50/50
Climate Project

Utility Climate Change Readiness: A Business Plan Analysis

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Executive Summary

One of the most significant issues confronting organizations today relates to the risks associated with climate change. While it is widely recognized that continued greenhouse gas emissions will cause further atmospheric warming, and this warming is expected to lead to damaging economic and social consequences, the exact timing and severity of physical effects are difficult to estimate. The scale and time horizon of the problem make it uniquely challenging. Many organizations and their shareholders incorrectly perceive climate change implications to be strictly long term and, therefore, not especially relevant to decisions made today.

The potential impacts of climate change, however, are not only physical, and some are already manifesting or will do so in the near future. Much of the global community is seeking to tackle the problem with a resolve not previously exhibited. The reduction in greenhouse gas emissions implies movement away from fossil fuel energy and related physical assets. This coupled with rapidly declining costs and increased deployment of clean and energy-efficient technologies could have significant, near-term financial implications for organizations dependent on fossil fuels. Indeed, the past several years have seen the bankruptcy of several coal companies in the United States. Utilities are critical institutions to the shift from highly-polluting fossil fuels to clean energy sources, and therefore are very much exposed to these risks. They also are poised to benefit from the opportunities that come along with a well-designed strategy that focuses on solutions.

Because this transition to a lower-carbon economy requires significant and, in some cases, disruptive changes across economic sectors and industries in the near term, investors are interested in the implications for businesses. Their concerns focus on preventing severe financial shocks so that companies do not experience sudden losses in asset values. These potential shocks and losses in value include the economic impact of precipitous changes in energy use and the re-valuation of carbon-intensive assets—real and financial ones whose value depends on the extraction or use of fossil fuels. Many investors are similarly interested in understanding how utilities that manage the transition astutely could grow.

In the United States, the energy sector is already at the leading edge of a significant transition. There is growing uptake of and demand for renewables, particularly on the part of large commercial customers. In many places, renewable energy sources have reached cost parity with conventional fossil generation. In certain applications, solar, wind and other clean energy sources can outcompete even natural gas generation. Further, natural gas proliferation has gutted the coal market. There are significant moves toward more distributed generation[1], and rapid changes by some prominent utility regulators in how utility structures treat distributed generation.

Most industry observers agree that the entire utility sector must continue to transform rapidly. Some utilities are further ahead in adapting their business models and in managing associated regulatory changes, while others appear to cling to conventional modes of generation and appear to resist regulatory initiatives that would support transition.

Various barriers exist to effective transformation of the electric utility sector. At the federal level, the 2016 election results have plunged the industry into uncertainty about the fate of the Clean Power Plan, a central plank of the Obama administration's efforts to support transition to a clean energy economy and implement the 2015 Paris climate accord. The new Trump administration's general energy and environmental policy initiatives were not clear when this report was finalized in March 2017, but were clearly poised to roll back major environmental protections. Yet the dominant change drivers for utilities are at the state level. Each state has its own patchwork of regulations; some states appear to thoroughly embrace the need to implement clean energy resources, in some cases expressly in response to climate change imperatives, while other

states have protected utilities' reliance on traditional energy sources and structures. Regulated utilities are at the mercy of the contexts within which they operate, but still exert considerable influence over these through stakeholder consultation processes, lobbying and election spending. The result of this regulatory latticework, as well as such factors as regional variations in energy source availability, is that no uniform transition strategy is appropriate for all utilities. However, this study identifies five key elements that should characterize transition planning at the board level of all major utilities:

1. Acknowledge climate change and its exigencies
2. Commit to International Energy Agency targets for emissions intensity
3. Work transparently to reform obstructive regulation
4. Collaborate with stakeholders
5. Align incentives with transition goals

More on each of these elements is included in the section on Transformation Strategies below (pages 12-14).

This study builds on work Si2 conducted last year with the IRRC Institute, which examined in depth the climate orientation of the boards of the 25 largest investor-owned utilities, allowing investors to make informed judgments. The Top 25 U.S. Electric Utilities: Climate Change, Corporate Governance and Politics evaluated boards using a standardized set of metrics designed by Si2 with input from investors, governance experts and utility economists. The project provided data for use by investors concerned about climate and regulatory impacts on their portfolio companies.

We analyze in this report the business strategies of five of the companies most oriented toward the status quo:

- Duke Energy
- American Electric Power (AEP)
- DTE Energy
- Southern
- FirstEnergy

The following table summarizes the above companies' overall performance against the above transformation plan characteristics.

Company Performance on Transformation Plan Characteristics					
	Duke Energy	Southern	FirstEnergy	DTE Energy	AEP
1 **Climate change exigencies**	Strictly regulatory risk acknowledgement	Strictly regulatory risk acknowledgement	Basic risk acknowledgement but no plan	Basic risk acknowledgement but no plan	Risk acknowledgement, articulates rudiments of a transition plan
2 **IEA Targets**	Emissions intensity targets, long way to IEA targets	Emissions intensity disclosure but no targets; long way to IEA targets	No intensity disclosure; absolute emissions targets	No intensity disclosure; absolute emissions targets	No intensity disclosure; absolute emissions disclosure but no targets
3 **Regulatory reform**	Opaque strategy, history of lobbying for status quo, sometimes with misleading tactics	Opaque strategy, despite some broader elements of disclosure; history of lobbying for status quo, sometimes with reportedly fraudulent tactics	Opaque strategy, history of lobbying for status quo	Opaque strategy, history of lobbying for status quo, but able to adjust	Opaque strategy, history of lobbying for status quo, but able to adjust
4 **Collaborate**	Mixed track record: generally adversarial, but w/ several examples of successful collaboration	No strong history	No strong history	Positive example of collaboration	No strong history
5 **Align incentives**	One climate change element in exec comp	None	None	Partial, but not significant	Partial, but not significant

Introduction

As the impact of climate change on businesses becomes more apparent, investors are seeking boards and business strategies that are equipped to deal with the risks and opportunities climate change presents. Large institutional investors, concerned about their portfolio risks, increasingly are focused on the climate change orientation of corporate business strategies, particularly regarding energy. While global governance bodies have focused on policies needed to constrain average global temperature increase to two degrees Celsius—a level previously believed to mitigate against the most severe impacts of climate change—new research published in the last year suggests that even two degrees could be too much to prevent very high costs and impacts. As the target now begins to turn to an average warming threshold of 1.5 degrees Celsius, the challenge grows ever more difficult to meet.

Challenges to Electric Utility Business Models

Electric utilities are facing unprecedented external and internal challenges to the traditional business models. Technological change and associated new market entrants, climate change regulation and shifting consumer demands are putting pressure on traditional electrical generation, transmission and distribution. Fossil fuels—particularly coal—are becoming increasingly expensive to exploit. Energy efficiency and other demand side resources are now cheaper than conventional generation in many cases. Renewables—particularly solar and wind—outcompete fossil fuels in many instances, and generally are approaching grid parity.[2] Many utilities are also experimenting with electricity storage, thanks to very rapid advances in the technology. Electricity generation, transmission and delivery is growing increasingly decentralized, electricity is no longer necessarily consumed immediately and formerly high barriers to market entry are eroding.

Distributed generation[3] of electricity has proliferated in many states. Residential rooftop solar is expanding rapidly as costs for solar panels decrease and companies such as Solar City and First Solar expand. Many environmental activists and utility sector analysts see distributed generation as a critical element of the electric grid of the future. Key advantages they point to are reduced emissions from prevented generation, cost advantages to owners, efficiency gains in the form of decreased transmission loss, resilience that comes from independence from an interconnected grid that is otherwise subject to cascading outages and modularity that enables renewable energy source integration.

Others question the value of distributed generation proliferation in the current framework. Some scholars at the Massachusetts Institute of Technology (MIT) who have been skeptical about distributed solar assets' usefulness recently published a report suggesting large-scale, utility-controlled solar assets may make better long-term economic sense.[4] This view comports with that of American Electric Power (see p. 52). MIT's report warns regulators that they must:

> ***minimize distortions from charges that are designed to collect taxes, recover the costs of public policies [including subsidies for renewable energy [and] cross-subsidies between different categories of customers, etc.), and recover residual network costs (i.e., those network costs that are not recovered via cost-reflective charges).***

This admonition is based on the difficulty utilities face under traditional regulatory structures, where their costs for grid

maintenance are recovered from customers' charges, which are largely volumetric. In general, customers generating their own solar power, for instance, are entitled to electrical grid access to draw power during times of insufficient generation and to sell power back to the grid in times of excess, yet such customers will pay less for grid availability because of lower usage. On net, this can result in the utility receiving less in fees than it costs to keep that customer connected to the grid. In some cases, customer rates (i.e. cost per unit of electricity) would increase substantially if the same fixed costs for grid services were applied to lower volumes of usage. Importantly, these challenges are not necessarily an inherent problem with distributed generation, but rather largely with the cost recovery mechanisms that regulators have put in place for utilities. A number of experts, regulatory officials and utilities have described rate solutions to such problems. These rate structures could be changed.

Strikingly, new data show that unsubsidized solar generation is beginning to outcompete coal and natural gas on a larger scale, particularly in emerging markets.[5] Utility-scale solar costs could decline by 36 percent between now and 2025.[6]

Renewable energy demand among U.S. companies that are large utility customers is significant and growing quickly, according to a report from Advanced Energy Economy (AEE), a clean energy trade group. The report[7] found that 71 of Fortune 100 companies have set renewable energy or sustainability targets, up from 60 just two years ago. Among Fortune 500 companies, commitments have held steady at 43 percent, or 215 firms, the report found. Twenty-two Fortune 500 companies have committed sourcing 100 percent of their electricity needs from renewables, including **Wal-Mart Stores, Apple, General Motors** and **Amazon.com**. **Google** announced in December 2016 that 100 percent of its data centers around the world would be powered exclusively by renewable energy sources by 2017. However, as discussed in greater detail below, companies with operations in states whose regulatory structures are not supportive of advanced energy must commit significant effort and creativity to meet these commitments.

Non-utility companies are entering the energy efficiency services market, particularly in deregulated markets. Google recently purchased Nest, which provides products and services to reduce residential electricity use. **Comcast** now provides an EcoSaver service to help customers save money on energy bills. **General Electric** has created a new company, Current, to focus on providing products and services in energy efficiency, renewable generation and storage to large buyers such as hospitals, universities, retail stores and cities. If this trend continues, utilities could be outpaced in providing a service in which they should be more expert than anyone.

According to PricewaterhouseCooper's 2015 Global Power & Utilities (P&U) Survey[8], 94 percent of electric power industry representatives predict that the power utility business model will be either completely transformed or significantly changed by 2030:

> *In defining future business models, utilities need to understand and challenge their company's purpose and positioning in tomorrow's markets. In the past, operating an integrated utility from generation through customer supply was well understood. Now, unbundling opportunities are extending deeper into the value chain and enabling greater participation by specialists. As a result, electric companies will need to rethink not just their roles and business models, but also their service and product offerings and approaches to customer engagement.*[9]

In May 2014, Barclays downgraded bonds for the entire U.S. electric utility sector due to risks posed by the rapidly declining costs of solar power and energy storage technologies. Deutsche Bank predicts total solar photovoltaic (PV) power costs

would reach grid parity in 36 U.S. states as soon as this year, and Frost & Sullivan projects that both residential and utility-scale solar photovoltaic power will reach global grid parity by 2020. In many regions, wind and solar—especially at utility scale—are already reaching grid parity and often pricing out more traditional generation resources.[10]

Barriers to Transformation

Regulatory

Federal

With the outcome of the 2016 presidential election, the United States has entered an era of deep federal regulatory uncertainty. President Trump initially revealed very little about any energy policy he would pursue. All signals emerging from the President's team suggest a reversal of President Obama's positions on climate policy, renewed support for fossil fuel extraction and usage and a general repudiation of established climate science. Trump's agency heads have already begun taking steps to dismantle key environmental regulations, and Trump is pursuing dramatic cuts to the EPA's budget.

Most of Trump's cabinet picks have expressed doubt about fundamental climate science, despite overwhelming consensus in the scientific community. Former Oklahoma Attorney General Scott Pruitt is now the new head of the EPA, of which he has long been a vocal critic. In March 2017, Pruitt declared that he did not believe carbon dioxide was a primary contributor to global warming, in contravention of the Agency's own website.[11] He and other cabinet members have criticized the Clean Power Plan (CPP), currently working its way through a legal challenge (to which Pruitt is a party), and condemned the 2015 Paris climate accord, which the President has publicly declared a desire to "cancel." Both the CPP and the Paris climate accord will be discussed in detail in the following sections of this report.

Meanwhile, as the fate of the CPP hangs in the balance, it will likely wend its way back to the U.S. Supreme Court, which from Antonin Scalia's death in February 2016 lacked a tie-breaking ninth justice. This was initially due to the refusal of Senate Republicans to consider President Obama's nominations for a replacement. Then, on April 7, 2017, on a party-line vote, the Senate confirmed President Trump's nomination of Neil Gorsuch. Gorsuch, a conservative whom observers across the political spectrum recognize as one of the most qualified of Trump's picks, is an originalist, meaning that he believes in using only the text of a statute to interpret it, rather than sources such as legislative history.[12] He is opposed to the "Chevron standard," which says courts should defer to federal regulatory agencies when the regulators are carrying out ambiguous laws. The Chevron standard has provided the EPA considerable leeway in using the Clean Air Act to control carbon dioxide pollution. Gorsuch once rejected a challenge to a state renewable portfolio standard, although his reasoning was grounded in an area of law that had nothing to do with the environment. While it is not certain how he might rule on environmental matters, if confirmed, in all scenarios, the CPP seems likely to be on shaky ground under the new nine-member court of 2017.

In March 2017, the federal landscape remained so volatile that any assumptions about the immediate future of federal climate policy and its effect on the private sector remained speculative. Looking ahead, any potential for energy transformation appears to reside with the states.

State

The electricity sector in the United States is fragmented. Wholesale transactions are regulated by the Federal Energy Regulatory Commission (FERC)—though often with deference to market-based determinations of whether reasonable rates have been set by the market. Retail sales to customers occur through a range of entities, including investor-owned utilities,

public power (such as municipally owned utilities) and cooperatives, which primarily serve rural areas.

Retail rates for investor-owned utilities are set by states using some combination of cost-of-service ratemaking and market returns. Cost-of-service ratemaking is also the norm for publicly owned utilities, but investor-owned utilities operate under varying regulatory regimes. Some operate under traditional cost-of-service ratemaking by a state public service or public utilities commission; others act as load-serving entities that must procure all of their electricity from non-regulated participants through power purchase agreements or markets. Those markets may in turn be operated by Regional Transmission Organizations (RTOs) or Independent System Operators (ISOs). However, some load-serving entities may be "islands" within or between RTO/ISOs or other Balancing Area Authorities that are not formally RTO/ISOs under direct FERC jurisdiction. The extent to which any given authority within this patchwork encourages or inhibits climate-resilient strategies varies greatly.

It would be difficult to overstate the importance of state-level regulatory landscapes to a utility's ability to achieve its targeted rate of return on investments while at the same time transforming its business model into one optimally suited to address climate change imperatives. For instance, while companies across the country are purchasing advanced energy at an unprecedented rate, policy and regulation in many states constrain such purchases. Competing interests mold state policy and many can work against a climate change-resilient agenda.

Regulated vs. deregulated states: The move toward deregulation of electricity markets that began in the 1970s has dramatically altered the playing field. The United States now features a mix of regulated and deregulated markets. Regulated markets feature vertically integrated utilities that own or control the entire flow of electricity from generation to meter. Examples include Florida, Colorado, Idaho and Kentucky. Conversely, utilities in deregulated markets must divest all ownership in generation and transmission, and are only responsible for:

1. Distribution, operations and maintenance from the interconnection at the grid to the meter;
2. Billing the ratepayer; and
3. Acting as the Provider of Last Resort (POLR).

Deregulated markets feature grid operators that administer wholesale markets to ensure reliability on the grid and prevent blackouts. Multiple retail suppliers (or load serving entities, known as LSEs) buy generation and sell electricity to end users. Several states have become deregulated markets over the last 20 years, largely in the Northeast and Mid-Atlantic, as has Texas. Other states, such as California, are partially deregulated or have had deregulation suspended.

In a regulated electricity market, utility companies are legally protected monopolies. This structure was originally put into

place because of the high capital costs of building out and maintaining electrical generation plants, distribution systems and transmission lines. In these markets, the utility company owns the electric transmission lines, distribution system and all associated infrastructure, and it generates or purchases the electricity from suppliers and sells it on to the customer. This system, while perhaps the most efficient mechanism for supplying electricity for many decades, also prohibits competition in those markets from competing suppliers. Customers have no choice in their electricity supplier, and often cannot choose the source of the energy they buy, although that is beginning to change.

In a deregulated electricity market, competing electric companies can offer customers a choice of the source of their electricity. Utilities continue to own and maintain the transmission infrastructure and distribution system to deliver electricity to customers, but other companies can compete in that market to supply electricity to the end user. Some advocates have argued this structure can lead to lower prices for customers and enable the integration of additional generation sources, such as wind and solar energy, into the grid, although this is a matter of some debate.

