

POLITICAL ECONOMY

IN THE CAROLINAS

THE POLITICAL ECONOMY OF RESOURCE MISALLOCATION IN THE ENERGY SECTOR: A CASE STUDY OF SOUTH CAROLINA'S V. C. SUMMER NUCLEAR PROJECT

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At the dawn of the twenty-first century, federal- and state-government policy makers attempted to bring about a “nuclear renaissance” that would provide abundant, clean, carbon dioxide-free electricity for decades. Nonetheless, these policies—and in some cases the reversals of these policies—brought incentives that combined with inadequate and asymmetric information in the private sector and changes in relative prices in energy markets to misallocate over \$9 billion of resources in South Carolina, when two of the state’s largest electric utilities, South Carolina Electric & Gas and Santee Cooper, halted construction of two nuclear reactors at the V. C. Summer nuclear site, nearly a decade after their initial application to the Nuclear Regulatory Commission. This case study provides insight into the scale of resource misallocation that can occur when government influences private sector decisions and may be of interest to policy makers, business leaders, investors, consumers, and the general public.

KEYWORDS:

regulation, electric utilities, energy policy, asymmetric information

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I. INTRODUCTION

On July 31, 2017, South Carolina utility giants South Carolina Electric and Gas (SCE&G) and Santee Cooper terminated construction of two nuclear reactors at the V. C. Summer nuclear plant northwest of Columbia, South Carolina. The decision came nearly a decade after the utilities submitted their original application to the Nuclear Regulatory Commission (NRC) for licenses to build the reactors, adding to the one reactor in operation there since 1983. It came over four years after construction began. It came after spending over \$9 billion on the project, a figure greater than 4 percent of the state's total output in 2017. Perhaps most striking, the decision came only fourteen months after SCANA (the holding company for SCE&G)¹ CEO Kevin Marsh declared in a company press release that completion of the project was “imperative to bring clean, safe, and reliable electricity to meet the long-term energy needs of South Carolina” (SCANA 2016).

How did these companies embark on the path of additional nuclear power and then decide to stop midstream, resulting in what one state representative called “the largest economic failure in state history”? (Benson 2018)? Once the companies had already invested billions of dollars and many years on this project, what led them to halt construction and give up on their aspirations for additional nuclear power? As with any decision of this magnitude, the factors of influence were many and complex. The invisible hand of the market was at play, but so too was the visible hand of government.

Many supporters of nuclear power, in and outside of government, believed the twenty-first century would usher in a “nuclear renaissance.” To achieve that end, government at both the federal

and state levels enacted legislation to subsidize nuclear power and shift investment risk from stock- and bondholders to consumers. Regulations to reduce carbon dioxide emissions played a central role as well. All the while, unexpected cost overruns and construction delays, combined with changes in relative energy prices, worked to undermine the economic viability of this project. In the end, government policies favorable to the nuclear industry, policies that had seemed so certain even a few years earlier, became increasingly uncertain. As SCE&G put it in its July 31, 2017, press release, “It would not be in the best interest of its customers and other stakeholders to continue construction of the project” (SCANA 2017c).

In this paper, I tell the story of the nuclear renaissance that many expected and that, in the end, was not to be. Central to the story are the decisions SCE&G and Santee Cooper made in response to the political incentives and constraints they faced. Certainly, changes in energy markets and information asymmetries played major and consequential roles in this economic debacle. Nonetheless, I build the case that powerful governmental legislation and regulation played the decisive role in this colossal economic failure in the Palmetto State. The South Carolina nuclear story is important in its own right, but its implications extend far beyond a single state or project. Government policies of all stripes and in all places can result in major resource misallocations that have far-reaching economic effects.

In the second section of this paper, I highlight briefly how government policies can lead to resource misallocation. I then turn in section III to the history, organization, and market position of SCE&G and Santee Cooper. The acclaimed nuclear renaissance and the federal- and state-

1. South Carolina Electric & Gas is investor-owned and the primary subsidiary of the holding company SCANA. “SCANA” is not an acronym but is taken from the letters in “South Carolina.” Santee Cooper is state owned and legally known as the South Carolina Public Service Authority.

government policies intended to bring it about comprise section IV. In the fifth section, I examine how SCE&G and Santee Cooper responded to the policies they faced from the federal and state governments that incentivized the choice to build the reactors. In the sixth section, I trace the information problems, changing energy markets, and policy reversals that doomed the V. C. Summer reactors. The seventh section examines the aftermath of the decision for the utilities' customers and investors and draws inferences on what the future may hold for the financially distressed utilities. The eighth section draws implications from South Carolina's nuclear experience that may be of interest to policy makers at the federal and state levels, managers in the electric-utility industry, and concerned consumers, investors, and citizens.

II. POLITICAL DECISION-MAKING AND RESOURCE ALLOCATION

Writing in 1776, Scottish economist Adam Smith, in his passage on the “invisible hand,” advanced the idea that private decision-makers put their resources to their most highly valued and profitable uses, and that in doing so, they promote not only their interests but also the welfare of society at large. In this same passage, Smith also warns against the dangers of politicians who would have the “folly and presumption” to direct resources to uses they deem most appropriate (Smith [1776] 1976).

A long tradition in the economics discipline has taken issue with Smith, arguing that market failure is commonplace and warrants government intervention to correct. Economists in other traditions, particularly those who identify with public choice, have countered that market failures are neither frequent nor severe and that the purported benefits of government intervention must be balanced against the hazards of government failure.

The likelihood of government failure follows directly from the numerous and inherent flaws that plague political decision-making. To begin, government policy makers are not all-knowing, benevolent, objective social planners. Their knowledge about the resources they direct, and the potential consequences of this direction,

is limited. Further, affected industries and other interest groups seek to use the political sector to channel resources in directions that benefit them. Campaign contributions and lobbying expenditures are at the heart of a practice commonly known to political economists as rent-seeking. Interest groups may be especially effective if they can cloak their private gains with a public interest argument (Yandle 1983). All the while, citizens and taxpayers are often rationally ignorant of the decisions being made in their national and state capitals and the effects these decisions will have on them.

Short time horizons compound these problems. Politicians can downplay the possible long-run consequences of their decisions when their primary concern is re-election in the next electoral cycle. Further, legislators and regulators are involved in making decisions that affect others and that may have little or no impact on themselves. At other times, their decisions allow some actors in the private sector to shift the risk of their actions onto others. Either way, severing the risk of a decision from the responsibility for it brings moral hazard—a recipe for adverse consequences and outcomes.

In the South Carolina V. C. Summer nuclear debacle, this flawed government decision-making process had a powerful influence on the subsequent decisions SCE&G and Santee Cooper made, and the consequences for the Palmetto State were severe. Market forces and information asymmetries in the private sector mattered too, but government failure instigated and sustained the entire matter.

III. SCE&G AND SANTEE COOPER: A BRIEF OVERVIEW

Before examining the nuclear renaissance and the policies that promoted it, I provide a brief overview of the history, organization, and market position of South Carolina utilities SCE&G and Santee Cooper.

A. HISTORY

SCE&G is a regulated, investor-owned public utility and principal subsidiary of SCANA, a holding company formed in 1984 for electric and

gas utilities operating in the Carolinas and Georgia. The history of state-owned Santee Cooper dates to the election of Franklin D. Roosevelt, a president who pursued vast expansion of federal power, including government-owned utilities.² In 1934, the South Carolina governor signed legislation to create the state-chartered South Carolina Public Service Authority (SCPSA), and in 1935, Roosevelt approved the project and Works Progress Administration funds for it. Of particular note, in 1973 the state Supreme Court changed the SCPSA Act to allow the utility to enter contracts and co-own production plants with private utilities, permitting Santee Cooper to take one-third ownership in SCE&G's V. C. Summer Nuclear Plant, Reactor One (Edgar 1984).

