Cash Now, Current Later: Energy Investment in the AI Era

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Abstract

The data centers behind artificial intelligence are raising U.S. electricity demand after a decade of flat growth. Several states have responded by reviving Construction Work in Progress (CWIP), a cost-recovery rule that lets a utility begin collecting from customers while an asset is still being built rather than only after it enters service. Using the historical wave of state-level CWIP adoptions in a staggered difference-in-differences design, I find that utilities build more and finish construction faster once their state allows CWIP. I find less evidence for an eased financing constraint and more for a higher payoff to investing. Looking beyond investment, the data do not suggest customers are better served. In the current wave, CWIP states are already planning far more customer-funded capacity than states without the rule, where new building is left to independent producers. These results contribute to the emerging literature on financing the infrastructure demands of artificial intelligence.

Keywords: energy demand; asset recognition; capital investment; regulated industries; electric utilities

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1 Introduction

The rise of artificial intelligence (AI) is reshaping electricity demand. Data centers, the physical infrastructure behind AI, consumed about 4.7 percent of U.S. electricity in 2024, and projections for 2030 are uncertain, ranging from 2.7 to 4.4 times that level (Smith et al., 2026). The growth in electricity demand is concentrated regionally, putting supply pressure on local grids. Spurring investment quickly enough to keep pace with this growth has become a challenge for state regulators (Mural et al., 2026; Stansbury et al., 2025). Since 2024, Missouri, Arkansas, and Oklahoma have passed laws designed to make their regulatory environments more favorable to utility investment (Mehta, 2025; OK Energy Today, 2025b). One change governs when a utility can begin billing customers for a new asset.

Traditionally, regulators let a utility recover the cost of a new asset only after construction ends and the asset enters service.[1] The outlays incurred while it is being built, including the cost of financing, accumulate on the balance sheet and are recovered from customers later, over the asset's service life. This traditional treatment is known as the Allowance for Funds Used During Construction, or AFUDC. Construction Work in Progress (CWIP) moves that recovery into the construction phase. Under CWIP, the utility begins collecting from customers (through higher electricity prices) as soon as construction spending begins and before the asset delivers any service. Figure 1 contrasts the cash a utility collects on the same asset under the two regimes. The contrast has a rough analog in revenue recognition. Traditional cost recovery works like the completed-contract method, under which a firm recognizes no revenue on a long-term project until the work is complete. CWIP is closer to percentage-of-completion, which recognizes revenue as the work proceeds.[2] In this paper, I ask how CWIP affects utilities' investment decisions and what channels drive their response. Beyond how much utilities invest, I examine the characteristics of that investment, how it affects customers and the regulator's other objectives, and what it implies for utility investment in the data-center era.

[1] A state commission sets a utility's prices so that its allowed revenue covers operating costs plus a return on the asset base, the value of the capital assets on which the utility is allowed to earn. Section 2.1 describes the setting in detail.

[2] The parallel runs to timing only, since CWIP governs the cash a utility collects from customers rather than the revenue it reports.

The policy debate on CWIP centers on how the rule changes the way utilities carry out construction and their operations. Supporters argue that by giving utilities a steady cash flow while the work is underway, CWIP lowers the cost of financing large projects and speeds construction (U.S. General Accounting Office, 1980; Brigham, 1981). They also argue that it spreads price increases more evenly over time since costs collected during construction leave a lower capitalized value to recover once the asset enters service. Critics argue that it shifts the financial risk of construction to customers (Olson et al., 2025; Martin and Peskoe, 2025). A utility less exposed to the consequences of delays and cost overruns may have weaker incentive to manage construction tightly, focus on operating performance, or limit how much it builds.

The timing of cost recovery is what the accounting literature on intertemporal cost allocation studies (Rogerson, 1997). CWIP is a rule of that kind, set in a different institutional context. The rule is set by a state utility regulator rather than inside the firm, and the conflict it governs is between the regulator and the utility rather than between a manager and shareholders. For a regulated utility, accounting timing is also cash timing. The price a utility charges is set by a formula based on the book value of its assets, so the date an asset is recognized as part of the asset base is the date the firm starts receiving revenue on it. CWIP therefore moves the utility's operating cash inflow forward, from the asset's service life into the construction period. Regulators adopt CWIP primarily to expand generating capacity, so I focus the analysis on how it changes utilities' investment decisions.

Moving the cash inflow forward does not by itself imply more investment. Under traditional treatment (the non-CWIP treatment), the utility is not simply made to wait to recover its investment. The costs it defers accumulate interest until they are recovered. Thus, if the utility can finance construction in the meantime, and if AFUDC accrues at the utility's cost of capital, then a dollar collected during construction and a dollar collected later with interest have the same present value. Under these assumptions, moving the collection date should leave investment decisions unchanged (Rogerson, 2008; Nezlobin et al., 2012). Each condition can fail, and each failure is a channel through which CWIP can change investment.

The current wave of CWIP adoption is too recent for its effects to appear in the data, but an earlier wave of adoptions provides the same policy change under comparable conditions. Between 2002 and 2012, 13 states adopted CWIP at different times, to help utilities finance generation projects against expected load growth.[3] That variation in timing lets me compare investment outcomes at utilities in those states, before and after the rule took effect, with outcomes at utilities in states that did not allow CWIP at any point through 2023. I implement this comparison using a staggered difference-in-differences design, with treatment assigned in the year of CWIP adoption. I draw on regulatory filings for 115 investor-owned utilities in 27 states between 2000 and 2023.

I find that CWIP raises investment. On the books, the balance of construction work in progress rises by about two percentage points of assets, and capital expenditure rises by about one percentage point, roughly a sixth of the never-treated base. The construction record tells the same story. Treated utilities record more construction starts and add more megawatts of new capacity than utilities in never-treated states. This is consistent with the rationale CWIP's proponents point to, namely that the rule leads to more capacity being built.

I also examine how CWIP changes the way projects move through construction. Once a project is approved, treated utilities start construction sooner, the construction phase is shorter, and on net the gap between a project's originally filed completion date and its actual completion shrinks by about two years, without utilities lengthening the schedules they file. The timing results provide little evidence for the critics' concern that CWIP weakens utilities' incentive to manage construction tightly.

The results so far do not reveal whether CWIP moves investment toward an efficient level, and since no clear benchmark for that level exists, I turn instead to describing the investment itself. I examine the capital intensity of the capacity utilities build, whether their projects are canceled and at what stage, and how intensively that capacity is used once it enters service. I find that the additional capacity comes from technology types that are cheaper to build per kilowatt, which runs against the concern that early returns encourage utilities to favor capital-intensive investment (Averch and Johnson, 1962; Baumol and Klevorick, 1970). The construction record, however, points

[3]The panel begins in 2000, and a state adopting CWIP in 2001 or later enters the design as treated. No state did so after 2012, so the adoptions the design uses all fall between 2002 and 2012. Panel A of Appendix B lists the 13 states with their adoption years.

the other way.

Treated utilities are about 15 percentage points more likely to cancel a project after construction has begun, while fewer projects are dropped before construction starts. Cancellation shifts from the planning stage to after construction begins, consistent with utilities carrying projects further once approved. The projects that are completed also exhibit lower utilization. Newly built capacity is used about ten percentage points less than comparable capacity elsewhere. These outcomes do not provide a definitive test of over-investment since utilities require spare capacity to meet peak demand and accommodate unplanned outages. Nonetheless, the results describe how CWIP changes the construction process and planning. Utilities under CWIP select cheaper projects to build. They build more of them, abandon more after construction begins, and use the completed capacity less intensively.[4]

Having established that CWIP raises investment, I next ask what drives the response. Advancing the collection of construction costs should leave investment unchanged if utilities can finance construction in the interim and are fully compensated for delaying recovery. A failure of either condition creates a potential channel through which CWIP can affect investment. I begin with financing constraints. If utilities had been investing below their preferred level because they could not fund large, front-loaded projects (Fazzari et al., 1988; Hadlock and Pierce, 2010), the cash provided during construction should relax that constraint by increasing internal funds or improving the firm's credit profile. The evidence supports neither implication. Although revenue and cash collections rise after CWIP adoption, higher operating expenses offset these gains, leaving operating cash flow and net income unchanged. On the debt side, the only thing that changes is the term. Utilities issue shorter-dated debt, consistent with matching borrowing to the earlier cash inflows CWIP generates. However, the coupon on new debt and firm-level ratings do not change. Overall, the results provide no evidence that CWIP expands the funds available for investment.

The second condition is whether the interest accrued during construction fully compensates the utility for waiting. If it does not, CWIP raises the payoff to investing, since the utility earns its

[4] Treated utilities also retire generators later, so aging capacity remains on the utility's books longer. I report these estimates in Online Appendix Section O.10, as they are based on a smaller subsample and are therefore less precisely estimated.

return on a larger asset base and earns it sooner.[5] If this is what drives the investment response, the response should be largest where the payoff rose the most. Consistent with this, the results show that it is larger in states whose regulatory regimes are rated more favorable to utilities, where commissions typically allow a higher return on the asset base.

Finally, I look beyond investment, to the customers who fund the construction and to other goals the regulator is pursuing. On the service side, residential satisfaction in CWIP states falls even after controlling for prices, and there is directional evidence of more outages during major storms. On the regulator's other goals, utilities in CWIP states cut back demand-response programs, an alternative way to manage demand.[6] Where a state also requires renewable procurement, utilities appear to move into wind and solar sooner under CWIP. Because a cost-recovery rule reaches these outcomes only through the investment choices utilities make, I read them as describing what followed from adoption rather than as further evidence on what drives those choices.

These findings speak to the wave of CWIP adoption now underway. Missouri, Arkansas, and Oklahoma are the states adopting CWIP for the first time in this wave. The recent adoptions are too new to study with the same design, so I use what the earlier wave shows to inform what today's adopters can expect, without claiming a causal effect. The difference between today's CWIP states and states without CWIP is already visible in what they plan to build. Regulated utilities in CWIP states have announced new capacity equal to between 3.7 and 4.4 percent of their peak demand, paid for by customers while it is built. Regulated utilities in the large never-treated states have announced 0.7 percent, and new capacity there is left to independent producers, which finance it themselves, at 23.5 percent of peak. The demand appears common to both sets of states, so the groups differ in who bears the risk while capacity is built, not in whether the demand is there. Today's adopters are authorizing capacity largely against forecast demand. If realized demand falls short, customers still pay for the capacity as it is built. For a regulator weighing CWIP today, the trade-off is that the rule speeds capacity into construction while customers carry the risk that the demand never arrives.

[5] The payoff here is the one the regulatory formula writes on the utility's accounting base. I do not take a stand on agency frictions inside the firm.

[6] The scale of these programs is an equilibrium outcome, set jointly by the utility's supply of them and by customers' demand for them, so the decline need not reflect reduced utility effort alone.

One limitation of the study concerns identification, since states do not adopt CWIP at random. If the same rising demand that leads a state to adopt CWIP also spurs utilities to invest, part of the post-adoption increase in building could reflect the demand shock rather than the rule change. I address this in two ways. Where the data allow, I compare regulated utilities with independent power producers in the same state and year. Both face the same state conditions, but only the regulated utility is subject to CWIP.[7] On every outcome the comparison can measure, its estimates point in the same direction as the main results. I also test whether the response is stronger where pre-adoption demand was growing faster, and find no such pattern.[8] Although these checks cannot rule out demand-driven adoption, they suggest that demand shocks alone are unlikely to explain the investment response.

