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Nashville Carbon Competitiveness

Prepared by David Gardiner and Associates



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Overview

This report analyzes three questions to assess how the sources of electric power in the Nashville area may affect the area's competitive position for attracting new businesses:

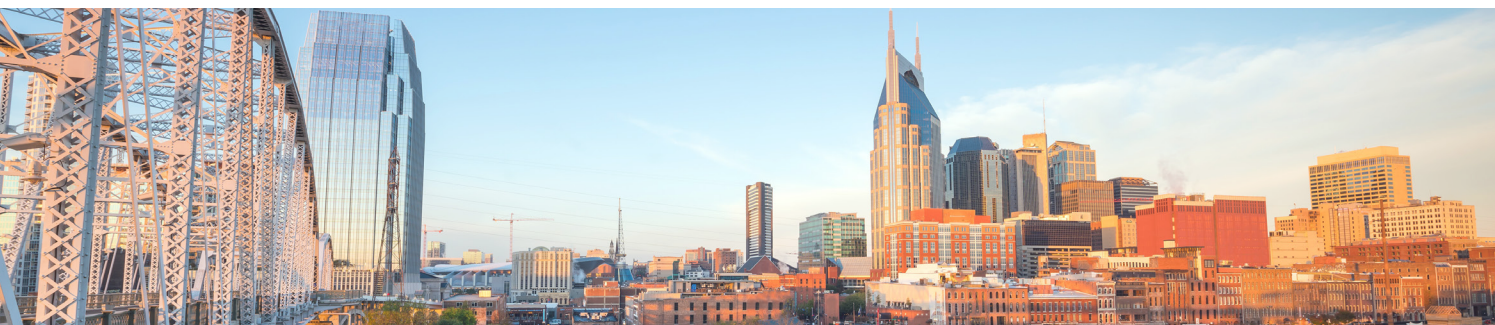
1. Are Fortune 500 companies increasingly prioritizing climate and clean energy factors into their economic development decisions?
2. How do the climate and renewable electricity plans of the Nashville-area grid compare to the plans of power providers for six similarly sized cities with whom the Nashville area competes for new businesses (competitor cities)?
3. To what extent will the electricity generation plans for the Nashville-area make it less attractive as companies consider expanding, relocating, or siting new facilities?

To answer these questions, David Gardiner and Associates (DGA):

- Gathered data on whether companies are factoring climate and clean energy into their economic development decisions;
- Reviewed six cities which Nashville competes with to attract new businesses—Austin, Charlotte, Columbus, Indianapolis, Minneapolis, and Raleigh—and identified the primary electric service provider for each of the six competitor cities and their surrounding areas—Austin Energy, Duke Energy Carolinas, American Electric Power, Indianapolis Power and Light, Xcel Energy, and Duke Energy Progress, respectively; and
- Analyzed each utility's carbon reduction targets and planned renewable energy generation capacity and compared each against the carbon reduction target and planned renewable energy generation capacity of the Nashville area's primary electric service provider, the Tennessee Valley Authority (TVA).

DGA based its research and analysis for this report on a variety of sources, including:

- Public utility filings and annual reports, e.g. integrated resource plans (IRPs), corporate sustainability reports, Securities and Exchange Commission (SEC) and other financial filings, and Edison Electric Institute (EEI) data;
- City and county sustainability, climate, and energy plans;
- Corporate press releases, news articles, and other media sources; and,
- Data provided by and from correspondence with state public utility commissions (PUC or PSC) and utility regulatory staff.



Executive Summary

DGA's analysis finds that corporations are not only increasingly looking to procure renewable and low- or zero-carbon electricity, but that they are also stepping up their efforts to focus investment and new facilities in areas that offer those electricity resources.

Second, DGA's analysis of TVA's Integrated Resource Plan (IRP) and greenhouse gas (GHG) reduction commitment, as well as the corresponding analysis for the utilities serving the Nashville area's competitor cities, shows the grid generation mix and associated carbon emissions (Nashville-area grid) are falling short of its competitor cities in two key areas. It is delivering:

1. Fewer Greenhouse Gas Reductions The Nashville-area grid is completely powered by TVA. TVA's GHG reduction target, and by extension the Nashville-area grid's carbon reduction target, is weaker than its competitors for two reasons. First, TVA's GHG reduction target is an "intensity" target, measuring how much GHG it emits per unit of electricity produced. If electricity use were to increase due, for example, to the electrification of the transportation and buildings sectors, the total GHG emissions of the Nashville-area grid could increase. By contrast, five out of the six utilities that serve the Nashville area's competitor cities—Austin, Charlotte, Columbus, Minneapolis, and Raleigh—use absolute GHG reduction targets. This means that their emissions cannot increase above that level, even if electricity use were to increase.

Second, TVA has made no commitment to decrease its emissions beyond 2030. By contrast, five out of the six utilities that serve the Nashville area's competitor cities—Austin, Charlotte, Columbus, Minneapolis, and Raleigh—have committed to emissions reductions targets out to 2050 or to achieve zero emissions before 2050. Figure 1.1 shows the percentage of expected carbon reductions from each cities' primary electric service provider between 2020 and 2050.

2. Less Renewable Energy The Nashville-area grid is expected to average between 10 to 15 percent growth in total renewable energy generation capacity for each of the 30 portfolios outlined in TVA's 2019 IRP by 2038. The two potential portfolios used in this analysis range from 8 percent to 17 percent growth in renewable generating capacity by 2038. However, this percentage is well below four of the six competitor cities—Austin, Columbus, Indianapolis, and Minneapolis—based on each current utility's planned renewable generation capacity additions. Figure 1.2 shows the percentage of planned renewable generation capacity for each utility based on their IRP's or corporate reports.

Second, if both potential portfolios for the Nashville-area grid used in this analysis are projected out to 2050 at the same rate and their competitor cities are projected out to 2050 on a path to meet their carbon commitments (assuming no additional nuclear additions or retirements), TVA's percentage of total renewable capacity on is on average 40 percent less than each competitors in 2050.

Figure 1.1 Comparison of Utility Reduction Projections from 2020-2050

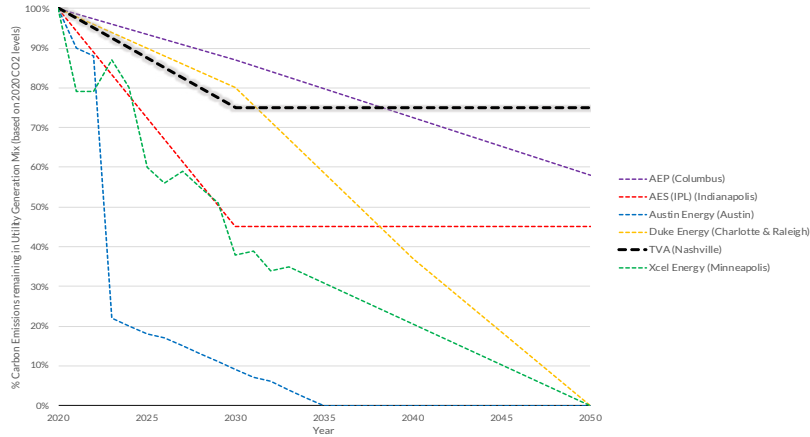
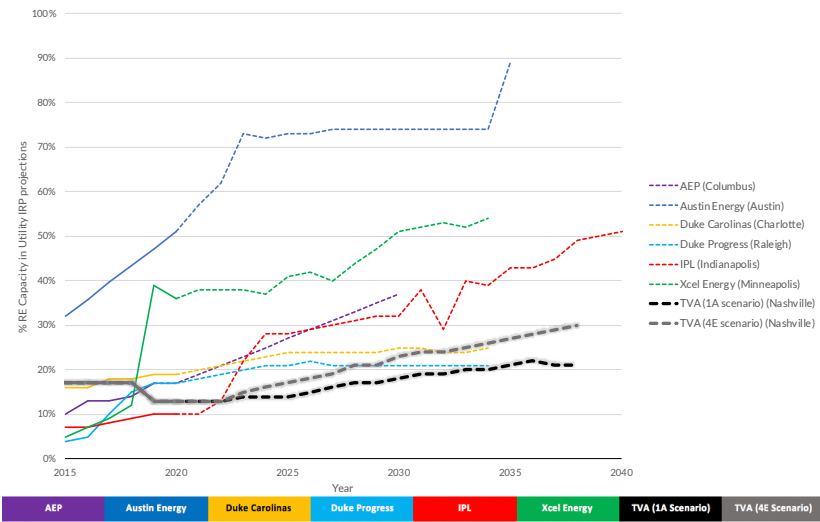
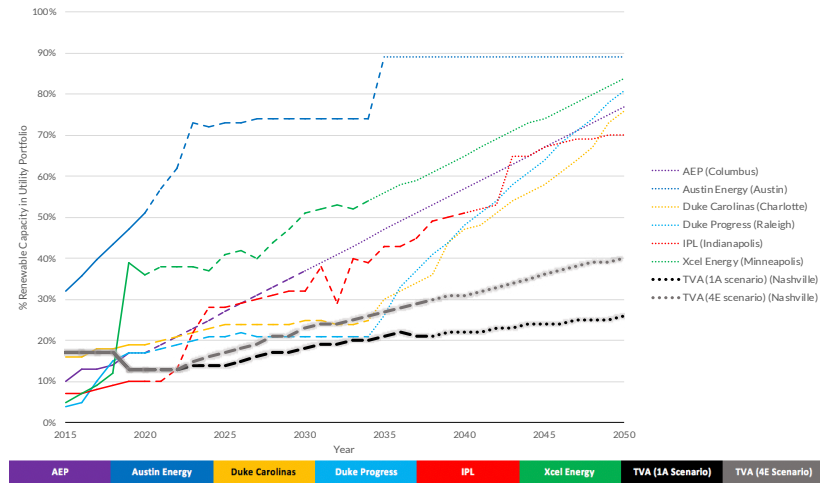


Figure 1.2 Comparison of Utility Renewable Energy Generating Capacity



Legend: — Historical - - - Planned Projected

Figure 1.3 Comparison of Utility Renewable Energy Share of Generating Capacity (2050 Projections)



Legend: — Historical - - - Planned Projected

1



Question 1

Are Fortune 500 companies increasingly prioritizing climate and clean energy factors into their economic development decisions?