B. ORGANIZATION

The primary difference between these utilities is ownership, investor versus state. Whereas SCE&G is obligated to its stockholders, Santee Cooper emphasizes its customer focus. To raise rates, SCE&G must appeal to the South Carolina Public Service Commission (SCPSC). Santee Cooper, on the other hand, has a twelve-member, governor-appointed, senate-approved board of directors with sole authority over rate increases (Santee Cooper n.d.b). South Carolina uses Santee Cooper, a state-owned enterprise, for economic development, a goal clearly specified in its mission statement (Santee Cooper 2016, p. 4).

Economists have long recognized that regulated utilities have an incentive to overinvest in capital if the regulated rate of return exceeds the marginal cost of capital (Averch and Johnson 1962). This overinvestment may take many forms, such as capital-intensive pollution-abatement techniques,

unnneeded generating capacity, or excessive upgrades for safety and reliability (Douglas, Garrett, and Rhine 2009). The capital intensity of nuclear reactors presents electric utilities with yet another option to increase capital and the return earned from it.

Of particular importance to this study, Shleifer and Vishny (1994) point out that when it comes to government regulation, the difference between private and state firms may not be as great as some assume. They write that “there is no magic line that separates firms from politicians” (p. 998) and that the “fact that a firm is private does not mean that it is free from political influence” (p. 1002).

C. MARKET POSITION

SCE&G and Santee Cooper are major players in the South Carolina utility landscape. As shown in table 1, these utilities rank in the top three in the state in terms of share of customers, sales, and revenues.

The decisions of these utilities regarding production and rates affect the majority of South Carolinians. As major providers, both utilities believed it was in their best interest to meet future electricity demand through the V. C. Summer additions.

IV. THE NUCLEAR RENAISSANCE THAT WAS TO BE

The twenty-first century heralded a revival in the long-moribund US nuclear industry.³ Government policy makers saw nuclear power as an important means to meet future electricity demand from a carbon dioxide-free source.

2. For a full discussion of the history of Santee Cooper, see Edgar (1984) and Strong (2017).

3. The Three Mile Island accident in 1979, combined with high construction and regulatory-compliance costs and public concerns about safety, brought construction of new nuclear plants to a virtual standstill with no new construction started since 1977. Today, the United States has ninety-nine reactors producing about 20 percent of the country's electricity. The reactors are old, most built from 1967 to 1990 (World Nuclear Association 2018). The Tennessee Valley Authority completed the country's last reactor in 1996, but it had been ordered a full twenty-six years earlier (Parker and Holt 2007).

Table 1. South Carolina's Major Electricity Providers, 2016

COMPANY	OWNERSHIP	CUSTOMERS	SALES (MWhs)	REVENUES (\$000s)	CUSTOMER SHARE	SALES SHARE	REVENUE SHARE
SANTEE COOPER	State-owned	950,508	24,622,370	2,527,902	36.9	31.0	32.6
DUKE	Investor-owned	740,385	28,014,190	2,241,671	28.8	35.3	28.9
SCE&G	Investor-owned	705,025	22,524,213	2,531,516	27.4	28.4	32.6

Note: Figures are for residential, commercial, industrial, and transportation users. Santee Cooper totals include 20 electric cooperatives. Duke totals include Duke Energy Carolina, LLC and Duke Energy Progress.

Source: Energy Information Administration at https://eia.gov/electricity/sales_revenue_price/ (table 10).

The nuclear renaissance appeared to be coming to fruition in the first decade of the twenty-first century, when electric utilities announced applications with the NRC for twenty-eight Combined Construction and Operation Licenses (COLs) from 2007 to 2009 (Holt 2014).

Realization of the nuclear renaissance would require heavy government intervention. Studies by the Congressional Research Service (Parker and Holt 2007) and the Congressional Budget Office (CBO) (2008) show unequivocally that nuclear power is not competitive financially with advanced or even conventional coal- and natural gas-fired plants. Private utilities, if uninfluenced by government policy, would not choose to build nuclear reactors.

Nonetheless, the federal and state governments stood ready to provide legislative and regulatory incentives that altered private decision-making. The above-cited studies show with equal clarity that with sufficient subsidies to nuclear power, or with sufficiently high taxes on carbon dioxide emissions, nuclear power could be competitive with coal and natural gas. The federal and state governments provided these incentives through the federal government's Energy Policy Act of 2005 and Clean Power Plan of 2015 and South Carolina's Base Load Review Act of 2007.

A. THE ENERGY POLICY ACT OF 2005

The Energy Policy Act of 2005 was the single-most-important piece of legislation that launched the nuclear renaissance, and an understanding of its political background and basic provisions is essential to understand how SCE&G and Santee Cooper chose the nuclear path.

1. POLITICAL BACKGROUND

Passed by strong majorities in the House

and Senate,⁴ the Energy Policy Act of 2005 purported to secure the country's energy future while protecting the environment and promoting economic growth. President George W. Bush praised the act as "an energy strategy for the 21st century," and went on to proclaim the vital role nuclear power would play in the new national energy strategy, given its capacity to "generate massive amounts of electricity without emitting an ounce of air pollution or greenhouse gases." He added that nuclear plants are "safer than ever" and that America would "start building nuclear power plants again by the end of this decade" (Bush 2008).

Beneath this veneer of public interest, the act provided taxpayer-funded incentives for renewable energy, fossil fuels, and nuclear power (Ballotpedia; Energy Policy Act of 2005; Nuclear Energy Institute 2016; Grunwald and Eilperin 2005). Criticism arose from across the political spectrum. From the right, Myron Ebell of the Competitive Enterprise Institute said that the act provided some "pork" for every sector of the energy industry (Grunwald and Eilperin 2005). From the left, California House representative Nancy Pelosi complained that the act "catered to corporate special interests at the expense of the public" (Ballotpedia n.d.). As documented by Pick (2008), the major players in the energy industry spend millions of dollars on campaign contributions and lobbying expenditures every year in an effort to gain political benefits. Of these major players, the Washington Post considered the nuclear industry the "biggest winner" from the 2005 Energy Policy Act, and an analysis of the benefits the act provides to the industry supports this conclusion (Grunwald and Eilperin 2005).

4. The final bill passed the House by a 275–156 margin and the Senate by 74–26 margin.

2. PROVISIONS FOR THE NUCLEAR INDUSTRY

Tax credits are a key incentive in the 2005 Energy Policy Act. At 1.8 cents per kilowatt-hour (kWh) for eight years for new, advanced reactors, the magnitude of the subsidy is striking. Parker and Holt (2007) estimate annualized costs for an advanced nuclear plant at 5.6 cents per kWh, and the CBO (2008) reports an average wholesale price of nuclear power at 5.0 cents per kWh. Utilities face two constraints to qualify for these credits. First, the act sets a 6,000 megawatt (MW) global cap.⁵ Second, the reactors have to produce electricity by December 31, 2020.⁶ One question is how the tax credits would benefit nonprofit municipal and state-owned utilities. Bills introduced in 2017 would allow nonprofit utilities to transfer the credit to their for-profit partners and extend the deadline for project completion beyond December 31, 2020 (World Nuclear Association 2018). As of this writing, these bills have not passed either chamber.⁷

Federal loan guarantees provided another subsidy to nuclear power plants deemed “critically important” by the Nuclear Energy Institute.⁸ As Parker and Holt (2007) explain, “Wall Street continues to view new commercial reactors as financially risky [so] the availability of federal loan guarantees could be a key element in attracting funding for such projects and reducing financing costs” (p. 12). In effect, private investors will not finance nuclear reactors unless financing risk

is shifted from them to taxpayers, who become contingently liable. The guarantees apply up to 80 percent of construction costs, with the Department of Energy (DOE) liable if the borrower cannot repay the loan. Lacking budgetary appropriations to fund defaulted loans, borrowers are charged an “estimated subsidy cost” to fund potential defaults (Parker and Holt 2007; World Nuclear Association 2017).⁹

B. THE CLEAN POWER PLAN OF 2015

A decade later, the Clean Power Plan (CPP) formed the centerpiece of the Obama administration’s climate and regulatory policy for electric utilities. An examination of the politics behind and provisions of the CPP provides useful insight into another important factor that drove utilities to pursue nuclear power.