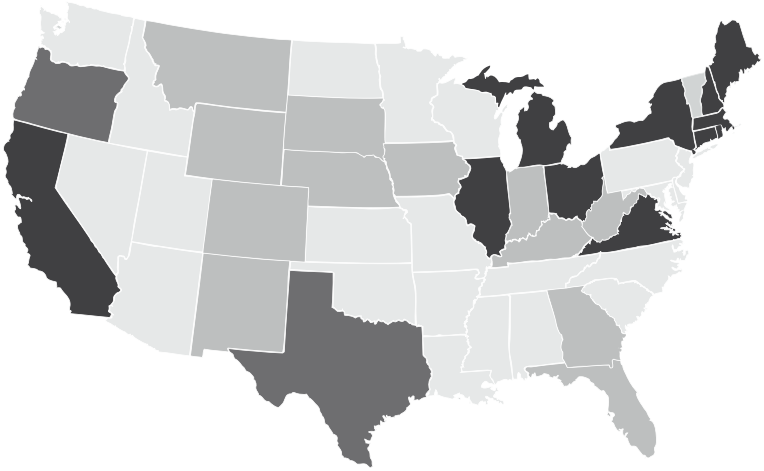


Figure 1: Regulated vs. Deregulated Electricity and Gas Markets as of December 2016 (Source: Electric Choice)

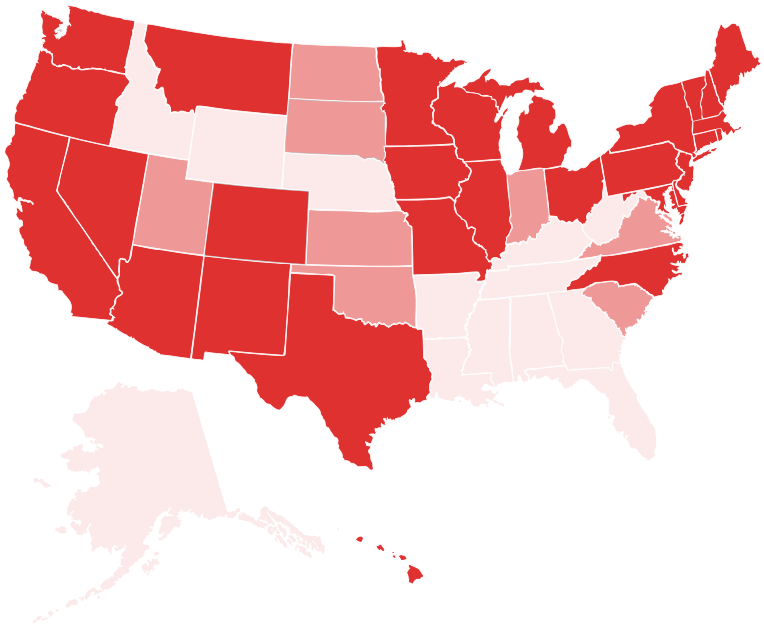


Figure 2: Renewable Energy Standards (Source: Advanced Energy Economy)

Structural

Carbon Capture & Storage: There appears to be a general tension among utilities between doubling down on high capital cost generation projects, into which significant investment has already been sunk, and pivoting toward lower cost, more nimble technologies that could be poised for broader market success. Carbon Capture and Storage (CCS) is an example of the former. Many CCS champions have viewed it as the key to continuing to exploit reliable coal assets while capturing their greenhouse gas emissions. However, many experts do not see the technology as currently viable, and it is increasingly implicated, along with other underground injection techniques, in the recent proliferation of earthquakes across the country, known as induced seismicity.

Engineers are working on methods to capture and store the carbon dioxide now emitted from coal-fired power plants. CCS typically involves three steps—capture of CO_2 at the power plant; transport of the high-pressure gas via pipeline to a storage site; and injection and storage of the CO_2 underground. While the techniques to implement all three of these steps are well understood, significant challenges remain in applying them at the scale and pace required to reduce greenhouse gas emissions. Barriers include significant additional power consumption, increased water use, massive expansion of existing pipeline networks, environmentally safe storage and induced seismicity.

There are currently 38 large-scale CCS projects in operation or construction around the world, of which 20 should be operational by the end of 2017. In recent years, insufficient financing and legislative support have inhibited growth in CCS, and these challenges persist.[13] CCS remains expensive and, so far, its prospects for economic viability are far from certain.

Many utilities—**Southern** in particular—have invested massive sums in developing CCS plants and technologies. In economic terms, these costs are largely sunk, or unrecoverable, except to the extent that regulators allow for some cost recovery through customer charges. According to economic theory, sunk costs should not affect future decisions, but this could be a hard pill to swallow for investors, and even for executive-level champions of such projects. Most CCS projects in the United States appear beset by constant set-backs and cost overruns. (For a detailed example, see ***Southern***'s case beginning on p. 30.)

In January 2017, the first large-scale CCS plant in the United States became fully operational. The Petra Nova plant, partially owned by **NRG Energy**, reportedly cost more than $1 billion. The plant operators say it captures more than 90 percent of the CO_2 released from its coal combustion, which is subsequently used for enhanced oil recovery; this could add a revenue stream, but the underground injection techniques are increasingly suspected of contributing to induced seismicity. The Petra Nova plant employs post-combustion carbon capture technology, which is different from the approach under development at Southern's Kemper plant.[14]

Meanwhile, a coal-fired industrial plant in southern India has begun successfully capturing CO_2 emissions and converting them to soda ash, also known as baking soda. The project's developers say the process, which will capture up to 60,000 tons of CO_2 each year, is the world's first successful, industrial-scale example of carbon capture and utilization.[15] According to the developer's press release, it costs just $30 per ton to capture the CO_2, compared to the $60 to $90 per ton price tag that came with previous carbon capture systems.[16] The technology uses a form of salt to bond with CO_2 molecules exiting the plant's boiler system. The plant then reuses the captured gas to make soda ash, used in the manufacturing of a variety of other products, including glass, paper, and detergents. It is too soon to tell what effect this development might have on the broader market, but it seems possible that companies betting on larger CCS projects that

so far have proved uneconomic may find themselves outstripped by this more nimble, effective technology.

Nuclear: Similar dynamics are at play in the development of new nuclear power plants, though with the critical distinction that nuclear plants are a proved technology: They reliably deliver electricity as intended, and do so with almost zero carbon emissions. But they are monumentally expensive, characterized by the same sort of delays, ballooning budgets and cost recovery conflicts that plague CCS. In addition, there is cost uncertainty related to the long-term storage of spent fuel. Nuclear power plants also are subject to physical risks from climate change, particularly related to rising sea levels that could inundate some plant sites, and a loss of lake and river water on which other plants depend for reactor cooling. Electric utilities and their regulators who approve investments in new generation sometimes appear to have the faulty perception that they must choose between old stalwart technologies, such as nuclear, and newer technologies, such as distributed generation with energy storage. While nuclear generation is reliable despite safety concerns, a forward-looking energy generation strategy also can have room for new technologies that have not yet had a chance to develop a long track record.

More to Explore

A rich area for further research and analysis lies in the individual states' energy policies and systems, and the extent to which each of them nurtures or inhibits advanced energy development. A comparative approach would be most useful, providing investors a clear view on the specific contexts within which utilities operate.

Transformation Strategies for Electric Utilities

Given the multiple factors discussed in the foregoing sections, it is clear no blueprint for transformation strategies is appropriate for all utilities. Variations in regulatory structures, regional availability of energy sources, the nature of the utility's customer base, consumer sentiment and other mutable characteristics all prompt different approaches. One size decidedly does not fit all. Nevertheless, there are certain fundamental attributes of transformation strategies that are broadly applicable:

1 **Acknowledge climate change and its exigencies:** At the risk of oversimplification, the most important aspect of a transformation strategy is its very existence. At a basic level, investors interested in strategic action from utilities on climate change want utilities to acknowledge the reality of climate change, their contribution to it and the risks it poses to ongoing operations and to prospects for future growth. These investors also want utilities to report much more comprehensively on their climate change risks and strategies for managing these. Ultimately, this is an SEC requirement, though most utilities still confine their reporting strictly to regulatory risk in their annual Form 10-K filings. Established climate science dictates expanded consideration of risks to physical property, supply chains, demand patterns and more.

   On December 14, 2016, a 20-nation task force released guidelines for voluntary climate risk disclosure by companies and investors in financial filings. The Task Force on Climate-Related Financial Disclosures (TCFD), set up by Bank of England Governor Mark Carney in his role as head of the Financial Stability Board, identified electric utilities as one of the sectors that would benefit most from supplemental, sector-specific guidance. The TCFD offered 11 specific recommendations for all industries, divided into four topics: governance, strategy, risk management and metrics and targets. They include:

- All companies should benchmark strategic and financial planning using a two-degrees Celsius economic scenario as their baseline for analyzing climate risks and opportunities. (As discussed earlier in this report, even two degrees Celsius of average global temperature increase could be too much to prevent catastrophic impacts.)

- All companies should disclose information related to water, energy usage and efficiency, land use and revenues from products and services designed for a low carbon economy.[17]

2 **Commit to International Energy Agency (IEA) targets:** It would make strategic sense for utilities to set and abide by specific emission reduction goals no matter what the current requirements of their existing regulatory structure. The failure of a state or country to modernize should not be understood by the utility to mean modernization will not occur; it simply could mean the utility will have a shorter and accelerated period in which to modernize when the relevant regulatory structure does modernize. It may make sense to develop and publish a transformation strategy with board-level oversight with a goal to achieve the IEA targets—consistent with constraining average global temperature increase to no more than two degrees Celsius—of 6.49 ounces/kWh of greenhouse gas emissions by 2035, and 1.41 ounces/kWh by 2050.[18] As discussed earlier in this report, even those may be insufficient to prevent significantly negative effects of climate change.

3 **Work transparently to reform regulation:** The goals set forth here are ambitious even for the utilities that are the most oriented to energy transformation. It would be an especially steep challenge for the five companies considered in this study. In most cases, the regulatory landscape within which they operate will require significant adjustment to allow utilities to retool their business models. Certainly, any individual utility cannot be held entirely responsible for the decisions of its regulators. However, utilities wield considerable influence over policy development in their role as one of the most knowledgeable stakeholders at the table in regulatory proceedings, as well as through lobbying and election spending.[19] As part of their transformation strategies, they can identify all regulatory barriers to their decarbonization and clean energy goals, describe possible solutions and deploy their political capital and money to pursue those remedies, while being entirely transparent about tactics and goals.

4 **Collaborate with stakeholders:** Utilities have a much greater chance of success in achieving regulatory reform if they choose to collaborate with all relevant stakeholders. Indeed, the history of states' energy policy is rife with both positive and negative examples in this regard. Arizona and Nevada have both experienced protracted conflicts over the expansion of rooftop solar, where the dialogue and policy struggle became so vitriolic and divisive for a time that no stakeholders were satisfied, and the prospects of rooftop solar in those states were deeply wounded. Blame in these cases belonged in multiple quarters, in no way solely at the utilities' feet.[20]

South Carolina serves as a counterpoint. The state started early on solar adoption, and the utilities—including Duke Energy—were deeply engaged. A coalition of environmentalists, solar advocates, utilities and electric cooperatives worked together toward a mutually agreeable outcome that has cleared a pathway for ongoing solar uptake. While the process had flaws, it still serves as a model for what can be achieved when stakeholders choose to collaborate. Oregon achieved a similarly satisfactory outcome in its plan to expand renewables and phase out coal, after investor-owned utilities, the state consumer advocate, environmentalists and renewables advocates cooperated, arriving at key compromises that kept all parties invested in the process.

5 **Align incentives with transition goals:** As inevitable change comes to electricity markets, electric utilities can

participate and profit, or hold fast to a dying era and risk missing out on opportunities. Already, as large companies buying power set increasingly ambitious renewable energy targets, some big customers are sidestepping utilities in some jurisdictions because conventional power providers cannot adequately address the companies' needs. This seems to be a recipe for obsolescence for certain power generators. But as long as executive compensation is geared toward legacy business models, change seems unlikely to happen quickly.

The TCFD recommended that energy companies disclose to investors how executive compensation is linked to climate change risks. Remuneration policies could consider how tighter pollution laws, extreme weather events and efforts to rein in fossil fuels may impact creditors and shareholders. Energy companies, responsible for about 60 percent of global emissions, are particularly vulnerable to concerted global efforts to tackle climate change, according to the TCFD, which notes the rapidly falling costs of clean-energy alternatives. Organizations should describe in detail how manager and board member pay is tied to climate risks, the task force advised.

Almost 30 global energy companies and utilities already offer their chief executives monetary rewards for the management of climate change, according to CDP, which surveys companies on their response to global warming. Another 17 energy companies and utilities reported monetary incentives for their board members, according to the 2016 survey. Almost 5,500 companies either did not respond to the survey or did not answer this question.

Investors increasingly want to understand how electric utilities are positioned to meet the demands of a carbon-constrained future. In many cases, these investors wish to engage with utilities whose business plans are least ready for climate change and impacts, to encourage strategic realignment. These investors wish to understand the gap between a utility's existing strategy and one optimally suited to address climate change imperatives.

This study builds on work Si2 conducted last year on behalf of the IRRC Institute, which examined in depth the climate orientation of the boards of the 25 largest investor-owned utilities, allowing investors to make informed judgements. The Top 25 U.S. *Electric Utilities: Climate Change, Corporate Governance and Politics*[21] evaluated boards using a standardized set of metrics designed by Si2 with input from investors, governance experts and utility economists. The project provided data for use by investors concerned about climate and regulatory impacts on their portfolio companies.

In the following sections, we analyze business strategies of five of the companies that we found in last year's study to be among those most oriented toward the status quo in their business models:

- Duke Energy
- American Electric Power (AEP)
- DTE Energy
- Southern
- FirstEnergy

Primary State Operations		
Company	**Headquarters**	**Service Territories and Other Operations**
Duke Energy	North Carolina	South Carolina, Florida, Ohio, Kentucky, Indiana
FirstEnergy	Ohio	Pennsylvania, West Virginia, Maryland, New Jersey, New York
DTE Energy	Michigan	Alabama, Arizona, California, Florida, Georgia, Illinois, Indiana, Kansas, Maryland, Mississippi, Nevada, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Virginia, Wisconsin
AEP	Ohio	Arkansas, Indiana, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia, West Virginia
Southern	Georgia	Alabama, Florida, Mississippi

The table below sets out how much energy is generated in each utility's primary location, the age of the generation fleet, the current cost of electricity, the generation sources, key elements of each state's energy market and important characteristics of each state's political and regulatory environment.

Study Companies' Domicile State Regulatory Parameters (as of January 2017)					
State		**North Carolina**	**Ohio**	**Michigan**	**Georgia**
Energy Electricity Net Generation Megawatt Hours		128,388,351 MWh	121,893,402 MWh	113,488,871 MWh	129,632,430 MWh
Total Nameplate Capacity of Generation Fleet, 2012		29,828 MW	33,252 MW	30,030 MW	36,954 MW
Nameplate Capacity Built Before 1980		15,270 MW	19,917 MW	17,644 MW	12,668 MW
Percent Capacity Built Before 1980		51%	60%	59%	34%
Average Retail Price of Electricity (cents/kWh)		9.54	9.62	11.45	9.95
Electricity Generated from...	Coal	35%	63%	36%	32%
	Natural Gas	27%	23%	24%	37%
	Nuclear	31%	11%	31%	25%
	Hydroelectric	2%	0%	1%	2%
	Geothermal	0%	0%	0%	0%
	Petroleum	0%	1%	1%	0%
	Solar Energy	3%	0%	0%	1%
	Biomass	2%	1%	2%	3%
	Wind	0%	1%	4%	0%
	Other Sources	0%	1%	2%	0%

State	North Carolina	Ohio	Michigan	Georgia
Renewable Energy Standard for IOUs	Mandatory 12.5% by 2021	Mandatory 25% by 2026	Mandatory 10% by 2015	None
Restructuring Status	Vertically Integrated	Restructured	Vertically Integrated (restructuring rolled back)	Vertically Integrated
Retail Competition/Customer Choice	None	Yes	Up to 10% of a utility's load that may be served by competitive retail suppliers	Commercial and Industrial with loads more than 900 kW
Governor Name	Roy Cooper	John Kasich	Rick Snyder	Nathan Deal
Governor Party Affiliation	Democrat	Republican	Republican	Republican
Governor Assumed Office	1/1/2017	1/10/2011	12/31/2010	1/10/2011
Utility Regulator	North Carolina Utilities Commission	Public Utilities Commission of Ohio	Michigan Public Service Commission	Georgia Public Service Commission
Commission Abbreviation	NCUC	PUCO	MPSC	PSC
Commission Year Established	1891	1867	1873	1879
Commission Associated ISO or RTO	PJM Interconnection (PA-NJ-MD)	PJM Interconnection (PA-NJ-MD)	MISO (Midcontinent ISO) and PJM Interconnection (PA-NJ-MD)	None
Legislature Name	North Carolina General Assembly	Ohio General Assembly	Michigan Legislature	Georgia General Assembly

Source: Advanced Energy Economy, with underlying data from the U.S. Energy Information Agency

A climate-resilient energy system would feature a broad range of technologies, products and services. Advanced Energy Economy (AEE), a national association of businesses and business leaders who are making the global energy system more secure, clean and affordable, broadly identifies the following seven categories that are likely to compose the energy system of the future, shown here with some examples:

- Electricity Delivery & Management
  - Advanced Metering Infrastructure
  - Microgrids
  - Energy storage
  - Enabling information technology ("The Internet of things")
- Advanced Fuel Production
  - Biodiesel
  - Compressed natural gas and liquefied natural gas
  - Hydrogen
- Advanced Transportation
  - Electric vehicles
  - Enabling IT
- Advanced Fuel Delivery
  - Fuel transportation infrastructure and stations
- Advanced Electricity Generation
  - Renewables
  - Gas turbines
  - Nuclear
  - Other distributed generation
- Building Efficiency
  - District energy, combined heat and power
  - Demand response
- Advanced Industry
  - Manufacturing machinery and process equipment

It is beyond the scope and purpose of this paper to prescribe what technologies and services are most appropriate for individual utilities. This report suggests that utilities set strong emissions targets and make their own decisions regarding the best mechanisms by which to meet them. To the extent that there may appear to be an emphasis on rooftop solar, this is only because that technology was the subject of many of the recent state-level battles in which these particular utilities were engaged, which we have highlighted in the following sections.

Comparative Climate Disclosure Metrics

Among the utilities in this study, Duke Energy discloses the most data related to climate change that can be compared across the industry. Relative and intensity metrics are critical to comparability, as is the establishment of goals that include target and base years.

2015 Electricity Generated in megawatt-hours							
	Coal	Nuclear	Natural Gas	Conventional Hydro	Wind	Solar	Oil
Duke Energy	32.9%	31.1%	25.9%	7.3%	2.2%	0.2%	0.8%
Southern	34.0%	16.0%	46.0%	3.0%	0.5%	0.5%	0.0%
FirstEnergy	55.5%	23.9%	8.4%	8.3%	2.8%	0.1%	1.0%
DTE Energy	62.2%	9.4%	16.9%	8.0%	3.3%	0.0%	0.0%
AEP	70.0%	17.0%	12.0%	1.0%	0.0%	0.0%	0.0%

Carbon Dioxide-Equivalent Emissions						
	2015 emissions ozs/kWh	Relative Emissions Reduction Base Year	Base year emissions ozs/kWh	Average annual reduction from base year	Relative emissions target year	Relative emissions goal ozs/ kWh
Duke Energy	15.84	2005	19.2	1.75%	2020	15.04
Southern	19.12	1990	23.1	0.69%	N/A	N/A

FirstEnergy, **DTE Energy** and **American Electric Power** only disclose absolute emissions, as detailed in their respective sections below. Absolute emissions disclosure does not allow comparison of a company's progress to that of its peers, however. Since climate change is a global challenge that no single country or company can address independently, effectively addressing it requires setting collective goals such as the intensity targets the IEA has recommended. Only then can the global carbon cycle be understood, framed in the context of energy demand, and addressed accordingly.