In the past decade, corporate sustainability efforts have increased substantially. Within the S&P 500, 90 percent of companies published a corporate sustainability report for 2019. This number has increased annually from just 20 percent in 2011.¹ The most important focus of those sustainability efforts has been on climate change, including the reduction of corporate GHG emissions and the scaling up of clean energy. For example:

- Within the Fortune 500, 242 companies have a GHG reduction target with renewable electricity being a key component of GHG targets. Among Fortune 100 companies, 63% have adopted a public renewable electricity commitment.
- RE100—a global corporate leadership initiative bringing together businesses committed to procuring 100% renewable energy—now includes over 200 companies

with 2028 as the average target date for companies to achieve their goals.²

- These corporate carbon reduction commitments are occurring in all sectors, including the globally competitive manufacturing sector. TVA notes in its IRP, “the Valley economy has been more dependent on manufacturing than the economies of other regions.” A 2018 report examining the sustainability targets of 160 of the largest manufacturing companies with U.S. operations found that the vast majority (79 percent) of companies had a GHG reduction target.³
- According to Smart Energy Decisions’ 2019 State of Corporate Renewable Energy Sourcing, which surveyed 110 companies from across various sectors, GHG reductions (70 percent) was the key reason for companies to pursue renewable electricity.⁴
- Business groups have come together to form a trade association with a goal of helping businesses procure by 2025 60 gigawatts (GW) of renewable electricity, an amount equal to approximately 120 conventional power plants. This association, the Renewable Energy Buyers Alliance (REBA) has over 230 members, including Amazon, Disney, General Motors, Google, Johnson &

¹Business Wire. “90% of S&P 500 Index Companies Publish Sustainability Reports in 2019, G&A Announces in Its Latest Annual 2020 Flash Report.” July 16, 2020. <https://www.businesswire.com/news/home/20200716005119/en/90-SP-500-Index-Companies-Publish-Sustainability>

²RE100. “Annual Report: RE100 Progress and Insights.” December 2019. <http://media.virbcdn.com/files/5c/aa8193f038934840-Dec2019RE-100ProgressandInsightsAnnualReport.pdf>

³Combined Heat and Power Alliance (formerly the Alliance for Industrial Efficiency). “Committed to Savings: Major US Manufacturers Set Public Goals for Energy Efficiency.” June 2018. https://chpalliance.org/wp-content/uploads/2018/06/AIE-EE-Targets_White-Paper_Final.pdf

⁴Smart Energy Decisions. “The State of Corporate Renewable Energy Sourcing.” October 2019. https://smartenergydecisions.com/upload/research+reports/sed_2019_re_sourcing_study.pdf

Figure 2.1 Corporate Climate-related Commitments by Type (2019 Ranking)

	GHG Target	Renewable Energy Target	Other Targets (EE and EVs)	CDP Supplier Engagement A Rating
Fortune 100	67	38	30	14
Fortune 500	242	66	77	31

Figure 2.2 Corporate Climate-related Commitments by Type (2019 Ranking). Companies include private companies and companies outside the Fortune 500.

	We Mean Business	Science Based SBTi	RE100
Companies with HQ in the U.S.	231	156	75

Johnson, McDonald's, Proctor & Gamble, and Walmart.⁵

Additionally, businesses are increasingly using scenario-based planning models to evaluate the risks associated with carbon pollution, which includes both energy consumption and GHG reductions. For example:

- In a recent NRG/GreenBiz survey of 240 companies, GHG reductions (87 percent), energy efficiency (82 percent), and renewable energy (64 percent) ranked as three of the four highest priorities for corporate sustainability efforts.⁶ The same survey highlights that companies are increasingly factoring climate considerations and GHG reductions into their overall business operations, risk management and investment strategies, not just their sustainability efforts, via scenario analysis such as science-based targets.
- Of the 242 Fortune 500 companies with a GHG reduction target, over 150 of those companies have set a science-based target, i.e. targets that are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement.⁷

These commitments are also beginning to extend to corporate supply chains, and by extension the small to medium-sized local businesses that supply large companies. For example, out of 128 global companies that received an "A" rating from CDP as part of their 2019 Global Supply Chain Report, 31

were in the US Fortune 500. The CDP supplier engagement rating is used to evaluate companies on their supplier engagement performance, and 73% of the CDP supply chain program members expect to deselect suppliers based on environmental performance.⁸ Utility carbon reduction goals are rapidly becoming very important for small to medium-sized businesses due to the growth in Fortune 500 supply chain decarbonization commitments.

Figure 2.1 and 2.2 highlight the previously stated demand for carbon reductions from leading corporations. DGA could not find any examples of these targets decreasing since 2011 and numerous reports and studies project this trend to continue or even accelerate.

This rising tide of corporate demand for renewable and low-carbon energy is driving companies to incorporate climate and clean energy factors into their decisions to locate. The Retail Industry Leaders Association (RILA), a trade association for leading retailers, has produced two reports ranking states on the degree to which they offer access to renewable electricity. RILA says a key purpose of these reports is to "assist renewable electricity buyers in selecting states with favorable renewable electricity policy conditions."⁹ To better illustrate this point, Figure 2.3 includes quotes from corporate executives about how renewable energy and grid decarbonization factor into their decisions on where to locate new facilities.

DGA also assessed the climate and clean energy targets

⁵ Renewable Energy Buyers Alliance. "One Year of REBA." April 6, 2020. https://rebuyers.org/blog/one-year-of-reba/?utm_source=rss&utm_medium=rss&utm_campaign=one-year-of-reba

⁶ GreenBiz. "How Corporations are Managing Risk, Resiliency and Sustainability Report." June 2020. <https://www.greenbiz.com/report/how-corporations-are-managing-risk-resiliency-and-sustainability-report>

⁷ The Science Based Targets initiative—a collaboration between CDP, World Resources Institute (WRI), the World Wide Fund for Nature (WWF), and the United Nations Global Compact (UNGC) champions science-based target setting as a powerful way of boosting companies' competitive advantage in the transition to the low-carbon economy. <https://sciencebasedtargets.org/>

⁸ CDP. Global Supply Chain Report. 2019. <https://www.cdp.net/en/research/global-reports/global-supply-chain-report-2019#671b3beee69d-9180412202b6528ec8f7>

⁹ Retail Industry Leaders Association. "Corporate Clean Energy Procurement Index 2020." March 2020, <https://www.rila.org/focus-areas/sustainability-environment/corporate-clean-energy-procurement-index-2020>

of several local corporations and institutions to see if TVA's potential portfolios aligned with their suitability commitments. TVA's plans do meet the current sustainability commitments for most of the leading corporations with facilities in the Nashville area. However, as previously mentioned, these commitments

are likely to increase since many have target dates before 2050. Figure 2.4 provides a snapshot of the commitments and public statements from six of these organizations.

Figure 2.3 Corporate Statements on Renewable Energy and Location Decisions

Company	Person	Quote
Switch	Adam Kramer, Vice President of Strategy	"Our first question was: Can you get us our power needs? The second question was: Can you get us 100% renewable? If the answer was no, Michigan wasn't going to be part of the site selection." (Michigan, January 2016) ¹⁰
Facebook	Bill Weihl, Director of Sustainability	"Access to clean energy is one of the key criteria that we consider when looking for new sites for data centers. We want to find places where ideally we can get 100 percent clean energy into our facility." (May 2016) ¹¹
Apple	Tim Cook, Chief Executive Officer	[Iowa's wind power is paramount to Apple's decision to locate two data centers in the state] "For us, that's kind of a gate. If we couldn't do that [run the two data centers on 100% renewable energy], we would not be here [in Iowa]. To Iowa's credit, Iowa saw this and had the vision to work with the utilities and so forth so it could happen. I think that says a lot about the people here and how they work together." (Iowa, August 2017) ¹³
Appalachian Power	Chris Beam, President	"At the end of the day, West Virginia may not require us to be clean, but our customers are. So, if we want to bring in those jobs, and those are good jobs, those are good-paying jobs that support our universities because they hire our engineers, they have requirements now, and we have to be mindful of what our customers want." (West Virginia, November 2017) ¹⁴
Adobe Systems, Akamai Technologies, eBay, Equinix, Salesforce	Statement from joint business letter	"Many of our companies have made public commitments to reduce our greenhouse gas footprint and invest in clean energy—in some instances, to procure 100 percent renewable energy for all of our operations. We intend to successfully fulfill our commitments to renewable energy, and access to cost-competitive renewable energy is a significant factor in deciding whether to locate or expand new data centers within the Commonwealth." (Virginia, September 2018) ¹⁵
Renewable Energy Buyers Alliance	Mike Terrell, Board Chair & Head of Energy Strategy Group at Google	"Every enterprise—whether it's a bakery, a big-box retailer, or a data center—should have an easy and direct path to buy clean energy. Ultimately, sourcing clean energy should be as simple as clicking a button," (REBA Announcement, March 2019)
Google	Robert Parker, Senior Lead of Data Center Energy and Location Strategy	"Ten years ago, nobody was offering us renewable energy, so we signed [power-purchase agreements]. Our goal is to decarbonize the grid. If our utilities will offer us products that we're looking for on a cost-effective basis, then that helps everybody." (October 2019) ¹⁶

¹⁰ Energy News Network. "Michigan Corporations Seek to Break Down Obstacles to Renewable Energy." February. 11, 2016. <https://energynews.us/2016/02/11/midwest/michigan-corporations-seek-to-break-down-obstacles-to-renewable-energy/>

¹¹ World Resource Institute. "New U.S. Map Shows Companies Where to Buy the Renewable Energy They Want." May 23, 2016. <https://www.wri.org/blog/2016/05/new-us-map-shows-companies-where-buy-renewable-energy-they-want>

¹² Radio Iowa. "Iowa's wind power 'paramount' to Apple's decision on new data centers." August 24, 2017. <https://www.radioiowa.com/2017/08/24/iowas-wind-power-paramount-to-apples-decision-on-new-data-centers/>

¹³ Charleston Gazette-Mail. "Appalachian Power president say company is looking towards renewables." April 22, 2017. https://www.wvgazette.com/business/appalachian-power-president-says-company-is-looking-toward-renewables/article_a0a68436-1525-5782-b9e7-35c2511175e9.html#sthash.YCKnX4YQ.dpuf

¹⁴ Ceres. Filing with the Virginia State Corporation Commission (SCC) regarding Case No. PUR-2018-00065. September 17, 2018. <https://scc.virginia.gov/docketsearch/DOCS/3ntc01!.PDF>

¹⁵ Greentech Media. "Facebook and Google: Utilities Must Take Lead on Grid Decarbonization." October 18, 2019. <https://www.greentechmedia.com/articles/read/facebook-and-google-voluntary-renewables-deals-wont-clean-up-the-grid>