1. POLITICAL BACKGROUND

If President Bush was reluctant to use federal policy to reduce carbon dioxide emissions, then-candidate and soon-to-be president Obama was not. In a January 2008 interview with the San Francisco Chronicle, Obama stated clearly that “if somebody wants to build a coal-fired plant, they can. It’s just that it will bankrupt them because they’re going to be charged a huge sum for all the greenhouse gas that’s being emitted” (Trinko 2012). Once in office, President Obama followed through with the Environmental Protection Agency’s (EPA) CPP.¹⁰ Announced with great

5. If total applications exceeded the 6,000 MW cap, the tax credits would be allocated proportionately.

6. Given the long lead times in nuclear construction, utilities also had to apply for a COL by the end of 2008 and begin construction by 2014.

7. A proposal to extend the production tax-credit deadline was included in the House version of the 2017 Tax Cuts and Jobs Act, but this proposal was not included in the final version of the bill. See Hallerman (2017).

8. Loan guarantees were available for all emissions-reducing energy sources.

9. In addition, the act provides cash payments to utilities that encounter regulatory delays caused by the NRC (Parker and Holt 2007).

10. Whereas Obama originally planned a cap-and-trade system to reduce carbon dioxide emissions, when it became clear that plan would never pass the Senate, Obama turned to the EPA and regulation. See Martinson (2012) for details. In June 2014, the Supreme Court ruled in its *Utility Air Regulatory Group v. EPA* decision that the EPA could regulate greenhouse gas emissions from stationary sources, when it already regulated other emissions from the same sources. This ruling followed the Supreme Court’s 2007 decision in *Massachusetts v. EPA* that the EPA had authority under the Clean Air Act to regulate greenhouse gas emissions from vehicles. The Obama EPA extended the regulation of greenhouse gases to stationary sources that were required to obtain permits for construction and operation. See Barnes (2014) for details.

fanfare, the Obama White House celebrated the “first-ever national standards to limit carbon pollution from power plants” that are “the largest source of carbon emissions in the United States” (White House 2015).

Of course, an anti-coal and anti-carbon dioxide stance does not necessarily translate into a pro-nuclear stance. But, by Obama’s second term, his administration saw nuclear power as a viable option in an overall strategy to reduce carbon dioxide emissions. In 2012, then assistant secretary for nuclear energy Peter Lyons expressed concern over the retirement of aging nuclear plants and the effect their shutdown would have on carbon dioxide emissions (Kraner 2014). In a similar tone, then DOE secretary Steven Chu, in remarks at Georgia’s Vogtle nuclear site, said that “nuclear energy is a critical part of President Obama’s ‘all of the above’ energy strategy” and “a vital part of our energy mix” (Chu 2012).

The implications for nuclear power were clear. Although nuclear power supplies only a fifth of the country’s total electricity, it accounts for 63 percent of carbon dioxide-free electricity, and the retirement of aging nuclear reactors could diminish this total (World Nuclear Association 2018). If the Obama administration was serious about reducing carbon dioxide emissions, nuclear power would have an important role to play. After decades of assertions that adding to the nation’s nuclear capacity was off the table, the future of nuclear power once again looked bright.

Nevertheless, as US energy policy became increasingly partisan, the bright future for nuclear power dimmed. The stakes were high, especially for the coal industry (Adelman and Spence 2017). Led by senators from coal-producing states, the Senate

passed a resolution to stop the CPP, and the House followed suit (Davenport 2015). Environmentalists, on the other hand, strongly supported the CPP. As shown in the following sections, the future of the CPP remains unclear, but it has set expectations for carbon dioxide emissions in the electric-utility industry and has already influenced the decisions utilities have made about fuel choice.

C. PROVISIONS FOR CARBON DIOXIDE-EMISSIONS REDUCTIONS

The final rules, announced in August 2015, were ambitious as they aimed to “reduce carbon emissions by 32 percent from 2005 levels by 2030.” The announcement listed numerous benefits for public health and employment and even promised Americans lower energy bills (White House 2015).¹¹

Each state would have an EPA-determined carbon dioxide-reduction goal and be responsible for a plan to reach that goal.¹² Final carbon dioxide-reduction targets varied across states, with the largest percentage reduction required of South Dakota at 48 percent and the smallest percentage reduction required of Connecticut at 7 percent.¹³ Although Adelman and Spence (2017) caution that the magnitude of emissions reductions does not necessarily correlate with the costs of compliance, and that the EPA attempted to equalize costs across states and regions, the costs of compliance (as well as benefits of emissions reductions) did differ across states and regions.

D. BASE LOAD REVIEW ACT OF 2007

The federal government was not alone in providing incentives for the construction of nuclear reactors. In 2007, the South Carolina General Assembly passed the Base Load Review Act (BLRA), which enabled utilities to charge current

11. Of note, the announcement of lower energy bills contrasts with the promise of higher electric rates in the San Francisco Chronicle interview.

12. For a list of states and their carbon dioxide-reduction targets, see Ramseur and McCarthy (2016).

13. Alaska, Hawaii, and Vermont are exempt either because they are too isolated or because they have no fossil fuel plants that qualify.

customers for the construction of the nuclear reactors. After the decision to halt construction, one state senator called this act “the initial catalyst for this debacle” (Wilks 2017a). As with the Energy Policy Act and the CPP, a closer look at the BLRA sheds light on the South Carolina utilities’ decision to pursue nuclear power.

1. POLITICAL BACKGROUND

SCANA has considerable influence in the South Carolina General Assembly. It has been a heavy contributor to state (and federal) campaigns (Bailey 2017). At the state level, SCANA “typically gave individual legislators \$500 to \$1,000” and spends about “\$200,000 a year to lobby the General Assembly, with a crew of eight lobbyists to monitor legislation and advance its message.” These contributions and lobbyists provide access to and build relationships with legislators. SCANA acknowledges that “geography and policy focus,” along with leadership roles, determine funding (Moore 2017b).

SCANA marketed the BLRA as a way to reduce customers’ overall costs since advance payment would reduce financing costs by billions of dollars (Wilks 2017a; Wilks and Cope 2017). The combination of statehouse influence and a purported public interest clearly worked. The BLRA passed the state House by a 104–6 vote, and twenty-five of forty-six senators sponsored the legislation (Scoppe 2017). Governor Mark Sanford had reservations about the costs the bill would impose on consumers and wanted to veto it, but facing veto-proof majorities in both houses, he allowed the bill to become law without his signature (Wilks and Cope 2017).

Rational ignorance abounded. Lawmakers believed in South Carolina’s past success with nuclear power and saw South Carolina as a leader in the incipient nuclear renaissance. Further, their focus was on other matters, such as Transportation

Department reform (Wilks and Cope 2017). South Carolina Small Business Chamber of Commerce president Frank Knapp commented poignantly that “the bill was novel, complex and written in a language mostly understood by the energy industry” (Knapp 2016). Even environmentalists were blindsided; the 2007 chair of the South Carolina Sierra Club admitted he was completely unaware of the bill until after its passage. As for the public, readers of the State newspaper were greeted with headlines about the Virginia Tech shooter and a Supreme Court ruling on abortion on the day after the bill’s passage (Wilks and Cope 2017).