Renewables Investment						
	Base Year	Investment (in millions $)	Average Annual Investment (in millions $)	Target Year	Investment Target (in millions $)	Average Annual Target (in millions $)
Duke Energy	2007	$4,000.00	$500.00	2020	$3,000.00	$600.00
DTE Energy	2008	$1,000.00	$142.86	ND		
AEP	ND			2019	$1,000.00	$333.33
Duke Energy's renewable investment target begins in 2015, while AEP's begins in 2017.						

FirstEnergy and **Southern** do not disclose their renewable energy investments.

Coal Plant Retirement Investment						
	Base Year	Investment (in millions $)	Average Annual Investment (in millions $)	Investment Target Year	Investment Target (in millions $)	Average Annual Target (in millions $)
Duke Energy	2005	$9,000.00	$900.00	2020	$3,000.00	$600.00

Duke Energy is the only company in this study to disclose its coal plant retirement investment figures.

The next sections of the report provide profiles that explore in more depth how each of the five companies disclose climate-related information, deploy advanced energy and include climate-related incentives in executive compensation.

Duke Energy (NYSE: DUK)

Duke Energy is headquartered in Charlotte, North Carolina and with its subsidiaries operates as an energy company in the United States and Latin America, through three segments: Regulated Utilities, International Energy and Commercial Portfolio.

- **Regulated Utilities** generates, transmits, distributes and sells electricity in the Carolinas, Florida, Ohio, Kentucky and Indiana; and transports and sells natural gas in southwestern Ohio and northern Kentucky. This segment owns approximately 50,000 megawatts (MW) of generation capacity; and uses coal, hydroelectric, natural gas, oil and nuclear fuel to generate electricity. It serves approximately 7.4 million retail electric customers in six states in the Southeast and Midwest with a service area covering approximately 95,000 square miles; and approximately 525,000 retail natural gas customers in southwestern Ohio and northern Kentucky. This segment also is involved in providing wholesale electricity to incorporated municipalities, electric cooperative utilities and other load-serving entities.

- **International Energy** operates and manages power generation facilities; and markets and sells electric power, natural gas and natural gas liquids. This segment serves retail distributors, electric utilities, independent power producers, marketers and industrial and commercial companies.

- **Commercial Portfolio** acquires, builds, develops and operates wind and solar renewable generation and energy transmission projects. Its portfolio includes nonregulated renewable energy, electric transmission, natural gas infrastructure and energy storage businesses. This segment has 22 wind farms and 38 commercial solar farms with a capacity of 2,400 MW across 11 states.

Quality of Climate Risk Disclosure

According to Duke Energy's response to CDP's climate change survey, the highest level of direct responsibility for climate change within the company is at the senior manager/officer level. In its disclosure, the company discusses climate change as a legislative and regulatory matter, rather than as an operational, financial, environmental or social risk. Management says it views climate change as "one of the most significant issues facing the electric power industry," but this again is discussed in terms of an expectation of regulatory constraints. The company says it incorporates climate change risk into its decisions in planning for new power plants by "evaluating projects against a range of potential future prices on CO_2 emissions."

In its most recent Form 10-K filing with the Securities and Exchange Commission in 2016, Duke Energy makes no mention of climate change in its risk disclosure section. The company only briefly addresses the topic in its "Other Matters" section, in which it largely describes the impact of various regulatory constraints. Management discloses the company's absolute carbon dioxide emissions for 2015 (discussed in greater detail later in this report), noting that its "future CO_2 emissions will be influenced by variables including new regulations, economic conditions that affect electricity demand and the Duke Energy Registrants' decisions regarding generation technologies deployed to meet customer electricity needs." The remainder of the climate change section follows:

The Duke Energy Registrants have taken actions that has resulted in reduced CO_2 emissions over time. Between 2005 and 2015, the Duke Energy Registrants have collectively lowered the CO_2 emissions from their electricity generation in the U.S. by more than 25 percent. These actions will lower the exposure to any future mandatory CO_2 emission reduction requirements or carbon tax, whether as a result of federal legislation or the final CPP regulation. Under any future scenario involving mandatory CO_2 limitations, the Duke Energy Registrants would plan to seek recovery of their compliance costs through appropriate regulatory mechanisms.

The Duke Energy Registrants recognize ***certain groups associate severe weather events with climate change****, and forecast the possibility these weather events could have a material impact on future results of operations should they occur more frequently and with greater severity. However, the uncertain nature of potential changes of extreme weather events (such as increased frequency, duration and severity), the long period of time over which any potential changes might take place and the inability to predict these with any degree of accuracy, make estimating any potential future financial risk to the Duke Energy Registrants' operations impossible. Currently, the Duke Energy Registrants plan and prepare for potential extreme weather events, such as ice storms, tornadoes, hurricanes, severe thunderstorms, high winds and droughts. [emphasis added]*

The Duke Energy Registrants routinely take steps to reduce the potential impact of severe weather events on their electric distribution systems. The Duke Energy Registrants' electric generating facilities are designed to withstand extreme weather events without significant damage. The Duke Energy Registrants maintain an inventory of coal and oil on-site to mitigate the effects of any potential short-term disruption in fuel supply so they can continue to provide customers with an uninterrupted supply of electricity. The Subsidiary Registrants have programs in place to effectively manage the impact of future droughts on U.S. operations.

The language above fails to acknowledge the established science of climate change, and its role in the proliferation of extreme weather events. The board of directors does not acknowledge the science of climate change and its associated risks, which would trigger a requirement under SEC rules to address the topic in the risk section of its annual filings. Underscoring this point in a June 2015 interview with Utility Dive, Robert Caldwell, Duke Energy's senior vice president for distributed resources, said, "Customers want more [renewables], whether they believe in greenhouse gas [impacts] or not. It's not really about the science — it's about making people feel good. So, we thought we've got to get into the space, and it makes sense."[22]

In Duke Energy's 2015 Sustainability Report, the term "climate change" appears twice: once in a general acknowledgement of "global efforts to stem climate change," and again in cautionary statements regarding forward-looking information. The subject is not addressed directly in any other part of the report.

The company similarly offers virtually no discussion of greenhouse gas emissions. The term appears twice in the sustainability report and once in a statement regarding its efforts to generate "cleaner" energy: "We are continuing our efforts to decrease greenhouse gas emissions in a way that preserves affordable rates and reliability. We are shifting our generation mix to more natural gas and renewable energy." The second instance is in a statement highlighting that one of

Duke's nuclear plants delivers "greenhouse gas emissions-free power."

Emissions

Duke Energy does not report on its methane emissions in its public disclosures. The word "methane" does not appear in the company's sustainability report or Form 10-K. The company does report its carbon dioxide, sulfur dioxide and nitrous oxide emissions. In its 2015 CDP response, Duke Energy provides the following explanation for its omission of both methane and nitrous oxide from its Scope 1 emissions reporting: "The combustion of fossil fuels for electricity generation produces a very small amount of methane and nitrous oxide emissions in addition to CO_2. The amount of methane and nitrous oxide produced on a CO_2 equivalent basis is a fraction of a percent of the CO_2 emissions produced." This does not shed any light on why the company chooses nonetheless to report nitrous oxide emissions in its sustainability report, but not methane emissions.

Advanced Energy Deployment

Low-Carbon Energy

Duke Energy Carolinas—the largest of Duke Energy's utilities—filed its most recent long-term Integrated Resource Plan (IRP)[23] in September 2016. Duke Energy sees slowing demand growth in the Carolinas, but its long-term outlook still finds a need for additional nuclear and natural gas, as well as expanding the amount of renewable power on its system.

In addition to pursuing a license for a new nuclear plant in South Carolina, the utility is working to complete three natural gas projects, including a combined cycle plant with a nameplate capacity[24] above 650 MW. Two other plants with a combined capacity of roughly 1,700 MW are planned to come online in 2023 and 2025. Duke says in the IRP that it wants to boost solar energy resources on its system from 735 MW in 2017 to 2,168 MW in 2031, but the utility also made a point in its filing of highlighting renewable energy's limitations:

> ***While the company is aggressively pursuing solar as a renewable resource, the 2016 IRP recognizes and plans for its operational limitations. Solar energy is an intermittent renewable energy source that cannot be dispatched to meet changing customer demand during all hours of the day and night or through all types of weather.***

The company anticipates that the percentage of Duke Energy Carolinas' electric generation in winter from renewable energy, energy efficiency and demand-curbing programs will rise from 6 percent in 2017 to 12 percent in 2031, slightly more than Duke predicted a year ago.

Distributed Energy Systems

Duke Energy's domestic utility operations all are in regulated jurisdictions. In the company's discussion of competition in its most recent Form 10-K, Duke identifies the development and deployment of alternative energy sources as the primary source of competition in the regulated electric distribution business. Within this, Duke Energy highlights on-site generation and distributed generation as the primary components. Regarding the extent to which this may pose a threat to its business, Duke Energy says it "is not aware of any proposed legislation in any of its jurisdictions that would give its retail customers the right to choose their electricity provider or otherwise restructure or deregulate the electric industry

including broadly subsidizing distributed generation such as rooftop solar." The company notes in its risk section that if this situation were to change, it could result in customer loss and "stranded costs" related to excess generation for which costs would not be fully recoverable.

Separately, the company says that its Commercial Portfolio unit has "executed investments to expand and grow the business through the addition of distributed solar projects, energy storage systems and energy management solutions specifically tailored to commercial businesses." At present, distributed generation accounts for less than 0.1 percent of Duke Energy's total generation capacity. That said, Duke Energy identifies five primary objectives for 2016 "and beyond," including its aim to modernize "the power grid to improve reliability and flexibility in support of increased distributed energy sources." The company does not elaborate further on distributed energy per se, but does provide more information on its plans for renewables expansion, which it associates directly with distributed generation as shown in the preceding paragraph. It says,

> ***The Commercial Portfolio renewables business is a significant component of the Duke Energy growth strategy. Renewable projects enable Duke Energy to respond to customer interest in clean energy resources while increasing diversity in the generation portfolio. The portfolio of wind and solar is expected to continue growing as between $1 billion and $2 billion of capital is expected to be deployed over the next three years. Additionally, investments in the Atlantic Coast Pipeline add approximately $1 billion of capital spending through 2017.***

The Atlantic Coast Pipeline is an interstate natural gas pipeline under development by four companies, including Duke Energy. The pipeline is the subject of some controversy, and has been the object of sustained protests. Research uncovered no association with renewables, except general assertions that natural gas can meet energy demand that renewables currently cannot fulfill.

In 2013, Duke Energy invested $42 million in Clean Power Finance, which provides financial services to the distributed solar industry. In 2015, Duke bought a majority stake in REC Solar, an additional move into the distributed energy space that should make it easier for commercial customers to go solar.

Executive Pay Packages and Incentives

According to Duke Energy's response to CDP's climate change survey for 2015, the company provides no incentives for the management of climate change issues. According to the company's 2016 proxy statement, Duke Energy's executive compensation structure is determined in part by performance metrics, which include a measure of "renewables availability." This is a renewable energy yield "calculated by comparing actual generation to expected generation based on the wind speed measured at the turbine and by calculating the actual generation to expected generation based on solar intensity measures at the panels. The renewables energy yield is weighted 90% to wind and 10% to solar." The company does not disclose the precise weighting of this metric, although it is one of five elements of the "reliability" objective that is weighted at 20 percent.

Patterns of Political Spending and Lobbying

Duke Energy's response to CDP's climate change survey for 2015 says the company is "committed to working with Congress and the White House to develop market-based approaches to reduce emissions that balance affordability for customers, protect the economies of our service territories, and provide reliable electricity to the 24+ million people that depend on us 24/7."

InfluenceMap is an independent, United Kingdom-based, non-profit organization whose goal is "to accurately assess, rank and communicate the extent to which corporations are lobbying climate and energy policy worldwide."[25] The organization maps and analyzes large amounts of data on corporate and trade association lobbying, communications and spending, collected from a wide range of sources, and then assigns those organizations a grade ranging from an A+ to an F. Influence Map provides full sources for all of its assessments, with links to the original source for verification purposes. InfluenceMap assigns Duke Energy a score of E-, summarizing the company's score thus:

> *Duke Energy appears to be opposed to most strands of climate change policy and regulations. It appears to support policy that would maintain a high [greenhouse gas (GHG)] energy mix in the US, promoting the continued role for coal to investors and the public, whilst emphasizing to policymakers in North Carolina the risk of decarbonizing industry. It also appears to have opposed the EPA Clean Power Plan in consultation and at a hearing in North Carolina in 2014, in addition to encouraging the public to oppose GHG emissions standards more broadly. It also seems to have opposed energy efficiency standards in Florida. Despite, in 2009, reportedly leaving the National Association of Manufacturers as a result of their opposition to climate change policy, it still, in 2014, appears to have advocated in US consultations for a less ambitious response to climate change. Duke Energy are also direct members of the Business Roundtable and the US Chamber of Commerce, which appear to be actively opposing climate change legislation.*

Florida's Amendment 1 Campaign

On Election Day 2016, voters in Florida rejected Amendment 1, a controversial ballot measure that would have amended the state constitution to pave the way for more restrictions and fees for solar customers.

A utility-backed political committee called Consumers for Smart Solar was behind the campaign for Amendment 1, entitled "Rights of Electricity Consumers Regarding Solar Choice." Duke Energy was among the utilities supporting Consumers for Smart Solar, as was **Southern**. Amendment 1 was originally a defensive measure from utilities, intended to undermine a rival amendment that Floridians for Solar Choice—a bipartisan coalition of solar advocates—was proposing, which would have expanded rooftop solar availability by allowing homeowners and businesses to sell excess generation to third parties. That proposal did not make it to Florida's ballot, but the utilities continued their efforts to promote Amendment 1.

In March 2016, the Florida Supreme Court narrowly ruled 4-3 to allow the petition to appear on the November ballot. Justice Barbara Pariente, one of the three dissenting judges, wrote in her dissent:

> *Let the pro-solar energy consumers beware. Masquerading as a pro-solar energy initiative, this proposed constitutional amendment, supported by some of Florida's major investor-owned*

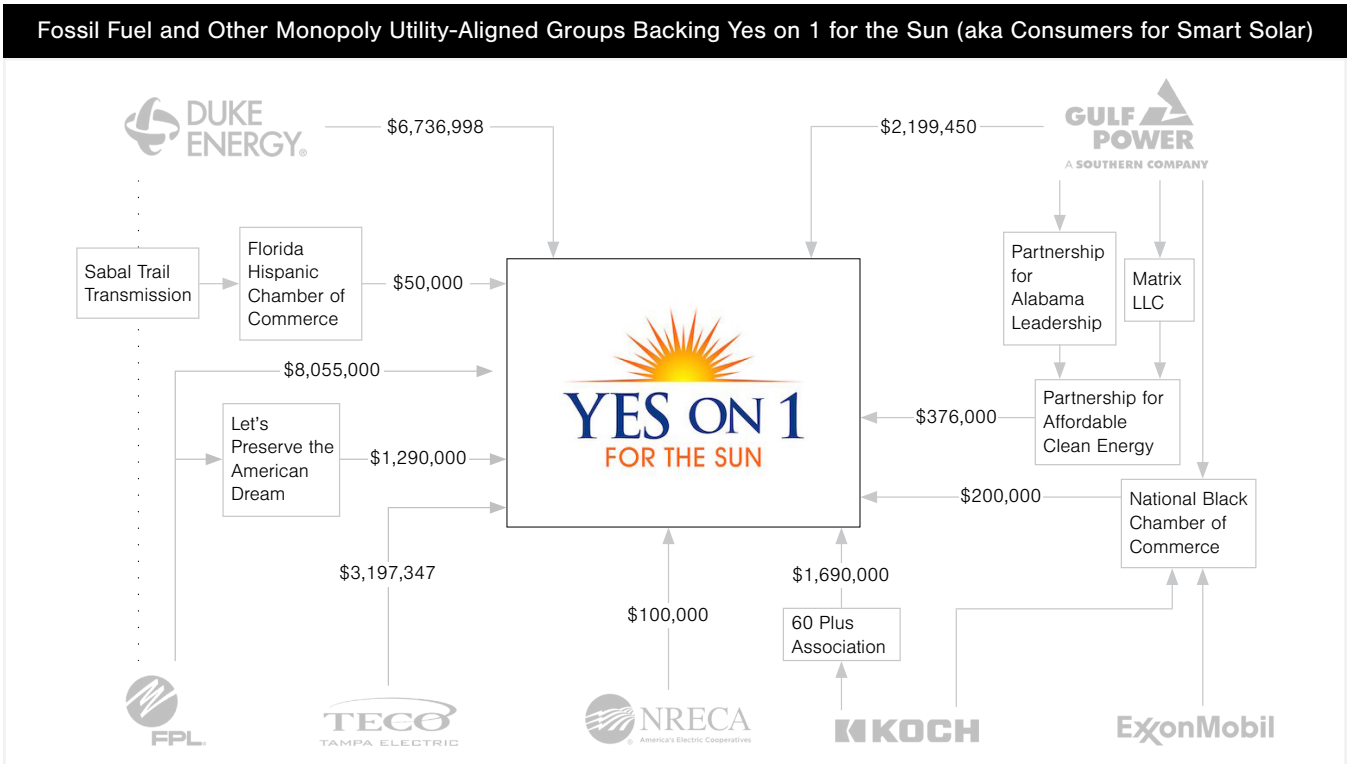
electric utility companies, actually seeks to constitutionalize the status quo. The ballot title is affirmatively misleading by its focus on "Solar Energy Choice," when no real choice exists for those who favor expansion of solar energy. The ballot language is further defective for purporting to grant rights to solar energy consumers that are illusory; and failing, as required, to clearly and unambiguously set forth the chief purpose of the proposed amendment—to maintain the status quo favoring the very electric utilities who are the proponents of this amendment...

As I more fully explain, the biggest problem with the proposed amendment lies not with what the [ballot] summary says, but rather, with what it does not say... What the ballot summary does not say is that there is already a right to use solar equipment for individual use afforded by the Florida Constitution and existing Florida statutes and regulations. It does not explain that the amendment will elevate the existing rights of the government to regulate solar energy use and establish that regulatory power as a constitutional right in Florida. This is a glaring omission, especially since rights enshrined in the Constitution are generally intended to limit, rather than grant, governmental power... This ballot initiative is the proverbial "wolf in sheep's clothing." [26]

Voters rejected the amendment after Floridians for Solar Choice opposed the measure, and a series of eleventh-hour revelations called into question the proponents' purported goal to expand solar generation.