This paper contributes to four streams of literature. First, the paper speaks to the accounting literature on investment and cost basis. In a cost-based system, what matters is not only which expenditures form the cost basis, but when those expenditures begin to affect the firm's payoff. Theory on intertemporal cost allocation shows that investment incentives depend on the timing with which an asset's cost enters prices or performance measures (Rogerson, 1997; Rajan and Reichelstein, 2009). In the existing literature an asset's depreciation and the interest imputed on its remaining book value begin at the same time, and both are spread over the periods in which the asset is productive. This study shows how investment responds when the two are not aligned, with the interest charge falling in periods before the asset is operational. The paper also extends the intertemporal cost allocation literature from settings where the incentive conflict lies between a manager and shareholders to one where it lies between a regulator and a firm, and where the allocation rule sets the firm's cash flow rather than a performance measure.

Second, the paper speaks to the literature on accounting in regulated industries. Early work established that a regulated firm's accounting incentives come from the regulatory process rather than from the capital market alone (Watts and Zimmerman, 1978). Jarrell (1979) shows that utilities

[7] Online Appendix Section O.4 reports these estimates. Independent power producers do not file Federal Energy Regulatory Commission (FERC) Form 1, so this comparison is available only for the outcomes drawn from Energy Information Administration (EIA) Forms 860 and 861.

[8] Online Appendix Table O.5.1 reports the underlying triple-interaction estimates. The test uses only the treated states and is underpowered.

report higher asset values than comparable unregulated firms, since a higher asset base earns a higher return. More recent work in banking shows that sector-specific rules have real consequences for firm behavior (Beatty and Liao, 2014; Bushman and Williams, 2012), as does work on sectors where the government reimburses cost directly.[9] The paper extends that literature to another regulated sector, utilities, which, unlike banks, operate in a non-competitive market. Accounting research studied the utility sector closely during the restructuring era of the 1990s, asking questions about stranded assets (Khurana and Loudder, 1994; Loudder et al., 1996; Blacconiere et al., 1997, 2000). This paper returns to that work as the sector faces another period of change, with data centers raising demand and a push toward renewable sources of generation.

Third, the paper speaks to the literature on utility regulation and energy policy. That work studies how the components of rate making and regulation shape utility behavior (Joskow, 1974, 2007). Existing work has focused on the asymmetry between capital and operating cost, which tilts spending toward capital (Averch and Johnson, 1962; Fowlie, 2010; Cicala, 2015, 2022), on the level of the allowed return (Dunkle Werner and Jarvis, 2026; Cambini and Rondi, 2010), and on the commitment to admit completed assets into the rate base (Gilbert and Newbery, 1994). A related strand treats rate setting as an implicit contract between the regulator and the utility (Goldberg, 1976), and asks how the utility invests when it cannot be sure the regulator will hold to it (Greenwald, 1984; Lyon and Mayo, 2005; Lim and Yurukoglu, 2018). This paper turns to another component of the same process, the timing of cost recovery. Under CWIP, construction costs enter the rate base before the asset is complete.

Fourth, the paper speaks to an emerging literature on who pays for the infrastructure that AI computing requires. Data centers are large capital projects that require financing as well as local resources such as energy and water (Smith et al., 2026; Hernandez-Cortes et al., 2026). This makes the question of who pays for data centers and related resources central to policy debate (Mural et al., 2026; Reuters, 2026). Kay et al. (2026) show that data-center growth raises wholesale electricity prices, and Meeks et al. (2026) find that retail prices rise for incumbent customers. That work

[9] Rogerson (1992) shows that the overhead allocation rules in defense procurement lead contractors to distort their input mix, and Eldenburg and Kallapur (1997) and Eldenburg and Soderstrom (1996) find hospitals shifting service mix and cost allocations in response to changes in Medicare reimbursement.

measures what customers pay under existing cost-recovery rules. This paper studies how changing the rule itself affects utility investment.

Section 2 provides institutional background on the utility sector and develops the conceptual framework. Section 3 describes the sample, data, and identification strategy. Section 4 presents the main investment results, and Section 5 the broader impacts on customers and on other goals the regulator is pursuing. Section 6 draws out the implications for the current data-center-driven wave of CWIP adoption, and Section 7 concludes.

2 Institutional Background and Conceptual Framework

2.1 Rate Setting and the Rate Base

Electric utilities operate as regulated monopolies across the United States.[10] In exchange for the exclusive right to serve a geographic area, regulated utilities are subject to oversight by a state public utility commission (PUC). The PUC sets the prices, commonly referred to as rates, that utilities can charge customers. The core objective of the regulator is to replicate the outcome of a competitive market. The regulator sets prices that cover costs, including a fair return on invested capital, while curtailing monopoly profits.

Revenues are typically set through a formal proceeding called a rate case. The utility submits detailed financial data on its costs and asset base to the PUC. The PUC reviews this filing, hears evidence from the utility, consumer advocates, and other parties, and issues an order setting allowed revenues. The allowed revenue is calculated using the following formula:

$$R = (RB \times r) + OE + D + T \tag{1}$$

where R is the total allowed revenue. RB is called the rate base, the value of capital assets on which the utility is allowed to earn a return. r is the allowed rate of return, intended to reflect the blended cost of debt and equity. OE is operating expenses, D is depreciation, and T is taxes, all of

[10] In vertically integrated states, one utility owns generation, transmission, and distribution, all under state commission oversight. In restructured states, generation is opened to competition while transmission and distribution remain regulated (Borenstein and Bushnell, 2015; Joskow, 1997). This paper includes utilities across both, since CWIP legislation and the rate-setting principles described here apply to the regulated portions of restructured markets as well.

which are recovered dollar for dollar with no profit margin. These revenues are then divided among customer classes to set per-unit prices.[11]

Two terms of Equation (1) pay for a completed asset. The utility earns a return on the asset's remaining book value through $RB \times r$, and it recovers the cost of the asset itself through depreciation, D. Depreciation begins only when the asset enters service. It is charged on the asset's capitalized cost, which includes the financing charge accumulated during construction, and is spread over the asset's estimated service life. Each year's depreciation reduces the book value remaining in the rate base, so the return the utility earns on the asset declines as it ages. Under the traditional treatment of construction costs, nothing is recovered before the asset enters service, and the amount eventually recovered depends on the capitalized cost at that date.

That recovery is not guaranteed. The commission rules on it years after the spending. A utility sinks money into construction projects that cannot be relocated and are difficult to resell. Once that money is spent, a commission could leave those assets out of RB, leaving customers better off in the near term. A utility that expects this will build less, or not at all. Commissions therefore commit to admitting that capital into the rate base once the asset is built. Gilbert and Newbery (1994) show that investment holds up better when the commission's power to exclude assets is fixed in advance rather than when the commission can reconsider each asset after the money is spent. The commitment settles which capital enters the rate base but not when it enters.

The utility chooses how much the rate base grows and what kind of capital goes into it. Earning a return on capital but not on operating cost creates the incentive problem known as the Averch-Johnson effect (Averch and Johnson, 1962). Because the allowed return applies to the asset base, utilities have an incentive to hold more capital and to build in more capital-intensive forms, even when doing so is not the most cost-effective way to serve customers. The same asymmetry works against operating efficiency, since spending that expands the asset base earns a return while operational improvements do not (Fowlie, 2010; Cicala, 2015).

[11] Per-unit prices are derived by dividing the total allowed revenue requirement by projected electricity sales, measured in kilowatt-hours. In practice, the forecast is not a major source of regulatory dispute. It is built from historical consumption data adjusted for known load changes, and any error is corrected in the next rate case. The more consequential judgment is the size of the revenue requirement itself.

2.2 Cost Recovery under AFUDC and CWIP

Under traditional regulation, a utility that is building a new asset cannot earn a return on that investment until it is complete and operational. This ties up capital that could otherwise be deployed elsewhere. To compensate for this, accounting rules allow utilities to capitalize the financing charge as an Allowance for Funds Used During Construction (AFUDC). AFUDC is added to the book value of the asset being built and recovered from customers over the life of the asset once it is operational. Completion is not the only condition for recovery. When the asset enters service, the commission also conducts a post-completion review of whether the spending was justified and the plant is actually needed, and it may disallow costs that fail that review. The utility therefore commits capital years before the regulator rules on whether it will be recovered.[12]

CWIP replaces this deferred recovery with current recovery. The utility adds construction costs to the rate base as it incurs them. It earns a return on them immediately. Because these costs now earn a cash return as they are incurred, the utility no longer capitalizes AFUDC on them. The financing charge is recovered in current cash instead of deferred into the asset's book value. In terms of the revenue requirement in Equation (1), CWIP increases RB during the construction period, which raises allowed revenue (and consequently the customer's bill) earlier. The completed asset then enters service with a smaller book value than it would have carried under AFUDC, so the rate base is smaller for the rest of the asset's life. Figure 1 illustrates how this shifts the pattern of revenue collection from customers over the life cycle of a new asset, with CWIP front-loading cash inflows that would otherwise begin only once the asset enters service. The same post-completion review still applies, but under CWIP the utility collects before it is settled, so even if the chance of disallowance is unchanged, it is better off collecting first and refunding any disallowed amount later.[13] Appendix A.2 describes a contested rate proceeding at Oklahoma Gas and Electric that shows how proponents and opponents of CWIP argue the case in practice.

[12]The utility is not entirely uninformed about the likelihood of recovery. The project is authorized before construction begins, and the utility keeps the commission informed as work proceeds, so it has some information on how its costs will be treated. That advance signal lowers the disallowance risk but does not remove it, and the risk it bears is still higher than under CWIP, where the utility has already collected the cash. Online Appendix Table O.7.1 sets out the stages.

[13]CWIP statutes typically pair current recovery with clawback provisions, true-ups or refunds that return disallowed amounts to customers. But because the utility collects during construction and any refund comes later, the time value of money leaves it better off even when the amount refunded equals the amount originally collected.

2.3 The Impact of CWIP on the Firm

The effect of CWIP on investment is not obvious. Under AFUDC the utility is not simply made to wait because the construction costs it defers accumulate a return until they are recovered. If recovery of that deferred balance is highly likely and the return fairly compensates the utility for waiting, then bringing the recovery date forward leaves the investment decision unchanged. This benchmark breaks if any of those conditions fails to hold (Bowen, 1981). Two such mechanisms are a financing constraint and a change in the payoff to investing.

Under the financing channel, CWIP eases a financial constraint. Utility construction is lumpy and front-loaded in cash outlays. Under AFUDC the utility finances the whole construction period and recovers nothing until the plant enters service, so the financing need is largest when the project still earns nothing (Joskow, 1974). The consequence depends on how the utility funds that need. If a utility could raise outside money as cheaply as spending its own cash, the timing would not matter, because it could fund any worthwhile project when the need arose. Utilities do not face such frictionless markets. That is, external finance is costlier than internal cash, so a utility short of cash passes up projects it would otherwise take (Myers and Majluf, 1984; Fazzari et al., 1988; Hadlock and Pierce, 2010). This shortfall binds hardest on the utilities least able to raise outside money, and they build below the efficient level. By delivering cash as construction spending is incurred, CWIP relaxes the constraint and lets a previously constrained utility take on work it could not otherwise fund. Both the utility and its customers benefit. Because the projects CWIP unlocks were worth building all along, this channel implies capacity that is prudently chosen and efficiently run. It predicts a response that concentrates among the utilities that were financially constrained beforehand.[14]

Under the investment-payoff channel, CWIP makes a given project more profitable without making it more affordable. The regulatory formula lets capital earn a return, so a larger asset base increases the utility's profit (Averch and Johnson, 1962; Baumol and Klevorick, 1970). Under AFUDC the utility recovers a larger sum, but only later, the larger amount compensating it for

[14]This was the rationale offered for CWIP in the late 1970s and early 1980s, during the nuclear construction era that preceded the wave studied here. The General Accounting Office described a utility's ability to fund construction from internal funds as a measure of financial integrity that determines what it pays for outside capital (U.S. General Accounting Office, 1980). Brigham (1981) argued that CWIP treatment would in turn lower a utility's cost of debt.

the wait. CWIP lets it collect a smaller amount now instead. The utility builds when the smaller amount collected now is worth more in present value than the larger amount collected later. The direction of that comparison depends on the allowed return. Approved returns carry a persistent premium over the cost of equity, so capital in the rate base earns more than it costs to fund, and utilities hold two to four percent more capital for each additional percentage point of approved return on equity (Dunkle Werner and Jarvis, 2026). CWIP starts that earning during construction rather than at completion. The gain is larger when the regime allows a higher return, so the comparison tips toward building under a laxer regulatory regime. Existing work finds this link in other dimensions of utility behavior (Cambini and Rondi, 2010).

