimbursement Fund and direct developer tax payments to the counties. Although the ad valorem exemption no longer is available for new wind projects, those that qualified on or before December 31, 2016, will remain in the program until their five-year exemption ends.

The increased revenue provided to school districts through the ad valorem exemption and reimbursement payments has benefitted not only schools in counties with wind projects, but across the state as well. Oklahoma’s school funding formula considers a number of the district’s revenue sources. After those sources are tallied, if a district’s projected per-pupil revenue exceeds 150 percent of the projected state average per-pupil revenue, the amount of aid provided to that district is proportionately reduced and redirected to other schools.

Rural and agricultural communities also have benefitted from the development of wind energy. The American Wind Energy Association estimates that royalty payments to Oklahoma landowners total between $15 million - $20 million annually. On average, total land use of wind energy projects in the state is approximately 0.87 acres per turbine. Turbine spacing allows for ample and diverse land uses within project areas, allowing farmers to continue to plant crops and graze livestock right up to the base of a turbine.
Virginia

The wind energy industry in Virginia is in its infancy. Although there are many residential, business and school wind installations in the state, there currently is no utility-scale wind energy production in Virginia. However, there is great potential for future growth in production, research, manufacturing and training.

Resources, Capacity and Transmission

Virginia has significant wind resources in the western mountains and along the Atlantic coast, where speeds can reach an average of between 6.0 and 7.0 meters per second at heights of 80 meters, as shown in Figure 4. The state also boasts impressive offshore resources, with wind speeds ranging from 7.5 to 10.0 meters per second at heights of 90 meters, as illustrated in Figure 5. These wind speeds translate to an offshore wind potential of more than 18,000 MW.58

After more than two years of planning and permitting, Virginia’s Department of Environmental Quality (DEQ) recently approved Apex Clean Energy’s application to construct the Rocky Forge wind farm, the state’s first utility-scale wind project.59 Rocky Forge will constitute up to 25 wind turbines on private land along the ridgeline of North Mountain. The site was selected, in part, due to its strong wind resources, existing high voltage power lines and proximity to state highways. Scheduled for completion in 2018, developers anticipate the project will generate enough energy to power up to 20,000 homes annually.60

Virginia also is making strides toward adding offshore wind generation to its power portfolio through a partnership between Dominion Energy and Ørsted (formerly DONG Energy).61 In July 2017, the companies announced plans to develop the Coastal Virginia Offshore Wind project, a two-turbine, 12 MW installation approximately 27 miles off the coast of Virginia Beach.62 Upon completion, it will be the first offshore project connecting to the PJM Interconnection, located on a 2,135-acre site leased by the state Department of Mines, Minerals and Energy.63 Power will be transmitted by a buried 34-kilovolt distribution line to a connection point near Virginia National Guard’s Camp Pendleton.64

Figure 4 Virginia – Annual average wind speed at 80 meters

Source: Wind resource estimates developed by AWS Truepower LLC for windNavigator®
As wind power production continues to expand, additional transmission infrastructure likely will be needed to accommodate increased energy flow and reduce grid congestion during peak production times. One project that could support this is the Atlantic Wind Connection, an undersea transmission system that would span the mid-Atlantic region from northern New Jersey to southern Virginia. If fully developed, the transmission line would connect wind farms in the federally designated Wind Energy Areas and support up to 6,000 MW of offshore wind energy.

**Policies and Incentives**

Although wind energy still is in the developmental stage, there are several policies and incentives in place to encourage both inland and offshore development. Furthermore, Virginia has a streamlined permitting system for projects under 150 MW, simplifying the process for new investments.

Beginning in 2007, the state implemented a voluntary Renewable Energy Portfolio (RPS) goal, which has subsequently been expanded. Any investor-owned incumbent electric utility may apply to the state Corporation Commission to participate in the program. To receive approval, an applicant must demonstrate a reasonable expectation of achieving 12 percent of its base year electric energy sales from renewable energy sources in 2022, and 15 percent by 2025. The statute sets forth goals, referred to as RPS goals, and grants double credit toward meeting the renewable energy portfolio standard for energy derived from onshore wind, with triple credit given for energy derived from offshore wind. The RPS goals are defined as percentages of the amount of electricity sold in 2007 (hereafter, the base year), minus the average annual percentage of power supplied from nuclear generators between 2004 and 2006. The statute establishes a tiered schedule for goals:

- **RPS Goal I:** 4 percent of base year sales in 2010;
- **RPS Goal II:** Average of 4 percent of base year sales in 2011 through 2015, and 7 percent base year sales in 2016;

![Figure 5 Virginia — Offshore wind speed at 90 meters](source: AWS Truepower LLC)
» RPS Goal III: Average of 7 percent of base year sales in 2017 through 2021, and 12 percent base year sales in 2022; and

» RPS Goal IV: Average of 12 percent of base year sales in 2023 and 2024, and 15 percent of base year sales in 2025

Participating utilities can recover the cost associated with the RPS program, and the State Corporation Commission offers these utilities an increased rate of return for each RPS Goal attained from qualified renewable energy generation facilities. Utilities participating in the program are required to submit an annual report to the Corporation Commission detailing efforts to meet the RPS goals, overall generation of renewable energy, any advances in renewable generation technology, and a list of all states where the purchased or owned renewable energy was generated. To qualify, electricity must be generated in the state or in the interconnection region of the regional transmission entity.