2. PROVISIONS FOR SOUTH CAROLINA UTILITIES

As Enformable Nuclear News puts it, the BLRA “allows utilities to charge ratepayers for certain costs while the project is under construction, as opposed to the utilities using their own resources or loans to pay for construction costs and recovering fees from consumers only after the facility is producing power.” Opponents of the BLRA recognize that “it shifts the risk for the project onto consumers, who are forced to pay for a facility even if it never is put into operation” (Enformable Nuclear News 2015). In effect, the BLRA injected moral hazard into the project as SCE&G was able to charge captured consumers with SCPSC-approved rate increases for construction of the reactors. If the project was completed on time and on budget, customers and the utilities would benefit. If not, however, customers would face increasing charges, delayed production, and, in the worst case, paying for reactors that would never be finished—all with little to no recourse. For customers of a regulated monopoly, competition offers no way out, and political and legal recourse are fraught with uncertainty.¹⁴

V. SOUTH CAROLINA ELECTRIC & GAS, SANTEE COOPER, AND THE NUCLEAR RENAISSANCE

Against this backdrop of regulatory carrot and stick, SCE&G and Santee Cooper decided in 2008 to expand generating capacity by building two additional nuclear reactors at the V. C. Summer site in Jenkinsville, South Carolina, the site of their joint-owned single reactor that had come online in 1983. SCE&G was the majority partner with a 55 percent stake; Santee Cooper was the minority partner with a 45 percent interest. Despite differences between investor- and state-ownership, both utilities responded to federal subsidies for

value of the production tax credits was estimated at \$2.2 billion.¹⁵ They also applied for federal loan guarantees in 2009 and were on the accepted short list at the time they terminated the project (World Nuclear Association 2018).

B. RESPONSE TO THE CLEAN POWER PLAN OF 2015

The clear signal from the federal government was that electric utilities were to play a major role in the political objective to reduce carbon dioxide emissions. Under the CPP, the EPA specified four means for states to achieve their carbon dioxide–reduction targets: making existing coal plants more

Table 2. EPA-Mandated Carbon Dioxide–Reduction Goals for South Carolina

	2012 EMISSIONS (lbs./MWh)	2030 GOAL (lbs./MWh)	% REDUCTION
INITIAL	1,587	772	-51
FINAL	1,791	1,156	-35

Source: Ramseur and McCarthy (2016) at <https://fas.org/sgp/crs/misc/R44145.pdf>.

construction of the reactors and to political objectives to reduce carbon dioxide emissions. Of particular import, SCE&G also responded to the game-changing Base Load Review Act.

A. RESPONSE TO THE ENERGY POLICY ACT OF 2005

SCE&G and Santee Cooper took the requisite steps to qualify for federal production tax credits by applying for their COL by the end of 2008 and by beginning construction by 2014. The total

efficient, using existing natural gas plants more effectively, increasing end-use energy efficiency, and increasing renewable and nuclear sources (Natural Resources Defense Council 2014).

As shown in table 2, the initial standards for South Carolina were stringent, requiring a 51 percent reduction in carbon dioxide emissions.¹⁶ Both state officials and the utilities expressed serious concerns about these standards, highlighting not only the detrimental effects these standards would have on economic development but also

14. Bursery (2017) notes that customers were charged for Unit 1 of the V. C. Summer plant only after it began production.

15. This figure, cited in Wren (April 27, 2017) and elsewhere, is reached if the two reactors each generate 1,117,000 kWh of electricity earning \$0.018 per kWh for eight years and operate at 78 percent capacity.

16. Only Washington State and Arizona had larger reduction mandates at 72 percent and 52 percent, respectively.

the utilities' prior efforts to reduce carbon dioxide emissions (Wise 2014). According to the president and CEO of The Electric Cooperatives of South Carolina, the state's consumers could expect rate increases of 15 to 25 percent (Couick 2014).

Of particular concern to state and utility officials, the initial standards did not allow South Carolina to count reduced carbon dioxide emissions from the nuclear plants then under construction toward the carbon dioxide-reduction target (Santee Cooper. n.d.a). Facing pressure from states constructing nuclear power plants, the EPA changed this rule to allow carbon dioxide reductions from these plants in process, reducing the mandate to a more achievable 35 percent (Environment & Energy News 2016).

SCE&G and Santee Cooper had, of course, already embarked on the path of carbon dioxide reduction through nuclear power before the EPA handed down its mandates. Santee Cooper said plainly that its decision to join SCE&G to build the nuclear reactors was based on anticipated demand growth and "proposed legislation and regulations that were putting more emphasis on carbon restrictions." In addition, the utility cites candidate Obama's opposition to coal-fired plants. As early as 2007, Santee Cooper set a goal of increasing power generation from carbon dioxide-free sources, of which "nuclear power is the only reliable base load resource that is virtually emissions free" (Santee Cooper. n.d.c).

Along with expanding their nuclear capacity, the utilities were reducing their carbon dioxide emissions by shutting down coal-fired plants. Both utilities pointed explicitly to environmental pressures and their anticipated nuclear capacity as

reasons for shutting down the coal-fired facilities (Tomlinson 2009; Fretwell 2009; Wise 2012b; Wise 2012a; SCE&G Newsroom 2013; Wren 2017a).¹⁷

C. RESPONSE TO THE BASE LOAD REVIEW ACT OF 2007

SCE&G made aggressive use of the BLRA, raising rates nine times under its authority. According to the South Carolina Office of Regulatory Staff (SCORS), rate hikes based on the BLRA raised the monthly bill for the average residential consumer, using 1,000 kWh of electricity per month, about \$27, or just under 24 percent, and accounted for over 18 percent of the total bill. Cumulative rate increases reached nearly \$1.9 billion through 2017, and if continued, would reach over \$2.3 billion by the end of 2018 (Fretwell 2017c; Aiken 2017).

Santee Cooper raised rates five times; however, as a state-owned utility, it does not have to appeal to the SCPSC to raise rates. Its rate increases are approved by its board and neither subject to review nor directly traceable to construction of the V. C. Summer reactors. On its website, Santee Cooper reports rate increases of 4.3 percent for the nuclear project (see Santee Cooper. n.d.c).¹⁸

D. INCENTIVES AND DECISION-MAKING

Strong federal and state governmental support to bring about a nuclear renaissance incentivized SCE&G and Santee Cooper to pursue nuclear power. Tax credits and loan guarantees subsidized nuclear power, while ensuing regulations made coal a risky, perhaps prohibitive fuel source. The ability to charge consumers in advance of production shifted risk from holders of equity and debt to customers, creating an immense moral-hazard

17. Concern over emissions of sulfur dioxide, nitrogen oxide, and mercury also played a role in the decisions to close the coal-fired units. See Cary (2014) for details.

18. According to the Fitch Full Rating Report, December 5, 2017, the utility's retail base-rate adjustments (exclusive of changes in fuel costs or wholesale rates) were 3.4 percent in 2009, 3.5 percent in 2012 and 2013, 5.34 percent in 2016, and 2.09 percent in 2017. Rates did not increase in other years. Canceled rate increases for 2018 and 2019 were 3.7 percent for each year. The author notes the apparent discrepancy over the amount of the rate increase between Santee Cooper and Fitch.

problem. These combined factors led SCE&G and Santee Cooper to choose nuclear power, a decision that ultimately proved to lack viability—economically or politically—for themselves and their stakeholders.

VI. THE NUCLEAR LANDSCAPE CHANGES: INFORMATION PROBLEMS, ENERGY PRICES, AND POLITICAL UNCERTAINTY

The prospects for nuclear power that had looked so promising a decade earlier were, by 2017, dim at best. Unanticipated cost overruns and construction delays, falling prices of natural gas, and a sea change in political priorities brought about by the unexpected win of presidential candidate Donald Trump undermined the future of nuclear power. These factors culminated in the announcement by SCE&G and Santee Cooper that they were abandoning the partially constructed¹⁹ nuclear reactors at the V. C. Summer site. In the words of South Carolina Sierra Club attorney Bob Guild the announcement marked “the absolute confirmation of the failure of the nuclear renaissance” (Bland 2018).

A. INFORMATION PROBLEMS

When SCE&G and Santee Cooper contracted to build Units 2 and 3, the cost estimate was \$9.8 billion,²⁰ with earliest estimated completion dates of 2016 for Unit 2 and 2017 for Unit 3 (World Nuclear Association 2018; Nuclear Street News 2015). From the outset, cost overruns and construction delays plagued the project. When the utilities finally disbanded the project, estimated total costs reached approximately \$14 billion, possibly as high as \$25 billion, with projected

completion set back to 2022 for Unit 2 and 2024 for Unit 3, well beyond the December 31, 2020, deadline to qualify for production tax credits (World Nuclear Association 2018; Henry 2017; Moore 2017a; SCANA 2017a). Clearly, SCE&G and Santee Cooper based their decisions on grossly inaccurate information.