Over the course of 14 months, the four large power companies in Florida—Duke Energy, **NextEra Energy's** Florida Power & Light, **Southern Company's** Gulf Power and **Tampa Electric Company**—along with organizations funded by these and other fossil fuel companies, contributed more than $24 million dollars to the Consumers for Smart Solar campaign. Only $305 of the $26.1 million total contributions came from individual donors.[27] The following graphic shows the flow of money to the campaign.

Fossil Fuel and Other Monopoly Utility-Aligned Groups Backing Yes on 1 for the Sun (aka Consumers for Smart Solar)



Source: Energy and Policy Institute

Amendment 1 originally had appeared destined for easy passage. Consumers for Smart Solar promoted the amendment as protecting consumers and encouraging solar expansion, without explaining that the amendment would have paved the way for new fees and costs to rooftop solar users.

However, the situation began to shift in mid-October 2016, when leaked audio of a key Amendment 1 backer featured him acknowledging that the utilities had promoted the amendment as being pro-solar in an act of "political ju-jitsu." He described the amendment as "an incredibly savvy maneuver" that "would completely negate anything they [pro-solar interests] would try to do either legislatively or constitutionally down the road." The story spread rapidly, and bolstered the opposition campaign. Florida's Governor, Bob Graham, decried the proposal as "deceptive," saying it would have accelerated the decline of solar power as an energy source in Florida.

Only days before Election Day, Florida's professional firefighters' union withdrew its support for Amendment 1, saying many of its members viewed it as deceptive, including in its portrayal of solar panels as a fire hazard. Ultimately, the amendment failed.[28]

Duke Energy's overall state lobbying expenditures in Florida grew nearly four-fold from $75,000 in 2013 to nearly $310,000 in 2015.[29]

Political Influence in North Carolina

In a 2015 report on North Carolina political influence, the Institute for Southern Studies at the University of South Carolina found that Duke Energy was the number one special interest entity with political clout in the region.[30] The company gave state-level candidates, party Political Action Committees (PACs) and an independent political spending group $944,250 in 2012 and 2014. Duke Energy also donated $100,000 to the North Carolina Chamber Independent Expenditure group, and is the second most influential lobbying interest in the state, according to the report.

Duke Energy's political influence includes ties to top state officials, including former Governor Pat McCrory, a previous Duke employee. Former Duke Energy employee and current Majority Leader at the North Carolina House of Representatives, Mike Hager, is also Vice Chairman of the Public Utilities Committee, with authority over energy policy. In 2015, Hager told a group sponsored by Americans for Prosperity (funded by fossil fuel proponents Charles and David Koch) that he would continue to work to freeze North Carolina's Renewable Portfolio Standard (RPS). Hager is the top recipient of campaign contributions from Duke Energy.[31]

North Carolina, South Carolina, Florida and Kentucky all limit the use of third-party solar financing, resulting in Duke Energy's virtual solar monopoly in these states. At least 98 percent of North Carolina's 2,000 MW of solar is due to a federal law, the Public Utility Regulatory Policies Act (PURPA), which Duke Energy has fought to limit.[32] PURPA requires that utilities buy power produced by facilities that meet certain specified terms. In 2014 and 2015, Duke unsuccessfully fought to change the standard contract term and the formula for determining the avoided cost to which solar developers and other independent power producers are entitled. The North Carolina Utilities Commission rejected Duke's proposals, which would have shortened the term of the power purchase agreements (PPAs), limited the size of systems eligible for PPAs and reduced remuneration to potentially uneconomic levels.

Duke Energy is again seeking to revise the PURPA bidding process, seeking anew to reduce contract lengths and trim project size, though not as drastically as in its previous attempts. This time around, though, the company has added a new

element: It wants to be allowed to bid competitively to develop projects. A company spokesman said Duke's main goal is to own more renewable energy.[33]

After California, North Carolina is the second-leading state for installed solar capacity. The state's position as a leading solar market has at times come with difficulties: Duke has reported a slate of utility-scale installations interfering with the system's ability to provide power to retail load customers, as circuits are overloaded or the intermittent nature of solar causes instability. To avoid these problems, the utility worked out an agreement with solar companies allowing their projects to move forward, while giving Duke the authority to disconnect them from the grid.

Ohio's Clean Energy Standards

In the United States, despite many attempts from fossil fuel companies, big utilities and conservative groups, no Renewable Portfolio Standard (RPS)[34] put in place has ever been repealed. The closest any state has come was in 2014, when Governor John Kasich (R-Ohio) signed a law suspending the state's clean energy mandates for two years. Now that two-year suspension is up, but the Ohio legislature passed a bill in December 2016 that would make the RPS voluntary, effectively extending the suspension, for two more years. Kasich vetoed the measure, ending its suspension.

Ohio originally established its clean energy mandates in 2008 under a Republican legislature and a Democratic governor. The Alternative Energy Portfolio Standard requires Ohio's utilities to get 25 percent of their energy from "advanced" sources by 2025. Advanced sources include nuclear, so-called "clean coal" and combined heat and power.[35] Half of that requirement—the 12.5 percent RPS—must come from renewable energy, and 0.5 percent specifically from solar. Half of the renewables must come from inside Ohio. Finally, the Energy Efficiency Resource Standard requires utilities to reduce demand by 22 percent by 2025 relative to 2009 levels.

Five years later, Ohio state senator Bill Seitz (R-Cincinnati) put forward a bill, SB 58, to do away with the state's RPS altogether. As of December 2016, Seitz sat on the board of directors of the American Legislative Exchange Council (ALEC), which has consistently and aggressively sought to roll back state clean energy policy. However, the RPS has enjoyed broad support among Ohioans, so the Republican leadership softened the bill to suspend the clean energy mandates, rather than abandoning them outright. The new bill, SB 310, established an Energy Mandates Study Committee (EMSC) in the Senate.

The EMSC launched an investigation that, by most accounts, was dramatically biased, focusing on the perceived drawbacks and costs of wind and solar with virtually no attention to their benefits.[36] The EMSC's final report[37] recommended indefinitely suspending the clean energy mandates. Kasich described the recommendation as "unacceptable" in September 2015.[38]

In the second half of 2016, recognizing the risk of a veto, Ohio Republicans softened their stance, passing a bill that made the mandates voluntary for two years. For all intents and purposes, though, this would have had the same impact as a suspension. In addition to freezing the 2016 targets until 2018, the bill also sought to eliminate the "advanced energy" part of the mandates, push all deadlines back two years, and remove the in-state requirements on the RPS. In late December 2016, Kasich vetoed the bill, effectively reinstating the renewable energy and efficiency standards.[39]

Three of the utilities in this study—**Duke Energy**, **FirstEnergy** and **American Electric Power**—have actively lobbied to weaken Ohio's clean energy standards. The Energy and Policy Institute, a watchdog group, filed public information requests for emails from state legislators during the development of the bill, and uncovered significant influence of the utilities over legislators, particularly Seitz.[40]

One month before the EMSC report was published, Seitz emailed some fellow Republican legislators and 10 utility and fossil fuel lobbyists (including those representing Duke Energy, FirstEnergy and American Electric Power), saying, "we should be meeting as a small group to figure out what that report is going to say." He also emailed lobbyists earlier, asking, "which portions of [a Michigan bill to repeal that state's RPS] we should emulate."

The emails also show that Ryan Gentil, a Duke Energy lobbyist, was scheduled to meet with Senator Troy Balderson, co-chair of the EMSC, a little more than two weeks before the committee's final report was released. Gentil requested the meeting with Senator Balderson "to discuss with him Duke's position on the EMSC." Seitz also solicited lobbyist feedback on a report outlining the financial benefit of Ohio's energy efficiency standards. This report was ultimately excluded from the EMSC's report. Another email shows Seitz denying that carbon dioxide is a factor in "clean air."

The emails also show that a Duke Energy lobbyist reached out to several Ohio state legislators on June 30, 2015 to request a meeting about the evolving push to reregulate Ohio's electricity markets. Reregulation would allow Duke to return to a vertically integrated model in the state, gutting competition at the generation level.

Two Carolinas and Third-Party Ownership

Duke has been involved in debates around third-party ownership (TPO) of rooftop solar that provides investors insight into how it might capitalize on growth opportunities. In states where it is permitted by regulators, TPO arrangements allow customers to lease solar panels from a financier over many years instead of owning them outright. For many consumers, this option has significantly boosted the solar value proposition because they can avoid high up-front costs and enjoy cost savings. Duke Energy's involvement in and experience with the TPO debate in North Carolina versus South Carolina has been decidedly different, highlighting the importance of stakeholder collaboration in policy design.

In 2015, Duke Energy came to a settlement with solar advocates and environmentalists in South Carolina to legalize TPO, but opposed a similar bill in its home state of North Carolina. Since Duke's unregulated renewables subsidiary takes advantage of TPO opportunities in other states, this has led some environmentalists and solar advocates to assert that the company is trying to limit the growth of solar in its own service territory. Duke counters that the situation in the two states is drastically different. In South Carolina, while customers may finance and buy panels from a third-party provider, only Duke can sell electricity directly. If a customer has generated excess power that it wants to sell back to the grid, it must go through Duke Energy. North Carolina's proposition would allow other companies, such as renewables developers, to bypass the utility and sell directly to their consumers.

Renewables advocates say that clean energy could grow even faster if direct sales of electricity were allowed from third parties. The idea is that competition could push utilities either to use more renewables or to reduce their prices if vendors can undercut utility prices. Duke's position is that anyone trying to sell electricity on the company's grid needs to pay for it, and third-party providers will not pay their share for grid upkeep if they sell power directly to customers.

In the North Carolina debate, Duke has repeatedly said that instead of tackling TPO in an individual bill, it prefers to craft comprehensive electricity policy legislation with all the relevant stakeholders at the table, as it did in South Carolina. Solar advocates argue that the two states have significantly different solar markets, and that North Carolina's is sufficiently advanced that it does not need Duke's support, as South Carolina still does.

Duke Energy had been embroiled in recent years in a regulatory test case, brought by environmental advocacy group NC

WARN, which had filed an application to sell power directly to a church from a rooftop solar array, bypassing the utility. Duke Energy and NC WARN have a long-standing, antagonistic relationship. The North Carolina Utilities Commission rejected the test case in April 2016, fining NC WARN $60,000 for illegally acting as an electricity provider.[41]

In South Carolina, Duke Energy nominated the Electric Cooperatives of South Carolina and Central Electric Power Cooperative for the Electric Cooperative Solar Power Player award, in recognition of the cooperatives' work on the state's solar settlement. Duke's nomination said that co-op leaders "effectively changed the conversation in South Carolina from one that was very adversarial and positional, to a conversation about 'what we are interested in doing' and 'a shared vision' for the future." During the legislative vote on Act 236, when the list of endorsers was read on the South Carolina House floor by the Chair of the sponsoring committee, he said it was "highly unusual for those endorsers to even be in the same room..."[42]

The coalition of environmentalists, solar advocates, utilities and electric cooperatives had already agreed on Act 236 before it went to the legislature. That meant the politicians had no votes or campaign contributions to lose in supporting it. The bill also required that South Carolina Electric & Gas and Duke Energy Carolinas commit to minimum amounts of renewables, but it allotted the renewables in various sizes. That gave both sides something. The utilities liked the opportunity in utility-scale projects, and private sector developers saw opportunity in smaller projects.

Conclusions

This section builds on the general transformation strategies described in detail on pages 12-14.

1 **Acknowledge climate change and its exigencies**

Duke Energy currently discusses climate change strictly in terms of regulatory risk. The company does not acknowledge established climate science and the risks—both immediate and longer term—associated with it. Duke Energy thus does not address in its disclosures threats to physical infrastructure, asset devaluation, supply chain disruption and other elements of a carbon-constrained world.

2 **Commit to IEA carbon emissions intensity targets: 6.49 oz/kWh by 2035, 1.41 oz/kWh by 2050**

Duke Energy is the only company in this study that not only discloses its past and current carbon emissions intensity, but also sets a target for the future. However, even if the company meets its goal of emitting 15.04 oz/kWh by 2020, down from 19.2 oz/kWh in 2005, it would still need to make dramatically accelerated progress to meet IEA recommendations.

3 **Work transparently to reform obstructive regulation**

In Duke's engagement with its regulator and state legislatures, it does not appear to advocate for modernizing changes that would enable it, as a regulated utility, to invest in clean energy solutions for its customers. Duke Energy is highly opaque in its attempts to influence the shape of the regulatory structure under which it operates. As described in the previous section, as well as the previous report on which this one builds, Duke Energy appears by and large to have lobbied aggressively to protect coal and fossil fuels and discourage clean and renewable energy expansion. In some cases, critics say its consumer- and voter-facing efforts were misleading at least, and outright deceptive at worst.

4 **Collaborate with stakeholders**

Duke Energy has a mixed record on collaboration. In some states, the company has been a party to pitched, unyielding battles over the fate of various elements of energy policy. In others, such as South Carolina, Duke Energy participated in successful engagement with other stakeholders to arrive at a mutually agreeable outcome. Certainly, Duke Energy alone cannot dictate the relative hostility or collaborative nature of an engagement among multiple parties. However, a well-developed and transparent stakeholder engagement strategy could help to improve its relations with other influencers of energy policies in its regulatory environment, as well as the productiveness of its engagements.

5 **Align incentives with transition goals**

Duke Energy is the only company in this study that features a metric in its executive compensation package that relates to climate change, although the metric—targeting renewables deployment—has more to do with portfolio diversification than a methodical approach to climate change. If the company were to develop a transition strategy, it could adjust its executive remuneration approach to include factors aligned with that strategy, such as progress towards emissions intensity goals.

Resources

- **Duke Energy 2015 Form 10-K**
  https://www.sec.gov/Archives/edgar/data/17797/000132616016000221/duk-20151231x10k.htm

- **Duke Energy 2016 Proxy Statement**
  https://www.sec.gov/Archives/edgar/data/1326160/000104746916011517/a2227478zdef14a.htm

- **Duke Energy 2015 Sustainability Report**
  http://sustainabilityreport.duke-energy.com/

Southern (NYSE: SO)

Southern, together with its subsidiaries, generates, transmits and distributes electricity through coal, nuclear, oil and gas and hydro resources in the states of Alabama, Georgia, Florida and Mississippi. The company also constructs, acquires, owns and manages generation assets, including renewable energy projects. As of December 31, 2015, it operated 33 hydroelectric generating stations, 31 fossil fuel generating stations, three nuclear generating stations, 13 combined cycle/cogeneration stations, 16 solar facilities, one wind facility, one biomass facility and one landfill gas facility. The company also provides digital wireless communications services with various communication options, including push to talk, cellular service, text messaging, wireless Internet access and wireless data; and wholesale fiber optic solutions to telecommunication providers in the Southeast. Southern is headquartered in Atlanta, Georgia. The company owns approximately 44,000 MW in generation capacity.

Quality of Climate Risk Disclosure

The only mention Southern makes of climate change in its 2015 Form 10-K regards existing and pending litigation. The same holds for greenhouse gases, except that the company states its greenhouse gas emissions as calculated in keeping with its legal disclosure requirements. U.S. utilities are legally required to report their greenhouse gas emissions to the U.S. Environmental Protection Agency's (EPA) Facilities-Level Information on Greenhouse Gases Tool (FLIGHT). The data do not represent a company's total emissions, as companies are only required to report emissions from facilities emitting 25,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year. Still, the reporting ultimately covers 85 to 90 percent of total U.S. emissions. The company does not discuss emissions in the context of material risk factors to operations or finances.

The company's corporate responsibility section of its website[43] includes a section it calls Greenhouse Gases, where Southern makes a brief statement on climate change: "Climate change is a challenging issue not just for electric utilities and Southern Company but for our nation and the world. Leadership on this issue requires developing and deploying technologies that reduce greenhouse gases while making sure that electricity remains reliable and affordable for customers." Rather than going on to discuss the company's actual emissions, the page instead follows the climate change statement with a brief, qualitative discussion of some of the company's carbon capture and sequestration projects, which are described more fully later in this report. The page concludes with a section on sulfur hexafluoride emissions, and appears to de-emphasize the importance of carbon dioxide emissions:

> *Carbon dioxide is neither the most widespread nor the most potent greenhouse gas. For example, water vapor is a greenhouse gas in higher atmospheric concentration while methane has a much stronger greenhouse effect.*
>
> *Considerable progress has been made in controlling some anthropogenic (from human activity) greenhouse gases, like chlorofluorocarbons from refrigeration. Another lesser known gas, sulfur hexafluoride, has been a focus of Southern Company's attention. Sulfur hexafluoride SF_6 has more than 20,000 times the global warming impact of carbon dioxide on a pound-for-pound basis.*

> *The Southern Company system has hundreds of transmission substations with approximately two thousand breakers that use sulfur hexafluoride for its essential insulating properties. Southern Company was a charter member of EPA's Voluntary SF_6 Emission Reduction Partnership which began in 1999. Since the '90s the Southern Company system has made significant progress in reducing SF_6 emissions. In 1993, the Southern Company system's SF_6 emissions were approximately 660,000 metric tons of CO_2 equivalent, and in 2014, SF_6 emissions were down to approximately 44,000 metric tons of CO_2 equivalent, based on financial control/ownership.*

The page ends with a link to Southern's Environmental Performance page[44], where the company reports on its five-year trend on multiple emissions and benchmarks that trend against various base years. After noting methane's potency in its climate change statement, the company does not report on its methane emissions. Also, after highlighting its efforts to reduce its sulfur hexafluoride emissions, that is the only gas for which the company does not provide emissions intensity data, publishing only absolute emissions.

Southern says that it has no emissions targets.

Advanced Energy Deployment

Low-Carbon Energy and Distributed Generation

Southern's fuel mix for the past three years is shown in the table at right. The company relies substantially on fossil fuels, with some nuclear sources. Hydro sources make up a small proportion of the company's generation, and renewables accounted for 1 percent of Southern's fuel mix for the first time in 2015.