Figure 2.4 Climate Commitments from Local Corporations and Institutions

Company	Target	Quote
Bridgestone	Reduce absolute CO2 emissions (scope 1 and 2) by 30% and aspire to reduce by 50% by 2030 from a 2011 baseline	"A pillar of our corporate environmental mission is the reduction of CO2 emissions, through the implementation of different initiatives aimed at a more efficient consumption of energy resources." – Leoncio Rojas, Manager of Environment, Health and Occupational Safety of Bridgestone Costa Rica ¹⁶
Kroger	Reduce absolute GHG emissions from operations by 30% by 2030 from a 2018 baseline	[referring to a solar installation in La Habra, CA] "Kroger's newest solar installation is another responsible choice that supports our sustainability goals. We will continue to explore energy-efficient technologies and renewable energy options that are protective to the Southern California environment and communities we serve across America." – Erin Sharp, VP of Manufacturing) ¹⁷
Lowe's	Reduce absolute scope 1 and scope 2 emissions by 40% by 2030 from a 2016 baseline	"We are continuously making investments to improve our environmental performance, from energy efficiency in our stores to supporting renewable energy development." – Chris Cassell, Director of Corporate Sustainability ¹⁸
Nissan	Reduce CO2 emissions 80% (per vehicles sold) from corporate activities by 2050 from a 2005 baseline, with an interim goal of 30% reduction of CO2 by 2022	"Renewable energy is fundamental to Nissan's vision for Intelligent Mobility. With 10 wind turbines already generating energy for our Sunderland plant, this new solar farm will further reduce the environmental impact of Nissan vehicles during their entire lifecycle." – Colin Lawther, SVP for Manufacturing, Purchasing and Supply Chain Management in Europe ¹⁹
Tyson Foods	Reduce GHG emissions 30% by 2030 against a 2016 baseline	"The reality is that going green is not just the right thing to do, it's smart business." – David Young, Senior Manager, Live Production ²⁰
Vanderbilt University	Power its campus entirely through renewable energy and commit to carbon neutrality by 2050	"Off-site large-scale renewable energy is an integral part of FutureVU, Vanderbilt's holistic campus planning initiative, and the university's comprehensive long-term sustainability strategy. We are proud to partner with TVA and NES to support renewable energy in the region and hope other institutions follow the example and invest in similar solutions." – Eric Kopstain, Vice Chancellor for Administration ²¹

¹⁶ Bridgestone Americas Inc. "Bridgestone Improves Energy Efficiency in its Production Plant in Costa Rica." March 15, 2019. <https://www.bridgestone-america.com/en/newsroom/press-releases/2019/bridgestone-improves-energy-efficiency-in-its-production-plant-i>

¹⁷ Charlotte Business Journal. "Duke Energy Renewables, Kroger Partner on California Solar Project." July 14, 2020. <https://www.bizjournals.com/charlotte/news/2020/07/14/duke-energy-kroger-partner-on-solar-project.html>

¹⁸ Lowe's. "Wind Farm Takes Lowe's Sustainability Commitment to New Heights." June 24, 2020. <https://corporate.lowes.com/newsroom/stories/fresh-thinking/wind-farm-takes-lowes-sustainability-commitment-new-heights>

¹⁹ Nissan Motor Corporation. "Nissan switches on solar farm to power UK car production." June 2, 2016. <https://global.nissannews.com/en/releases/nissan-switches-on-solar-farm-to-power-uk-car-production>

²⁰ Tyson Foods. "The Future is Bright with our Solar Powered Feed Mill." November 19, 2018. <https://thefeed.blog/2018/11/19/the-future-is-bright-with-our-solar-powered-feed-mill/>

²¹ Vanderbilt University. "Vanderbilt Commits to First of its Kind Renewable Energy Partnership with TVA, NES." January 22, 2020. <https://news.vanderbilt.edu/2020/01/22/vanderbilt-commits-to-first-of-its-kind-renewable-energy-partnership-with-tva-nes/>

The overall trend of reducing corporate GHG emissions and incorporating these factors into their location decisions has not gone unnoticed by cities. Over 160 cities, more than ten counties, and 8 states across the U.S. have goals to power their electricity grid with 100 percent renewable energy (13 states have set a 100 percent renewable, zero-carbon, or clean energy standard).²² Last year, the Metropolitan Government of Nashville and Davidson County (Nashville Government) unanimously passed a bill requiring all government buildings to be run completely by renewable energy sources by 2041. The law does not cover residents or private businesses.²³

Utilities have also begun making commitments to substantially reduce or eliminate their GHG emissions. As of February 2020, 24 investor-owned utilities (IOUs) had made commitments to reduce their emissions by 80 percent or more before 2050, with 14 of those IOUs committing to 100 percent carbon reductions or carbon neutrality by 2050.²⁴ The previously mentioned RILA report highlights that utility GHG reduction commitments, generation mix, and ambitious state and local renewable standards are also important considerations for companies in addition to doing direct deals with developers or utilities for renewable power.²⁵

RILA also notes that utility programs, onsite renewables, and direct investment options are key for commercial-scale facilities and brick-and-mortar stores, as smaller companies do not have the resources to individually contract for large offsite renewable energy projects.²⁶ Clean energy access is also a key component of environmental justice for minority and women-owned businesses. As such, large corporations are also increasingly working with their local utilities to not only achieve their carbon reduction goals but to also help their communities and customers accelerate carbon reductions as well. For example, in June 2020, Bank of America announced a new partnership with Duke Energy to, “support new solar generation to power Bank of America’s Charlotte operations,” and that they deal would, “also support new solar projects in local communities.”²⁷



“Off-site large-scale renewable energy is an integral part of FutureVU, Vanderbilt’s holistic campus planning initiative, and the university’s comprehensive long-term sustainability strategy. We are proud to partner with TVA and NES to support renewable energy in the region and hope other institutions follow the example and invest in similar solutions.”

Eric Kopstain, Vice Chancellor for Administration at Vanderbilt University



²² Sierra Club. Ready for 100. Commitments. <https://www.sierraclub.org/ready-for-100/commitments>

²³ Metro Government of Nashville. Codes of Ordinance. https://library.municode.com/tn/metro_government_of_nashville_and_davidson_county/codes/code_of_ordinances?nodet=CD_TIT2AD_DIVICOOFOFDE_CH2.32DEGESE_2.32.065FLELPR

²⁴ DGA primary research.

²⁵ Retail Industry Leaders Association. “Corporate Clean Energy Procurement Index 2020.” March 12, 2020. <https://www.rila.org/focus-areas/sustainability-environment/corporate-clean-energy-procurement-index-2020>

²⁶ Ibid.

²⁷ Duke Energy news center. “Bank of America Taps Duke Energy to Expand Renewable Energy Commitment.” June 29, 2020. <https://news.duke-energy.com/releases/bank-of-america-taps-duke-energy-to-expand-renewable-energy-commitment>

2



Question 2

How do the climate and renewable electricity plans of Nashville-area grid compare to the plans of power providers of six similarly sized cities with whom the Nashville area competes for businesses?

To answer question two, DGA compared TVA’s GHG reduction targets and planned renewable energy

generation with the utilities that serve Austin, Charlotte, Columbus, Indianapolis, Minneapolis, and Raleigh, which the Nashville area competes with to attract new businesses (competitor cities).

DGA identified the primary electricity provider to the competitor cities and their surrounding areas, the GHG reduction targets for each utility and how they are structured, and what percentage of each utilities’ past, current, and planned generation capacity was expected to come from renewable energy resources.

Figure 3.1 details which utilities serve each of the Nashville area’s competitor cities.

Figure 3.1 Greenhouse Gas Reduction Targets by Utility

City	Utility	Description
Austin	Austin Energy	Austin Energy is a municipally owned and the primary electric utility for the City of Austin and surrounding areas.
Charlotte	Duke Energy Carolinas	Duke Energy Carolinas (DEC) is a subsidiary of the investor-owned Duke Energy Corporation and the primary electric utility serving the City of Charlotte and surrounding areas.
Columbus	AEP Ohio	American Electric Power (AEP) Ohio is a subsidiary of the investor-owned American Electric Power Company, and the primary electric utility serving the City of Columbus and surrounding areas. (Note: AEP operates in Ohio as the Ohio Power Company in two rate zones, Columbus Southern Power and Ohio Power. These companies are jointly managed under the name “AEP Ohio.”)

City	Utility	Description
Indianapolis	Indianapolis Power and Light	Indianapolis Power and Light (IPL) is a subsidiary of the investor-owned AES Corporation and the primary electric utility for the City of Indianapolis and surrounding areas.
Minneapolis	Xcel Energy	Xcel Northern Power States Company is a subsidiary of the investor-owned Xcel Energy Incorporated and the primary electric utility serving the City of Minneapolis and surrounding areas.
Nashville	Nashville Electric Service (NES)/ Tennessee Valley Authority (TVA)	Nashville Electric Service (NES) is municipally owned and provides electricity distribution service to the Nashville areas. ²⁸ NES purchases electricity from TVA under an all-requirements contract. ²⁹ In 2020, NES entered into a new contract with TVA, requiring NES to give a 20-year notice to terminate the all-requirements contract. ³⁰ The Tennessee Valley Authority (TVA) is a corporate agency of the United States that provides electricity for business customers and local power companies serving 10 million people in parts of seven southeastern states.
Raleigh	Duke Energy Progress	Duke Energy Progress (DEP) is a subsidiary of investor-owned Duke Energy Corporation and is the primary electric utility serving the City of Raleigh and surrounding areas.

Figure 3.2 Percentage of Past, Current, and Planned Renewable Generation Capacity

Utility	Past (2015)	Current (2020)	Planned
Austin Energy	32%	51%	89% by 2035
Duke Energy Carolinas	16%	19%	25% by 2034
AEP	10%	17%	37% by 2030
Indianapolis Power and Light	7%	10%	51% by 2040
Excel Energy	5%	36%	54% by 2034
TVA Scenario 1A	17%	13%	21% by 2038
TVA Scenario 4E	17%	13%	30% by 2038
Duke Energy Progress	4%	17%	21% by 2038

²⁸ Knox News. "TVA's push for lengthy utility deals could set back green initiatives in Tennessee cities." January 8, 2020. <https://www.knoxnews.com/story/news/local/tennessee/2020/01/08/tva-trying-lock-tennessee-cities-into-lengthy-utility-deals/2698982001/>

²⁹ "The Board purchases all of its power from TVA under an all-requirements contract that had an initial term of 20 years. Beginning on December 19, 1989, and on each subsequent anniversary thereafter, the contract is automatically extended for an additional one-year period. The contract is subject to earlier termination by either party on not less than 10 years' prior written notice. As of June 30, 2019, neither party has made notification of early termination." – NES Spokesperson

³⁰ Southern Environmental Law Center. Groups challenge TVA's decision to lock power distributors into contracts. August 2020. <https://www.southernenvironment.org/news-and-press/news-feed/groups-challenge-tvas-decision-to-lock-power-distributors-into-contracts>

DGA then examined the percentage of past, current, and planned renewable electricity capacity for each utility. The past capacity represents the percentage of renewable generation capacity in 2015 and the planned capacity represents the percentage of renewable capacity for the outmost projected year of each utilities' preferred IRP portfolio or a commitment to a specific percentage of renewable energy by a given year, if larger than or a later date than the preferred IRP projection.