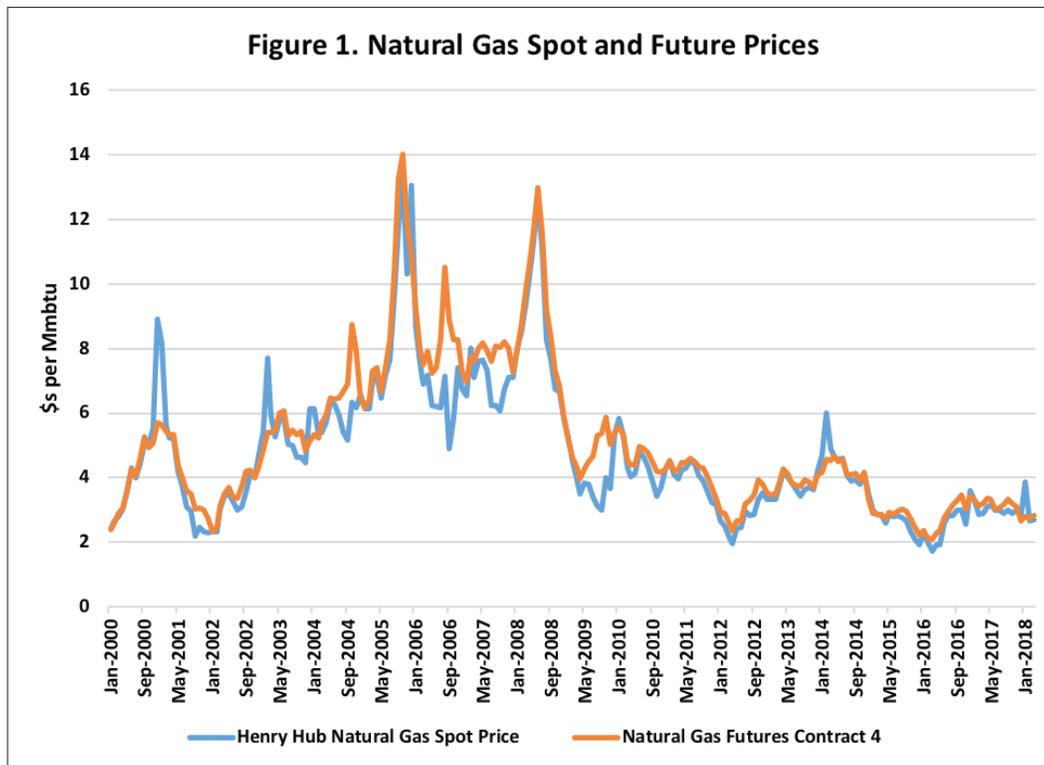
Perhaps they should have known. Although cost and schedule uncertainty may be reasonable for construction projects of this magnitude, the history of nuclear power plant construction points in a singular direction: projects are not finished on budget or on time (Romm 2016). As Rangel and Leveque (2013) put it, “Nuclear seems doomed to a cost escalation curse” (p. 14). Bocard (2014) points out that even coming to terms with the relevant costs may be problematic. There are development costs, construction and engineering costs, and, for projects of long duration, financing costs. Capital costs, however, are most important and determine competitiveness (Bocard 2014; Rangel and Leveque 2013).²¹

Of particular relevance to this study, Rangel and Leveque (2013) report that MIT and the University of Chicago revised their 2003 cost estimates for the Westinghouse AP1000 reactors in 2009 and 2010, respectively. In a particularly scathing review of SCE&G and Santee Cooper’s decision to build the reactors, Cooper (2017) notes that Westinghouse promoted the AP1000 reactors precisely because they would avoid the cost overruns and construction delays that had plagued past reactors. Nonetheless, this reactor model was “new, untested” and underwent numerous revisions

19. The reactors were 64.1 percent complete overall. This figure includes engineering at 96 percent complete, procurement at 88.2 percent complete, construction at 34.3 percent complete, and start-up activities at 8.6 percent complete. See V. C. Summer Expansion Project 64.1 Percent Complete, May 8, 2017.

20. This figure includes engineering, procurement, and construction (EPC) costs, plus an inflation allowance, costs for site preparation, contingencies, and financing costs (World Nuclear Association 2018). In “The Nuclear Story and Facts,” Santee Cooper lists EPC and financing costs at \$6.5 billion originally and \$11.4 billion projected when the decision was made to stop construction.

21. High construction costs are driven by safety concerns in the wake of nuclear accidents (Bocard 2014) and a minimal learning curve since so few reactors are built (Lovering, Yip, and Nordhaus 2016).



after construction began. As Cooper put it, nuclear construction history “repeated itself” (p. 9).

Plainly put, SCE&G and Santee Cooper did not have full information when they decided to build the reactors. Further, information asymmetries between the utilities and their primary contractor, Westinghouse, plagued the project. Eventually, the utilities hired the Bechtel Corporation, a construction and engineering firm, as a consultant to assess the status of the project, providing information that could and should have been forthcoming from Westinghouse. In the words of Santee Cooper CEO Lonnie Cooper, “We were definitely misled” (Brown 2017).

B. FALLING NATURAL GAS PRICES

Perhaps promises about the AP1000 reactors

convinced SCE&G and Santee Cooper they could avoid the cost overruns and construction delays that had proved systemic in prior nuclear construction. Be that as it may, another factor undermined the economic viability of nuclear power: falling natural gas prices.²²

Fracking and horizontal drilling have brought about what one author calls “the biggest story in the U.S. energy sector.” As the technology has advanced, extracting natural gas from shale rock has become feasible economically, and as natural gas production has increased,²³ prices have fallen (Boersma and Johnson 2012; Lu, Salovaara, and McElroy 2012). Further, analysts expect natural gas prices to stay low, relegating coal to a minor player in the country’s energy future (Boersma and Johnson 2012; Clemente 2017; Storrow 2017;

22. As an interesting historical aside, because of federal regulations that hindered interstate markets for natural gas, thereby creating shortages, Congress passed the Powerplant and Industrial Fuel Use Act of 1978, which restricted the use of natural gas for electricity production. Ironically, in light of today’s environmental concerns, the act encouraged the use of coal for electricity production. Congress repealed the act in 1987. See Bryce (2012) for details.

23. The Energy Information Administration reports that from 2007 to 2016, total (gross) production of natural gas increased over 34 percent, and natural gas production from shale rock increased a jaw-dropping 725 percent. See Energy Information Administration. n.d. Natural Gas Gross Withdrawals and Production.

and Light 2017). As an added benefit, natural gas produces electricity with far less carbon dioxide emissions than coal (Lu, Salovaara, and McElroy 2012).²⁴

Figure 1 shows spot and four-month futures prices for natural gas from January 2000 to March 2018. Leading up to the time of the decision to build the reactors, natural gas spot and futures prices were high and volatile. Both prices spiked in June 2008, just one month after the utilities signed the engineering, procurement, and construction contract with Westinghouse and three months after applying for the COL from the NRC. By the time construction began on Unit 2 in March 2013, spot and futures prices had fallen almost 70 percent. With natural gas prices continuing to fall and predicted to stay low, nuclear power was no longer competitive, if it ever was. In its July 31, 2017, report to investors, Santee Cooper highlighted high spot and future natural gas prices as reasons for its initial decision to go the nuclear route (Santee Cooper 2017). Technological change undid this rationale.

Source: Energy Information Administration.