Southern's 3-Year Fuel Mix Breakdown

		2015	2014	2013
%	Coal	34	42	39
	Nuclear	16	16	17
	Gas	46	39	40
	Hydro	3	3	4
	Other Renewables	1	–	–
Total generation*		187	191	179
Total purchased power*		13	12	12

*billions of KWHs

In its 2016 Carbon Disclosure Report, Southern emphasizes its deployment of renewable resources, calling renewable fuel sources "an important part" of its full portfolio. The company says it has added or announced more than 4,000 megawatts of renewable generation since 2012. The company's areas of research include solar photovoltaic (PV) technology, advanced hydropower turbine systems, offshore and onshore wind generation, bulk-power system integration of variable generation, wood biomass fuels, advanced battery testing and integration with solar PV technology and integration of distributed renewables into the electric grid.

Southern projects that it will add more than 1 GW of solar capacity by the end of 2016, which it says would be more than any other utility that operates without government mandates. Southern's areas of operation are not well suited to wind generation, but the company says it is importing wind energy from other regions when it is cost-effective.

Southern Power—the company's wholesale generation unit—accounted for 8 percent of the company's net income in 2015. However, in Southern's capital investment projections for 2017-2021, Southern Power is slated for 21 percent of the total. Within Southern Power's projected net income for 2016 and 2017, natural gas and biomass account for roughly one-third, while the company expects the rest to come from solar and wind assets.

In its 2016 Carbon Disclosure Report, Southern discusses distributed generation:

> *The Southern Company system has a long and successful history of incorporating distributed generation into its energy mix. Southern Company views distributed generation as a natural evolution and seeks the best ways to serve customers who want it without impacting the local operating utilities' ability to continue providing clean, safe, reliable, affordable energy to all of its customers.*
>
> *Southern Company's operating utilities purchase energy from distributed generation resources such as qualifying facilities, standby generation and other similar programs, and also own or buy energy output from cogeneration operations located alongside customer facilities that have large electric and thermal energy needs.*
>
> *In addition, Georgia Power is now providing solar installation and sales services through an unregulated business unit, Energy Services. Georgia Power's Rooftop Solar Service program, within the Energy Services business unit, commenced July 1, 2015, providing enhanced support and education to residential customers interested in installing rooftop solar.*
>
> *The system continues to support all forms of distributed generation that do not result in increased rates* ***for customers who do not choose to install distributed generation.*** *[emphasis added]*

The **italicized** caveat is an important one. If customers reduce their power purchases from electric utilities, utilities will have fewer units of sales over which to recoup their fixed costs, such as distribution grid maintenance and their investments in centralized power plants. Thus, utilities can argue that allowing or supporting installation of distributed generation can "result in increased rates" for other customers.

In its 2015 Form 10-K, Southern addresses distributed generation purely in terms of risk:

> *Generally, the traditional operating companies have experienced, and expect to continue to experience, competition in their respective retail service territories in varying degrees from the development and deployment of alternative energy sources such as self-generation (as described below) and distributed generation technologies, as well as other factors...*
>
> *A key element of the business models of Southern Company, the traditional operating companies, and Southern Power is that generating power at central station power plants achieves economies of scale and produces power at a competitive cost. There are distributed generation and storage technologies that produce and store power, including fuel cells, microturbines, wind turbines, solar cells, and batteries. Advances in technology or changes in laws or regulations could reduce the cost of these or other alternative methods of*

> *producing power to a level that is competitive with that of most central station power electric production or result in smaller-scale, more fuel efficient, and/or more cost effective distributed generation. Broader use of distributed generation by retail electric customers may also result from customers' changing perceptions of the merits of utilizing existing generation technology or tax or other economic incentives. Additionally, there can be no assurance that a state PSC or legislature will not attempt to modify certain aspects of the traditional operating companies' business as a result of these advances in technology. If these technologies became cost competitive and achieve sufficient scale, the market share of the traditional operating companies and Southern Power could be eroded, and the value of their respective electric generating facilities could be reduced. It is also possible that rapid advances in central station power generation technology could reduce the value of the current electric generating facilities owned by the traditional operating companies and Southern Power. Changes in technology could also alter the channels through which electric customers buy or utilize power, which could reduce the revenues or increase the expenses of Southern Company, the traditional operating companies, or Southern Power. If state PSCs fail to adjust rates to reflect the impact of any changes in loads, increasing self-generation, and the growth of distributed generation, the financial condition, results of operations, and cash flows of Southern Company and the traditional operating companies could be materially adversely affected.*

In May 2016, Southern acquired PowerSecure International, a distributed infrastructure provider offering primarily commercial and industrial customers solutions to meet their individual reliability, energy efficiency and green objectives. Over the last 15 years, PowerSecure has built one of the United States' biggest fleets of microgrids, now controlling some 1,500 MW. Most of the company's business is based on its Interactive Distributed Generation (IDG) systems. These are custom engineered, proprietary combinations of backup generators and on-site energy controls, built to provide the majority of a site's power needs and keep it running during times of grid disruption.

On January 29, 2016, Georgia Power—one of Southern's subsidiary utilities—filed its 2016 Integrated Resource Plan (IRP). On July 28, 2016, the Georgia Public Service Commission approved the IRP. Key parts of the approval include:

- allowing Georgia Power to pass on to rate payers up to $99 million of the cost of investigating and potentially licensing new nuclear units;
- retirement of three coal plants;
- approval of an expanded Renewable Energy Development Initiative (REDI) calling for 1,200 MW of renewables (including 150 MW of distributed generation);
- an additional 100 MW of distributed generation and 200 MW of self-build renewables;
- a 1 MW solar pilot demonstration project.

In its 3Q 2016 earnings presentation,[45] Southern showed an acknowledgment of the importance of renewable energy and distributed generation, even as the company seemed to place these on too long a time horizon for the exigencies of climate change. The company predicted:

- Gas, renewables and nuclear are dominant long-term solutions
- Environmental pressures will continue for all fossil resources
- Distribution will evolve along with resource and usage trends
- Energy efficiency, productivity and adaptive technologies will improve
- Electric and natural gas vehicle/transportation infrastructure will grow
- Distributed energy resources will become commonplace for large C&I [commercial and industrial]

In response to these trends, Southern says it plans the following strategies:

- Build and own utility-scale renewables, where applicable
- Develop solutions for distributed energy resources/solutions
- Take a pragmatic approach to transitioning the fleet
- Develop a model for long-term value with distributed energy resources
- Become the provider of choice for distributed infrastructure solutions

Executive Pay Packages and Incentives

Southern does not appear to have any aspect of its executive pay structure that is aligned with a low carbon energy future.

Patterns of Political Spending and Lobbying

Southern provides limited disclosure of its political contributions.[46] The table at right shows the political contributions Southern says it made in 2015 at the parent company level. More than 75 percent of those donations were to Republican interests. The company also reports the political contributions of its Georgia Power and Gulf Power, which skew similarly toward Republican recipients. These figures, even when tallied all together, fall dramatically short of the political spending figures Si2 calculated for Southern in our report published in April 2016 (note 21 on page 59). Clearly, Southern is not disclosing the full scope of its political spending, which in Si2's study included expenditures on the part of corporate political action committees[47] or the company treasury on federal lobbying, national 527 political committees, state ballot initiatives, state candidates and state political committees. Additional expenditures not tallied by Si2 come in the form of lobbying at the state level, where mandatory disclosure regimes vary widely and are largely opaque. The company is the single largest political activity spender among the 25 largest publicly traded U.S. utilities.

Southern 2015 Political Contributions	
Recipient	**Amount**
Republican Attorneys General Association	$35,000
Republican Governors' Association	$150,000
Republican State Leadership Committee	$50,000
Democratic Governors' Association	$85,000
Total	**$345,000**

Southern also reports in part on its trade association contributions, specifically those that are for political purposes (as

Southern 2015 Political Contributions	
Recipient	**Amount**
U.S. Chamber of Commerce	$472,500
Edison Electric Institute	$390,167
Electricity Reliability Coordinating Council	$193,340
Business Round Table	$128,558
American Coalition for Clean Coal Technology	$100,000
Nuclear Energy Institute	$82,763
National Association of Manufacturers	$32,763
Reforming America's Taxes Equitably	$25,000
Total	**$1,424,531**

opposed to membership dues, for instance). As discussed in greater detail in Si2's previous report, many of these groups have been actively engaged in efforts to roll back legislation that seeks to constrain climate change.

Florida's Amendment 1 campaign

Southern was one of the utilities behind Florida's Amendment 1 campaign, discussed in detail above in this report (see page 23).

Carbon Capture & Storage and the Kemper controversy

Southern is the leading U.S. champion of CCS. Southern's Kemper County Energy Facility, in Mississippi, is designed to capture 65 percent of carbon dioxide to be sold for enhanced oil recovery.[48] Kemper is the only integrated gasification combined cycle (IGCC) plant being constructed in the United States that is designed to capture and store carbon dioxide emissions the day it begins commercial operations. It has been fraught with operational delays and controversy for years.

A scathing, in-depth investigation The New York Times published in July 2016[49] found that Southern officials had misled state regulators and the federal government to obtain financial incentives for the Kemper plant. Documents and recordings the paper received from a whistleblower detailed mismanagement of the project by Southern and its regulated subsidiary, Mississippi Power. Those records and interviews with "more than 30 current or former regulators, contractors, consultants or engineers who worked on the project, show that the plant's owners drastically understated the project's cost and timetable, and repeatedly tried to conceal problems as they emerged."

When development began in 2008, the plant was originally slated to cost $2.8 billion for the 582 MW of power production from gasified coal. The gasification process is supposed to enable the plant to separate out carbon dioxide, which then

would be buried underground. Now more than two years behind schedule, the carbon capture part of the plant is still reportedly not online, and the price tag is approaching $7 billion. In a December 2, 2016, Form 8-K filing with the SEC, Southern said that it would once again push back its target start-up date to January 2017, and that delays could cost the project an additional $25 million to $35 million each month.[50] It remains unclear who will pick up the tab for more than $4 billion in cost overruns for construction of the plant, but the company's valuation and credit may be affected negatively, hurting investors.

The Times investigation found:

> *The company and regulators were eager to qualify for hundreds of millions of dollars in federal subsidies for the plant, which was also aggressively promoted by Haley Barbour, who was Southern's chief lobbyist before becoming the governor of Mississippi. Once in office, Mr. Barbour signed a law in 2008 that allowed much of the cost of building any new power plants to be passed on to ratepayers before they are built.*

Further, the SEC announced in May 2016 that it was launching an investigation into Southern and the Kemper plant, which is continuing in 2017. Ratepayers also are suing Southern, alleging fraud. Depending on the outcome of the SEC investigation, the company could be liable for millions in subsidies from the federal government and cost overruns from the plant.

Southern does not acknowledge that the Kemper project is not going well. In its 2016 proxy statement, the company concedes that it continues "to face challenges... in start-up and commissioning activities," yet says its directors met their targets for Kemper's annual objectives and that it paid them accordingly. In its discussion of its accounting principles, Southern notes that its calculation of its earnings per share (EPS) calculation for the last three years reflects "estimated probable losses" related to Kemper.

In Southern's Q4 2016 earnings call[51] in February 2017, company officials said that a drop in the natural gas price forecast means the Kemper plant will struggle to be profitable under most scenarios, and that Mississippi Power would file a rate case in the coming months that would seek to balance "the interests of customers and investors alike."

Conclusions

This section builds on the general transformation strategies described in detail on pages 12-14.

1 **Acknowledge climate change and its exigencies**

Southern currently discusses climate change strictly in terms of regulatory risk. The company does not acknowledge established climate science and the risks—both immediate and longer term—associated with it. Southern thus does not address in its disclosures threats to physical infrastructure, asset devaluation, supply chain disruption and other elements of a carbon-constrained world.

Southern appears torn between enormous recent investments in advanced coal and nuclear technologies—the company's successful strategy in the past—and a competing sense that natural gas and distributed energy might be the company's ultimate future. "Twenty-first century coal" and "new nuclear" are a big part of the company's vision

for the future. However, the company has seen massive cost overruns in flagship projects in both of these areas, and this has had a negative effect on the company's financial results. While Southern has in recent years beefed up its investment in distributed generation and grid-scale solar, these investments are utterly dwarfed by the sums the company continues to pour into nuclear and coal.

2 **Commit to IEA carbon emissions intensity targets 6.49 oz/kWh by 2035, 1.41 oz/kWh by 2050**

Southern has no emissions targets, whether absolute or relative. Its current emissions intensity is 19.2 oz/kWh, a long way from IEA recommendations.

3 **Work transparently to reform obstructive regulation**

Southern is opaque in its attempts to influence the shape of the regulatory structure under which it operates, despite providing more information on political spending than many of its peers. As described in this profile, as well as the previous report on which this one builds, Southern appears by and large to have lobbied aggressively to protect coal and fossil fuels and discourage clean and renewable energy expansion. In the case of its Kemper CCS facility, the company is facing legal action that alleges deceptive, corrupt and fraudulent practices.

4 **Collaborate with stakeholders**

Southern does not have a notable history of positive collaboration models at the level considered in this report. A well developed and transparent stakeholder engagement strategy could help to improve its relations with other influencers of energy policies in its regulatory environment, as well as the productiveness of its engagements.

5 **Align incentives with transition goals**

Southern has no incentives in place associated with climate change goals. If the company were to develop a transition strategy, it then could adjust its executive remuneration approach to include factors aligned with that strategy, such as progress towards emissions intensity goals.

Resources

- **Southern 2015 Form 10-K**
  https://www.sec.gov/Archives/edgar/data/3153/000009212216000126/so_10-kx12312015.htm
- **Southern 2016 Proxy Statement**
  https://www.sec.gov/Archives/edgar/data/92122/000120677416005386/southern_def14a.htm
- **Southern 2015 Corporate Responsibility Report**
  http://www.southerncompany.com/what-doing/corporate-responsibility/home.cshtml
- **Southern 2016 Carbon Disclosure Report**
  http://www.southerncompany.com/content/dam/southern-company/pdf/reports/CarbonDisclosureReport2016.pdf

FirstEnergy (NYSE: FE)

FirstEnergy, through its subsidiaries, generates, transmits and distributes electricity in the United States. The company operates through Regulated Distribution, Regulated Transmission and Competitive Energy Services segments. It owns and operates coal-fired, nuclear, hydroelectric, oil and natural gas, wind and solar power generating facilities. The company also provides energy-related products and services to retail and wholesale customers. It operates 24,211 pole miles of overhead and underground transmission lines, alongside electric distribution systems that include 268,682 miles of overhead pole line and underground conduit carrying primary, secondary and street lighting circuits. It also owns substations with a total installed transformer capacity of approximately 154,612,802 kilovolt-amperes. The company serves approximately six million customers within 65,000 square miles in Ohio, Pennsylvania, West Virginia, Maryland, New Jersey and New York. FirstEnergy is based in Akron, Ohio.

Quality of Climate Risk Disclosure

FirstEnergy had a section dealing with climate change on its website in 2015 that since appears to have been removed. The company now provides limited reporting on such topics as greenhouse gas emissions and generation sources on its website. FirstEnergy's 2016 Sustainability Report includes a section entitled "climate change," but says almost nothing about the topic. The section includes assertions in several places that the company has significantly reduced its greenhouse gas emissions—which bears on climate change—and otherwise deals with FirstEnergy's various initiatives around clean energy and generation fleet diversification. First Energy does not say if reductions in emissions are attributable to intentional activities on its part, or to the reduced operations of its dirtiest coal plants due to less dispatch or lower customer demand. (More on these topics appears below.) FirstEnergy does not offer any discussion related directly to climate science, the role electricity generation plays in a changing climate, the company's own contribution to that process, the risks it faces to its physical infrastructure and operations or its strategy for dealing with these matters.

Similarly, FirstEnergy's most recent response to CDP's climate change survey includes various statements about the company's absolute emissions reduction over the years. The company also acknowledges various non-regulatory risks from climate change—including change in mean temperature, change in temperature extremes and change in precipitation—but characterizes the time horizon, likelihood and impact magnitude as unknown, and says these considerations are already part of existing management practices and procedures without offering substantive elaboration. FirstEnergy further acknowledges that climate change poses a risk to its reputation, may drive shifts in consumer behavior and socioeconomic conditions and more, but says the costs of these risks are already integrated into existing budgets, with little elaboration.

At various points in its 2015 Form 10-K, FirstEnergy provides discussions of the legislative and regulatory frameworks to which it is subject that aim to constrain greenhouse gas emissions. The company offers these details in the context of highlighting its risk associated with future tightened legislation, as is standard for companies in its sector. With respect to the physical risks from climate change, FirstEnergy accurately acknowledges some of these, saying:

> ***Physical risks of climate change, such as more frequent or more extreme weather events, changes in temperature and precipitation patterns, changes to ground and surface water availability, and other related phenomena, could affect some, or all, of our operations. Severe***

> *weather or other natural disasters could be destructive, which could result in increased costs, including supply chain costs. An extreme weather event within the Utilities' service areas can also directly affect their capital assets, causing disruption in service to customers due to downed wires and poles or damage to other operating equipment. Climate change could also affect the availability of a secure and economical supply of water in some locations, which is essential for continued operation of generating plants. Further, as extreme weather conditions increase system stress, we may incur costs relating to additional system backup or service interruptions, and in some instances we may be unable to recover such costs. For all of these reasons, these physical risks could have an adverse financial impact on our operations and operating results. Climate change poses other financial risks as well. To the extent weather conditions are affected by climate change, customers' energy use could increase or decrease depending on the duration and magnitude of the changes. Increased energy use due to weather changes may require us to invest in additional system assets and purchase additional power. Additionally, decreased energy use due to weather changes may affect our financial condition through decreased rates, revenues, margins or earnings.*

The company does not go on in its Form 10-K to address how it may be addressing these risks. FirstEnergy has announced a goal of reducing its absolute carbon dioxide emissions by at least 90 percent by 2045, compared to its 2005 baseline. It says it has already achieved a 25 percent reduction across its footprint. FirstEnergy does not appear to have any emissions intensity goals, making it difficult to gauge its efficiency compared to its peers.

Advanced Energy Deployment

FirstEnergy says that it is diversifying its fuel mix "to a much stronger platform of units," asserting that it now operates "one of the cleanest, lowest-cost generation fleets" in the United States. This is unsubstantiated in its report. At the same time, the company declares its belief in coal's ongoing importance:

> *Coal continues to play a vital role in our own fleet as well as the nation's generation mix. Among other benefits, coal offers a mature technology and on-site fuel storage, which make it a reliable source of electricity. FirstEnergy also has made significant investments in technologies that have reduced emissions from our coal fleet, and we continue to explore opportunities to improve the environmental performance and efficiency of all our generating units.*

FirstEnergy highlights its research and development activities, specifically related to CCS and electric vehicles. While these are aimed at reducing carbon dioxide emissions, they remain in the development stage and have no significance for the company's current operations, nor are they likely to do so in the near term.