Additionally, TVA's most recent IRP did not include a preferred portfolio. Instead it modeled 30 different potential resource portfolios out to 2038. This included modeling six different scenarios—current outlook, economic downturn, Valley load growth, decarbonization, rapid distributed energy resource (DER) adoption, and no nuclear extensions—against five different strategies—base case, promote DER, promote resiliency, promote efficient load shape, and promote renewables. For each strategy, promote “means an incentive was modeled to make the resource more attractive for adoption or selection,” e.g. the Decarbonization scenario includes a \$25-40/ton carbon tax.³¹

Given the range of TVA's potential resource portfolios within the IRP, DGA focuses on two of 30 portfolios modeled in the IRP: portfolio 1A (scenario: current outlook + strategy: base case) and portfolio 4E (scenario: decarbonization + strategy: promote renewables). Since TVA is the only utility out of the group that does not provide a preferred portfolio, DGA chose these two portfolios to provide a range that represents the difference between a potential “base case” and “pro-decarbonization and pro-renewable energy” portfolio by TVA's own categorization.

Figure 3.2 details each utility's past (2015), current (2020), and planned (date and percentage) percentage of renewable energy generation capacity:

Given the above information, the Nashville-area grid will fall short of its competitors in two key areas: fewer GHG reductions and less renewable energy.



³¹ Tennessee Valley Authority. 2019 Integrated Resource Plan. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/irp/2019-documents/tva_executivesummary_final_20190628-spreads.pdf?sfvrsn=939819db_4

Fewer Greenhouse Gas Reductions

TVA has publicly stated it is on track to achieve a 60 percent GHG reduction by the end of 2020.³² This would indicate that TVA has only committed to reduce its GHG intensity another 10% from the 2005 baseline by 2030 based on its current emissions reduction target. The utilities serving TVA's competitor cities have also achieved similar reductions from their baseline emissions, most of which also have a mid-2000's baseline by switching from coal to natural gas generation. Therefore, this analysis is focused on what TVA plans to do from now until 2050 in order to achieve the targets of leading businesses. This leads to two main conclusions for TVA's GHG reduction target:

1. TVA uses an intensity-based target which commits to a reduction in the rate of emissions not total emissions; and,
2. TVA's GHG reduction target only goes to 2030, whereas 2050 carbon reductions targets have become fairly common in the utility industry.

Additionally, all of the competitor utilities are committed to deeper reductions than TVA has committed to provide to the Nashville area. Each of the other companies commits to greater reductions than TVA, even if it takes them until 2050 to get there.

1. Intensity vs Absolute Emissions Reductions

When comparing utility emissions targets, there is an important distinction between targets which commit to a decrease in the emissions rate (intensity) versus total emissions reductions (absolute). With an intensity-based target, GHG emissions could theoretically increase with a corresponding increase in

“Every enterprise—whether it’s a bakery, a big-box retailer, or a data center—should have an easy and direct path to buy clean energy. Ultimately, sourcing clean energy should be as simple as clicking a button.”

Mike Terrell, REBA Board Chair & Head of Energy Strategy Group at Google

electricity usage. By contrast, absolute GHG reduction targets commit to reducing total emissions despite potential increases in electricity production.

Absolute emissions reduction targets offer corporations more certainty in their long-term economic development investments. Five out of the six utilities that serve the Nashville area's competitor cities—Austin, Charlotte, Columbus, Minneapolis, and Raleigh—use absolute emission reductions targets from a 2000 to 2005 baseline rather than an intensity-based target. Companies are setting ambitious GHG reduction targets and TVA's target is far less ambitious than its competitors, which is a disadvantage for attracting new companies with GHG commitments.



2. No GHG Reduction Commitment Post-2030

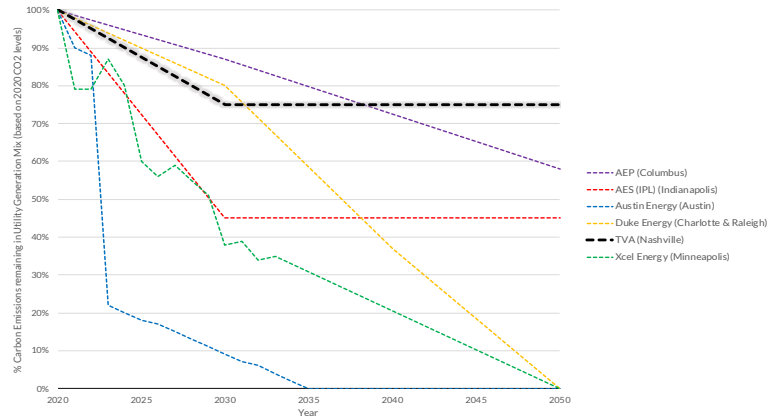
As mentioned, utility commitments to achieve net-zero emissions by 2050 have become common in the industry. When comparing TVA to the utilities serving the Nashville area's competitor cities, five out of the six utilities have committed to GHG reduction targets out to 2050 or to achieve net-zero emissions before 2050 (Duke Energy's target has been applied to both Duke Progress and Duke Carolinas).

In terms of comprehensive GHG reductions, the TVA commitment that will affect the Nashville area is weaker than its competitor cities on the percentage of total reductions by 2050, the length of its commitment, and the overall structure of its commitment. Companies with GHG targets can be expected to consider these factors when making long-term economic development and investment decisions.

³² Tennessee Valley Authority. Sustainability Report FY2019. <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

“Access to clean energy is one of the key criteria that we consider when looking for new sites for data centers. We want to find places where ideally we can get 100 percent clean energy into our facility.” -Bill Weihl, Director of Sustainability at Facebook

Figure 3.3 Comparison of Utility Carbon Reduction Projections from 2020-2050



Less Renewable Energy

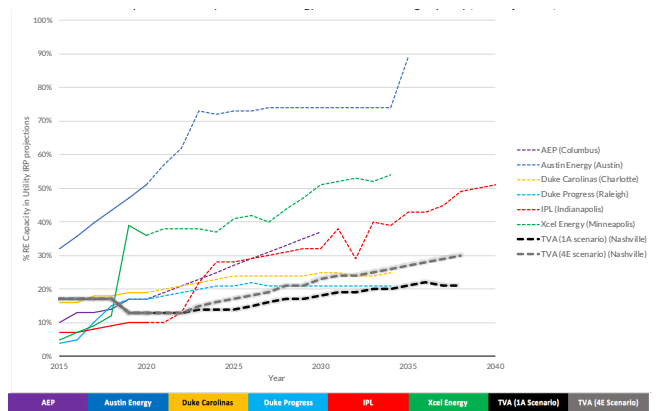
TVA expects to add anywhere from 2.5 to 14 gigawatts (GW) of new solar generation by 2038. While this is range is fairly robust, the average for each of the 30 portfolios outlined in its 2019 IRP is closer to 6 GW by 2038. Despite the potential ranges between the various portfolios, TVA's percentage of renewable energy capacity for scenario 4E (scenario: decarbonization + strategy: promote renewables) falls short of the percentages of five out of the six utilities serving the Nashville area's competitor cities by 2030—Austin, Charlotte, Columbus, Indianapolis, and Minneapolis. Figure 3.4 shows the current percentage of renewable energy capacity for each utility as of 2020 and the planned renewable energy capacity based on IRP projections and reported utility capacity projection targets.

Moreover, all of the primary electric service providers for the competitor cities have more ambitious GHG targets out to 2050, in terms of the percentage of total carbon reductions. Charts 3 assumes both potential portfolios (1A and 4E) for the Nashville-area grid are projected out to 2050 at the same rate and their competitor cities are projected out to 2050 on a path to meet their carbon commitments (assuming no additional nuclear additions or retirements).

The chart shows that TVA's percentage of total renewable capacity is at least 30 percent less for scenario 4E (decarbonization and promote renewables) than any other provider and on average over 40 percent less than its competitors in 2050. These are the types of considerations companies are increasingly looking at when making long-term decisions to site new facilities. Further as more states and utilities commit to 100 percent renewable energy or zero-carbon electricity by 2050, this will only make these considerations more important and decrease the need for individual corporate renewable energy contracts.

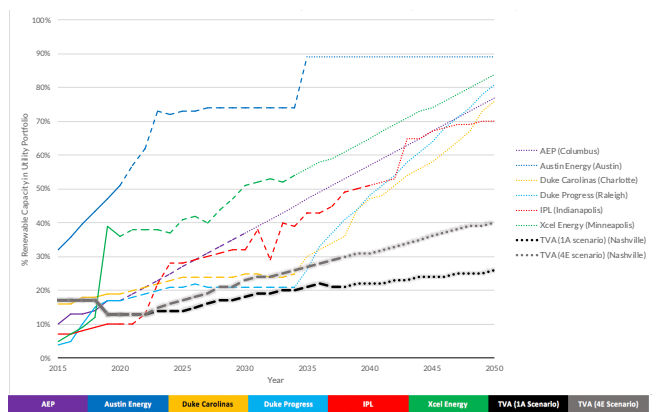


Figure 1.2 Comparison of Utility Renewable Energy Generating Capacity



Legend: — Historical — — Planned Projected

Figure 1.3 Comparison of Utility Renewable Energy Share of Generating Capacity (2050 Projections)





Question 3

To what extent will the electricity generation plans for the Nashville-area make it less attractive as companies consider expanding, relocating, or siting new facilities?

Utilities and cities within the utilities' service territories which have a higher percentage of relative carbon emission and less renewable energy will be at disadvantage for attracting companies with GHG reduction targets. Companies are also increasingly prioritizing GHG reductions and overall grid decarbonization, not just individual renewable energy deals, and value working with trusted utility partners to meet these objectives.

The Nashville area is currently less attractive than its competitor cities in terms of GHG reductions from the power sector and is likely at a competitive disadvantage for attracting new businesses with GHG targets. The Nashville-area grid is falling short of its competitors by planning for fewer GHG reductions and less renewable energy than its competitor cities.

The Nashville-area grid is currently meeting the carbon objectives of many local corporations. However, it may not continue to meet these objectives if local companies were to increase their GHG targets or set additional climate-related commitments. Since corporate climate commitments have increased annually since 2011, the prospect of local companies continuing to increase their targets is highly likely.

Additionally, providing renewable energy options for small to medium-sized businesses that supply large companies will likely increase in importance as corporations increasingly shift to scenario-based planning analyses, such as Science Based

Targets, and set supply chain targets as part of their climate objectives. The importance of environmental justice and growing awareness of these issues within large corporations will likely also increase the importance of decarbonization and providing renewable energy for all businesses, especially historically disadvantaged minority and women-owned businesses.

The Nashville-area grid could increase the Nashville area's ability to attract new businesses by both committing to more ambitious carbon reductions and increasing its planned renewable energy capacity. More specifically, the Nashville-area grid should focus on the following recommendations to be more competitive with similarly sized cities and improve its economic development potential for attracting new businesses with carbon reduction targets:

1. The Nashville area should work with its primary electric service provider to set a 2050 carbon reduction target that achieves at least 80 percent, and preferably 100 percent, absolute emissions reductions by 2050.
2. The Nashville-area grid should substantially increase its planned renewable generation capacity and set ambitious renewable energy goals as part of any 2050 carbon reduction targets.
3. The Nashville-area grid should provide more options for small to medium-sized and other local business to purchase renewable energy and to help these businesses decarbonize in order make them more attractive partners for large corporations with GHG and supply chain commitments.