C. CHANGING POLITICAL PRIORITIES

The battle over the CPP began immediately after the EPA issued its final state targets. Twenty-seven states and a host of electric utilities, coal-mining companies, and other industry associations, including the US Chamber of Commerce, filed suit to stay the EPA ruling, raising questions of EPA authority and federalism. On the other side of the aisle, eighteen states, numerous metropolitan areas, and a number of environmental and public health organizations, along with solar and wind

industry associations and other interests defended the CPP and the EPA's authority to regulate carbon dioxide emissions.²⁵ In February 2016, the US Supreme Court issued a stay of the CPP until legal challenges are resolved (Adler 2016). The US Court of Appeals in the District of Columbia heard arguments in September 2016 and issued orders of abeyance in April and August of 2017 (Gilmer 2017; Bebon 2017).

The path forward is clouded by the Trump administration's opposition to the CPP. Following through on campaign promises to undo President Obama's clean-air regulations and restore jobs in the coal industry, President Trump signed the Promoting Energy Independence and Economic Growth executive order in March 2017, directing the EPA to relax rules on carbon dioxide emissions. Although the revision process could be long and the legal challenges many, the executive order was an important first step in reducing the urgency faced by the electric-utility industry to reduce carbon dioxide emissions (Davenport and Rubin 2017). In June 2017, President Trump continued the political shift by announcing that the United States would withdraw from the Paris Climate Agreement. As with the EPA's plans to revise the CPP, the process could take years, but the shift in political priorities is clear (Shear 2017).

By October 2017, the process was underway, when EPA administrator Scott Pruitt issued a document stating that the agency would repeal the CPP in favor of new, less stringent rules to reduce carbon dioxide emissions. A move to replace the CPP in lieu of outright repeal may be necessary to avoid litigation because the EPA took responsibility

24. Natural gas is superior to other fossil fuels in terms of carbon dioxide emissions. Pounds of carbon dioxide emitted per million British thermal units (Btu) of energy are as follows: coal (anthracite) is 228.6; coal (bituminous) is 205.7; coal (lignite) is 215.4; coal (sub-bituminous) is 214.3; diesel fuel and heating oil are 161.3; gasoline (no ethanol) is 157.2; propane is 139.0; and natural gas is 117.0. See the Energy Information Administration. n.d. Frequently Asked Questions: How Much Carbon Dioxide Is Produced When Different Fossil Fuels Are Burned?

25. For details on the relevant interest groups filing suit for or against the CPP, see the E&E News n.d. Power Plan Hub: Your Guide to the Clean Power Plan in the Courts and Union of Concerned Scientists n.d. Who's Fighting the Clean Power Plan and EPA Action on Climate Change?

to regulate carbon dioxide emissions in 2009. New standards, whatever they are, will be demonstrably lower (World Nuclear Association 2018; Eilperin 2017; Friedman 2017; Bravender 2017).²⁶

Accordingly, a number of Democrat-leaning states and environmental groups have pledged to challenge the EPA ruling in the courts (Swartz and Klump 2017; Monsivais 2017).

The weakening or replacement of the CPP undermines a key impetus for nuclear power, because electricity produced from nuclear power would no longer be useful to meet the scuttled CPP targets (Swartz and Klump 2017).²⁷

D. REACHING THE FINAL DECISION

The culmination of information problems, lower natural gas prices, and reduced political pressure to curb carbon dioxide emissions all played a role in the companies' decision to abandon construction of the nuclear reactors at the V. C. Summer site. In its July 31, 2017, board presentation, Santee Cooper stated that “under current reasonable assumptions, the projected costs of power resulting from completing Summer 2 & 3 or completing Summer 2 only are projected to be significantly higher than a natural gas alternative” (p. 15). The utility also noted the “complete political reversal on carbon regulation trends” and explained that the combination of low natural gas prices and a lack of (or weaker) regulation of carbon dioxide emissions rendered nuclear power uncompetitive (Santee Cooper 2017, n.d.c). The

proximate cause, however, was financial, as both utilities made clear. High and uncertain costs, along with the uncertainty of production tax credits,²⁸ drove the decision. Nuclear power was, in the words of SCANA's July 31, 2017, announcement, “prohibitively expensive” (SCANA 2017c).

Before the final decision, SCANA exercised a fixed-cost option in its EPC contract with Westinghouse, as amended in October 2015, to cap costs and protect the companies' interests. The option, approved by Santee Cooper and the SCPSC, set the price at just under \$7.7 billion for SCE&G's share of the project.²⁹ The fixed-price option forced Westinghouse's hand. Unable to finish the project at the option price, Westinghouse rejected the contract and declared bankruptcy in March 2017.

After a four-month evaluation, Santee Cooper determined that termination of the entire project was the only fiscally responsible choice. SCE&G followed Santee Cooper's lead, calling abandonment of the project the “only remaining prudent course of action” (World Nuclear Association 2018; Santee Cooper n.d.c; SCANA 2017c, 2017a).

VII. CURRENT AND FUTURE CONSEQUENCES AND OPTIONS

Nine years after the initial application with the NRC and contract with Westinghouse, four years after construction began, and over \$9 billion later, SCE&G and Santee Cooper finalized their decision

26. Despite the change in political priorities, in January 2018, the Federal Energy Regulatory Commission (FERC) rejected unanimously a proposal by DOE secretary Rick Perry to subsidize electricity producers that can maintain a ninety-day supply of fuel on site to ensure grid reliability. Coal and nuclear generators would have been the beneficiaries. Of interest, Trump appointed four of the five FERC commissioners. See Mufson (2018) and St. John (2018).

27. Georgia Power, however, continues construction of two reactors at its Vogtle facility, believing government will likely price carbon dioxide in the future (Swartz and Klump 2017).

28. See Wren (April 27, 2017) and Follett (2017) for details.

29. The contract price was set at \$6.827 billion. Other cost increases, including \$505 million directly related to the fixed-price option, brought the total to \$7.679 billion. See SCANA 2016. Press Release (May 26).

to cease construction on V. C. Summer Units 2 and 3 that were over budget, much-delayed, and only partially complete (World Nuclear Association 2018; Associated Press 2017; Nuclear Street News 2017). The announcements and press releases did not, however, explain the consequences for stakeholders or project a path forward. In this section, I examine the consequences for the utilities' customers and investors, as well as the possible futures of these South Carolina utilities.

A. FOR CUSTOMERS

The stark reality for SCE&G and Santee Cooper customers is that the reactors will never produce the first kilowatt of electricity. In defending the decision to abandon the project, SCE&G CFO Jimmy Addison said, "We are confident we're making a prudent decision that is in the best interest of our customers." Nonetheless, for customers, Addison's claim rings hollow. In documents released in March 2018, the SCORS showed that SCE&G had paid dividends of \$2,552.0 million to shareholders from 2009 to 2017, with \$529.2 million derived from revenues collected under the BLRA. In 2017, the year the project was canceled, \$120.4 million of \$350 million paid in dividends came from BLRA revenues, the highest share of any year (SCORS 2018; Moore 2018c). As one state senator put it, "Stockholders have been making out like bandits while the people who are supposed to be protected, the ratepayers, were suffering" (Fretwell 2017a).

Santee Cooper has collected \$540 million from its customers and estimated rate increases of an additional 41 percent by 2030 to complete the project. Santee Cooper CEO Lonnie Carter said, "We simply cannot ask our customers to pay for a project that has become uneconomical" (Mufson 2017; SCANA 2017a). Cooper (2017) agrees with these assessments, estimating that abandonment may save ratepayers up to \$10 billion.

Nonetheless, a multibillion-dollar problem remains: the utilities have not collected enough through rate hikes to cover the costs already incurred. SCE&G lists its abandonment cost at \$4.9 billion, and Santee Cooper lists its costs at \$4.7 billion for construction and interest paid (SCANA 2017a; Santee Cooper. n.d.c).