In the General Assembly, House Bill 389 of 2010 established the Virginia Offshore Wind Development Authority and charged it with developing offshore wind energy. Specifically, the authority is charged with facilitating, coordinating, and supporting—the development of the offshore wind energy industry, offshore wind energy projects and associated supply chain vendors. It also is responsible for collecting relevant data, identifying regulatory or administrative barriers to development, and working with other local, state and federal agencies to upgrade port and logistical facilities to accommodate the manufacturing and assembly of offshore wind energy components and structures. The authority also is required to ensure the development of offshore wind energy projects is environmentally sound and does not adversely impact naval or aviation and shipping industries.

To encourage the expansion of wind energy production, the state requires that electric utilities provide customers with the option to purchase 100 percent renewable energy. If a utility does not offer a program that meets this requirement, its customers are permitted to purchase renewable energy from another licensed supplier. Of note, the renewable energy is not required to be generated in-state, thus potentially limiting the development of wind energy within the state.

To attract and encourage the development of renewable energy, including wind energy production, House Bill 1297 of 2015 allowed local governing bodies to lower their property tax on renewable energy generating machinery and tools. Specifically, localities are authorized to levy a tax on this separate class of property at a lower, but not higher, rate from that levied on other machinery and tools. The tax rate does not apply to machinery and tools owned by public service corporations, unless it results in a lower property tax on such machinery and tools.

The state has a streamlined, predictable permitting process for wind energy projects under 150 MW. This process, called permit-by-rule, necessitates approval of a permit request once DEQ determines that an applicant has met certain requirements. These requirements include:

» publishing a notice of intent;
» obtaining a certificate of compliance from the local governing body;
» providing copies of all interconnection studies undertaken by the regional transmission organization (RTO) or transmission owner on behalf of the project;
» entering into an interconnection agreement with an RTO or transmission owner that does not cause reliability issues for the grid;
» providing certification from a state-licensed engineer showing that the maximum generation capacity of the project does not exceed 150 MW;
» undertaking an environmental impact study;
» designing a mitigation plan, certified by a licensed engineer;
» designing and submitting a site plan;
» meeting all environmental permitting requirements;
» participating in a 30-day public review and comment period, with a public meeting and a summary report addressing any issues raised by the public; and
» submitting a payment of $16,000 with an application, and $5,000 for modifications.
Siting requirements fall under the authority of localities, but must align with the state’s energy policies. Local ordinances must provide reasonable criteria for the placement of sites, balancing the promotion of wind development with the interests of the locality, and establish reasonable requirements for noise limitations, buffer areas, set backs, and facility decommissioning.

**Economic Impact**

Virginia’s burgeoning wind industry provides a host of economic benefits, with potential for future growth. In 2016, the industry supported up to 500 direct and indirect jobs, and at least five manufacturing facilities contributed to the wind energy supply chain. While the current economic impact of the industry is modest, the state has significant advantages in terms of location, workforce, logistics and research that could make it a major hub for development of wind energy research, project implementation, training and manufacturing. Furthermore, current projects are expected to significantly increase the local tax base and provide land lease payments to property owners.

As wind energy production continues to grow across the nation, Virginia is poised to become a major manufacturing hub for wind energy components. Although only five manufacturing facilities in the state contributed to the industry’s supply chain in 2016, Virginia boasts a highly-skilled technical workforce, suggesting a capacity for increased manufacturing. Port complexes and multimodal linkages also are well-positioned to receive larger turbine components manufactured overseas.

Virginia also stands to be a leader in wind energy training and research. The state’s Offshore Wind Development Authority already has made great strides in this arena. Virginia’s substantial research assets, including the Center for Wind Energy at James Madison University, reinforce its ideal positioning for studies on the interaction between wind energy production and military activities, particularly as they relate to naval and aviation operations. Concerns about the impact of wind energy production on operations of the U.S. Navy and Air Force, particularly relating to navigational issues, continue to grow. A considerable military presence and multiple inland and offshore wind energy projects have the potential to make Virginia a national center for research into and training of Navy and Air Force officers in navigation of wind energy production areas.

The wind industry will have direct economic impacts in terms of job creation, land lease payments and property tax collections. As production continues to expand, turbine technicians—the fastest growing occupation in the nation—will be needed to service and repair equipment, while additional jobs also will be created in construction and manufacturing. As an example, although Apex Clean Energy’s Rocky Forge wind farm will be run by approximately six onsite employees, it is expected to produce approximately 150 construction jobs, and officials anticipate an injection of up to $45 million annually into the local economy.