Two implications follow from that comparison. The projects CWIP unlocks are more likely to be the ones closest to the margin, so the extra building is more speculative than what the utility would otherwise have chosen. Nezlobin et al. (2012) show why the timing of recovery matters. Under rate-of-return regulation, the point at which the utility is allowed to recover its costs determines whether the price customers pay matches what the service actually costs to provide. CWIP moves that point as early as it can go.

The argument so far assumes managers simply follow the payoff the regulatory formula sets in front of them. Short horizons or agency problems inside the firm would only strengthen this response, and the paper does not test for either. The two channels are not mutually exclusive, and CWIP could ease a constraint and raise the payoff to investing at the same time.

2.4 The Historical CWIP Wave

The focus of this study is the historical wave of CWIP adoption, the 13 states that authorized it between 2002 and 2012. The motivations for adoption varied but shared a common thread, the aim of getting large projects built ahead of anticipated demand. Florida's 2006 statute was enacted amid projections of rapid residential and commercial load growth (Blackburn and Runkle, 2007). South Carolina, Georgia, and Virginia cited the need to finance new nuclear capacity and manage capital costs over long construction timelines (Bartelme, 2017).[15] Mississippi, Louisiana, and most of the other adopters cited anticipated load growth and the need to attract large industrial

[15] Virginia authorized CWIP in 2000, the first year of the panel, so it has no pre-adoption period and is excluded from the estimation sample with the other pre-2001 adopters.

investment, motivations that closely mirror the data-center recruitment arguments heard in Missouri and Oklahoma today.[16]

In several of these cases, the demand forecasts underlying the investments did not materialize. Florida projected robust load growth that slowed sharply after 2008. Virginia's nuclear expansion plans were scaled back as demand fell below expectations. The result in both cases was that customers financed capacity that turned out not to be needed. That risk applies directly to the current wave. The amount of data-center load that will actually materialize is uncertain, and utilities themselves have limited insight into how much new generating capacity they will need (Mehta, 2025). The regulatory structure is the same in both periods, and so is the regulator's motive, which is to attract investment. That is what makes the comparison informative. I provide more detail on the current, data-center-driven wave in Section 6.

3 Sample, Data, and Identification

3.1 Sample Construction

Electric utilities in the United States vary along two organizational dimensions that jointly determine whether CWIP applies. The first dimension is ownership form. Utilities take one of three ownership forms: investor-owned (IOUs), state-owned, or cooperative. IOUs operate on a for-profit basis and are therefore subject to comprehensive oversight by state public utility commissions, which set the prices they can charge and the returns they can earn. State utilities and cooperatives are nonprofit and receive less oversight. The second dimension is function. A utility may distribute power, selling it to end customers, or it may only generate power for sale into wholesale markets at market prices. A utility is regulated only when it distributes power because distribution is the monopoly part of the business. IOUs that operate only on the generation side form a separate group, the independent power producers (IPPs), which face lighter regulation and are not exposed to CWIP because they recover costs through wholesale market prices rather than a regulator-set rate base. CWIP therefore applies at the intersection of these two dimensions, that is, to IOUs that distribute power and recover costs through a regulated process. I refer to this group as regulated utilities throughout the paper.

[16] Appendix B, Panel A, lists the statute or commission action that authorized CWIP in each state.

The IOU organizational structure consists of a small set of parent holding companies sitting above a larger set of operating utilities. The Edison Electric Institute counts 44 parent-company electric utilities in the United States at the end of 2023, of which 39 are publicly traded (Edison Electric Institute, 2024). Southern Company illustrates the corporate structure of these utilities. It operates through separate subsidiaries including Georgia Power, Alabama Power, and Mississippi Power, each of which serves a distinct state and files independently with its state regulator. Approximately 75 percent of these operating utilities report retail sales in a single state. Because CWIP is adopted at the state level, the operating utility rather than the parent is the natural unit of analysis, and I refer to these operating subsidiaries as firms throughout the paper. Within this structure the analysis uses three units of observation that nest inside one another, the operating-subsidiary-level utility (firm), the plant, and the generator. A generator is a single machine that produces electricity. A plant is the physical facility at one site that houses one or more generators, together with the land, buildings, and connection to the power grid they share. A utility owns one or more plants.

3.2 Data Sources

The empirical analysis draws on regulatory filings that U.S. electric utilities submit to three federal agencies, the Energy Information Administration (EIA), the Federal Energy Regulatory Commission (FERC), and the Environmental Protection Agency (EPA).[17]

Plant and generator construction data come from EIA Form 860 (the Annual Electric Generator Report), which every U.S. electric power plant is required to file. For each generating unit, the form records the year construction began, the proposed and actual in-service dates, and whether the project was canceled or suspended. It covers both regulated utilities and IPPs. Operating and demand-side variables come from EIA Form 861 (the Annual Electric Power Industry Report), which all electric utilities file and which reports each utility's retail operations, including sales, customer counts, and outage statistics.[18] Some items are reported for the utility as a whole and others separately for each state in which the utility operates.

[17]The EIA forms, FERC Form 1, and the EPA data used in the analysis are mandatory filings, so which utilities appear in the panel does not reflect a disclosure choice.

[18]In 2023, 177 investor-owned utilities filed Form 861, of which 144 both distribute power and report retail customers. Form 861 does not identify a utility's parent, so this count and the Edison Electric Institute count of parent companies in Section 3.1 come from different sources and are not linked to one another.

The FERC Form 1 financial statements are the regulated-utility analog of a public company's annual 10-K report, filed for regulatory oversight rather than investor disclosure. I access them through the Public Utility Data Liberation (PUDL) project.[19] Generating-unit utilization comes from the EPA's Continuous Emissions Monitoring System (CEMS), which records the hourly electricity output of fossil-fuel generating units larger than 25 megawatts.[20]

Additional data sources support specific subsections. Bond-issue characteristics used in the credit analysis, including the credit rating, maturity, and coupon on each new issue, come from S&P Capital IQ new-issues data. EIA Form 861 reports outage statistics from 2013 onward, so outage measures for 2000 through 2012 come from the Lawrence Berkeley National Laboratory utility reliability compilation (the Berkeley compilation). Customer satisfaction scores are from the J.D. Power Electric Utility Residential Customer Satisfaction Survey, which is publicly available from 2006. State-level regulatory variables are hand-collected from rate case notes issued by S&P Regulatory Research Associates (RRA), state regulator websites, the American Council for an Energy-Efficient Economy (ACEEE), the National Association of Regulatory Utility Commissioners (NARUC), and individual state renewable portfolio standard statutes.[21]

3.3 Identification Strategy

The empirical specification compares regulated utilities in treated states to regulated utilities in never-treated states, in a stacked difference-in-differences design (Baker et al., 2022; Cengiz et al., 2019; Barrios, 2021) exploiting the staggered timing of CWIP adoption across states. In each year that one or more states adopt CWIP, I construct a cohort. The cohort pairs all regulated firms treated in that year with a corresponding set of never-treated regulated control firms. The treated group consists of firms operating in states that enacted CWIP legislation between 2002 and 2012, as listed in Appendix B. Treatment is assigned at the state level in the year of adoption, and a firm is considered treated from that year onward. Where a firm operates in multiple states and only some of those states adopt CWIP, treatment is assigned in the year any of the states implements

[19] PUDL is a nonprofit initiative that cleans, standardizes, and publishes FERC data in analysis-ready formats. I apply additional cleaning to the raw PUDL output, including verifying data consistency with the original filings.

[20] I link CEMS to EIA-860 through a generator-level crosswalk. The linking and cleaning process is documented in Online Appendix Section O.2.1.

[21] ACEEE (`https://www.aceee.org`) publishes a state energy-efficiency scorecard and NARUC (`https://www.naruc.org`) publishes regulatory policy summaries.

CWIP. The control group comprises firms operating exclusively in never-treated states, i.e., states that had not adopted CWIP as of the end of the sample period in 2023. Always-treated firms, those in states that adopted CWIP before 2001, are excluded because they have already adjusted to CWIP, so comparing newly treated firms against them could understate the response.[22]

I use the following difference-in-differences specification. For unit i in cohort c in year t,

$$Y_{i,c,t} = \delta \left(\text{Treat}_{i,c} \times \text{Post}_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t}, \tag{2}$$

where $\text{Treat}_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $\text{Post}_{c,t}$ equals one in years on or after the cohort's adoption year. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, where the unit is the level at which the outcome is measured, a generator or a utility. $\alpha_{t\times c}$ is a year-by-cohort fixed effect, absorbing anything common to all units in a cohort in a given calendar year, such as fuel prices, interest rates, and national demand conditions. Standard errors are clustered at the utility-by-cohort level.[23] Identification comes from cross-state variation in adoption timing within the regulated arm.[24]

The specification compares 53 regulated utilities in 13 treated states against 62 regulated utilities in 14 never-treated states. These 27 states are every state that had not adopted CWIP before 2001. The two groups overlap, because 18 utilities operate in both a treated and a never-treated state and so enter both, and the sample contains 97 distinct utilities. Table 1 reports descriptive statistics for the sample. Several of the patterns that follow are already visible in the unconditional means. Treated regulated utilities carry a construction-work-in-progress balance roughly twice that of their never-treated counterparts, 7.3 versus 3.8 percent of lagged assets.[25] They operate more total capacity, about 3,500 versus 2,200 megawatts. They also build lower in the capital-intensity

[22] Twenty-three states and the District of Columbia allowed CWIP before 2001, most of them adopting it during the nuclear construction era of the 1960s and 1970s. Appendix B, Panel C, lists them with their adoption years.

[23] Online Appendix Section O.3 reports standard errors clustered at the state level.

[24] Some outcomes are also estimated on a within-state design, which compares regulated utilities to independent power producers in the same state and year. Independent power producers face the same local conditions but are not rate-regulated, so CWIP does not reach them. Online Appendix Section O.4 sets out the specification, and Section 4.5 discusses what it adds.

[25] Every utility that is building reports a construction-work-in-progress balance on its balance sheet, whether or not its state allows CWIP recovery. The policy governs whether that balance enters the rate base and earns a current return, not whether it is recognized.

ordering, a rank of 1.9 versus 4.3, where the ordering runs from one for the cheapest capacity per kilowatt to eight for the most expensive.

I use symmetric estimation windows around the cohort's adoption year that span ±5 years unless otherwise specified. The sample starts in 2000, so a wider window would truncate the pre-period for most cohorts and leave more post-adoption years than pre-adoption years. The ±5 window also keeps a cohort's post-period from overlapping unrelated state-environment shocks. Most of the outcomes move quickly enough after adoption that the tighter window does not lose the response. I re-estimate the main specifications at ±7, ±10, and ±15 years in Online Appendix Section O.3, and the results are qualitatively similar.