The company has a number of smart grid pilot programs across its service area, some of which are showing promise for broader deployment. Smart grid technology has the potential to yield improvements in demand-side energy efficiency, although FirstEnergy discusses this topic largely in terms of service reliability. FirstEnergy is also currently testing a utility-scale fuel cell system to determine its feasibility for augmenting generating capacity during summer peak-use periods. This also remains in the pilot stage.

Low-Carbon Energy

FirstEnergy says that it is one of the largest providers of renewable energy in its region, with approximately 1,906 Megawatts (MW) of pumped-storage hydro and contracted wind and solar resources.

FirstEnergy says, "Nearly 100 percent of the power we generate is from non- or low-emitting sources, including nuclear, natural gas, scrubbed coal and renewable energy." The company provides little detail regarding its scrubbed coal, with no elaboration in its Form 10-K or its sustainability report. Scrubbed coal falls within the controversial topic of "clean coal," which many environmental activists view as a contradiction in terms. Others say that until renewables and other clean sources of energy are scaled up and storable enough to meet full demand—a development they see as decades away—coal will remain a vital energy source, and technologies to remove some of its dirtiest elements will help to reduce its environmental impact. Scrubbing technology, which removes some mercury, sulfur and harmful particulate matter, does nothing to reduce or contain coal's heavy carbon dioxide emissions.

While FirstEnergy says it supports research in the area of distributed energy, it is not clear to what extent it has integrated distributed generation into its service offerings. The company has a page on its website dealing with the process by which retail customers may interconnect small generation with the FirstEnergy distribution system, but this reveals nothing about the level of uptake.

In an April 2014 speech to the U.S. Chamber of Commerce, then-CEO Anthony J. Alexander expressed reservations about distributed generation, renewables deployment and energy efficiency initiatives, objecting to government support of these systems, particularly subsidies.[52] Alexander's remarks are particularly noteworthy in light of FirstEnergy's heavy lobbying efforts to protect subsidies for coal-fired power plants, discussed below, and the 2016 emergence of unsubsidized solar in some 30 countries as the cheapest source of power. Highlights from the full transcript include the following:

> In the electric utility industry, energy efficiency, renewable power, distributed generation, micro grids, roof-top solar and demand reduction are examples of what "sounds good" – and while they may all play some role in meeting the energy needs of customers, they are not substitutes for what has worked to sustain a reliable, affordable and environmentally responsible electric system. And, the mandates and subsidies needed to force their use have far-reaching consequences for our customers and our economy.
>
> Consider the fact that... electric customers are being forced to pay additional costs for subsidized, unneeded generation.
>
> Or that these policies and others – designed to achieve a social agenda that has little, if anything, to do with maintaining electric service – are shifting the fixed costs of the system to customers who can least afford it... and are undermining our nation's competitive position.
>
> Let me be clear – FirstEnergy supports and encourages energy efficiency and the wise use of electricity by our customers... we always have. And, in some cases, it makes sense to charge all customers to fund energy efficiency programs for customers who cannot make those investments on their own.
>
> But when efficiency targets are mandated by government – and based on arbitrary, overly aggressive goals – all customers pay the price... and it is a substantial tax on those who do not, or cannot, participate in the program...

So why are we engaged in this effort to experiment with the electric system by taking away customer choice... increasing prices... and jeopardizing reliability?...

Quite frankly, I believe state and federal policymakers are manipulating the supply and demand, and distorting markets for electricity, to further advance the "war on coal." And, the convergence of government policies, laws and regulations aimed at coal use – both directly, through EPA rules, and indirectly, through subsidies, preferences and mandates – will lead to higher prices and less reliable service over the long term.

The United States holds the world's largest estimated recoverable reserves of coal. We're a net exporter of coal – and over the past three years it has been used to generate about 40 percent of this nation's electricity.

The continued use of these important and cost-effective domestic resources, however, is being challenged by new environmental rules. For example, as a result of the U.S. EPA's mercury and air toxics standards, an estimated 376 coal-based units will close in 38 states over the next three to five years. That's nearly 17 percent of our nation's coal fleet's capacity. And, there are additional EPA rules being considered that could have similar impacts on the fleet.

But, it's not just EPA rules that are challenging our use of coal. In competitive states, if market rules don't change to reflect the true value of baseload generation, additional units may be shut down...

We need to maintain a diverse fleet – including real generating assets such as coal, nuclear and natural gas – to ensure reliable, affordable service over the long term.

But, perhaps more important, we need to develop a national energy plan that will allow us to take advantage of our vast supply of domestically produced resources – both coal and natural gas – and our superior electric system to stimulate and support our economy...

[W]e need an approach to electric energy that makes reliability, affordability and economic expansion our key priorities:

- We need to reaffirm this nation's long-term energy policy in favor of diversity of supply and reliance on the market, not the government picking winners and losers among energy technologies and customer choices.
- We need better coordination among federal agencies and the regulatory certainty needed to support the long-term investments that have been made, and will continue to be made, to maintain essential electric service.
- We need an energy policy that recognizes regional differences and provides the flexibility and time needed for each region to adapt to its resources and conditions.
- And, we need an energy policy that establishes a balance between necessary and effective environmental standards and the reliability and affordability of electricity.

Executive Pay Packages and Incentives

According to FirstEnergy's response to the CDP climate change survey for 2015, the company provides no incentives for the management of climate change issues.

Patterns of Political Spending and Lobbying

Ohio's Clean Energy Standards

FirstEnergy was one of the utilities implicated in lobbying efforts to undermine Ohio's clean energy standards, detailed above (see page 26) in this report. In addition to the details provided earlier, FirstEnergy had been circulating a form letter to commercial and industrial customers urging them to lobby lawmakers to amend the efficiency rules.[53] In its 2015 Form 10-K, the company describes its regulatory initiatives in Ohio differently:

> *On December 1, 2015, FirstEnergy's Ohio Companies filed an additional settlement at the [Public Utilities Commission of Ohio (PUCO)], which included the PUCO Staff as a signatory party, that sets forth ambitious steps to help safeguard customers against retail generation price increases in future years, deploy new energy efficiency programs, and provide a clear path to a cleaner energy future by establishing a goal to substantially reduce carbon emissions. The settlement includes an eight-year rate provision (Rider RRS) designed to help protect customers against rising retail price increases and market volatility, while helping preserve vital baseload power plants that serve Ohio customers and provide thousands of family-sustaining jobs in the state. A decision is anticipated in March 2016. On January 27, 2016, certain parties filed a complaint at FERC against [FirstEnergy utilities] that requests FERC review of the ESP IV PPA[54]... In addition to such proceeding, parties have expressed an intention to challenge, in the courts and/or before FERC, the PPA or PUCO approval of the ESP IV, if approved. Management intends to vigorously defend against such challenges.*

For the last two years, proceedings at the PUCO have been dominated by a single issue: subsidies for aging power plants. Financial difficulties at both FirstEnergy and American Electric Power, stemming from their electricity market where many aging baseload plants cannot compete with low-cost natural gas and renewables, set off the regulatory struggle. The problem is that FirstEnergy Solutions and Allegheny Energy Supply, FirstEnergy's unregulated subsidiaries that own the power plants, cannot afford to operate them at today's power prices. Gas-fired power plants and wind farms have pushed prices down on regional wholesale markets in which the company's power plants must compete.

In May 2014, FirstEnergy filed a complaint against PJM, the Mid-Atlantic regional transmission organization, at FERC. If FirstEnergy had prevailed, the decision would effectively have kept all utilities in the PJM territory from being compensated for energy efficiency savings. System operators such as PJM manage which generation is dispatched to serve demand, and can compensate customers for reducing usage at peak times—called demand response—instead of dispatching additional power. FirstEnergy's complaint aimed to have demand response barred from all markets under PJM's tariffs. Demand response is a typical—though not essential—component of the sort of smart grid systems that FirstEnergy says it is

piloting. Critics believed that FirstEnergy's motivation behind the complaint was to prevent the kind of significant efficiency improvements that would markedly reduce demand for the energy it produces.[55] But in January 2016, FirstEnergy withdrew the complaint in light of the U.S. Supreme Court decision in Federal Energy Regulatory Commission v. Electric Power Supply Association that allows FERC to set rates for demand response payments.[56]

In August 2014, FirstEnergy had applied for permission from Ohio to pass costs from coal plants on to customers. The company also requested that it be allowed to reopen its Sammis plant, which when operational was the 41st most polluting power plant in the United States. The company met with considerable community opposition in response to this effort, and regulators ultimately rejected the request.[57] But in November 2014, regulators approved FirstEnergy's request to eliminate the vast majority of its own energy efficiency programs.

In March 2016, FirstEnergy won approval for the previously rejected plan from the PUCO. The FERC went on to block these plans to provide direct income support to aging coal and nuclear plants owned by FirstEnergy and American Electric Power. Activists argue that those baseload plants should simply retire. In the wake of the FERC rejection, American Electric Power opted to sell some of its plants and push for re-regulation of the Ohio utility market. FirstEnergy, however, pushed for a distribution modernization rider, which sought to allow the company to recover additional costs annually from ratepayers for the next three years in order to make grid investments. The PUCO approved the rider on October 12, 2016, but at a level that disappointed FirstEnergy. The PUCO allowed a cost recovery of approximately $204 million per year over the three-year period, which FirstEnergy described in a press release as "insufficient to cover the necessary and costly investments."[58]

The significance of the above proceedings to FirstEnergy's business model is revealed by the company itself in its 2015 Form 10-K:

> ***FirstEnergy's longer term strategic outlook for its regulated and competitive businesses will be determined following resolution of the Ohio Companies' ESP IV, including the proposed PPA between FES and the Ohio Companies. Once the ESP IV is finalized, FirstEnergy expects to be in a position to more fully understand the longer-term outlook of its competitive businesses and the longer term growth rate of its regulated businesses, including planned capital investments and any additional equity to fund growth in its regulated businesses.***

In November 2016, FirstEnergy announced that it would exit competitive generation and return to being fully regulated. By extension, if the company is unable to re-regulate its expensive coal-fired plants, thereby receiving higher prices for the power they produce, FirstEnergy will shut them down or sell them and become a delivery-only company.[59] This would constitute a major turnabout in strategy: FirstEnergy fought hard back in 2008 for deregulation and succeeded at the time in securing $6 billion from ratepayers to cover its assets that were stranded in the process. The company's prospective reversal could once again cost customers billions.[60]

According to a Form 8-K FirstEnergy filed with the SEC on December 6, 2016,[61] the company is now negotiating the sale of several struggling generating assets, including natural gas and hydroelectric facilities.

While FirstEnergy and AEP are pushing for re-regulation, one of Ohio's other primary investor-owned utilities, Dynegy, is working to preserve free-market competition and resist subsidies. Dynegy's position is that customers should not have to pay to prop up unprofitable plants. The company argues that unlike traditional utilities, when power prices are low, it has

to lower its costs. Dynegy CEO Bob Flexon said at a February 2017 conference that traditional utilities should be labeled as monopolies with a no-fault capitalism model, noting that Dynegy is "a competitive power player" that "has to compete," and that his company does not "have a regulatory reach into the pockets of consumers." [62]

A trend toward re-regulation

FirstEnergy and AEP's efforts to guarantee income for affiliated coal and nuclear operations are part of a broader trend, according to a September 2016 report by legal analysts. The utilities' actions are among the more aggressive "around market" efforts in a nationwide trend the report authors noted. Those efforts coincide with multiple coal and nuclear plants' exit from the market. If stakeholders and policy makers do not develop workable market solutions, the report warns, the continued exit of baseload power plants could raise questions about reliability and lead to more re-regulation efforts.[63]

In addition to the Ohio case, Exelon sought support in Illinois for two of its nuclear generation plants. Meanwhile, the New York Public Service Commission has backed a system to provide short-term supplementary credits to keep certain nuclear power plants online. Texas has had a debate over what kind of capacity market, if any, is appropriate to support fossil fuel power plants, according to the report.

The report concludes that stakeholders and grid operators should consider how best to value baseload power plants in competitive capacity markets.

Conclusions

This section builds on the general transformation strategies described in detail on pages 12-14

1 **Acknowledge climate change and its exigencies**
FirstEnergy offers measured acknowledgement of the physical risks climate change poses, beyond the simple regulatory risks that most utilities address as a matter of course. However, the company fails to provide substantive information regarding what strategies it may have to address these risks. As described earlier in this report, FirstEnergy recently suffered a significant regulatory defeat in Ohio. The company said in its most recent annual report that its business strategy hinged substantially on the outcome of that process. FirstEnergy may now be at a pivot point, and more robust treatment of climate risk could be an approach to which management would be more open.

2 **Commit to IEA carbon emissions intensity targets: 6.49 oz/kWh by 2035, 1.41 oz/kWh by 2050**
FirstEnergy does not disclose its emissions intensity. The company has absolute emissions targets, and has exhibited a steady decline in absolute emissions over the years, though this is not clearly attributable to any strategic action on FirstEnergy's part and possibly could be due to macro factors. Emissions intensity disclosure and targets are essential for peer comparison of progress, as well as to meet global targets designed to avert the most harmful effects of climate change.

3 **Work transparently to reform obstructive regulation**
FirstEnergy is opaque in its attempts to influence the shape of the regulatory structure under which it operates. As described in this profile, as well as the previous report on which this one builds, FirstEnergy appears to have lobbied

to protect coal and fossil fuels and discourage clean and renewable energy expansion. Two years ago, a former CEO laid out a case for status quo technologies and strategies, with an emphasis on coal and other fossil fuels.

4 **Collaborate with stakeholders**

FirstEnergy does not have a notable history of positive collaboration models at the level considered in this report. A well developed and transparent stakeholder engagement strategy could help to improve its relations with other influencers of energy policies in its regulatory environment, as well as the productiveness of its engagements.

5 **Align incentives with transition goals**

While FirstEnergy says it has incentives in place associated with climate change goals, these are quite limited and take the form of employee prizes for a host of eligible initiatives, many of which have nothing to do with climate change. If the company were to develop a transition strategy, it then could adjust its executive remuneration approach to include factors aligned with that strategy, such as progress towards emissions intensity goals.

Resources

- **FirstEnergy 2015 Form 10-K**
  https://www.sec.gov/Archives/edgar/data/1031296/000103129616000071/fe-12312015x10k.htm
- **FirstEnergy 2016 Proxy Statement**
  https://www.sec.gov/Archives/edgar/data/1031296/000119312516526920/d127651ddef14a.htm
- **FirstEnergy 2016 Sustainability Report**
  https://www.firstenergycorp.com/content/dam/environmental/files/sustainabilityreport.pdf

DTE Energy (NYSE: DTE)

DTE Energy, is based in Michigan but operates in many other states, as well, through five segments:

- The **Electric** segment generates, purchases, distributes and sells electricity to approximately 2.2 million residential, commercial and industrial customers in southeastern Michigan—it is the largest electric utility in that state. It generates electricity through fossil-fuel plants, hydroelectric pumped storage plants, nuclear plants and wind and other renewable assets. This segment owns and operates approximately 676 distribution substations and 432,500 line transformers. DTE Electric has long- and short-term purchase contracts for approximately 37.9 million tons of low-sulfur western coal, and approximately 3 million tons of Appalachian coal to be delivered from 2016 to 2021. DTE Electric accounted for 47.4 percent of DTE's 2015 operating revenues.

- The **Gas** segment purchases, stores, transports, distributes and sells natural gas to approximately 1.2 million residential, commercial and industrial customers in Michigan, and sells storage and transportation capacity. This segment has approximately 19,000 miles of distribution mains, 1,165,000 service pipelines and 1,314,000 active meters, and owns approximately 2,000 miles of transmission pipelines. DTE Gas accounted for 13.3 percent of the company's 2015 operating revenues.

- The **Gas Storage and Pipelines** segment controls natural gas storage fields, and intrastate lateral and intrastate gathering pipeline systems, and has ownership interests in interstate pipelines serving the Midwest, Ontario and Northeast markets.

- The **Power and Industrial Projects** segment provides metallurgical coke, pulverized coal and petroleum coke to the steel, pulp and paper and other industries; and power generation, steam production, chilled water production, wastewater treatment and compressed air supply to industrial customers. This segment also owns and operates four renewable generating plants with a capacity of 191 Megawatts, and nine reduced emissions fuel facilities, as well as developing landfill gas recovery systems.

- The **Energy Trading** segment focuses on physical and financial power, as well as gas marketing and trading, structured transactions and optimization of contracted natural gas pipeline transportation and storage positions.

Quality of Climate Risk Disclosure

DTE Energy does not acknowledge climate change risk in any fashion in its 2015 Form 10-K, except for several brief, vague nods to the possibility of future regulation.

The company has announced an absolute target of reducing carbon dioxide emissions from electric generation by 20 percent below a 2010 baseline by 2020, and by 40 percent by 2030. DTE says it already has achieved a 17 percent reduction. It has no intensity targets, making it difficult to gauge the company's performance relative to its peers.

DTE Energy's 2015 response to CDP's climate change survey includes various statements about the company's absolute

emissions reduction. The company also acknowledges various non-regulatory risks from climate change—including change in temperature extremes and increased storm severity—but characterizes the time horizon, likelihood and impact magnitude as unknown, and says these considerations are already integrated into existing budgets.

In its CDP response, DTE Energy says that its Public Policy and Responsibility Committee of the board of directors is "responsible for reviewing and advising the Board on emerging social, economic, political, reputational and environmental issues that could significantly affect the Company's business and performance in relation to the community, shareholders, customers and employees," and that this committee is responsible for climate change issues. DTE Energy does not have a board committee that is dedicated only to climate change issues. In contrast, the company does have a board committee, the Nuclear Review Committee, that is charged with reviewing "the policies, procedures and practices related to health and safety, potential risks, resources and compliance" at its nuclear facilities and reviewing "non-financial audit findings" related to its nuclear facilities or personnel, among other things.

Advanced Energy Deployment

DTE Electric retired one of its coal-fired units with 110 megawatts (MW) in generation capacity in April 2016. This added to a reduction in fossil fuel dependence in recent years; in 2013, the company relied on coal for more than three-quarters of its generation mix. Since that year, the company has not significantly grown its wind and solar generation, instead increasing its use of natural gas and hydroelectricity. Over the next 15 years, DTE Electric expects to retire additional coal-fired generation and to increase the proportion of its generation mix attributable to natural gas-fired generation and renewables.