These recommendations would make the Nashville area more attractive to companies with GHG reduction commitments as they consider expanding, relocating, or siting new facilities.

Appendix

Methodology

The Appendix lays out the methodology, data analysis and assumptions that DGA used to produce this report. We provide an overview of the report methodology and then give detailed utility-by-utility data collection methods and assumptions used for both renewable energy capacity projections and carbon reduction projections.

DGA identified six cities which Nashville competes with to attract new businesses—Austin, Charlotte, Columbus, Indianapolis, Minneapolis, and Raleigh. DGA determined the primary electric service provider for each of the six competitor cities and their surrounding areas—Austin Energy, Duke Energy Carolinas, American Electric Power, Indianapolis Power and Light, Xcel Energy, and Duke Energy Progress, respectively.

DGA then analyzed all of the utility carbon emission reduction targets and utility planned renewable energy generation mixes and compared them all against TVA's emission reduction target and planned renewable energy generation mix.

There is no uniform national data source that tracks both renewable energy resource mix projections and carbon emission reduction projections by electricity service provider. Therefore, DGA based this report on an analysis of a variety of sources: utility filings and annual reports (integrated resource plans (IRPs), corporate sustainability reports, SEC and financial filings, Edison Electric Institute filings), city sustainability, energy, and climate plans, corporate press releases, energy-related news articles, and correspondence with both public utilities commission staff and utility regulatory staff. These data sources have varying levels of comprehensiveness, with varying assumptions used to project trends out to 2050.

DGA determined renewable energy capacity projections for each utility. DGA used a combination of the known generation mix from 2015 to 2020 and anticipated renewable energy capacity projected from 2020 to a given date specified in a utility's latest IRP. Then DGA further projected renewable energy capacity from the end date specified in a utility IRP out to 2050 using line of best fit averages in conjunction with known utility 2050 carbon reduction targets.

DGA projected carbon reductions for each utility out to 2050. First, DGA homogenized all utility carbon reduction goals onto a single baseline year: 2020. To do that, DGA collected all utility carbon emission data (metric tons of carbon dioxide) for 2020 either from utility IRPs or sustainability reports or calculated using previous years' emission data and averaged over time to 2020 using line of best fit averages. Once DGA determined all 2020 emissions data, DGA mapped out utility carbon reduction projections from 2020 to 2050 by proportionally adjusting each utility target.

Resource Mix Categories

DGA standardized the resource generation mixes for each utility, defining and using the following categories in each case, where applicable.

Coal – Includes coal-fired power plants

Natural Gas – Includes natural gas, combined cycle, combustion turbines, combined heat and power (CHP), future firm peaking, and oil (where applicable)

Nuclear – Includes all nuclear generation plants

Efficiency – Includes energy efficiency (EE), demand side management (DSM), and distributed energy resources (DER/DR) (where applicable)

Renewables – Includes solar (grid-scale, community, and distributed), wind, hydropower, storage (energy/battery/pumped), and biomass where applicable

Other – Only applicable to Austin Energy, which classifies less than 0.1 percent of its electricity generation as being produced by “other.” What “other” refers to resource-wise is not defined.

Purchases – Only applicable to Duke Energy Carolinas and Duke Energy Progress, which classifies “cumulative purchase contracts” in its IRP as purchased capacity from PURPA Qualifying Facilities. Purchases were omitted from Duke Energy Carolinas data since they accounted for less than 1 percent of base case capacity; however, purchases were included in Duke Energy Progress data given they accounted for 11 percent of the base case capacity in 2020.

Utility and Public Utilities Commission Staff Communications

DGA reached out to either utility or public utilities commission staff for all of the Nashville competitor cities, and received the following information:

Austin – Austin Energy Market Operations and Resource Planning staff provided data on Austin Energy generation mix

Charlotte – North Carolina Utilities Commission Economic Research Division staff provided data on Duke Energy Carolinas

Columbus – Public Utilities Commission of Ohio staff provided consultation on AEP integrated resource planning process

Indianapolis – Indiana Utility Regulatory Commission staff provided data on Indianapolis Power and Light generation mix

Minneapolis – Xcel Energy Regulatory Policy specialists provided data on Xcel Energy generation mix and carbon emissions projections

Raleigh – North Carolina Utilities Commission Economic Research Division staff provided data on Duke Energy Progress generation mix

Utility Resource Mix Projections

American Electric Power (AEP) – AEP Ohio does not file an IRP with the Public Utility Commission of Ohio, therefore DGA used generation resource data from the parent company AEP for the city of Columbus. DGA determined generating capacity data for 2015-2019 using AEP factbooks for the annual EEI Financial conference.³³ DGA then projected generating capacity mix for 2020-2050 using a line of best fit average given AEP’s 2020 and 2030 generating resource portfolio estimates.³⁴

Austin Energy – DGA calculated generating capacity data for 2015-2019 using 2015 resource mix data and then used line of best averages to map out generation mix to 2019.³⁵ ³⁶ DGA forecasted generating capacity data from 2020-2035, including planned coal and natural gas power plant retirements, using generation mix data acquired from Austin Energy resource planning staff and Austin Energy’s plan to 2030.³⁷ DGA used line of best fit averages were to map out resource forecasts from 2035 to 2050.

Duke Energy Carolinas (DEC) – DGA located generating capacity data for 2015-2019 in Duke Energy Carolinas annual

³³ American Electric Power. Factbooks for Annual Edison Electric Institute (EEI) Financial Conference. 2015-2019.

- 2015: https://aep.com/Assets/docs/investors/eventspresentationsandwebcasts/2015_EEI_Factbook.pdf
- 2016: https://www.aep.com/Assets/docs/investors/eventspresentationsandwebcasts/2016EEI_FactBookv2.pdf
- 2017: https://www.aep.com/Assets/docs/investors/eventspresentationsandwebcasts/2017_Fact_Book_All_Sections.pdf
- 2018: https://www.aep.com/Assets/docs/investors/eventspresentationsandwebcasts/2018FactBook_AllSections_Final.pdf
- 2019: https://www.aep.com/Assets/docs/investors/eventspresentationsandwebcasts/2019Factbook_All_Sections_FINAL.pdf

³⁴ American Electric Power. “Clean Energy Future: Our Vision.” <https://www.aep.com/about/ourstory/cleanenergy>

³⁵ Austin Energy. “Austin Energy Resource, Generation and Climate Protection Plan to 2025: An Update of the 2020 plan.” <https://austinenergy.com/wcm/connect/461827d4-e46e-4ba8-acf5-e8b0716261de/aeResourceGenerationClimateProtectionPlan2025.pdf?MOD=AJPERES&CVID=n-89qHqa>

³⁶ Austin Energy. City of Austin. “Renewable, Carbon Free and Battery Storage Studies.” <https://austinenergy.com/wcm/connect/700b2a98-bd65-4e2c-ab2d-aed09a7d1159/ResourcePlanningStudies-Renewable-CarbonFree-Storage.pdf?MOD=AJPERES&CVID=mRGafpZ>

³⁷ Austin Energy. “Austin Energy Resource, Generation and Climate Protection Plan to 2030.” March 9, 2020. <https://austinenergy.com/wcm/connect/6dd1c1c7-77e4-43e4-8789-838eb9f0790d/gen-res-climate-prot-plan-2030.pdf?MOD=AJPERES&CVID=n85G1po>

IRP filings.³⁸ DGA calculated generating capacity data for 2020-2034 using Table 8-B Load, Capacity, and Reserves – Summer projections on page 53 of Duke Energy Carolinas IRP 2019 update report.³⁹ DGA projected generating capacity data for 2034-2050 using line of best fit averages and Duke Energy’s 2050 carbon reduction goals.

Duke Energy Progress (DEP) – DGA located generating capacity data for 2015-2019 in Duke Energy Progress annual IRP filings (DGA averaged 2017 resource capacity values based on 2016 and 2018 IRP filing data).⁴⁰ DGA calculated generating capacity data for 2020-2034 using Table 8-B Load, Capacity, and Reserves – Summer projections on page 60 of Duke Energy Progress IRP 2019 update report.⁴¹ DGA projected generating capacity data for 2034-2050 using line of best fit averages and Duke Energy’s 2050 carbon reduction goals.

Indianapolis Power and Light (IPL) – DGA determined generating capacity data for 2015-2019 using line of best fit averages, given 2007 and 2019 generation mix information (note that the generation mix data in 2007 and 2019 did not include any information on efficiency resources).⁴² DGA calculated generating capacity from 2020-2040 using Portfolio 3b (IPL’s preferred plan) Installed Capacity Additions and

Planned Retirements in Figure 8.7 on page 161 of IPL’s 2019 Integrated Resource Plan were used to calculate generating capacity from 2020-2040.⁴³ DGA projected generating capacity for 2040-2050 using line of best fit averages based on 2020-2040 IRP data.

Tennessee Valley Authority (TVA) – DGA located generating capacity data for 2015-2018 in TVA’s annual SEC 10K forms, under the generating property capacity section of each form (note that TVA’s 10K forms do not include information on efficiency resources).⁴⁴ DGA calculated generating capacity data for 2019-2038 using the “Strategy A/Scenario 1” data (Base Case: Current Outlook) and “Strategy E/Scenario 4” (Promote Renewables: Decarbonization) in TVA’s 2019 Final IRP and in TVA’s Appendix G Annual Capacity Additions Tables with Storage.⁴⁵ ⁴⁶ DGA projected generating capacity data from 2038-2050 using line of best fit averages given the 2019-2038 IRP capacity table values.

Xcel Energy Northern Power States Company (NPSC) – DGA determined generating capacity data for 2015-2018 using line of best fit averages given NPSC data within Xcel Energy’s 2015 SEC 10K form and data within NPSC’s 2018 SEC 10K form (note that the SEC 10K forms did not include information on efficiency resources).⁴⁷ DGA used generating capacity data

³⁸ Duke Energy Carolinas Annual Integrated Resource Plan filings. 2015-2019.

• 2015: <http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=c3c5cbb5-51f2-423a-9dfc-a43ec559d307>

• 2016: <http://www.energy.sc.gov/files/view/2015DECIRP.pdf>

• 2017: <http://www.energy.sc.gov/files/view/DEC IRP 2016 Corrected 10-2016 Clean Copy.pdf>

• 2018: <http://www.energy.sc.gov/files/view/2017 Duke Energy Carolinas Integrated Resource Plan-UPDATED.pdf>

• 2019: <https://dms.psc.sc.gov/Attachments/Matter/Ocf6f148-eb5e-45bd-a401-14aee8a148f8>

³⁹ Duke Energy Carolinas. 2019 Integrated Resource Plan: Update Report. October 29, 2019. <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=d5888a19-da40-42c6-b75c-f2ce7bdb1ac4>

⁴⁰ Duke Energy Progress Annual Integrated Resource Plan filings. 2015-2019.