I control for state characteristics that could confound the estimate, all measured at the state-year level. The state energy-policy controls are indicators equal to one when the state has the policy in force that year. These are a multi-year rate plan, a performance incentive mechanism, revenue decoupling, securitization, and a restriction on recovering performance-based executive compensation.

A second set of indicators describes the regulatory and political environment rather than a policy the utility can invoke. These are the use of a historical rather than a forward-looking test year for rate setting, an average rather than a year-end rate base, and the election of commissioners instead of their appointment. Two political controls also enter, a Republican governor and full Republican control of the state legislature. I also control for state policies that promote renewable energy. Three measures capture a state's renewable portfolio standard (RPS), an indicator for a mandatory standard, the binding target under that mandate, and an indicator for a state with only a voluntary standard. For a utility operating in more than one state, the energy-policy indicators equal one if any of its states has the policy in force. The environment variables and the two RPS indicators enter as the share of the utility's states with the attribute, and the RPS target is weighted by the utility's revenue share in each state. Detailed definitions of these policy controls are in Appendix C.

Demand controls all enter with a one-year lag. They comprise state-level retail electricity sales, which absorb the demand-pressure variation that may drive both CWIP adoption and investment behavior, log state real GDP, log heating degree days, and log cooling degree days. At the firm level these are weighted by the firm's revenue share in each state.[26]

Every specification also includes a size control, measured at that specification's unit of analysis. Generator-level specifications use the natural log of the generator's nameplate capacity, utility-state-year specifications use the log of the total nameplate capacity the utility owns in that state, and the FERC Form 1 specifications use the log of total assets. All continuous firm-level variables are winsorized at the 1st and 99th percentiles to limit the influence of outliers.

4 Main Results

I organize the main results in five subsections. Section 4.1 establishes how CWIP changes the investment and construction decision. Section 4.2 examines the construction process. Section 4.3 describes the characteristics of the investment itself. Section 4.4 asks what drives the investment response. Lastly, Section 4.5 sets out what the design cannot settle.

4.1 Impact on Investment

I begin by examining how much utilities invest. I look at financial-statement numbers, expecting a utility that is building more to report more spending on capital assets and more cost tied up in projects that are not yet in service. I estimate Equation (2) on two such measures. *Capex* is annual capital expenditure scaled by lagged total assets, recording what the utility spent on capital assets during the year. *CWIP_ balance* is the construction-work-in-progress balance, scaled by lagged total assets, recording the accumulated cost of construction the utility has begun but not yet completed.

Panel A of Table 2 reports the estimates. Capital expenditure is 1.1 percentage points higher after adoption, about 16 percent more than the 6.9 percent of assets a never-treated utility spends in an average year. The same holds for the construction-work-in-progress balance, which is 2.0 percentage points higher, about 50 percent more than the 3.8 percent of assets a never-treated utility carries in construction at any one time.[27] Panels A and B of Figure 2 trace the two outcomes

[26]Heating degree days (HDD) and cooling degree days (CDD) measure how far daily average temperature falls below or rises above a 65-degree Fahrenheit baseline, accumulated over the year. They are standard proxies for weather-driven electricity demand.

[27]In untabulated results, two further financial-statement measures are consistent with these estimates. Net utility

in event time. In both cases, the pre-adoption coefficients are flat and statistically indistinguishable from zero, supporting the parallel-trends assumption.

Financial-statement numbers have two limitations. They are reported for the utility as a whole, so a utility that operates in more than one state files one consolidated statement, and what it spends in a state that adopted CWIP cannot be separated from what it spends in a state that did not. They are also shaped by the rule under study since part of what a utility reports as capital expenditure and as construction work in progress is a carrying cost that CWIP itself replaces with cash.[28] To address both limitations, I use a direct measure of construction activity, which is recorded at the state level.

I use EIA Form 860, which records construction timelines for each generating unit. The outcomes are the number of new construction starts, the megawatts of those new starts, and the utility's built capacity, the total nameplate capacity of every generating unit it has finished building, each measured for a utility in a state in a given year.[29] Panel B of Table 2 reports the estimates, and all three are consistent with the financial measures. After adoption, a treated utility begins construction on about 0.4 more generating units a year in an adopting state, roughly two more over five years. It starts about 35 more megawatts of new capacity, more than twice the 15 megawatts a never-treated utility starts in an average year. Its built capacity is also about 202 megawatts higher. Across both the financial and the physical measures, the evidence is consistent with CWIP raising utility investment.

4.2 Construction Timing

Next, I look into CWIP's impact on the construction process. A construction project passes through four milestones. The utility files for approval, the commission approves the project, the utility starts construction, and the plant reaches commercial operation.[30] The two accounting

plant in service per megawatt-hour sold and the year-on-year growth in production plant are both higher after adoption and statistically significant.

[28]Under AFUDC the utility capitalizes a carrying cost on construction into the recorded cost of the asset, and this capitalization raises both reported capital expenditure and the reported construction-work-in-progress balance. CWIP substitutes current cash recovery for that accrual, so for a given amount of real building the reported figures grow more slowly after adoption. The bias runs against the estimates above.

[29]Nameplate capacity is the maximum output a unit is rated to produce, measured in megawatts.

[30]Online Appendix Section O.7 lays out these four stages in detail and contrasts how AFUDC and CWIP recover construction costs at each one.

regimes differ in which milestone starts the cash inflow. Under traditional AFUDC accounting, recovery begins only when the plant reaches commercial operation. Under CWIP, it begins when the utility starts construction. That difference pulls completion time in two opposing directions. Because AFUDC pays nothing until the plant operates, the utility has a strong reason to finish quickly and begin earning, whereas CWIP lets it earn during construction and so weakens that urgency. Taken alone, this would slow completion (Olson et al., 2025). But waiting for recovery also means the utility must fund the project out of its own constrained cash while earning nothing, and that financing pressure can itself hold up construction. CWIP delivers cash during construction and eases the pressure, which would speed completion.

CWIP can also change when a project starts, by shifting the risk the utility carries while it waits. Any decision to build rests on a forecast of demand years ahead, and holding off lets the utility predict that demand more accurately before it commits. Under AFUDC the utility funds construction at its own risk until the plant enters service, and the value of waiting is high. Under CWIP the utility recovers that spending in stages as construction proceeds, so the value of waiting falls (Teisberg, 1993; Dixit and Pindyck, 1994). A utility under CWIP should therefore commit earlier on a less certain forecast of demand.

I test these predictions on four measures of a project's schedule. They are the completion delay against the date proposed at filing, the gap from approval to the start of construction, the construction time itself, and the planned duration. These outcomes are properties of a project, so the unit of observation changes to individual construction projects. Each construction project is a single generating unit, and it enters the sample once. The four outcomes are measured on the same projects, those observed at every milestone. I modify Equation (2) as

$$Y_{i,c} = \delta \left(\text{Treat}_{s,c} \times \text{Const\_Post}_{i,c}\right) + X'_{i,c}\gamma + \alpha_{u\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c}, \tag{3}$$

where i indexes a construction project undertaken by utility u in state s with construction-start year t. $\text{Treat}_{s,c}$ equals one for a project in a state that adopts CWIP in cohort c and zero for a project in a never-treated state. $\text{Const\_Post}_{i,c}$ equals one for a project whose construction started in or after cohort c's adoption year. The terms $\alpha_{u\times c}$, $\alpha_{s\times c}$, and $\alpha_{t\times c}$ are utility-by-cohort, state-by-cohort, and start-year-by-cohort fixed effects. They hold fixed, in turn, what a utility typically builds, the conditions a project faces in its state, and anything common to projects that start in the same year, such as borrowing costs.

I begin with the completion delay. When a project is filed, the utility states the year it expects the plant to be in service. Form 860 records that proposed date and the year the plant actually reaches commercial operation. The completion delay is the actual year of commercial operation minus the year the utility proposed at filing, so a positive value means the project finished later than the utility had planned. Column (1) of Table 3 shows that the delay falls by about 2.0 years, indicating a project built under CWIP is less likely to overrun the planned completion date. Panel C of Figure 2 traces the same outcome in event time and shows flat, statistically insignificant pre-adoption coefficients. CWIP therefore moves projects toward finishing on time, the opposite of the slower completion its critics predict.

Next, I examine which stage is driving the results. I split the project timeline at the start of construction into two stages. The first stage is the post-approval gap, the time from approval to the start of construction. Column (2) shows that it shrinks by about a year, so once a project is approved, treated utilities move into construction sooner. The second stage is the construction time, the time from the start of construction to commercial operation. Column (3) shows that it is shorter as well, by about 3.0 years.

The faster completion could be a filing artifact, since a utility could file a longer schedule to post a shorter delay. Column (4) shows that the planned duration is not lengthened. If anything it is shortened, by about 2.5 years, which would push the measured delay up, not down, and so would cut against the filing-artifact reading. In untabulated results the interval between filing and approval does not differ either, so the result is not driven by quicker regulatory approval. On net, CWIP speeds projects along at both stages of the timeline, with the larger movement in the construction stage itself.

4.3 Nature of the Investment

The results so far show that CWIP raises the level of investment and speeds the construction process. A higher level of investment does not by itself distinguish over-investment from the correction of earlier under-investment (Biddle et al., 2009). I look at three characteristics of the investment CWIP produces. The first is the capital intensity of the capacity added. The second is construction project cancellation. The third is how intensively the new capacity is used. None of the three is a welfare benchmark, but together they characterize the investment.

4.3.1 Capital Intensity

I start with the kind of capacity treated utilities choose to build. Because a utility earns its allowed return on every dollar of capital, the classical prediction is that regulated utilities over-capitalize, favoring more expensive, capital-intensive assets (Averch and Johnson, 1962; Johnston, 1979). I measure capital intensity with a rank that orders generator technologies from the cheapest to the most expensive to build per kilowatt of capacity. The rank captures what capacity costs to build, not what it costs to run. The ordering follows each technology's overnight capital cost per kilowatt in the EIA Annual Energy Outlook (AEO) 2010, where overnight cost is what a unit of capacity would cost to build if it could be built instantly, before any of the financing charges that accumulate while the plant is being built. Gas combustion turbines are the cheapest technology and receive rank one. Nuclear is the most expensive and receives rank eight.[31]

I estimate Equation (3) on this rank. Panel A of Table 4 shows that the rank falls by 1.57 toward the cheaper end, with treated regulated utilities averaging 1.9 and their never-treated counterparts 4.3, a decline of about a fifth of the eight-point scale and roughly half a standard deviation. The within-state design is consistent with this (Online Appendix Table O.4.2, Panel C). The results are also consistent if we re-estimate the specification using each technology's overnight cost per kilowatt in place of the rank.[32] The capacity built under CWIP is cheaper per kilowatt to

[31] The full ordering, defined at the generator level, is (1) gas combustion turbine, (2) oil, (3) gas combined cycle, (4) wind, (5) hydroelectric, (6) coal, (7) solar, and (8) nuclear. A gas generator is classified as combined cycle only if its nameplate capacity is at least 300 megawatts; smaller gas generators are treated as combustion turbines and take rank one. The threshold separates the larger combined-cycle configurations, which carry the higher per-kilowatt capital cost of that technology, from the smaller peaking turbines. The rank is ordinal and encodes only the ordering of technologies by installed cost.

[32] Online Appendix Section O.6.1 shows that treated utilities build capacity that is roughly \$715 and \$1,089 per kilowatt cheaper when valued at the 2003 and 2010 AEO cost schedules, which are contemporaneous with the sample's

build, not more expensive, so the investment does not follow the over-capitalization prediction.[33]

4.3.2 Project Cancellation

The results so far speak to projects that reach completion. A project can be canceled before construction starts or after it is under way. Relative to traditional AFUDC accounting, CWIP does not change the decision for the first group. Canceling before construction carries the same financial implication under both regimes, because CWIP recovery does not begin until construction starts. CWIP changes the cost of cancellation once construction has started. Once a project starts construction, the utility begins recovering its construction spending. If the project is then canceled, the utility in some cases still recovers what it has already spent, and even where the commission later reverses that recovery, the utility loses less on a present-value basis than it would under AFUDC. CWIP therefore lowers the penalty for abandoning a project mid-construction.