DTE Energy notes that some communities in its operating area oppose new wind turbines, noting that at least one township in Huron County has imposed a moratorium on new turbines. Regarding solar, the company says: "Given today's solar technology, it doesn't make sense for our state to invest in solar at a significant scale; however, we remain committed to implementing technology breakthroughs in solar when, and if, they happen."

Between the company's SEC filings and Corporate Citizenship Report, the only reference DTE Energy makes to distributed generation is in the section of its 2015 Form 10-K that deals with competition:

> ***Competition in the regulated electric distribution business is primarily from the on-site generation of industrial customers and from distributed generation applications by industrial and commercial customers. DTE Electric does not expect significant competition for distribution to any group of customers in the near term.***

On the client-facing section of its website, DTE Energy has a page describing options for customer generation that includes distributed generation. The page is intended to help customers sign up for distributed generation and other options. Si2 was unable to find any information about the extent of customer uptake of this option.

In a 2011 conference presentation, a DTE Energy representative described the company's application of distributed resources.[64] The presentation highlights several distributed generation projects, which appear to be partnerships with customers. It is unclear how significant these projects were to the company's overall business, and to what extent they persist today.

Under the SolarCurrents utility-owned pilot program, DTE Electric obtains easement rights to locate large (up to 1,100 kW) photovoltaic (PV) arrays in southeastern Michigan. DTE Electric currently has 22 sites in operation totaling 9.9 MW of solar generating capacity. DTE Energy achieved its goal of bringing approximately 15 MW of solar capacity online and investing approximately $70 million in this program by the end of 2015. It engineers, builds, owns and maintains the PV systems and receives all energy, capacity and environmental and/or renewable attributes generated by the PV systems. The property owner receives an annual income generated as an easement payment. Because the company reached its targets, it is no longer accepting customer applications to participate in the program.

In 2008, Michigan established a renewable portfolio standard for Michigan electric providers. Michigan required them to source 10 percent of electricity sold to retail customers from renewable sources by 2015. DTE Electric says it met this goal.

The Midcontinent Independent System Operator (MISO) regional energy market, which includes the state of Michigan, faced capacity constraints in certain areas beginning in 2016 primarily because increasingly stringent environmental requirements forced the retirement of coal-fired generation. DTE Energy notes in its 2015 Form 10-K that the increased dependency on its generation "to provide reliable service and price stability for customers" will require "a large investment due to DTE Electric's aging coal fleet along with increased environmental regulations."

DTE Energy provides a graphic on its website to illustrate its approach to energy transformation.[65] The graphic, while too large for clear reproduction here, shows the following elements:

- We participate in research on new technologies to make carbon capture and geologic carbon storage practical for both new and existing fossil-fuel power plants.
- Nuclear power generation provides a significant amount of essentially carbon-free, base-load electricity, which is crucial for helping the state of Michigan and the entire United States meet the challenges of reducing greenhouse gas emissions (GHGs).
- In 2015 we purchased two natural gas-fired simple cycle plants that, combined, can provide more than 1,000 MW of power during peak demand periods.
- We are national leaders in developing landfill gas capture systems and in converting small coal-fired power plants to run on biomass fuels.
- We're building the largest utility-owned solar project east of the Mississippi.
- DTE is the largest investor in renewable energy in the state.

As shown above, the company is banking on CCS, the challenges of which are detailed on page 11 of this report. DTE Energy also places strong emphasis on high capital cost nuclear projects. While the company shows some renewable initiatives in the graphic, the information provided earlier in this section suggests that these currently are not a significant part of its business.

DTE Energy has, however, made statements indicating that it may make a shift in the coming decade. In a June 2016 press release, the company announced that it would retire eight coal-fired generators at three power plants by 2023. DTE Energy said that these plants accounted for approximately 25 percent of its generation in 2015:

> *The retirements are part of an overarching fundamental transformation in the way DTE will produce energy for Michigan. Earlier this year, DTE retired three coal generating units due to age and projected future costs. With today's announcement, the company will retire 11 of its 17 coal-fired units by 2023.*
>
> *"The way DTE generates electricity will change as much in the next 10 years as any other period in our history. We will replace 11 aging coal-fired generating units at three facilities built in the 1950s and 1960s with a mix of newer, more modern and cleaner sources of energy generation such as wind, natural gas and solar," said DTE Energy Chairman and CEO Gerry Anderson. "DTE Energy will work with the state of Michigan on a plan that ensures electric reliability for our 2.2 million customers, places a premium on affordability, and is seamless for our employees and the communities that are home to these plants."*[66]

Executive Pay Packages and Incentives

DTE Energy says in its response to the CDP climate change survey for 2015 that it provides incentives for the management of climate change issues. However, according to the details the company itself provides, this characterization is something of a stretch. All DTE Energy offers are three awards—one monetary, two non-monetary—and none is specific to climate change; rather, the awards include environmental initiatives among the many categories of employee innovation that are eligible for consideration.

A review of the company's 2016 proxy statement revealed no environmentally related components in the executive compensation structure.

Patterns of Political Spending and Lobbying

Michigan's Electricity Market and Renewables Goals

Under Michigan's Electric Customer Choice Program, the supply of power is open to competitive suppliers. Electric transmission and distribution remain under a regulated utility structure. Customers with retail access to alternative electric suppliers represented approximately 10 percent of DTE Energy's retail sales in 2015 and consisted primarily of industrial and commercial customers. Michigan Public Service Commission (MPSC) rate orders and 2008 energy legislation enacted by the State of Michigan had placed a 10 percent cap on the total retail access related migration, mitigating some of the unfavorable effects of electric retail access on DTE Electric's financial performance and full service customer rates.

The year 2016 saw a pitched battle to overhaul Michigan's electricity markets, with DTE Energy advocating for charges or restrictions on alternative energy suppliers. Negotiations over this point were so intense that Michigan lawmakers held

overnight sessions in December, trying to arrive at a resolution. One particular sticking point was a proposed capacity charge that alternative energy suppliers would have been required to pay to Michigan's regulated utilities, including DTE Energy. The company argued that charges or restrictions on alternative suppliers were justified because DTE Energy is obligated to build the generation infrastructure to serve their customers. Opponents of the provision feared it would kill the retail choice market.[67]

In mid-December, regulators arrived at a bipartisan compromise that kept the retail choice program alive and raised Michigan's RPS from 10 percent to 15 percent. Clean energy advocates celebrated the decision, which did not include provisions that they feared would have undermined Michigan's nascent solar market. The legislation also directs state regulators to establish a tariff process for distributed generation resources, which advocates expect will expand Michigan's currently tiny solar generation capacity while preventing utility domination of the market. As with so much in electricity market regulation, though, the impact of this tariff will be determined by its design, which remains to be determined.

As in the Ohio case described earlier in this report, it was a Republican governor—in this case, Governor Rick Snyder—who ushered the legislation into passage. Snyder brokered a compromise between DTE Energy (along with the state's other investor-owned utility, Consumers Energy) and alternative energy suppliers, setting clear parameters for regulators to determine if a capacity charge is warranted and, if so, how high it could rise, or if it would be better for an alternative energy supplier to secure capacity demands through a three-year auction process.[68] Ultimately, this new legislation is a victory for compromise and collaboration, and DTE Energy and alternative energy providers alike declared their general satisfaction with its outcome.

Conclusions

This section builds on the general transformation strategies described in detail on pages 12-14.

1 **Acknowledge climate change and its exigencies**

DTE offers a cursory acknowledgement in its CDP response of the physical risks climate change poses, but characterizes these as fully accounted for in the company's management strategy without offering details, and says the impact and time horizon of these are unknown, defying established climate science. The company does not address climate risk in its regulatory filings.

2 **Commit to IEA carbon emissions intensity targets: 6.49 oz/kWh by 2035, 1.41 oz/kWh by 2050**

DTE Energy does not disclose its emissions intensity. The company has absolute emissions targets, and has exhibited a steady decline in absolute emissions over the years, but emissions intensity disclosure and targets are essential for peer comparison of progress, as well as to meet global targets designed to avert the most harmful effects of climate change. The company is retiring a substantial proportion of its coal-fired generation, and suggests that its strategy over the next decade will involve a significant shift toward cleaner generation.

3 **Work transparently to reform obstructive regulation**

DTE Energy is opaque in its attempts to influence the shape of the regulatory structure under which it operates. As described in the previous section, as well as the previous report on which this one builds, DTE Energy appears to have lobbied to protect coal and fossil fuels and discourage clean and renewable energy expansion. However, the company has not been intractable on this point.

4 **Collaborate with stakeholders**

DTE Energy also provides an example of successful collaboration and negotiation in Michigan, and ultimately emerged with a regulatory solution with which all parties were generally satisfied. A well developed and transparent stakeholder engagement strategy could help further to improve its relations with other influencers of energy policies in its regulatory environment, as well as the productiveness of its engagements.

5 **Align incentives with transition goals**

While DTE Energy says it has incentives in place associated with climate change goals, these are too thin to have much relevance since they take the form of employee prizes for a host of eligible initiatives, many of which have nothing to do with climate change. If the company were to develop a transition strategy, it then could adjust its executive remuneration approach to include factors aligned with that strategy, such as progress towards emissions intensity goals.

Resources

- **DTE Energy 2015 Form 10-K**
  https://www.sec.gov/Archives/edgar/data/28385/000093634016000243/dteenergy2015123110k.htm

- **DTE Energy 2016 Proxy Statement**
  https://www.sec.gov/Archives/edgar/data/936340/000119312516500274/d119554ddef14a.htm

- **DTE Energy 2015-2016 Corporate Citizenship Report**
  https://newlook.dteenergy.com/wps/wcm/connect/dte-web/dte-pages/ccr/home/home

American Electric Power (NYSE: AEP)

American Electric Power (AEP), a public utility holding company with its headquarters in Columbus, Ohio, generates, transmits and distributes electricity for sale to retail and wholesale customers. The company generates electricity using coal and lignite, natural gas, nuclear, hydroelectric and other energy sources. It also supplies and markets electric power at wholesale to other electric utility companies, rural electric cooperatives, municipalities, and other market participants. The company delivers electricity to approximately 5.4 million customers in 11 states. It also owns and leases approximately 4,838 railcars, 498 barges, 12 towboats, 8 harbor boats and a coal handling terminal.

Quality of Climate Risk Disclosure

AEP provides a section called "Climate Change" in its 2015 Form 10-K:

> *AEP has taken action to reduce and offset CO_2 emissions from its generating fleet and expects CO_2 emissions from its operations to continue to decline due to the retirement of some of its coal-fired generation units, and actions taken to diversify the generation fleet and increase energy efficiency* ***where there is regulatory support*** *for such activities. AEP's total CO_2 emissions in 2015... were approximately 102.4 million metric tons, a 30% reduction from AEP's 2005 CO_2 emissions of approximately 146 million metric tons... [emphasis added]*
>
> *Management expects emissions to continue to decline over time as AEP diversifies generating sources and operates fewer coal units. The projected decline in coal-fired generation is due to a number of factors, including the ongoing cost of operating older units, the relative cost of coal and natural gas as fuel sources, increasing environmental regulations requiring significant capital investments and changing commodity market fundamentals. Management's strategy for this transformation includes diversifying AEP's fuel portfolio and generating more electricity from natural gas, increasing energy efficiency and investing in renewable resources,* ***where there is regulatory support.*** *[emphasis added]*
>
> *AEP's fossil fuel-fired generating units are large sources of CO_2 emissions. If substantial additional CO_2 emission reductions are required, there will be significant increases in capital expenditures and operating costs which would hasten the ultimate retirement of older, less-efficient, coal-fired units. To the extent additional investments are made to reduce CO_2 emissions and receive regulatory approvals to increase rates, return on capital investment would have a positive effect on future earnings. Prudently incurred capital investments made by AEP subsidiaries in rate-regulated jurisdictions to comply with legal requirements and benefit customers are generally included in rate base for recovery and earn a return on investment. Management would expect these principles to apply to investments made to address new environmental requirements. However, requests for rate increases reflecting these costs can have adverse effects because regulators could limit the amount or timing of increased costs that AEP would recover through higher rates.* ***For sales of energy into competitive markets, however, there is no such recovery mechanism****. [emphasis added]*

In the risk section of its Form 10-K, AEP provides further details. Its acknowledgement of climate risk is more in line with established science than that of the other companies in this report: "Climate change creates physical and financial risk. Physical risks from climate change may include an increase in sea level and changes in weather conditions, such as changes in precipitation and extreme weather events." The company goes on to describe the particular impacts its operations could face from the changing climate:

> *Increased energy use due to weather changes may require AEP to invest in additional generating assets, transmission and other infrastructure to serve increased load. Decreased energy use due to weather changes may affect financial condition through decreased revenues. Extreme weather conditions in general require more system backup, adding to costs, and can contribute to increased system stress, including service interruptions. Weather conditions outside of the AEP service territory could also have an impact on revenues. AEP buys and sells electricity depending upon system needs and market opportunities. Extreme weather conditions creating high energy demand on AEP's own and/or other systems may raise electricity prices as AEP buys short-term energy to serve AEP's own system, which would increase the cost of energy AEP provides to customers.*
>
> *Severe weather impacts AEP's service territories, primarily when thunderstorms, tornadoes, hurricanes, floods and snow or ice storms occur. To the extent the frequency of extreme weather events increases, this could increase AEP's cost of providing service. Changes in precipitation resulting in droughts, water shortages or floods could adversely affect operations, principally the fossil fuel generating units. A negative impact to water supplies due to long-term drought conditions or severe flooding could adversely impact AEP's ability to provide electricity to customers, as well as increase the price they pay for energy. AEP may not recover all costs related to mitigating these physical and financial risks.*
>
> *To the extent climate change impacts a region's economic health, it may also impact revenues. AEP's financial performance is tied to the health of the regional economies AEP serves. The price of energy, as a factor in a region's cost of living as well as an important input into the cost of goods and services, has an impact on the economic health of the communities within the AEP System.*

AEP publishes an annual corporate accountability report. In its 2016 edition, unusually for a company in this sector, AEP says less about climate change than it does in its Form 10-K. The company does declare its support for the Paris climate agreement, on the principle that climate change is a global issue and responsibility, and that no single company or country can carry the burden: "The Paris agreement sets the stage for such a global solution." AEP provides no further direct discussion of climate change, going on instead to address its carbon emissions reduction efforts, further details of which are provided below.

AEP includes a section called "carbon & climate" on its website, where it asserts, "The EPA has the authority to regulate carbon. Regardless of the outcome of legal challenges to the Clean Power Plan, there will be carbon regulations in the future." The company's integrated resource plans incorporate a carbon price starting in 2022, as a proxy for future carbon regulations.

AEP says it has reduced absolute CO_2 emissions by 39 percent since 2000. The company does not provide carbon intensity metrics, making it difficult to compare its performance to its peers. AEP says it has invested approximately $8.5 billion in the past 16 years installing environmental controls on its plants. Most of these would have been necessary for legal compliance with air regulations. The company also says it has retired more than 7,200 MW of coal-fired generation capacity in the last five years, which may be one primary reason for its CO_2 emissions reductions noted above, and is in the process of replacing it with "transmission, natural gas and renewables, including solar and wind, as well as energy storage." AEP says it is expanding its customer energy efficiency and demand response programs, as well. At the same time, AEP asserts its belief that fossil fuels must remain part of the energy mix for the long term.

AEP provides a detailed analysis of its carbon profile on its website that includes a discussion of the economics of coal plant retirement, an analysis of AEP's risks under carbon constraints and a discussion of its management approach in the face of this risk.[69] Among its notable statements, AEP nods to the possibility that CCS technology (see page 35) may not live up to its original promise, and to the move toward cost-competitiveness of renewables. Among its management responses (described elsewhere in this report), the company says it has substantially moved its capital expenditures from environmental investments—presumably because those measures have brought it into compliance—to investments in infrastructure, including transmission, which would include elements that would be necessary for clean power integration.

AEP says it has included a carbon price in its integrated resource planning for a number of years to account for regulatory risk around carbon, and that it will continue to reassess its price assumptions as additional details emerge. On the policy front, AEP has called for a price on carbon as the most straightforward way to preserve nuclear power plants in the Northeast.

Advanced Energy Deployment

Page 17 of this report provides comparative generation mix data for the five companies under examination. These data were from 2015, as this was the most recent year for which all companies had reported. AEP has reported 2016 figures, and shows a decline in coal generating capacity to 48 percent in 2016, resulting from an increase in natural gas and hydro, wind, solar and pumped storage capacity, as well as improvements in energy efficiency and demand response.

AEP says in its corporate accountability report that it is changing its "business to accommodate local generation of clean energy, optimize power flows and connect diverse resources to the power grid." The company says that its current integrated resource plans call for adding roughly 3,400 MW of solar, 6,300 MW of wind and 3,000 MW of natural gas by 2034. Currently, AEP has approximately 7,500 MW of renewable generation interconnected across the United States through its transmission system. In November 2016, AEP announced a capital investment plan for 2017 to 2019 that included $1 billion for renewables projects. Regarding its strategy, AEP says:

> *The power grid will change as we integrate new 24/7 energy resources, local generation, and large-scale universal renewables, and merge all of that with technological advances that will drive further efficiency and use of electricity. Our transmission and distribution business strategy is based on targeted capital investments to build infrastructure that enables local generation and provides it in a safe, clean, reliable way for all customers.*

The company elaborates on its website that "given current economics, the logical technology choice for new 24/7 power sources will be high-efficiency combined-cycle natural gas units." AEP acknowledges that "wind and solar generation will play an increasing role as they become cost-competitive at grid-scale as an intermittent energy resource," repudiating distributed generation. AEP is also investing in energy storage technology research as a pathway to improved grid reliability, allowing for "greater use of variable resources in the future."

AEP views universal solar[70] as the most sensible long-term solution, because the company can provide it more cost-effectively than smaller-scale renewables. AEP also notes that universal solar can be aligned with grid operations, preventing long-term integration costs. It believes that with its power systems engineering experience, it is the best able "to optimally integrate variable resources with the grid."