**Conclusion**

As discussed in Part I of this Special Series Report, the nation’s growing wind energy industry has ushered in numerous benefits for Southern states through the creation of new jobs, support for rural communities, and the diversification of energy portfolios. Texas, Oklahoma and Virginia each exemplify unique opportunities and challenges for wind energy development and are informative examples for other states.

Texas, the national leader in wind energy production, provides a unique example. Because the state has its own energy grid, it was able to rapidly build out new and robust transmission capacity. Doing so enabled the state to leverage its plentiful wind resources, diversify its power portfolio and decrease electric power rates. Proving that “if you build it, they will come,” the state also leads the nation in the number of total turbines, further bolstering its manufacturing sector. As other Southern states do not have the same resources or grid advantages, replication of the Texas model may not be feasible for states in
the SLC region. However, its Competitive Renewable Energy Zones could provide a framework for expanding transmission capacity within states, particularly in states with abundant wind resources.

Oklahoma, a state synonymous with strong winds, created financial incentives to encourage wind development. These incentives have been successful in catapulting the state to rank third in the nation for wind energy production. However, as the state encountered budgetary challenges in recent years, those incentives largely have been eliminated. It remains to be seen what impact this will have on new wind development. It is possible that the implementation of new transmission lines, such as the Plains and Eastern Clean Line Transmission Project, could attract new development, softening the impact of reduced incentives. The state remains an excellent example of how substantial wind resources, partnered with targeted financial policy incentives, can rapidly enhance development.

The fledgling wind industry in Virginia holds tremendous potential; with attractive inland and offshore resources, it is poised to be a major contender in wind energy production. Industry-specific incentives could encourage more rapid development. As wind energy production grows, additional transmission capacity may be needed to prevent grid congestion. However, the state also stands to benefit from increased wind energy development nationwide and could be a leader in research and development. A large military presence provides a unique opportunity to study the impacts of inland and offshore wind development on naval and aviation activities, an issue of growing national concern. As these impacts are better understood, the state also could become an ideal training location for Navy and Air Force personnel who may need to navigate wind production sites.

The future of wind development, as can be seen from this examination of three states in the SLC region, relies on many factors, not the least of which is the development of legislative policies which provide myriad and diverse incentives for this sector to succeed. While this Special Series Report, the second in a three-part series, examined the impact of wind energy generation in Texas, Oklahoma and Virginia, Part III, the final installment in this series, will analyze the challenges posed by wind energy development and will examine issues of impacts to wildlife, challenges to military navigation and cultural perceptions.

Endnotes

2. Ibid.
4. Ibid.
8. Ibid.
10. Ibid.
13. Ibid.
15. Ibid.
20. Ibid.
22. Ibid.
26. Ibid.
29/30. Ibid.
33. 17 Okl. St. § 287.
34. Ibid.
38. Ibid.
40. Ibid.
44. Ibid.
45. 68 Okl. St. § 2357.32B.
51. “Oklahoma Wind Energy.”
54/55. Ibid.
56. “Oklahoma Wind Energy.”
60. Ibid.
61. “Virginia Wind Energy.”
63/64. Ibid.
66/67. Ibid.
69/70. Ibid.
72. Ibid.
73. Hammack, “Plans OK’d for Botetourt’s North Mountain as Site of Virginia’s First Commercial Wind Farm.”
74. 9 VAC 15-40-30.
75. “Virginia Wind Energy.”
76. Hammack, “Plans OK’d for Botetourt’s North Mountain”
This report was prepared by Anne Roberts Brody, policy analyst and committee liaison of the Energy & Environment Committee of the Southern Legislative Conference, chaired by Senator Lynn Smith of Georgia. This report reflects the policy research made available to appointed and elected state officials by the Southern Office of The Council of State Governments (CSG).

Opened in 1959, the Southern Office of CSG promotes intergovernmental cooperation among its 15 member states, predominantly through the programs and services provided by its Southern Legislative Conference (SLC). Legislative leadership, members and staff utilize the SLC to identify and analyze government policy solutions for the most prevalent and unique issues facing Southern states. Meanwhile, SLC member outreach in state capitols and coordination of domestic and international delegations, leadership development and staff exchange programs, meetings, and fly-ins support state policymakers and legislative staff in their work to build a stronger region.

Established in 1947, the SLC is a member-driven organization and the largest of four regional conferences of CSG, comprising the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. The Annual Meeting of the Southern Legislative Conference, convened as the focal point and apex of its activities, is the premier public policy forum for Southern state legislatures and the largest regional gathering of legislative members and staff. The Annual Meeting and a broad array of similarly well-established and successful SLC programs—focusing on both existing and emerging state government challenges—provide policymakers diverse opportunities to ask questions of policy experts and share their knowledge with colleagues.