• 2015: <http://www.energy.sc.gov/files/view/PROGRESS2014IRP.pdf>

• 2016: <http://www.energy.sc.gov/files/view/2015DEPIRP.pdf>

• 2018: <http://www.energy.sc.gov/files/view/2017 Duke Energy Progress Integrated Resource Plan-05.29.2018.pdf>

• 2019: <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=25fb3634-54b6-464b-9704-b6fe99cda1a8>

⁴¹ Duke Energy Progress. 2019 Integrated Resource Plan: Update Report. October 29, 2019. <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=a0b81afe-4f07-4452-b537-f1fb211eb323>

⁴² Indianapolis Power & Light Company. “About IPL: Power Generation.” https://www.iplpower.com/About_IPL/Power_Generation/

⁴³ Indianapolis Power & Light Company. 2019 Integrated Resource Plan. December 16, 2019. https://www.in.gov/iurc/files/2019_IPL_IRP_Public_Volume_1_121619.pdf

⁴⁴ Tennessee Valley Authority. Annual SEC 10K Form filings. 2015-2018.

• 2015: <http://www.snl.com/irw/Doc/4063363/Index?did=34600175>

• 2016: <http://www.snl.com/irw/Doc/4063363/Index?did=38384836>

• 2017: <http://www.snl.com/irw/Doc/4063363/Index?did=42643490>

• 2018: <http://www.snl.com/irw/Doc/4063363/Index?did=48033155>

⁴⁵ Tennessee Valley Authority. 2019 Integrated Resource Plan. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/irp/2019-documents/tva-2019-integrated-resource-plan-volume-i-final-resource-plan.pdf?sfvrsn=44251e0a_4

⁴⁶ Tennessee Valley Authority. IRP Appendix G: Annual Capacity Additions Tables with Storage. 2019. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/irp/foia-responses/appendix-g-annual-capacity-additions-tables-with-storage.pdf?sfvrsn=11e11782_4

⁴⁷ Xcel Energy. Annual SEC 10K Form filings. 2015, 2018.

• 2015: http://large.stanford.edu/courses/2015/ph240/mcfadden2/docs/Xcel_Energy-AR2014.pdf

• 2018: <http://investors.xcelenergy.com/Cache/IRCache/aa70d21c-430c-7f1d-d94e-2645b81781a5.PDF?O=PDF&T=&Y=&D=&FID=aa70d21c>

for 2019 from Xcel Energy's Upper Midwest power generation home page.⁴⁸ DGA calculated generating capacity data for 2020-2034 using Scenario 9 on page 132 of the Upper Midwest Supplement Preferred Plan for the Northern Power States Company 2020-2034 IRP.⁴⁹ DGA projected generating capacity from 2034-2050 using line of best fit averages and Xcel Energy's 2050 carbon reduction goals.

Utility Emissions Reduction Projections

AEP (AEP Ohio parent company) – DGA projected utility emissions based on AEP's 2050 carbon reduction goal⁵⁰ and annual carbon emissions data on page 7 of AEP's 2019 EEI sustainability report.⁵¹

Austin Energy – DGA projected utility emissions from Austin Energy's 2035 carbon reduction goal and the Reduce Emissions Affordably for Climate Health (REACH) approach on page 8.⁵²

Duke Energy (DEC and DEP parent company) – DGA projected utility emissions based on Duke Environmental Performance Metrics (Emissions from Electric Generation)⁵³ and Duke Energy's 2020 Energy Climate Report on pages 20 and 27.⁵⁴

AES (IPL parent company) – DGA projected utility emissions

[-430c-7f1d-d94e-2645b81781a5&iid=4025308](#)

⁴⁸ Xcel Energy. Power Generation: 2019 Upper Midwest. https://www.xcelenergy.com/energy_portfolio/electricity/power_generation

⁴⁹ Xcel Energy. Upper Midwest Integrated Resource Plan 2020-2034. Supplemental Preferred Plan. <https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bF0AB0573-0000-C11C-B7B2-2FA960B89BD1%7d&documentTitle=20206-164371-01>

⁵⁰ American Electric Power. "Carbon & Climate: A Clean Energy Future." <http://www.aepsustainability.com/environment/carbon/>

⁵¹ American Electric Power. "EEI ESG/Sustainability Report for Investors." 2019. <https://www.aep.com/assets/docs/investors/esg/EEI-ESGSustainabilityReportforInvestors-2019.pdf>

⁵² Austin Energy. "Austin Energy Resource, Generation and Climate Protection Plan to 2030." March 9, 2020. <https://austinenenergy.com/wcm/connect/6dd1c1c7-77e4-43e4-8789-838eb9f0790d/gen-res-climate-prot-plan-2030.pdf?MOD=AJPERES&CVID=n85G1po>

⁵³ Duke Energy. "Operations: Environmental Performance Metrics." 2019. <https://sustainabilityreport.duke-energy.com/operations/environmental-performance-metrics/>

⁵⁴ Duke Energy. "Achieving a Net Zero Carbon Future: Duke Energy 2020 Climate Report." April 2020. https://www.duke-energy.com/_/media/pdfs/our-company/climate-report-2020.pdf

⁵⁵ AES Corporation. "AES Climate Report." https://s2.q4cdn.com/825052743/files/doc_downloads/2018/11/AES_Climate_Scenario_Report111318.pdf

⁵⁶ AES Corporation. "2018 Sustainability Report." https://s2.q4cdn.com/825052743/files/doc_downloads/2019/07/2018_SustainabilityReport_vFinal.pdf

⁵⁷ Tennessee Valley Authority. "2018 EEI ESG/Sustainability Reporting." June 2019. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/investors/eei-esg-sustainability-reporting-template.pdf?sfvrsn=b4a09e7c_0

⁵⁸ Tennessee Valley Authority. "Environmental Stewardship: Carbon Dioxide." <https://www.tva.com/environment/environmental-stewardship/air-quality/carbon-dioxide#:~:text=About%20TVA%2Dspecific%20CO2%20lbs,from%20owned%20and%20purchased%20power.>

⁵⁹ Tennessee Valley Authority. Sustainability Report FY2019. <https://www.tva.com/environment/environmental-stewardship/sustainability/sustainability-report>

⁶⁰ Xcel Energy. "Corporate Responsibility Report: Leading the Clean Energy Transition." https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/CorporateResponsibilityReport/2019_CRR/2019_LeadingtheCleanEnergyFuture_CRR.pdf

⁶¹ Xcel Energy. "Building a Carbon-Free Future: Carbon Report." February 2019. https://www.xcelenergy.com/environment/carbon_reduction_plan

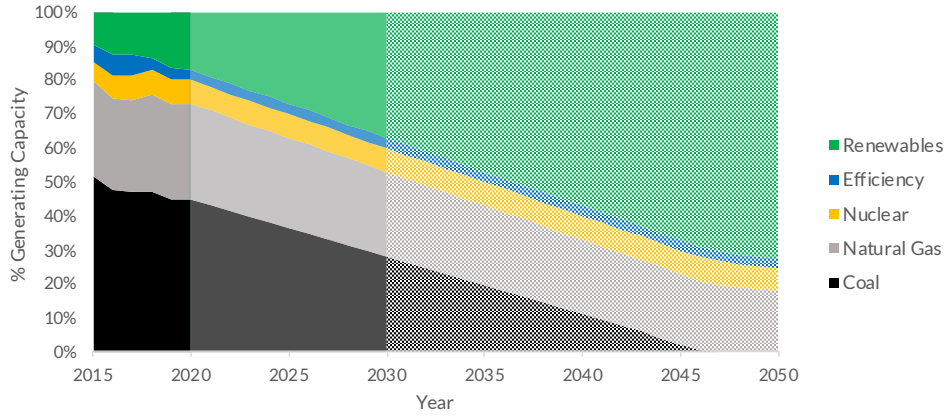
based on AES' 2030 carbon reduction goal⁵⁵ and the emissions data on page 23 in the AES 2018 sustainability report.⁵⁶

TVA – DGA projected utility emissions based on TVA's EEI ESG & sustainability report,⁵⁷ emissions data at TVA plants from 1995-2019,⁵⁸ and the TVA 2019 sustainability report.⁵⁹

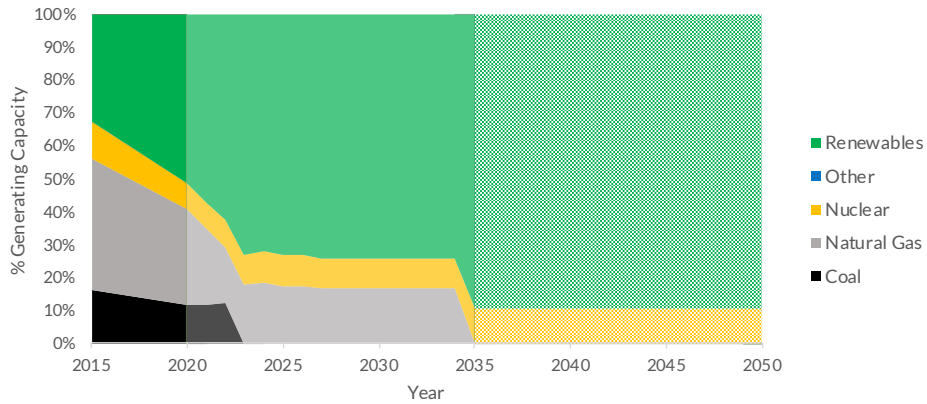
Xcel Energy (Northern Power States Company parent company) – DGA projected utility emissions based on Xcel's Corporate Responsibility report,⁶⁰ Xcel's carbon reduction plan,⁶¹ and emissions data collected from Xcel policy regulatory specialists.