The lower penalty also changes when a project starts, not only when it stops. Every project is based on a forecast of future demand. That forecast becomes more reliable the longer the project remains in planning. Time in planning therefore works as a screen, since a weak demand case becomes apparent before any money goes into construction. A utility that stands to lose less from walking away can commit while the forecast is still uncertain. CWIP may lead utilities to start construction on marginal projects that under traditional accounting they would have canceled before construction began.

I begin with cancellation after construction starts. I estimate Equation (3) with *Cancel_after_construction* as the outcome, which equals one for a project that started construction and was then canceled before reaching commercial operation. The specification is otherwise the one used for the construction-timing outcomes. Treatment is dated by the construction-start year, with *Const_Post* equal to one for a project that started construction in or after its cohort's adoption year. Each project contributes a single observation. Column (1) of Panel B of Table 4 reports the estimate. Treated regulated utilities are about 15 percentage points more likely to cancel a project mid-construction than never-treated regulated utilities.

construction decisions.

[33] The fall in capital intensity comes from a shift toward cheaper natural gas and away from coal. The full estimates are reported in Online Appendix Table O.6.2.

I next examine cancellation before construction starts. A project enters this analysis once it first appears on Form 860's planned-generator schedule. If it is later flagged as canceled or indefinitely postponed without ever starting construction, the outcome *Cancel_ before_ construction* equals one for it. I date treatment by the year the project first appeared as planned, replacing *Const_ Post* in Equation (3) with *Prop_ Post* and the start-year-by-cohort fixed effect with a proposal-year-by-cohort fixed effect. Because Form 860 records planning-phase entries for a subset of projects, this column is estimated on roughly half as many projects as the after-construction-start margin.[34] The estimate in column (2) of Panel B is negative, at −0.69. The magnitude is too large to interpret as a probability shift, but the negative sign is informative. Fewer projects are dropped in planning after CWIP adoption, and the within-state design is consistent with it (Panel D of Online Appendix Table O.4.2).

The shift between the two stages can also be seen directly (Online Appendix Table O.8.1). I look at the fraction of canceled projects whose cancellation came after construction started rather than before. For treated utilities this share rises from 0.07 before adoption to 0.52 after, while for never-treated utilities it falls slightly, from 0.18 to 0.14. Because it is computed only among canceled projects, and on few of them for the treated group, this is descriptive, not an estimate. It is consistent with the increase in mid-construction cancellation in column (1).

Taken on its own, more mid-construction cancellation would not indicate over-investment. A project that turns out not to be needed should be stopped, and stopping it is the right decision whenever that becomes clear. The informative fact is that the two margins move in opposite directions. Cancellation rises after construction starts and falls before it, so projects that would once have been dropped in planning are instead carried into construction and abandoned there, after customers have begun paying for them. The screening moves from before the commitment to after it, the pattern expected when a utility commits to a project before its demand case is settled.

[34]Form 860 requires a planned generator to be reported only within five years of its expected in-service date, or ten for coal and nuclear, so long-lead projects can reach construction without appearing as planned, and the subset under-represents projects most likely to be dropped in planning. Because that rule is federal, not state policy, it applies to both arms and shifts the level, not the difference, unless CWIP also changed which projects are proposed.

4.3.3 Capacity Utilization

The last characteristic I look at is how intensively the new capacity is used. If CWIP leads utilities to build more capacity than the system needs, that capacity should run less than comparable capacity. There is no direct measure of how idle a plant is, so I use three proxies. The first two, the capacity factor and the share of days operating, are built from EPA CEMS data at the generator-year level. The capacity factor is the electricity a unit actually generated over the year divided by the electricity it would have generated had it run at full output the whole year. The share of days operating is the fraction of days in the year when a unit generated any power, capturing how often the units run.[35] The third, the standby share, is built from EIA-860 at the plant-year level. It is the share of a plant's installed nameplate capacity that is held in standby or out-of-service status. The numerator is the nameplate capacity of units flagged as standby or out of service; the denominator is the plant's total installed nameplate capacity. All three outcomes are measured on capacity that has to be built before it can be observed, and construction takes several years, so the specification carries a wider event-time window than the paper's baseline, ± 10 years rather than ± 5. The lag is most direct for the two CEMS measures, since CEMS records a unit only once it is operating and a plant built under CWIP does not reach operation until construction finishes.[36]

Panel C of Table 4 reports the estimates from comparing the utilization of fossil generators that came into service under CWIP in treated regulated states with that of comparable generators in the control group. The capacity factor falls by about ten percentage points and the share of days operating by about three percentage points.[37] Both estimates go the same way, indicating that newly built capacity under CWIP runs less than comparable capacity in the control group.

Lower utilization can mean one of two things. The first is that CWIP changes the kind of unit a utility builds, toward units designed to run only part of the year. Gas combustion turbines,

[35] Capacity factor is gross load, the total electricity the unit produced during the year, divided by nameplate capacity, the maximum output the unit is rated for, times the 8,760 hours in a year, that is, gross load / (nameplate capacity $\times$ 8,760). Online Appendix Section O.2.2 describes the underlying data and the screens applied to both measures.

[36] The CEMS panel covers about half the utilities of the EIA panel, a further reason for the wider window on the event-time counts.

[37] Aggregating utilization to the utility-year level gives the same reading. The utility-level estimates, reported in Online Appendix Table O.9.1, indicate that the lower utilization shows up across the utility's fossil generators, not only the newly built units.

the cheapest technology on the capital-intensity rank, are built to meet peak demand and sit idle the rest of the time, so a utility that builds more of them reports a lower capacity factor even if it runs each unit exactly as it did before. The second is that units of a given kind are simply run less than they used to be. To tell the two apart I add fixed effects for the fuel a unit burns and for the kind of machine it uses, so the comparison is between units of the same type (Online Appendix Table O.9.2). With type held constant, the capacity-factor decline shrinks by about 60 percent but remains, and the decline in the share of days operating becomes statistically insignificant. Most of the fall in utilization therefore comes from the kind of capacity CWIP leads utilities to build, and a smaller part from how units of a given kind are run. The type fixed effects absorb part of the treatment response, because Section 4.3.1 shows that CWIP itself shifts construction toward cheaper technologies.

The standby-share estimate in column (3) of Panel C is small and statistically indistinguishable from zero. The lower utilization therefore shows up in the output of units that remain in service, rather than in capacity being taken out of service altogether.

Customers begin paying for this capacity while it is under construction, and the estimates suggest that once it enters service it runs less than comparable capacity in states without CWIP. However, I cannot say what the right utilization rate is, since some spare capacity is necessary by design to meet peak demand and cover outages. The lower utilization may also reflect capacity built for forecast demand growth that did not materialize, and not deliberate over-building.

4.3.4 What the Three Characteristics Show

In summary, I find that the capacity added under CWIP is cheaper per kilowatt, more of the projects that start are abandoned before completion, and capacity utilization falls.

Beyond these three characteristics, I also look at retirement. Gowrisankaran et al. (2026) show that regulated utilities are slow to retire capacity, holding older units in service to keep earning a return on them. In Online Appendix Section O.10 I compare the generators that treated regulated utilities retire with those retired by never-treated regulated utilities, and I find that treated utilities retire later. A generator remains on the utility's books until it is retired, so retiring later extends the period over which the asset can earn a return. I keep this out of the main analysis because it is estimated on the small number of generators retired during the sample period, and the estimates are sensitive to the event-time window. The direction of the results is consistent with treated utilities keeping older capacity on their books for longer.

These results do not settle whether the investment is efficient. There is no benchmark for the right utilization rate or the right cancellation rate, and the design cannot separate capacity built for demand that never arrived from capacity built because the rule made building attractive. The results do characterize the nature of the investment CWIP produces. Utilities build more capacity. In addition, utilities with CWIP build that capacity more cheaply, commit to it earlier, abandon more of it mid-construction, and run it less once in service. Utilities in treated and never-treated states face the same uncertainty about future demand, so the difference between them points to CWIP rather than to forecasting.

4.4 Drivers of the Investment Response

Sections 4.1 through 4.3 establish that CWIP raises investment. This section asks what drives that response. I test two channels. The first is the financing constraint. The second is the investment payoff.

4.4.1 The Financing Constraint

If CWIP relaxed a binding financing constraint, the relief should surface in two places, the utility's internally generated funds and the terms on which it borrows. I start by looking at financial statements. If the constraint eases, internally generated funds should grow faster after adoption. Table 5 reports year-over-year growth rates of key financial numbers across the ± 5, ± 10, and ± 15 year windows. Revenue growth is about 5.2 percentage points higher at the ± 10 and ± 15 windows. Cash revenue (operating revenues less the increase in receivables) grows almost as fast, by about 3.7 to 4.0 percentage points, consistent with CWIP letting the utility bill a return on construction balances earlier. Higher operating-expense growth appears to offset those gains, leaving growth in operating income, net income, and cash flow from operations indistinguishable from zero at every window. This makes it less likely that CWIP eases a financing constraint by expanding the internal funds available for investment.

CWIP brings a utility's cost recovery forward into the construction period, which improves the timing of its cash flows and matters directly to its bondholders. Cash flows that arrive earlier should, other things equal, improve the terms on which the utility borrows. I look at three measures, the issuer's credit rating, the maturity of new debt, and the coupon at the time of issuance. The sample is limited to utilities covered by S&P, and the outcomes are measured at the firm-year level.[38] The rating is the S&P long-term issuer rating on a 1 to 22 numeric scale, where a higher value is a better rating. The maturity and the coupon are firm-year averages taken over the utility's newly issued fixed-rate bonds.[39]

Results in Table 6 indicate that credit quality does not deteriorate. At the firm-year level the estimated change in the rating is 0.23 notches and is indistinguishable from zero. Measured on the individual security instead, the rating on newly issued debt is about 1.3 notches higher (Online Appendix Table O.11.2). I read that as suggestive of an improvement rather than as an established upgrade, for two reasons. An upgrade is a change in the utility's own standing as a borrower, and the issuer rating does not move. The security-level estimate is also significant only when the standard errors are clustered on utility by cohort, as in the table, and not when they are clustered on states.

The term of new debt does move after CWIP. Treated regulated utilities issue shorter-dated debt, with the firm-year average maturity at issuance falling by 4.25 years in column (4) of Table 6.[40] That is roughly a fifth of the average maturity of the debt these utilities issued before adoption. The shortening is concentrated among the longest-dated issues. In untabulated results, the share of new issues running beyond 30 years falls by nine percentage points, from a base of 15 percent.[41] The direction runs against the usual pattern, in which regulated utilities are among the firms that borrow longest (Barclay and Smith, 1995). It tracks CWIP's retiming of the utility's cash flows, since recovery now begins during construction, years before the plant enters service. Timing

[38] The results are robust to estimating the same three outcomes at the individual-security (bond-issue) level, with each debt issue entering as its own observation. Online Appendix Section O.11.2, Table O.11.2, reports these estimates.

[39] The coupon and maturity results are robust to weighting each bond by its face value, the original principal amount. The principal-weighted averages are reported in Online Appendix Section O.11.1, Table O.11.1. The firm-year rating carries no such weighting, since it is the utility's issuer rating.

[40] Estimating the same regression at the security level gives 3.4 years, reported in columns (4)-(6) of Online Appendix Table O.11.2.