In its analyst conference call of July 31, 2017, SCE&G made it clear that it intends to "proceed with the appropriate filing with the Public Service Commission of South Carolina to seek recovery of project costs under the abandonment provisions of the Base Load Review Act" (p. 4). The utility is clearly within its rights and quotes from the Abandonment Provision of the BLRA in its analyst conference call: "Where a plant is abandoned after a base load review order approving rate recovery has been issued, the capital costs and AFUDC [Allowance for Funds Used During Construction] related to the plant shall nonetheless be recoverable under this article provided that the utility shall bear the burden of proving by a preponderance of the evidence that the decision to abandon construction of the plant was prudent" (p. 6).

Although Santee Cooper is not subject to the BLRA, it too will turn to its customers to recoup its costs. To ease the burden, SCE&G plans to amortize the cost over sixty years. Santee Cooper's debt is structured over forty years (SCANA 2017a; Wilks 2017b). Settlement payments from Toshiba, the parent company of Westinghouse, of \$2.168 billion can be used to mitigate the impact, but ratepayers still face the likelihood of paying for nonproducing reactors for decades to come.

The question of prudence may be significant. The aforementioned Bechtel report, completed in February 2016, cited a host of significant problems, ranging from flawed design and construction to poor management and oversight. High worker turnover and low morale compounded the engineering and management problems. Further,

the report noted that difficulties should have been anticipated, given that decades had passed since a nuclear power plant had been constructed in the United States and that the AP1000 reactors had never been built. SCE&G opposed the release of the report, and only the governor's threat to remove the Santee Cooper board forced the reluctant utilities to release the report to the governor's office (Fretwell and Wilks 2017; Nuclear Street News 2017; Lovegrove and Brown 2018). Should SCE&G's actions be found to lack prudence, rate increases under the BLRA could be jeopardized.

Santee Cooper says it saw problems as early as 2013 and sought to address them but Westinghouse was not forthcoming with pertinent cost and scheduling information (Brown 2017; Santee Cooper. n.d.c). Tensions also ran high between Santee Cooper and SCE&G. As early as May 2014, Santee Cooper expressed concern that the project needed independent management, and in November 2016, the junior partner expressed a lack of confidence in its senior partner's ability to manage the project. Santee Cooper even anticipated the Westinghouse bankruptcy (Fretwell 2017b).

Realizing the role played by the BLRA in customers' rate hikes, the General Assembly wasted little time introducing legislation to prevent future use of the act (Wilks 2017a). In September 2017, state attorney general Alan Wilson added his weight to the move to protect ratepayers when he issued an opinion that the BLRA was unconstitutional (Wilson 2017). In June 2018, the South Carolina General Assembly passed a bill (H. 4375) to cut SCE&G's rates by 15 percent, lowering the average residential customer's charge for the abandoned nuclear reactors from \$27 per month to about \$5 per month until the SCPSC makes a final

decision on rates at the end of the year. Because an 18 percent cut would be necessary to eliminate the entire charge for the abandoned reactors, Governor Henry McMaster vetoed the bill. Both houses of the state legislature voted to override the veto with overwhelming majorities.³⁰ As expected, SCE&G filed suit immediately in the US District Court in Columbia to stop the rate cut, arguing revenues collected under the BLRA are legal and that the bill (H. 4375) is unconstitutional because the utility had no opportunity to defend itself in a court of law (Wilks 2018f; Wilks 2018g; Scoppe 2018; Downey 2018).

Should the court uphold the bill, consumers would benefit, but the consequences for SCE&G could be devastating financially. Further, the legislation risks compromising the credibility, rule of law, and environment of regulatory stability that South Carolina promotes to attract business. Reversal of the BLRA would set a dangerous precedent, no matter how much political support such a move has (South Carolina Policy Council 2017; Wilks 2018c).

B. FOR INVESTORS

The fallout from the abandoned nuclear project has not been favorable to investors, as an analysis of equity and debt markets shows. In particular, the markets show high sensitivity to legislative and regulatory uncertainty. The response of the stock market to SCANA's woes has been decidedly negative. Since January 3, 2017, SCANA's stock price has fallen from \$73.25 per share to about half this value, although the stock price has held steady in the wake of the passage of H. 4375.

Analyses by rating services provide additional insight. After the July 31, 2017, announcement, Fitch and Moody's downgraded SCANA and SCE&G debt, citing fears that the BLRA might

30. The bill passed by a vote of 109-4 in the House and 32-2 in the Senate. The votes to override were 110-1 in the House and 39-0 in the Senate.

not be upheld, given the “political and regulatory backlash” (Fitch Ratings 2017a; Fitch Ratings 2017d; Fitch Ratings 2017b; Moody’s 2017b; Street Insider 2018). Standard & Poor’s (S&P) downgraded Santee Cooper debt as well, and S&P and Moody’s expressed concern over Santee Cooper’s heavy debt, possible limits on the utility’s ability to raise future rates, and Toshiba’s ability to meet its obligations³¹ (Moody’s 2017a; Standard & Poors 2017; Sigo 2018). The rating agencies continue to keep a close watch on the utilities and relevant political events.

C. FOR THE UTILITIES

The same cloud of political and regulatory uncertainty hangs over the utilities and their futures. For SCANA, a merger with Virginia-based Dominion Energy is possible. For Santee Cooper, privatization is on the table. But, as the ensuing analysis shows, neither outcome is certain.

As movement to repeal the BLRA gained momentum in the South Carolina House, SCE&G attempted to counter the shifting political winds. On November 16, 2017, the utility offered a 3.5 percent, five-year rate reduction for consumers (\$5 per month for the average residential consumer), valued at \$450 million, and lower stockholder earnings over fifty years, valued at \$2.9 billion. The SCPSC rejected this proposal (SCANA 2017b).

In a following step, SCE&G argued that if the SCPSC forced the utility to lower customer rates, it “would have no choice [but] to declare bankruptcy.” As long as the utility can continue to collect \$37 million per month for the unfinished reactors, the reactors can remain on the company’s balance sheet as assets. If the SCPSC denies these

revenues, SCE&G may face liquidity problems, further ratings downgrades, and threatened access to credit markets (Rogers 2017; Moore 2017c; Lapson 2017).

On January 3, 2018, Dominion Energy of Virginia and SCANA announced a \$7.9 billion merger (Wilks 2018a).³² Adding in the value of SCANA’s assumed debt, the total deal is valued at \$14.6 billion. In its press release, Dominion emphasized the benefits to customers: a \$1.3 billion cash payment to SCE&G customers, averaging \$1,000 per residential customer; a 5 percent rate reduction, averaging \$7 per customer, per month; a \$1.7 billion write-off of the reactors that would not be funded from customers; and the elimination of collections under the BLRA after twenty years, instead of the SCE&G-proposed fifty to sixty years (Dominion Energy 2018). Dominion CEO Tom Farrell noted the offer was “far more than SCANA can bring to the table on its own” (Wilks, 2018e). SCE&G estimated the value of future revenue collections to pay for the reactors over these twenty years at \$3.8 billion, a figure that includes a 10.3 percent return for shareholders (Moore 2018d).

Whatever the merits of the proposed merger, controversy over the BLRA again raised its head. An audit by the SCORS determined that repealing the law would not result in bankruptcy (Moore 2018a; Miller 2018). Utilizing this report, Governor Henry McMaster informed the General Assembly that he wanted a bill that ensured SCE&G customers would pay no additional funds for the V. C. Summer reactors. As discussed earlier, the South Carolina General Assembly passed legislation that cuts significantly revenues SCE&G can collect under the BLRA. However, the Dominion offer

31. On September 27, 2017, SCE&G announced that it and Santee Cooper had monetized the Toshiba settlement payment for \$1.997 billion (approximately 92 percent of value) with Citibank. See SCANA 2017. Press Release (September 27).

32. The offered value of SCANA stock, \$55.35 per share, exceeded the January 2 value of \$38.87 per share. SCANA shareholders would receive 0.669 shares of Dominion Energy stock per share of SCANA stock. The deal would require approval of SCANA shareholders, the Federal Trade Commission, the Department of Justice, the NRC, the FERC, and the SCPSC.

is contingent upon receipt of the aforementioned revenues, so if this legislation is upheld by the courts, Dominion may withdraw its merger offer (Moore 2018b; Wilks 2018b; Walton 2018; Wilks 2018f; Wilks 2018g).