Utility Generation Resource Mix Charts

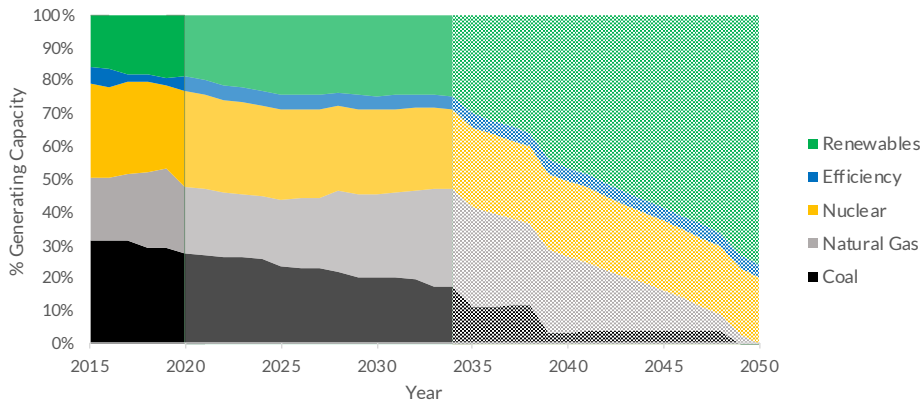
American Electric Power Resource Mix



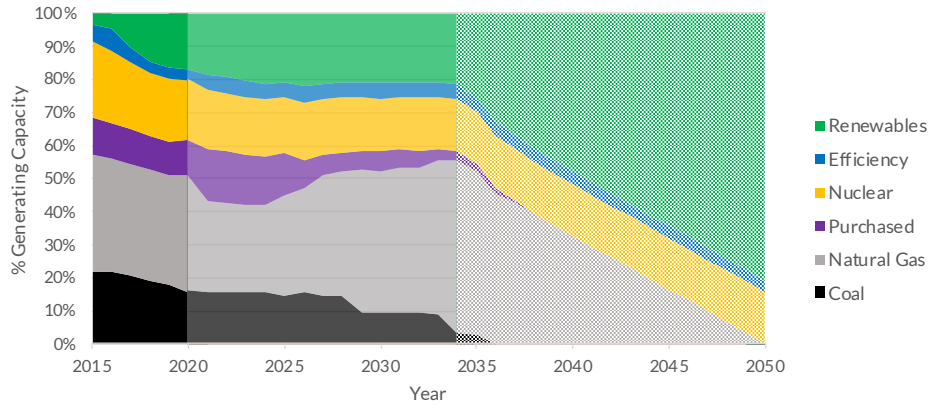
Austin Energy Resource Mix



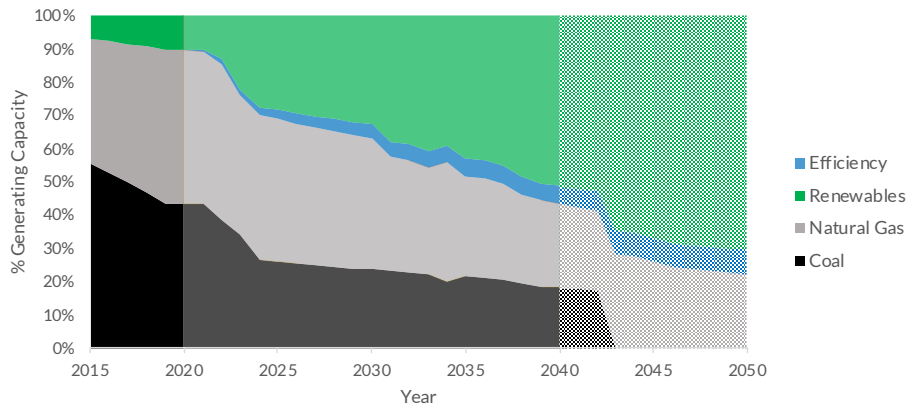
Duke Energy Carolinas Resource Mix



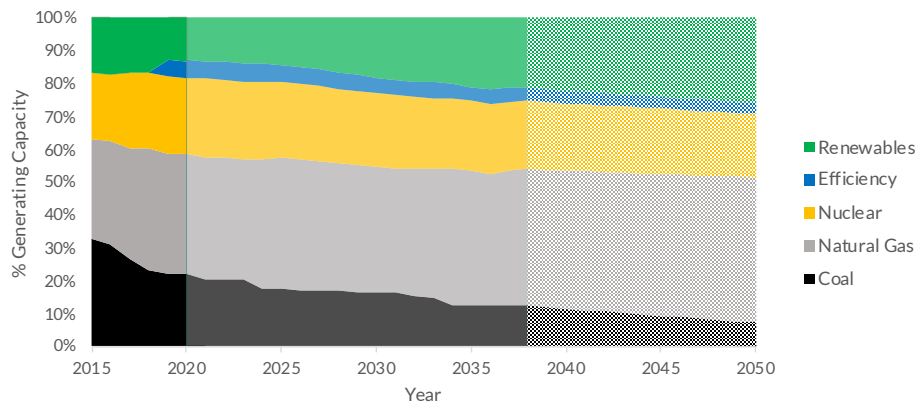
Duke Energy Progress Resource Mix



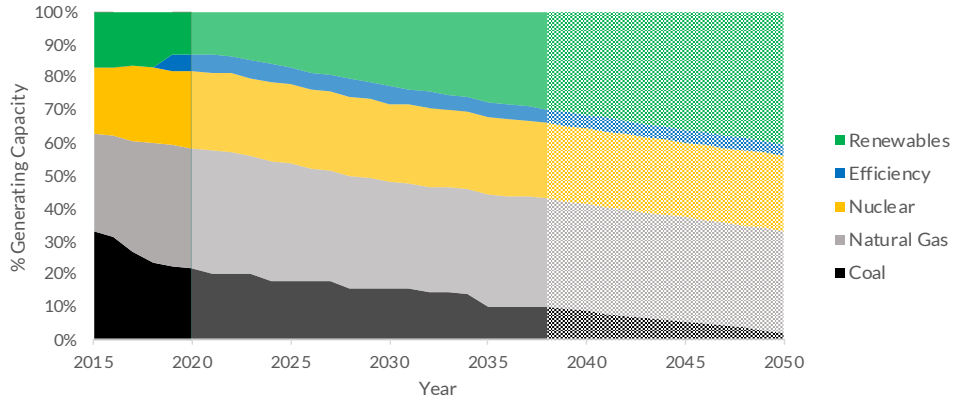
Indianapolis Power and Light Resource Mix



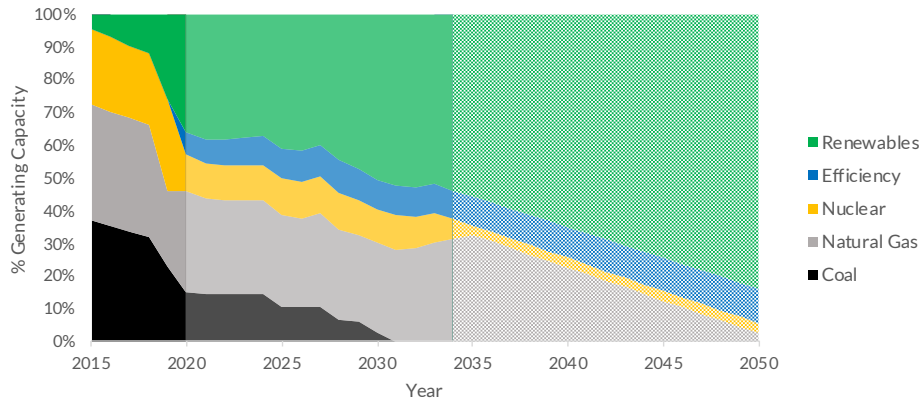
Tennessee Valley Authority Resource Mix (Scenario 1A)



Tennessee Valley Authority Resource Mix (Scenario 4E)