[41] The share running beyond 20 years falls by 12 percentage points from a base of 54 percent, in the same direction, though it is not statistically distinguishable from zero.

information of this kind shows up in the term of new debt, not in its coupon or in the issuer's rating (Diamond, 1991; Goyal and Wang, 2013; Custódio et al., 2013).[42] The same retiming shows up elsewhere on the balance sheet. Total long-term leverage does not move, but short-term leverage falls, consistent with construction being funded from current recovery rather than from short-term borrowing. What changes is the mix of financing, not the utility's overall reliance on debt (Online Appendix Section O.12, Table O.12.1).

The coupon moves down as well, by about 11 basis points in column (6) of Table 6, though not by enough to be statistically distinguishable from zero. That movement tracks the shorter term of the debt, which reflects the timing of the utility's cash flows, not a repriced risk premium (Stohs and Mauer, 1996; Guedes and Opler, 1996).[43] On balance, the evidence suggests no deterioration in credit quality, which is consistent with CWIP shifting the risk of the construction program onto customers rather than onto the firm (Clarke, 1980; Norton, 1985). The results also stop short of showing that credit quality improves.

The two tests so far cover the utility's own funds and the lenders who finance it. The remaining party with a claim is the shareholder. Equity is issued by the parent holding company, so the question has to be asked at the parent level. Online Appendix Section O.13 reports such a test on a parent-year panel, in which CWIP exposure is the share of the parent's electricity sales made in adopting states. A construction dollar is worth less to shareholders as exposure rises, not more. That is the opposite of what relief from a binding financing constraint would produce, and is more consistent with CWIP making it worth starting projects that would not otherwise have been built. The test does not use the paper's research design, so I read it as a suggestive association.

Overall, the results agree. Internal funds do not expand, and credit quality does not deteriorate but neither does it clearly improve. Timing is what moves instead. Debt maturity shortens, and the coupon falls only to the extent that shorter debt is cheaper, both consistent with

[42] A natural alternative is that CWIP, as a change in the regulatory regime, raises the policy uncertainty the utility faces, which would push maturity the other way, toward longer-dated debt (Datta et al., 2019). The mechanism here runs the other way. CWIP resolves uncertainty about when the utility's construction cash flows arrive instead of adding to it, so the financed horizon shortens.

[43] Estimated on individual securities, the coupon effect is about 24 basis points, roughly two thirds of which follows from the shorter term rather than from a lower price of credit. The remaining third is estimated too imprecisely to say whether the price itself moved. Online Appendix Table O.11.2, columns (7)-(9), and Online Appendix Section O.11.3, Table O.11.3, report these estimates.

CWIP pulling the utility's cost recovery forward rather than loosening a limit on the funds available to invest.

4.4.2 The Investment Payoff

CWIP also changes what a utility stands to earn from investing. A project is worth more when the allowed return on it is higher, and worth more again when that return arrives sooner. If this is what drives the investment response, two things should hold. The first is that the payoff from a construction project is higher under CWIP than under AFUDC. The second is that the investment response is larger where that payoff rose the most.

Under AFUDC a utility accrues a carrying charge on money committed to construction and recovers nothing in cash until the plant enters service. CWIP instead pays the allowed return on the construction balance as construction proceeds. The payoff from investing is therefore higher under CWIP whenever the carrying charge accrues at less than the allowed rate of return.[44]

To test whether the response is larger where the payoff rose the most, I add a triple interaction to Equation (2),

$$Y_{i,c,t} = \delta\left(\text{Treat}_{i,c} \times \text{Post}_{c,t} \times \text{Mod}_i\right) + \lambda\left(\text{Treat}_{i,c} \times \text{Post}_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t}, \quad (4)$$

where Mod_i is a characteristic of the regulatory environment the utility faces that stands in for how much adoption changed the payoff, and δ measures how much larger the CWIP response is where that characteristic is higher. I use two moderators. *RRA*, the regulatory regime of the state where the utility operates, stands in for how generous the allowed return is. *Historical_ Test_ Year*, the test-year rule of that state, stands in for how long the utility would otherwise have waited before recovery began.

I begin with the regulatory regime. A utility earns its allowed return on the allowed asset base, and approved returns carry a persistent premium over the cost of equity (Dunkle Werner and

[44]Using the treated utilities' own data, this appears to be the case. In the years before adoption the carrying charge accrued at 4.64 percent, against a mean allowed rate of return of 7.20 percent granted in those utilities' rate cases. Both rates are measured on a small subset of firms, and the accrual rate is a proxy, since the rate itself is not reported and I compute it as total AFUDC over the average construction balance. Online Appendix Section O.15 reports both inputs and what they imply.

Jarvis, 2026), so CWIP should matter more where the regime allows a higher return.[45] A more favorable regime also widens the gap between capital and operating expense, since only capital in the rate base earns the allowed return. Where the regime is more favorable the utility should therefore lean further toward capital. I test this moderator on the investment and the operating-cost outcomes.

I measure the regulatory regime using the S&P RRA state regulatory ranking, a nine-level ordinal grade oriented so that higher values denote a more utility-favorable regulatory environment.[46] For utilities operating in more than one state I weight state grades by retail electricity sales. I standardize the grade to have mean zero and unit standard deviation, so the coefficient of interest, *Treat* × *Post* × *RRA*, measures how much larger the CWIP response is where the regime is one standard deviation more favorable.[47]

Table 7 shows that the triple interaction is positive and significant for both investment measures, capital expenditure scaled by assets and the construction-work-in-progress balance scaled by assets. The *Treat* × *Post* coefficient, which gives the response at the average regime score, is less than half that size in both cases. The average investment response of Section 4.1 therefore concentrates in states whose regulatory regime is favorable to utilities.

On the operating-expense side, the interaction for production operation-and-maintenance (O&M) expense per megawatt-hour is negative and strongest at wider windows. The post-adoption rise in operating expense shrinks with the regime score and reverses in the most favorable regimes. Because capital spending rises in those same states, the pattern is consistent with substitution toward remunerated capital rather than tighter cost discipline, which would lower operating expense without a matching increase in capital.[48]

[45] I do not measure the allowed rate of return directly. A utility's allowed return is recorded only in the years its commission decides a rate case, so the series is too sparse to use as a moderator, and I use the regulatory regime as a proxy for how generous the allowed return is likely to be.

[46] Earlier accounting work on utilities used commercial rankings of this kind to capture cross-sectional differences in regulatory treatment (Khurana and Loudder, 1994; Loudder et al., 1996; Blacconiere et al., 1997). Online Appendix Section O.2.3 sets out how the variable is constructed in detail.

[47] The regime index is not a proxy for CWIP itself. Across the 51 state jurisdictions, a CWIP indicator explains about 4.5 percent of the variation in the regime score (Online Appendix Table O.2.1).

[48] At the average regime score, adoption is associated with higher production O&M expense per megawatt-hour, an estimate that is imprecise at the ±5 window and stronger at wider ones. See Online Appendix Section O.14, Table O.14.1.

A second proxy captures not how large the return is but how long the utility waits for it. A return that arrives sooner is worth more. Section 4.2 argues that a long wait makes holding off on construction worth more, because the utility learns about demand in the meantime, and that CWIP shortens that wait. Where the pre-adoption wait was longest, CWIP should therefore move the decision to build the most.

I proxy that wait with the state's historical-test-year policy. Under a historical test year the commission sets rates from costs the utility actually incurred in a past year, so construction spending enters the rate base only after a later rate case covers the year in which the money was spent. Under a forward-looking test year the commission can set rates from projected costs and begin recovery sooner. Historical-test-year states are therefore where the wait between construction spending and recovery was longest before CWIP. Because this proxy is about when a project proceeds, I test it on the timing outcomes, adding the triple interaction to Equation (3). The coefficient of interest is $Treat \times Const\_Post \times Historical\_Test\_Year$.

In historical-test-year states the gap between approval and the start of construction falls by an additional 1.7 years, and the overall completion delay by an additional 2.2 years (Table 8). The response appears at the point where the utility commits to building and carries through to the date the plant enters service. Building therefore moves earliest where the wait for recovery to begin was longest. In both tables the lower-order interaction of the moderator with the post-adoption indicator, estimated from the utilities that never adopt, is indistinguishable from zero and opposite in sign to the triple interaction above it, so neither moderated response is likely to reflect a movement these states were already showing without CWIP.

Taken together, the evidence points to CWIP raising investment by changing what utilities stand to earn from investing rather than by easing a financing constraint. It also speaks against a hold-up alternative, in which utilities under-invest because they fear opportunistic cuts to allowed returns once capital is sunk (Guthrie, 2006). That alternative predicts the largest CWIP response in the states with the least favorable regulatory regimes, and the results run the other way. Set against the investment increase these utilities record after adoption, the higher return CWIP delivers corresponds to roughly 1 to 2 percentage points of additional capital expenditure for each percentage point of return (Online Appendix Section O.15).[49]

4.5 Robustness and Limitations

States do not adopt CWIP at random. If the same rising demand that leads a state to adopt also spurs its utilities to build, part of the post-adoption increase in construction reflects the demand shock rather than the rule. The state policy and demand controls cannot absorb a shock that arrives with adoption timing. As a partial check I ask whether the response is stronger where demand was growing faster before adoption, and I find no such pattern (Online Appendix Table O.5.1). The test uses only the treated states and is underpowered, so it points to the rule and not demand pressure, but it does not settle the question.

A sharper answer compares utilities within the same state and year. EIA Form 860 also covers independent power producers, which generate for wholesale sale, do not distribute power, and are not rate-regulated, so CWIP does not reach them even in an adopting state while they face the same local conditions. Comparing regulated utilities to them within a state and year absorbs any shock common to both and leaves identification to the differential response of the regulated arm (Online Appendix Section O.4). On every outcome both designs can estimate, the two agree in sign. Both show more construction starts and more capacity built, a shorter post-approval gap and a shorter delay to completion, cheaper capacity per kilowatt, and more cancellation after construction starts with less before it. Independent power producers do not file FERC Form 1, so the financial outcomes have no within-state counterpart at all and are estimated on the main specification alone.

Two further checks appear in Online Appendix Table O.3.1. Because CWIP is assigned at the state level, I re-estimate every main specification that is estimated at the state level, with standard errors clustered by state. The point estimates are unchanged, and statistical significance is unaffected for all but a few outcomes. I also re-estimate at ± 7, ± 10, and ± 15 years to confirm that the results are not driven by the choice of window. The capital-intensity, capacity-factor, and mid-construction cancellation results hold their sign and significance throughout, as does the construction-work-in-progress balance.[50] Full control coefficients for Tables 2, 4, 6, and 9 are

[49] This is a back-of-the-envelope calculation that combines descriptive means with arithmetic on the two cost-recovery regimes, reported to give a sense of magnitude rather than as a further result.

[50] Capital expenditure keeps its sign at every window but loses significance at the seven-year window, so the

reported in Online Appendix Section O.16.

A final check concerns how treatment is coded. Colorado's 2007 statute reaches transmission but not generation, and Nevada leaves the PUC some discretion over CWIP. In untabulated results, I drop Colorado and Nevada and the results remain the same. Never-treated states that have fully restructured retail generation are also weak controls since their utilities no longer place construction in the rate base. Many utilities in the sample operate in more than one state, so removing every utility whose operations touch a restructured state would cost a large share of the observations. I instead add an indicator for those utilities, interacted with the post-adoption period. Most results are unchanged in sign and significance.[51]

5 Beyond Investment: Broader Stakeholder Impacts

Section 4 establishes CWIP's effect on the investment margin. A full account of CWIP should also discuss the implications for other stakeholders. This section takes a step in that direction. Sections 5.1 and 5.2 look at power outages and residential customer satisfaction, which are what customers experience directly. Sections 5.3 and 5.4 ask how CWIP interacts with two other goals the regulator is pursuing.