The state Senate voted unanimously on February 15, 2018, to delay any decision on the proposed Dominion-SCANA merger till December 2018 to give the legislators and the SCORS time to evaluate past rate hikes and the merger proposal. SCPSC approval is on hold. Dominion's offer expires in April 2019, though the company has expressed desire to close the deal sooner (Wilks 2018h).³³

The future of Santee Cooper is also problematic. Governor McMaster and some members of the General Assembly favor selling the state utility giant to pay off the utility's debt and raise revenues to refund ratepayers.³⁴ Although the spirit to sell may be strong, the flesh may be weak. A first and obvious problem is determining Santee Cooper's worth. Unlike with SCANA, there is no equity-market valuation for Santee Cooper. As a result, the governor and General Assembly are using appraisals to assess value; however, they have been at odds even over which appraisal firm to hire. The legislature is also split. Some favor privatization philosophically, seeing government-owned utilities as a relic of Depression-era policies whose time has passed. Others fear that privatization may lead to job losses, higher utility rates, or a shift in corporate focus outside of South Carolina (Wilks, November 27, 2017; Shain, December 18, 2017).

Two other considerations make a sale difficult. As has been noted, the state uses Santee Cooper for economic development, a function that would be lost with privatization. Second, debt covenants would require the purchaser to redeem the utility's tax-exempt bonds, posing a significant financial obstacle to sale (Sigo 2018).³⁵

VIII. IMPLICATIONS AND CONCLUSIONS

When SCE&G and Santee Cooper announced the termination of Units 2 and 3 at the V. C. Summer nuclear site on July 31, 2017, they unleashed an economic fallout unprecedented in the modern economic history of the Palmetto State. The words "fiasco" and "debacle" have flowed from many lips and heralded the news in eye-popping headlines. Many fingers have pointed at many individuals, as many want to hold someone—anyone—accountable, and others seek to deflect blame. The question in the minds of so many is this: how could this have been averted? Perhaps the first point to make is that it should have been averted. Scarcity, resource allocation, and opportunity cost are at the heart of economics, and the failed V. C. Summer project is an example of a colossal misallocation of scarce resources that had alternative uses. For all stakeholders—from ratepaying customers to investors—an investigation into the causes is warranted.

A theme throughout this paper is that government policies gave strong, decisive incentives in favor of the construction of the nuclear reactors. Interest group influence pervaded legislation at

33. Dominion has lobbied state legislators and conducted a public relations and media blitz to gain support for the proposed merger. See Brown (2018) and Demarest (2018).

34. Multiple utilities have expressed interest, including Florida's NextEra Energy, North Carolina's Duke Energy, Georgia's Southern Company, Virginia's Dominion Energy, and a joint interest between in-state Pacolet Milliken and Twenty First Century Utilities of Washington, DC (Wilks, November 27, 2017; Shain, December 18, 2017).

35. In the meantime, Santee Cooper will pay \$19 million per year to preserve the V. C. Summer site and its equipment, keeping open the option to sell them in the future. See Wilks (February 21, 2018).

the federal and state levels, as the nuclear industry sought and received subsidies in the Energy Policy Act and insulation from the risks of their decisions in the Base Load Review Act. Legislators, with time horizons only to the next election, wanted campaign contributions and industry support. They had little incentive to think through the consequences of the legislation they passed and were largely exempt from them. The purported environmental benefits of the CPP provided a public interest justification for nuclear power, and all the while, the vast majority of citizens remained rationally ignorant. As time passed, policy reversal wreaked havoc on the nuclear decision, as the Trump administration undid the CPP.³⁶

Despite government's central role in this economic debacle, inadequate and asymmetric information in the private sector played a role too. Westinghouse knew more about its reactors, the construction costs, and the project delays than did SCE&G and Santee Cooper and was not forthcoming in what it knew. In turn, SCE&G and Santee Cooper knew more about the construction costs and project delays than did their ratepayers, their investors, the SCPSC, the state legislature, and the citizens of the state. A central question to put to Westinghouse, SCE&G, and Santee Cooper may be a modification of Howard Baker's famous line in the Watergate investigation: what did the companies know, and when did they know it? Federal and state authorities are taking the question seriously, with grand jury and law enforcement investigations into whether SCANA misrepresented

or withheld information (Monk, Fretwell, and Wilks, September 21, 2017; Downey, September 21, 2017; Downey, September 26, 2017).

The collapse in natural gas prices also suggests the utilities could have realized sooner that nuclear power was becoming less competitive once again and pulled the plug on the project before spending additional funds. Markets are dynamic, and well-functioning market economies are littered with failed ideas, outputs, and firms, as creative destruction clears the way for newer and better ideas, outputs, and firms. The fracking revolution has rendered nuclear power economically unviable, at least in the absence of large subsidies or high carbon dioxide taxes. Further, sunk costs should not determine current decisions.

The turn of the century brought hope for a national revival of nuclear power. South Carolina utility giants South Carolina Electric & Gas and Santee Cooper followed the lead set by the policies and tenor of the times, joining forces to embark on an ambitious project to add two nuclear reactors to their V. C. Summer site. In the end, the utilities abandoned the project after misallocating billions of dollars of resources. The prospects for additional nuclear reactors in the United States are dim.³⁷

I have argued that government policy played a pivotal role in this economic waste. Environmentalists may counter that climate change is real and that government intervention is necessary, since markets do not account for the social costs inherent in production. Perhaps so. Nonetheless, government policy makers are

36. As an aside, Austrian economists point out (rightly in the author's view) the possibility that monetary policy can misalign the output firms produce with the output consumers want, leading to "malinvestment" that requires painful capital liquidation and recession to correct. The upshot of this paper's analysis is that time-inconsistent legislative and regulatory policies can yield similar outcomes.

37. Despite the rash of COL applications submitted from 2007 to 2009, Georgia Power's Vogtle reactors are the only ones currently under construction in the United States. Like the V. C. Summer reactors, these are over budget (by approximately \$9 billion) and behind schedule (by five years). Georgia Power, a subsidiary of Southern Company, does have some advantages over SCE&G in that its stake (45 percent) is smaller, its loan guarantees (\$8.3 billion) have been approved, and its customer base (approximately 2.5 million) is larger. Georgia's Nuclear Energy Financing Act of 2009, like South Carolina's BLRA, allows Georgia Power to collect revenues from current customers to pay for the project, but unlike South Carolina's BLRA, it has the support of the state attorney general. Georgia Power also hopes production tax credits for nuclear construction will be extended. See Grantham (2017), Plummer (August 31, 2017), Plummer (December 21, 2017), and Merchant and Pyper (2017) for details.

hardly omniscient, and picking winners is rarely, if ever, successful.³⁸ Economists have long observed that rising incomes are an effective way to deal with many environmental problems, and the movement to carbon dioxide-free and renewable energy reflects, in part, the priorities that rising incomes bring. In addition, profit incentives led to technological innovations that enable abundant and relatively cheap natural gas with about half the carbon dioxide emissions of coal. Many environmentalists fear these measures will be too little, too late, or both to stop detrimental changes to the Earth's climate. Be that as it may, South Carolina's foray into nuclear power shows that in today's political and financial environment, nuclear power is not an option. Wasting resources is not good for the economy—or for the environment. The nuclear renaissance may not be dead, but it is badly wounded. Any attempts to revive it should give due consideration to the South Carolina experience.

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38. Proponents of a carbon dioxide tax may argue that such policies do not strictly pick winners or losers, but merely set a price on carbon dioxide and then allow the market to operate. Carbon dioxide taxes do, however, provide advantages to low-carbon dioxide energy producers as compared to high-carbon dioxide energy producers. Further, the point about policy makers lacking omniscience still stands: how much should the tax be to account for social costs?

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