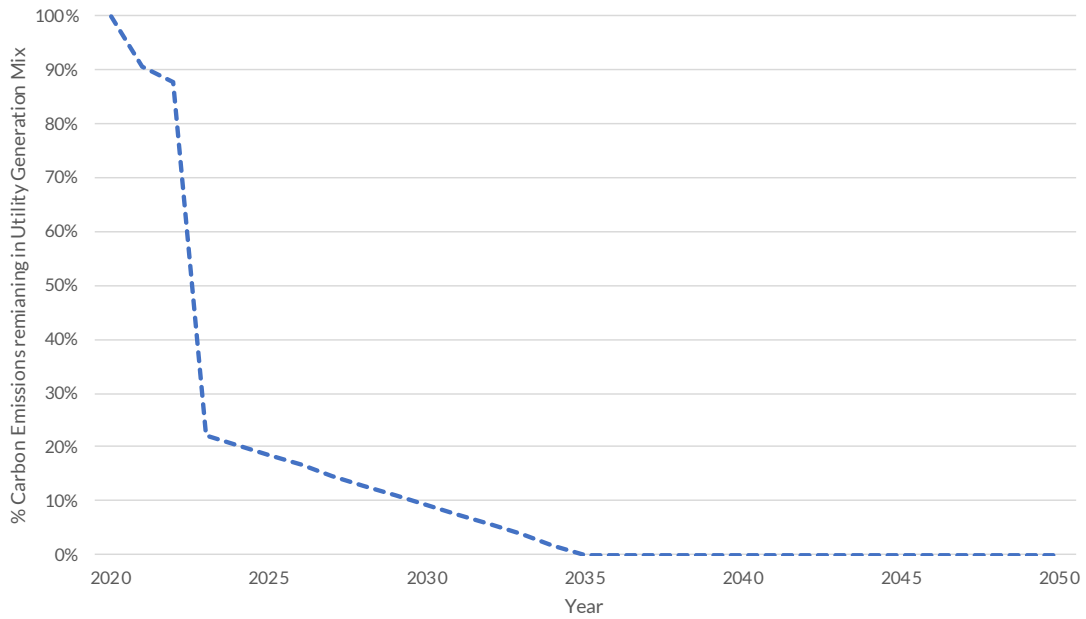


Xcel Energy Northern Power States Company Resource Mix

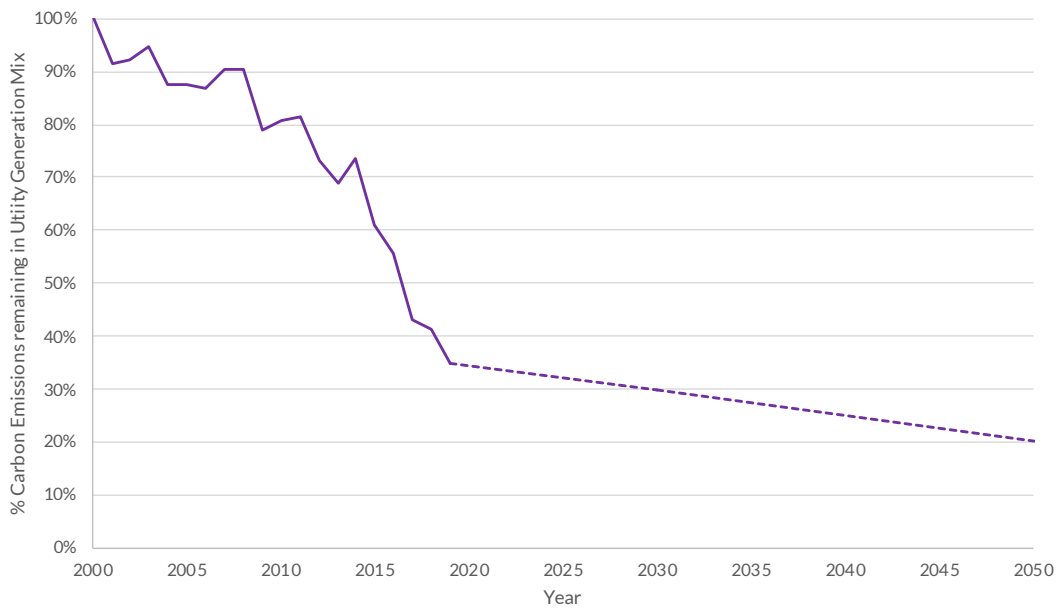


Utility Carbon Reduction Projections

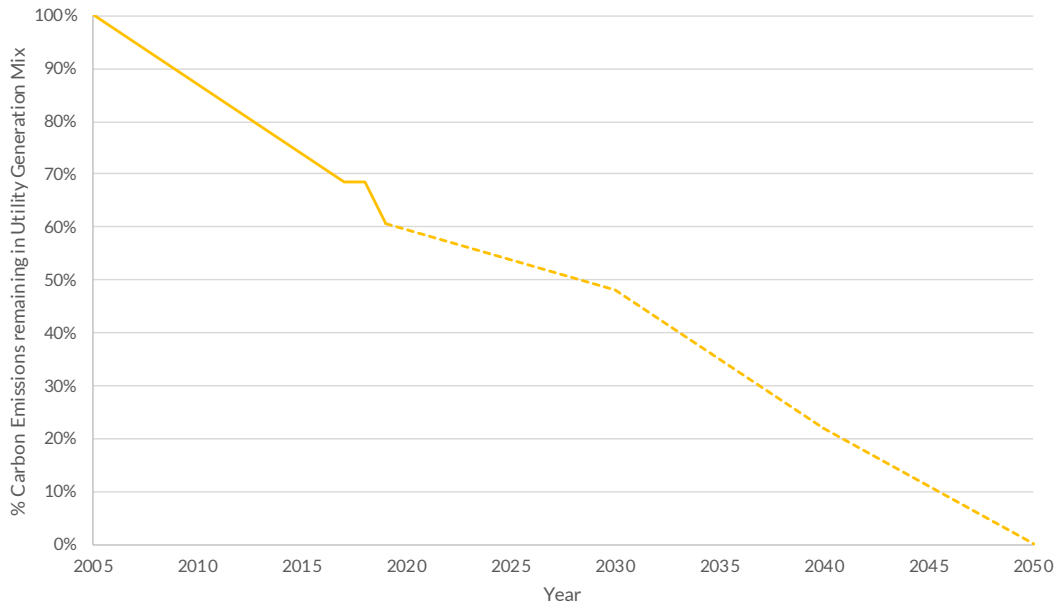
Austin Energy Projected Carbon Reductions from 2020 Baseline



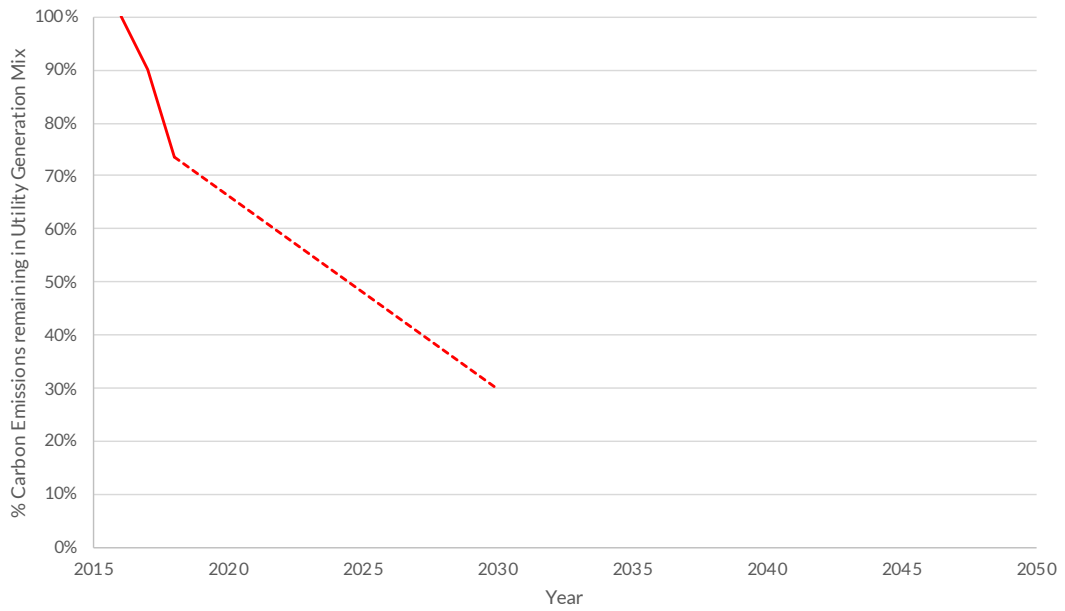
AEP Projected Carbon Reductions from Target Baseline (2000)



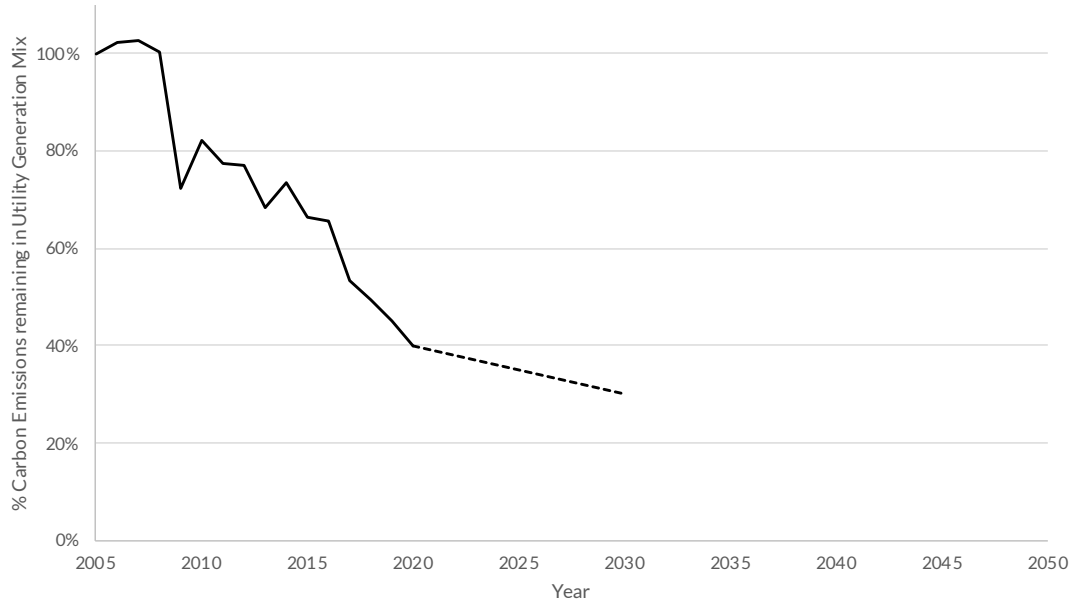
Duke Energy Projected Carbon Reductions from Target Baseline (2005)



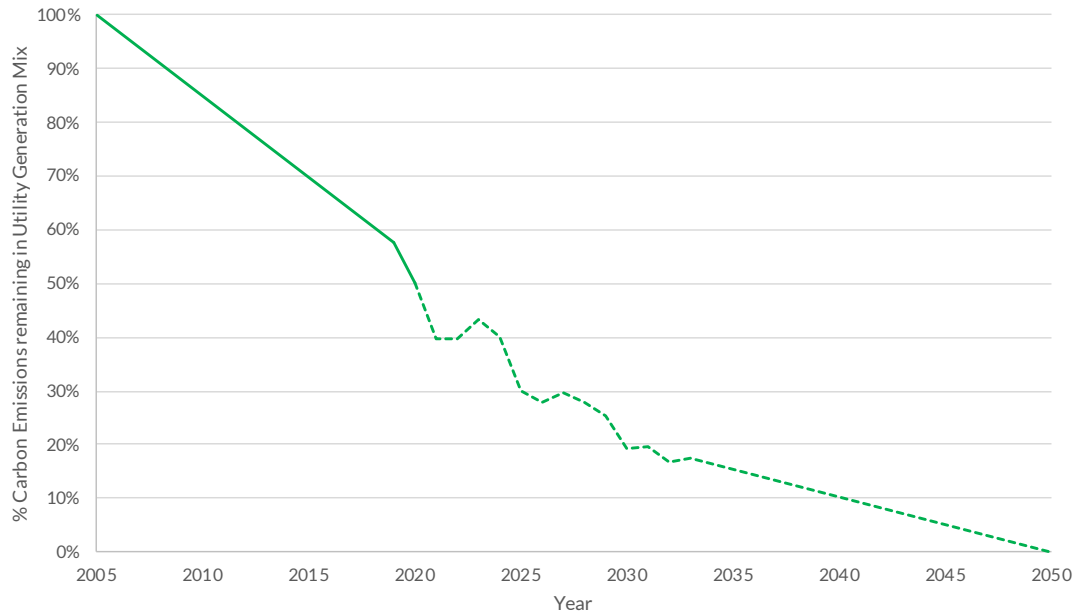
AES Projected Carbon Reductions from Target Baseline (2016)



TVA Projected Carbon Reductions from Target Baseline (2005)



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James Hewett has more than seven years of experience providing companies and organizations strategic guidance on renewable energy policy, finance, and power market issues. As vice president for renewable energy, he leads DGA's work to open electricity markets to make it easier for companies and other institutions to buy renewable energy. James is also engaged with several other DGA projects, including our work to scale up the deployment of renewable thermal technologies through the Renewable Thermal Collaborative, and helps clients such as Americans for a Clean Energy Grid expand long-distance transmission to move electricity from the wind and solar-rich center of the country to load centers in the East and West.

Before joining DGA, James worked at the American Council on Renewable Energy (ACORE) for 5 years where he has worked extensively with the business community on accelerating renewable energy deployment. At ACORE, James advocated for renewable energy policy, launched their Corporate Procurement Working Group, managed ACORE's work around organized markets and the Clean Power Plan, and authored or co-authored numerous industry reports. In his spare time, he has also been an active leader in the Clean Energy Leadership Institute (CELI), helping lead their Fellowship Training Program. He has a B.S. from Texas A&M University and a Master of Science and a graduate certificate of business from American University.

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William Sherman has a background in environmental policy and research, with an emphasis on climate and sustainability issues. As a client and research manager with DGA, William concentrates primarily on corporate sustainability, and conducts research and data analysis for various client projects. He contributed to multiple published works, including a report on the growing demand for renewable energy among major global manufacturers and a report highlighting the need for transmission upgrades to meet corporate America's growing demand for clean energy.

Before DGA, William taught students of all ages about marine biology and ocean conservation in the Florida Keys. He earned a B.A. in environmental sciences from the University of Virginia, focusing on ecology and hydrology. Throughout his undergraduate years, he would spend his summers leading month-long canoe expeditions in the wilderness of Northern Ontario, and those experiences are why he decided to pursue a career in environmental policy.



David Gardiner and Associates (DGA) was founded in 2001 and is a strategic advisor to organizations and businesses seeking a sustainable future. DGA has worked for foundations, businesses, and non-profit advocacy groups to develop strategies to identify and promote policies that will advance clean energy and a low-carbon economy. Our firm combines expertise developing research and analysis with deep understanding of clean energy markets and policy.

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