5.1 Power Outages

Under CWIP, construction spending earns a regulated return from the first day of construction, while operating spending is recovered dollar for dollar with no return. The activities customers experience most directly, such as keeping the system running and maintaining service quality, lie on the unrewarded side of this divide. The multitask literature argues that when a manager's rewarded and unrewarded tasks compete for the same effort, effort flows to the task the measure rewards (Holmström and Milgrom, 1991; Feltham and Xie, 1994). Evidence from cost-based reimbursement in other regulated settings, such as hospitals, shows the same pattern (Eldenburg and Kallapur, 1997). New investment can also work in the opposite direction, as replacing old, inefficient units with newer and more reliable ones lowers maintenance and improves service (Abel

construction-work-in-progress balance is the sturdier of the two investment measures. The share of days operating likewise keeps its sign at every window but is not distinguishable from zero at the seven- and fifteen-year windows.

[51] The exceptions are as follows. Capital expenditure loses significance while the construction-work-in-progress balance holds. The revenue and expense growth rates of Section 4.4.1 also lose significance, which, if anything, reinforces that section's conclusion that the evidence for a financing channel is weak.

and Eberly, 1994).

Outages are the most direct outcome a customer experiences. Customer rates pay for the distribution network that makes electricity available, not only for the energy consumed, so an outage is service the customer has paid for and not received. The two industry-standard measures are the System Average Interruption Duration Index (SAIDI), the total minutes a typical customer spends without power in a year, and the System Average Interruption Frequency Index (SAIFI), the number of separate interruptions a typical customer experiences in a year. Each is reported in two versions. The first excludes major event days, which cover extreme weather events and other extraordinary disruptions, and so measures outages under normal operating conditions. The second includes them and measures outages under stress.

I estimate Equation (2) at the utility-state-year level, using the four winsorized log outcomes as dependent variables. The outage data begin in 2000, combining the Lawrence Berkeley National Laboratory utility reliability compilation for 2000 through 2012 with EIA Form 861 for 2013 onward.[52] Because the with-major-event measures pick up precisely the years in which severe weather arrives, and severe weather arrives unevenly across states and years, I control for *Storm_Declarations*, the log of one plus the number of storm-related federal disaster declarations covering the utility's state in that year.[53]

Panel A of Table 9 reports the results, with each outcome in a row and each column a symmetric event-time window around adoption. Eleven of the 12 estimates on Treat $\times$ Post are positive, so the point estimates lean toward more outage minutes and more interruptions per customer after adoption. The estimates that include major event days are the larger ones at every window, placing the movement in periods when the system is under stress. Statistical significance is scarcer. None of the four estimates is distinguishable from zero at the ± 5 window used throughout the paper. Columns (2) and (3) widen the window to ± 7 and ± 10, roughly doubling the sample at the widest window, and only interruption frequency including major events reaches conventional

[52]The Berkeley compilation reports SAIDI and SAIFI at the utility-state level for 218 investor-owned utilities from 2000 through 2015. I name-match its utility labels to the EIA utility identifier and keep 2000 through 2012 to avoid mixing sources with the EIA Form 861 series that begins in 2013.

[53]The control behaves as a storm proxy should. It loads roughly ten times more heavily on outage duration including major events than on the normal-conditions measure (Online Appendix Table O.16.7).

significance, at roughly 22 to 24 percent more interruptions per customer. I therefore read Panel A as directional evidence.

The results are consistent with worse reliability after CWIP adoption, concentrated in periods of system stress rather than in day-to-day operation. That is the direction the return asymmetry predicts, because storm preparation and restoration are the work CWIP does not reward. Measured on a noisy outcome, the result is an association rather than a causal estimate.

5.2 Residential Customer Satisfaction

I next look at how residential customers rate their utility overall, an assessment that reflects both what they receive and what they pay. Higher bills and better service pull satisfaction in opposite directions. Residential customers pay more per unit sooner, which should lower how they rate their utility. On the other hand, the additional construction CWIP induces can improve service quality by replacing older units with newer and more reliable capacity, and may moderate price increases over the longer term, raising satisfaction.

I measure satisfaction with the J.D. Power residential customer-satisfaction survey, the standard residential satisfaction index, measured on a 1,000-point scale and publicly available from 2006. Because the survey does not extend further back, this analysis drops the earliest adoption cohort and uses only cohorts adopting in 2006 or later. I estimate Equation (2) at the utility-state-year level. Panel B of Table 9 reports the results. The coefficient on Treat × Post is negative and corresponds to a decline of approximately 12 points in satisfaction, roughly one-quarter of the sample standard deviation.[54]

One reading of the decline is that it reflects higher bills during the construction period rather than service quality. Column (3) controls for electricity price by using the log of implied residential price (residential revenue divided by residential megawatt-hours sold) to isolate the share of the satisfaction decline that flows through the price customers pay. The coefficient on Treat × Post is essentially unchanged, moving from −12.56 to −12.68, even though the price term itself enters negatively and significantly. The per-unit price customers pay therefore accounts for essentially

[54] The estimate becomes larger in magnitude with the event-time window, reaching −20.1 at ±10 years and −21.5 at ±15 (Online Appendix Table O.3.1, Panel H).

none of the measured decline.[55] The additional construction CWIP induces does not appear to have improved how residential customers rate their utility.

5.3 Demand-Response Programs

This subsection asks how CWIP interacts with an alternative tool regulators use to manage peak demand, demand-response programs. Under these programs, utilities work with their customers, generally industrial customers, offering discounts and concessions for shifting electricity use to off-peak hours and adopting energy-efficient equipment. They are the operating-side substitute for new capacity, since a kilowatt of avoided peak demand is a kilowatt the utility does not need to build. Program costs are generally recovered as operating expense at cost without additional return. Regulators have long favored these programs as a cheaper way to meet peak demand than building new generation (Joskow and Marron, 1992). The utility ranks the two the other way, since only new capacity earns it a return, and under CWIP that return flows early.

I estimate Equation (2) on a utility-year panel from EIA Form 861, with three outcomes, an indicator for operating any program (*Any_ DRP*), the number of customers enrolled scaled by lagged total customers (*DRP_ customers*), and energy savings from those programs scaled by lagged sales (*Energy_ Savings*). Panel C of Table 9 reports the results. On the extensive margin, the coefficient on *Any_ DRP* is indistinguishable from zero without controls and negative and significant in the full control specification, suggesting that treated utilities are less likely to operate a program. Both intensity measures fall too, with enrollment declining by about three to six percentage points of the lagged customer base and energy savings by 0.025 percentage points of lagged sales in that same specification. Read together, the two margins indicate that utilities retreat from demand-side management on both fronts, becoming less likely to run a program and, where they continue, devoting fewer resources to it.[56]

[55] The control captures the price customers pay per megawatt-hour, not the size of their bill. A customer whose price held steady but who used more still pays more, and the control does not pick that up.

[56] The decline could instead reflect customer-side factors, such as lower awareness or income. That is less likely here. Enrollment reflects both the utility's recruitment effort and customers' willingness to participate, and the demand controls and firm-by-cohort fixed effects absorb the economic conditions most likely to move customer demand on their own. A decline timed to CWIP adoption is more readily attributed to reduced utility effort than to customers independently withdrawing, though enrollment is an equilibrium outcome and the two cannot be fully separated here.

5.4 Renewable Investment Policy

This subsection asks how CWIP interacts with another goal state regulators pursue. Over the sample period many states adopted a renewable portfolio standard (RPS) requiring utilities to procure a rising share of their power from renewable sources. An RPS sets what a utility must procure but not when it begins recovering the cost of building it. CWIP acts on that timing. I therefore use this setting for descriptive insight into how CWIP interacts with an RPS in delivering the outcome the regulator seeks.[57] Both are state rules, so I work at the utility-state level, comparing regulated utilities only within states that have an RPS in force, leaving 63 utility-state pairs from 55 utilities across 24 states.

I start by looking at how long a utility takes to make its first renewable investment once its state's RPS is in force. Figure 3 uses a Kaplan-Meier estimator, a standard way to summarize how long a group takes to reach an event. Here the clock starts when the state's RPS takes effect and stops when the utility starts its first wind or solar project in that state.[58] Each year the estimator computes what share of the utilities still waiting start in that year, and accumulates those shares into the curve. A utility that never starts is followed to its last observed year and then leaves the group.

Figure 3 shows that the curves for states with and without CWIP separate early and stay apart for about a decade. The median utility-state pair in a CWIP state starts its first wind or solar project seven years after the RPS takes effect, against eleven years where CWIP is not available. The curves converge toward the end of the horizon, so the pattern is consistent with utilities starting sooner where CWIP is available rather than with a larger share of them ever starting at all. Over the whole horizon, a log-rank test, the standard test of whether two such curves differ, does not reject equality.

Figure 4 shows what is built, reporting wind and solar as a share of the capacity each group started. In the first five years after an RPS takes effect, regulated utilities in CWIP states put

[57] Both CWIP and the RPS are state-level rules that vary across states rather than within them, and the sample here is 63 utility-state pairs, so a regression would require controls, fixed effects and clustering that leave the estimates too noisy to be informative.

[58] Hydro is excluded throughout. Most hydro added over this period is incremental capacity at existing dams, and its siting is set by geography rather than by state rules.

a fifth and then over a third of what they started into wind and solar. Utilities without CWIP started a similar total and put almost none of it into either.[59] In the six-to-nine-year window the ordering reverses, but Panel B shows this is not the group without CWIP catching up. It started the smallest total anywhere in the figure, so a high renewable share rests on a very small base. By ten to fifteen years the original ordering returns, with the CWIP group at roughly 70 percent against 23 percent.[60] Overall, there is some descriptive indication that CWIP is associated with utilities moving into wind and solar sooner, not with building more of it in the end.

Taken across this section's four subsections, these results show how CWIP bears on both the customers who fund it and the regulator's broader goals. Customers do not appear to receive better service, since there is directional evidence that service deteriorates when the system is under stress, and residential customers rate their utilities lower after CWIP takes effect. For the regulator's other goals, the evidence points in both directions. Utilities scale back programs that could meet demand without new construction. However, renewable investment runs the other way. Utilities in CWIP states appear to move into wind and solar sooner, though not to build more of it in the end. Overall, the findings suggest that the customers paying for new capacity are not necessarily better served while the goals the regulator pursues elsewhere are affected in both directions, with less demand-side management but earlier renewable investment.

6 Implications for the Data-Center-Driven CWIP Wave

Several states have seen sharp growth in electricity demand driven by data centers and AI computing (Martin and Peskoe, 2025). That demand is concentrated in a few areas, so it falls on a small number of states and the utilities that serve them.[61] By one estimate, a third to a half of the large data centers due to come online in 2026 will be delayed with limited power a leading cause (Boudreau, 2026). States have responded differently. Some have moved to turn new data centers away. In 2026, New York became the first state to act statewide, pausing state permits for large new data centers for one year. Residents of Monterey Park, California voted to ban them outright

[59] Independent power producers, which are not subject to CWIP, started 23 and 32 percent renewable in those same states over the same two windows, so this is not a shortage of wind and solar opportunity.

[60] These are unadjusted shares. The states permitting CWIP are also the windier ones. Confining the comparison to states of overlapping wind speed narrows the timing gap to about two years, but the early difference in what was built remains.