The share of distributed generation on AEP's system is tiny but growing rapidly. Private solar generation accounted for 0.6 percent of AEP's customer base in 2015, up from 0.3 percent in 2013. The company says that despite that growth rate, it does not see "the threat to AEP's financial status" as "a material risk for the foreseeable future." Nevertheless, AEP says it is developing and marketing a distributed resource portfolio targeting wholesale and large retail customers. AEP offers a detailed discussion of its position on distributed generation on its website.[71]

Executive Pay Packages and Incentives

AEP says in its response to the CDP climate change survey for 2016 that it provides incentives for the management of climate change issues. However, according to the details the company provides, this characterization is something of a stretch. AEP provides incentive pay to all employees that rewards progress toward the company's strategic goals, including emission abatement technology deployment, energy efficiency and renewable generation elements. Environmental and sustainability managers have specific performance goals related to climate change management in their annual performance plans. The company does not disclose how these factors are measured or weighted. AEP also offers three awards—one monetary, non-monetary—neither of which is specific to climate change; rather, the awards include environmental initiatives among the many categories of employee innovation that are eligible for consideration.

A review of the company's 2016 proxy statement revealed no environmentally related components of the executive compensation structure.

Patterns of Political Spending and Lobbying

Ohio's Clean Energy Standards

AEP was one of the utilities implicated in lobbying efforts to undermine Ohio's clean energy standards, described above in this report (see page 26).

For the last two years, proceedings at the Public Utilities Commission of Ohio (PUCO) have been dominated by a single issue: subsidies for aging power plants. Financial difficulties at both AEP and **FirstEnergy**, stemming from their electricity market where many aging baseload plants cannot compete with low-cost natural gas and renewables, set off the regulatory struggle.

In April 2016, the FERC blocked Ohio energy regulators' plans to provide direct income support to aging coal and nuclear plants owned by AEP and FirstEnergy, despite both companies' aggressive lobbying. Activists argue that those baseload plants should simply retire. In the wake of the FERC rejection, AEP opted to sell some of its plants and push for re-regulation of the Ohio utility market.

In August 2016, AEP Ohio sought permission from regulators to more than double its fixed charges on all consumers, saying that an across-the-board increase was necessary because of the increasing number of customers with solar panels, who do not pay the standard fees for grid upkeep.[72] This reflects a similar tension across multiple jurisdictions involving various utilities. As more customers take up their own generation, and are entitled to grid access for load smoothing, they are not paying the full fees on which the utility relies for grid maintenance. In many cases where fixed charge increases are under consideration, the debate has become contentious and vitriolic, with utilities concerned about their ability to finance infrastructure upkeep and activists concerned that significant fixed charge increases will stifle renewable and distributed generation uptake. Many utilities have come to oppose net energy metering, the mechanism by which customers with rooftop solar can sell excess energy back to the grid, but industry experts advise that utilities focus on fixed cost recovery. In all scenarios, the solution will likely require compromise between utilities and solar advocates.[73] As of January 2017, the PUCO had not yet set a schedule for considering AEP's case.

In November 2016, AEP Ohio asked regulators to extend its existing Energy Security Plan to May 2024, which would allow the utility to invest in renewable power, microgrids and electric vehicle charging, among other things. The plan would also allow AEP to recover costs associated with coal generation. AEP is asking for $52 million to build eight to 10 microgrids in Columbus, Ohio, to support such critical facilities as hospitals, shelters, water plants and more.[74] End users currently own the vast majority of microgrids in the United States, but new ownership models are emerging, including a mixed category where ownership is split between two parties, usually the site or property owner and a utility or third party.[75] A decision from regulators is expected in April 2017.

AEP has also been involved in a controversial effort in Ohio to re-regulate baseload generation plants, a process that has far-reaching implications. This was discussed in detail on page 44.

Conclusions

This section builds on the general transformation strategies described in detail on pages 12-14.

1 **Acknowledge climate change and its exigencies**

Among the companies in this study, AEP provides by far the most substantive acknowledgement of climate change risks and its approach to addressing these. AEP has made substantially more progress toward articulating the rudiments of a climate change transition plan. The company favors utility-scale solar over distributed generation, but offers a reasonable basis for this position. Its reasoning, however, is largely based on regulatory factors, which it could work to change.

2 **Commit to IEA carbon emissions intensity targets: 6.49 oz/kWh by 2035, 1.41 oz/kWh by 2050**

AEP does not disclose its emissions intensity. The company discloses its absolute emissions, which have declined over time, but has no absolute emissions targets. Emissions intensity disclosure and targets are essential for peer comparison of progress, as well as to meet global targets designed to avert the most harmful effects of climate change.

3 **Work transparently to reform obstructive regulation**

AEP is opaque in its attempts to influence the shape of the regulatory structure under which it operates. As described in this profile, as well as the previous report on which this one builds, AEP appears to have lobbied to protect coal and fossil fuels and discourage clean and renewable energy expansion. In the wake of a recent regulatory defeat, the company adjusted its strategy, shutting down or selling high-cost generating assets and pushing for re-regulation of its markets. The latter is a new key battleground, in that it could have a stifling effect on renewables uptake, depending on its ultimate outcome.

4 **Collaborate with stakeholders**

AEP does not have a notable history of positive collaboration models at the level considered in this report. A well developed and transparent stakeholder engagement strategy could help to improve its relations with other influencers of energy policies in its regulatory environment, as well as the productiveness of its engagements.

5 **Align incentives with transition goals**

While AEP says it has incentives in place associated with climate change goals, these are too thin to have any relevance, as they take the form of general job performance metrics that are substantially compliance-based, and of employee prizes for a host of eligible initiatives, many of which have nothing to do with climate change. If the company were to develop a transition strategy, it could then adjust its executive remuneration approach to include factors aligned with that strategy, such as progress towards emissions intensity goals.

Resources

- **AEP 2015 Form 10-K**
  https://www.sec.gov/Archives/edgar/data/4904/000000490416000056/ye15aep10k.htm

- **AEP 2016 Proxy Statement**
  https://www.sec.gov/Archives/edgar/data/4904/000119312516505923/d66642ddef14a.htm

- **AEP 2016 Corporate Accountability Report**
  http://aepsustainability.com/about/report/docs/Chairman-message-booklet_2016.pdf

- **AEP 2016 CDP Response**
  http://aepsustainability.com/

Footnotes

[1] Distributed generation refers to power generation at the point of consumption. Generating power on-site, rather than centrally, eliminates the cost, complexity, interdependencies and inefficiencies associated with transmission and distribution.

[2] Grid parity occurs when new energy sources can generate power at a cost less than or equal to the price of purchasing power from the existing electricity grid.

[3] Distributed generation refers to power generation at the point of consumption. It usually involves renewable energy sources, particularly solar, and is thus intimately connected to the topic of renewable energy uptake.

[4] Pérez-Arriaga, Ignacio and Christopher Knittel. "Utility of the Future." *MIT Energy Initiative*. December 2016. Retrieved from http://energy.mit.edu/wp-content/uploads/2016/12/Utility-of-the-Future-Full-Report.pdf.

[5] Randall, Tom. "World Energy Hits a Turning Point: Solar that's Cheaper than Wind." *BloombergTechnology*. December 15, 2016. Retrieved from https://www.bloomberg.com/news/articles/2016-12-15/world-energy-hits-a-turning-point-solar-that-s-cheaper-than-wind. The article notes:

> The overall shift to clean energy can be more expensive in wealthier nations, where electricity demand is flat or falling and new solar must compete with existing billion-dollar coal and gas plants... [T]he buildup of wind and solar takes time, and fossil fuels remain the cheapest option for when the wind doesn't blow and the sun doesn't shine. Coal and natural gas will continue to play a key role in the alleviation of energy poverty for millions of people in the years to come.

[6] Shankleman, Jessica and Chris Martin. "Solar Could Beat Coal to Become the Cheapest Power on Earth." *Bloomberg*. January 2, 2017. Retrieved from https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar.

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[8] PwC. *A different energy future: Where energy transformation is leading us*. 2015. Retrieved from http://www.pwc.com/gx/en/industries/energy-utilities-mining/power-utilities/global-power-and-utilities-survey.html.html.

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[11] Mooney, Chris and Brady Dennis. "On climate change, Scott Pruitt causes an uproar — and contradicts the EPA's own website." *The Washington Post*. March 9, 2017. Retrieved from https://www.washingtonpost.com/news/energy-environment/wp/2017/03/09/on-climate-change-scott-pruitt-contradicts-the-epas-own-website/?utm_term=.77aca54e3ca6.

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[14] Mooney, Chris. "America's first 'clean coal' plant is now operational—and another is on the way." *The Washington Post*. January 10, 2017. Retrieved from https://www.washingtonpost.com/news/energy-environment/wp/2017/01/10/americas-first-clean-coal-plant-is-now-operational-and-another-is-on-the-way/?utm_term=.69e60b52fbf4.

[15] Harrabin, Roger. "Indian firm makes carbon capture breakthrough." *The Guardian*. January 4, 2017. Retrieved from https://www.theguardian.com/environment/2017/jan/03/indian-firm-carbon-capture-breakthrough-carbonclean.

[16] Available at http://carboncleansolutions.com//pdf_upload/first_fully_commercial_ccsu_plant_launches_capturing_co2_at_$30_per_tonne.pdf. (link opens a PDF file)

[17] Task Force on Climate-related Financial Disclosures. *Recommendations of the Task Force on Climate-related Financial Disclosures*. December 14, 2016. Retrieved from https://www.fsb-tcfd.org/publications/recommendations-report/.

[18] International Energy Agency. "Energy, Climate Change and Environment 2016 Insights." 2016. Retrieved from https://www.iea.org/publications/freepublications/publication/ECCE2016.pdf.

[19] On March 1, 2017, Si2 published a report, "How Leading U.S. Corporations Govern and Spend on State Lobbying." While considerable information is available about federal political spending, including lobbying, data are not available for all the states. Even where disclosure requirements do exist, they are mixed in their comprehensiveness and utility. Disclosure requirements are missing entirely in 22 states. The report, supported by the IRRC Institute, explores what is known now, under current reporting rules, so that investors and the public can contemplate whether reforms are needed and if a more precise voluntary corporate lobbying disclosure code makes sense. None of the domicile states of the utilities evaluated here feature sufficient lobbying or political spending disclosure to have been included in Si2's report on the subject.

[20] For an excellent piece detailing various states' successes and failures at regulatory reform, readers are invited to consult: Trabish, Herman. "Reporter's notebook: How conflict and collaboration shape utility policy in the age of renewables." *Utility Dive*. September 15, 2016. Retrieved from http://www.utilitydive.com/news/reporters-notebook-how-conflict-and-collaboration-shape-utility-policy-in/426332/.

[21] Murphy, Sara et al. "The Top 25 U.S. Electric Utilities: Climate Change, Corporate Governance and Politics." *Sustainable Investments Institute for the Investor Responsibility Research Center Institute*. April 2016. Retrieved from http://irrcinstitute.org/reports/the-top-25-u-s-electric-utilities-climate-change-corporate-governance-and-politics/.

[22] Bade, Gavin. "Inside Duke Energy's renewables strategy." June 22, 2015. *Utility Dive*. Retrieved from http://www.utilitydive.com/news/inside-duke-energys-renewables-strategy/401084/

[23] Retrieved from http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=0707e812-b29f-4d0e-8974-d215cb3a6e87.

[24] Nameplate capacity is the maximum rated output of a generator, prime mover or other electric power production equipment under specific conditions designated by the manufacturer.

[25] Duke Energy is the only company in this study that Influence Map has included in its research universe, which comprises the top 100 of the 2014 Forbes Global 2000 list of the world's biggest publicly traded companies.

[26] Retrieved from http://www.floridasupremecourt.org/decisions/2016/sc15-2150.pdf.

[27] Kasper, Matt. "Florida Power Companies Continue to Spend Money Supporting Amendment 1 to Limit Solar." Energy and Policy Institute. October 31, 2016. Retrieved from http://www.energyandpolicy.org/florida-amendment-1/. The *Energy and Policy Institute* describes itself as a "watchdog exposing the attacks on renewable energy and countering misinformation by fossil fuel interests."

[28] Klas, Mary Ellen. "Florida voters say no to misleading solar amendment." *Miami Herald*. November 8, 2016. Retrieved from http://www.miamiherald.com/news/politics-government/election/article113449438.html.

[29] Welsh, Heidi and Robin Young. "How Leading U.S. Corporations Govern and Spend on State Lobbying." *Prepared by the Sustainable Investments Institute for The Investor Responsibility Research Center Institute*. March 1, 2017. Retrieved from https://irrcinstitute.org/wp-content/uploads/2017/02/Corporate-Lobbying-in-the-States-FINAL.pdf.

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[33] Downey, John. "Duke Energy is selling a new plan for N.C. solar, but will anyone buy?" *Charlotte Business Journal*. November 15, 2016. Retrieved from http://www.bizjournals.com/charlotte/news/2016/11/15/duke-energy-is-selling-a-new-plan-for-n-c-solar.html.

[34] A renewable portfolio standard (RPS) is a regulatory mandate to increase production of energy from renewable sources such as wind, solar, biomass and other alternatives to fossil and nuclear electric generation.

[35] Combined heat and power (CHP) systems, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated system. CHP is not a technology, but an approach to applying technologies. Heat that is normally wasted in conventional power generation is recovered as useful energy, which prevents the losses that would otherwise be incurred from separate generation of heat and power. While the conventional method of producing usable heat and power separately has a typical combined efficiency of 45 percent, CHP systems can operate at levels as high as 80 percent. CHP typically still relies on fossil fuels.

[36] Kowalski, Kathiann. "Advocates hope Ohio energy committee will broaden focus." *Midwest Energy News*. April 14, 2015. Retrieved from http://midwestenergynews.com/2015/04/14/advocates-hope-ohio-energy-committee-will-broaden-focus/.

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[38] Knox, Tom. "Kasich: Ohio's renewable energy freeze is 'unacceptable.'" *Columbus Business First*. September 30, 2015. Retrieved from http://www.bizjournals.com/columbus/blog/ohio-energy-inc/2015/09/kasich-ohios-renewable-energy-freeze-is.html.

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[42] Trabish, Hamish. "Defying the usual headlines: How utility-solar collaborations are helping solar grow." *Utility Dive*. October 15, 2015. Retrieved from http://www.utilitydive.com/news/defying-the-usual-headlines-how-utility-solar-collaborations-are-helping-s/407097/.

[43] Available at http://www.southerncompany.com/what-doing/corporate-responsibility/home.cshtml.

[44] Available at https://www.southerncompany.com/corporate-responsibility/environmental-responsibility.html.

[45] Available at http://s2.q4cdn.com/471677839/files/SO_Analyst_Day-10-27-16-FINAL-FOR-SCREEN-and-ONLINE.pdf.

[46] Available at http://investor.southerncompany.com/information-for-investors/corporate-governance/political-contributions/default.aspx.

[47] Political action committee contributions come from executives' and employees' contributions, not the company treasury, although in practice, decisions about how this money is deployed in the political arena are made by many of the same company officials who also decide how corporate funds are spent.

[48] Enhanced oil recovery is the implementation of various techniques for increasing the amount of crude oil that can be extracted from an oil field. It typically involves the injection of carbon dioxide into already developed oil fields. As such, it is among the underground injection techniques that have been connected to induced seismicity in recent years.

[49] Urbina, Ian. "Piles of Dirty Secrets Behind a Model 'Clean Coal' Project." *The New York Times*. July 5, 2016. Retrieved from http://www.nytimes.com/2016/07/05/science/kemper-coal-mississippi.html?emc=eta1&_r=0.

[50] Available at https://www.sec.gov/Archives/edgar/data/66904/000009212216000219/msmonthlyreport8-k11x16.htm.

[51] Transcript retrieved from http://seekingalpha.com/article/4048610-southern-q4-2016-results-earnings-call-transcript?part=single.

[52] Alexander, Anthony J. *Remarks to CEO Leadership Series, Institute for 21st Century Energy, U.S. Chamber of Commerce*. April 8, 2014. Retrieved from https://www.firstenergycorp.com/content/fecorp/newsroom/featured_stories/AJA-Chamber-Speech.html.

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[54] "ESP IV PPA" refers to FirstEnergy's fourth Electric Security Plan, called "Powering Ohio's Progress." PPA stands for power purchase agreement, a contract between an electricity generator and purchaser of electricity.

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[56] See http://www.scotusblog.com/case-files/cases/federal-energy-regulatory-commission-v-electric-power-supply-association/ for a description of the case and discussion.

[57] Funk, John. "PUCO rejects deal to have ratepayers subsidize a coal-fired power plant." *Cleveland Plain Dealer*. February 25, 2015. Retrieved from http://www.cleveland.com/business/index.ssf/2015/02/puco_rejects_deal_to_have_rate.html.

[58] Available at http://www.prnewswire.com/news-releases/firstenergy-ohio-utilities-receive-disappointing-puco-decision-300343831.html.

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[61] Available at https://www.sec.gov/Archives/edgar/data/1031296/000103129616000125/a8-kdated12062016.htm.

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[63] Gifford, Raymond L. and Matthew S. Larson. "State Actions in Organized Markets: States Strive to 'Fix' Markets and Retain Base Load Generation." *Wilkinson, Barker, Knauer LLP*. Retrieved from http://e67ti2w9ws71al8xmnhsozd3.wpengine.netdna-cdn.com/wp-content/uploads/sites/64/2016/09/BaseloadWilkersonEtcPaper0916.pdf.

[64] Retrieved from http://www.ieee-pes.org/images/files/pdf/pesgm2011/supersessions/mon/Asgeirsson-DTE.pdf.

[65] Available at https://newlook.dteenergy.com/wps/wcm/connect/893469e7-766c-4efe-92f8-06530a97ebfc/2015-16_DTE_Energy_Transformation.pdf?MOD=AJPERES.

[66] Available at http://newsroom.dteenergy.com/index.php?s=26817&item=137044#sthash.vFZY0yzN.YXZKpjet.dpbs.

[67] Oosting, Jonathan. "Energy talks go all night in House, but no vote yet." *The Detroit News*. December 15, 2016. Retrieved from http://www.detroitnews.com/story/news/politics/2016/12/15/michigan-energy-deal/95460498/.

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[69] Available at https://www.aepsustainability.com/about/carbon.aspx. Readers are encouraged to consult the full text, as it provides valuable insight not only into AEP, but the industry as a whole.

[70] Universal solar is the standardized design and deployment of large-scale photovoltaic systems, in contrast to distributed generation.

[71] Available at https://www.aepsustainability.com/business/sustainability/distributed.aspx.

[72] Kowalski, Kathiann. "Ohio utility seeks to double its fixed distribution charges." *Midwest Energy News*. August 26, 2016. Retrieved from http://midwestenergynews.com/2016/08/26/ohio-utility-seeks-to-double-its-fixed-distribution-charges/.

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