[61] Roughly half of U.S. data-center capacity sits in just five regional clusters.

in their own city (Reuters, 2026). Others have chosen to accommodate the load. Virginia and some others make large new customers bear their own connection costs. Missouri, Arkansas, Oklahoma, and others have made CWIP available for new construction since 2024, arguing that utilities cannot otherwise commit to rapid capacity expansion. Appendix A.1 gives a brief case study of Missouri.

The historical wave of CWIP adoption studied above is informative for the current one because it begins from a similar place. The earlier adopters authorized CWIP amid rising demand, and today's adopters face the same pressure from data centers and AI computing, differing mainly in scale and in building against anticipated rather than realized growth. If the current wave follows the same course, utilities in the new CWIP states would expand capacity quickly and at a lower cost per unit, lean on natural gas as the fastest capacity to build, and begin projects they are also readier to abandon. Because that capacity is paid for by current customers while it is built, a demand shortfall would leave them covering capacity that sits underused if the anticipated load never arrives.

The announced pipeline already shows the investment side taking shape. Panel A of Table 10 reports the capacity that regulated utilities have planned or begun building (recoverable through CWIP), measured against each group's 2024 peak demand. The states adopting CWIP for the first time in this wave, Arkansas, Missouri, and Oklahoma, plan new capacity equal to 3.7 percent of peak, close to the 4.4 percent of peak for the long-standing CWIP states. The type of capacity the first-time adopters are adding is what stands out. Almost all of the first-time adopters' planned capacity is natural gas, at 98 percent, against 61 percent for the long-standing CWIP states. The first-time adopters resemble the earlier wave not only in how much they plan to build but in what they plan to build. Like the historical adopters, they are turning to gas, the quickest capacity to bring into service.[62]

The large never-treated states present the opposite picture. Without CWIP, they leave new capacity to the market. Across the group they plan almost no customer-funded capacity, at 0.7 percent of combined peak.[63] Their data-center build runs instead through independent power

[62]Virginia is the exception among the CWIP states. As the state with the largest concentration of data centers it plans the largest regulated build, at 16 percent of peak, but that capacity is offshore wind built under a state clean-energy mandate rather than gas.

[63]Most of the large never-treated states have deregulated their generation, so their near-absence of a

producers, at 23.5 percent of peak in Panel B. Private developers decide when demand justifies new capacity and carry the risk of building it themselves. Pennsylvania is the clearest illustration. Its regulated utilities have announced no new capacity at all, and its independent producers account for most of the gas in the large never-treated pipeline, which stands at 10.3 percent gas against 2.1 percent for the other five large never-treated states.

Across the two panels, the pipeline sorts by who finances construction. Independent producers are building in every group, including the CWIP states. The CWIP states add a customer-funded pipeline on top, billed to customers while it is built. The gas is concentrated in that regulated channel. Where CWIP is absent, the customer-funded channel in the large states is nearly empty, and the gas that does get built sits on the balance sheets of independent producers, not on customers' bills. The pattern is consistent with the demand being common to all of these states, with the groups differing in who bears the risk while the capacity is built.

CWIP is not the only rule these states have in force. A commission that authorizes it today is pursuing several objectives at once, and Section 5 indicates that CWIP reaches past the investment decision into how utilities pursue them. I find that utilities pull back from demand-response programs, which regulators have long favored as the cheaper way to meet peak demand, and there is some descriptive indication that utilities move into wind and solar sooner where a renewable portfolio standard is in force. CWIP's interaction with these two policies does not establish a general rule, and I do not read these two results as predicting how CWIP will interact with any particular measure a state adopts next. They do suggest that a state authorizing CWIP alongside siting restrictions, clean-energy requirements, or efficiency targets is not setting those policies independently of it.

The risk of a demand shortfall is what the current wave carries forward. Currently, the new adopters are authorizing capacity largely against anticipated demand. The historical treated states adopted when such demand was already rising. The concern is not that CWIP fails to finance construction. The concern is that CWIP puts that risk on customers, who pay for capacity while

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customer-funded pipeline reflects that shift rather than the lack of CWIP alone. In untabulated results I restrict both groups to states whose utilities still own generation. The gap holds. CWIP states plan customer-funded capacity equal to 5.4 percent of peak against 1.8 percent for never-treated states, and 56 percent of that capacity is gas against 11 percent. The small never-treated group comprises five small systems, so its percent-of-peak figures are illustrative rather than representative.

it is built whether or not the load ever arrives. For regulators weighing CWIP today, that is the trade-off the historical wave makes visible. The rule speeds capacity into construction, but it does so by shifting the risk of overbuilding onto customers. The central open question for the current wave is whether the announced pipeline turns into sustained demand, and I take it up in the conclusion.

7 Conclusion

This paper studies how CWIP changes the investment behavior of regulated electric utilities. CWIP is a cost-recovery rule that lets a utility begin earning a return on an asset while it is still under construction. I use the state-level adoptions between 2002 and 2012 in a stacked difference-in-differences design. I find that treated utilities raise their capital spending and record more construction starts and more megawatts of new capacity than utilities in never-treated states. I also find that in states with CWIP, building moves faster. Once a project is approved, construction starts sooner and the construction phase runs quicker, so the gap between a project's originally filed completion date and its actual completion shrinks by about two years.

I look at three characteristics of the investment that CWIP produces and at what drives it. The capacity utilities build under CWIP is cheaper per kilowatt rather than more expensive, which cuts against the concern that an earlier return leads them to over-capitalize. They abandon more projects once construction has started and drop fewer at the planning stage. The capacity they do finish runs about ten percentage points below the utilization of comparable capacity elsewhere. None of this settles whether the investment is efficient, since there is no benchmark for the right level of capacity and some reserve is necessary by design, but it does help us understand what utilities build and how they use it. The results suggest that the response comes from a higher payoff to investing rather than from an eased financing constraint.

At a broader stakeholder level, CWIP reaches both the customers who pay for the construction and the other policies the same regulator is pursuing. CWIP rewards the capital that enters the rate base but not the effort of running the system, and customers bear that asymmetry. Residential satisfaction falls by about 12 points on the 1,000-point J.D. Power scale. Service quality shows no improvement either. Interruptions during major storms are higher where CWIP is in force, though that evidence is the weakest of the stakeholder results. Utilities also pull back from demand-response programs. Separately, where states require renewable procurement, utilities appear to move into wind and solar sooner under CWIP, though not into more of it in the end.

These results bear directly on the policy debate over what CWIP delivers. States adopting it to attract data centers and meet AI-driven demand are betting both that CWIP will accelerate construction and that the acceleration will serve customers well. The evidence supports the first bet and cautions on the second. In the current wave, the capacity already announced suggests it is being built either way. In states without CWIP, independent producers are financing capacity of a similar order on their own balance sheets. CWIP alone does not change whether the plants get built. It changes who is exposed if the demand behind them does not arrive. CWIP does finance construction, but it does so by paying utilities to build and by shifting the risk of a demand shortfall onto customers, who pay during construction whether or not the load arrives. The earlier adopters authorized CWIP against demand growth that was already underway, and that growth, on average, slowed sharply after adoption. The current wave is also authorizing capacity against a forward demand shock that has not yet materialized. The debate over CWIP has largely turned on whether it eases a financing constraint. The evidence here suggests the more consequential questions are what the investment-payoff channel leads utilities to build, who bears the risk when demand falls short, and how the rule bears on the other objectives the same regulator is pursuing.

Data centers consume large amounts of resources, and energy is one of the most important. Regulators need better information about how data center expansion and the adoption of AI can proceed sustainably, with the interests of all stakeholders in mind. This paper is one step toward that, giving regulators evidence on a single policy they are now weighing. Rate setting has many other elements, and accounting research on those elements would add to that evidence. I hope this paper encourages that work.

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A Case Studies

I present two case studies that together illustrate the regulatory dynamics driving the current CWIP wave. The first examines Missouri, which has pursued linked data-center recruitment and CWIP reform strategies. The second examines a contested rate proceeding at Oklahoma Gas and Electric (OG&E) that captures the broader policy debate surrounding CWIP.

A.1 Missouri: A Case of AI Infrastructure Recruitment

The Kansas City metropolitan area has attracted substantial AI infrastructure investment outside the traditional coastal technology clusters. Meta completed its first Missouri data center, a $1 billion facility in Kansas City, in August 2025, and Google announced a separate $1 billion investment in Clay County in March 2024. Several larger campuses have since been announced, including a proposed $100 billion, six-building hyperscale complex known as "Project Kestrel."[64]

As of late 2025, Missouri's Department of Economic Development was courting ten additional data-center prospects with peak electric demands reaching as high as 2,000 megawatts, roughly 60 times the peak demand of Ameren Missouri's largest single customer as recently as 2024, and comparable to the full output of the utility's Labadie coal plant.[65] In the view of state officials, serving large new continuous loads without new in-state generation was not feasible, and attracting those loads without credibly committing to generation expansion was equally so.

Missouri followed with Senate Bill 4, signed by Governor Kehoe in April 2025, which authorized CWIP and explicitly repealed the voter-enacted ban of 1976, a measure Missourians had adopted by referendum in direct response to CWIP-financed nuclear construction. Representative Hurlbert, who carried the bill in the House and represents a district that is home to Meta's Kansas City facility, cited lost large industrial projects due to inadequate power supply as the immediate motivation.[66]

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[64]See Meta (2025), Economic Development Corporation of Kansas City (2025), and FOX4 Kansas City (2026).

[65]See Grumke (2025).

[66]Missouri's Governor Kehoe received approximately $400,000 in campaign contributions from utility companies (Kim, 2024). Similarly, the legislator who carried North Carolina's near-simultaneous CWIP bill was a former executive at Duke Energy (Natural Resources Defense Council, 2025). These associations do not demonstrate legislative capture, but they illustrate how closely utilities are tied to the process that produced these rules.

A.2 Oklahoma: Proponents and Opponents in Practice

The OG&E proceeding shows how supporters and opponents frame the CWIP debate in practice. OG&E filed an initial capacity request before the new CWIP law took effect, withdrew it once the law passed, then refiled to claim CWIP treatment. Opponents argued this amounted to retroactive application of the statute. OG&E was nonetheless willing to restart the entire regulatory process to obtain CWIP treatment. That willingness suggests the company saw financial benefits large enough to outweigh the legal risk and the procedural cost.

OG&E and its supporters argued that CWIP lowers the cost of building new generation by reducing financing costs during construction, and that this benefit ultimately flows to customers through lower total project costs. They pointed to the utility's documented capacity shortfall, with its 2024 Integrated Resource Plan projecting a gap of 1,096 megawatts by 2028 growing to 2,592 megawatts by 2034, as evidence that new investment was urgently needed.[67] OG&E did not argue that it was financially unable to proceed without CWIP, but rather that CWIP would lower the overall cost of the project and that customers would be better off as a result. The Oklahoma Attorney General supported this view, arguing the new law made CWIP approval mandatory once the statutory conditions were met.

Opponents, led by AARP and the Oklahoma Industrial Energy Consumers (OIEC), challenged both the economics and the fairness of CWIP.[68] On economics, they argued that customers would not see any net savings for at least 25 years and that the utility was financially healthy enough to proceed without it. On fairness, they raised a concern that customers who relocate before the assets complete their useful life would pay CWIP charges without ever receiving the benefit. The commissioners of the Oklahoma Corporation Commission (OCC), who had opposed the legislation, stated that it "only benefits the utility company at the expense of the ratepayer" and "goes against 100 years of ratemaking principles."[69]

[67] See OK Energy Today (2025a).

[68] In utility proceedings AARP intervenes on behalf of residential customers, particularly seniors on fixed incomes who are most exposed to bill increases.

[69] Oklahoma Corporation Commission, public statement of Chair Kim David, May 2025; see also Bennett-Steele and StateImpact Oklahoma (2025).

B CWIP Adoption Status by State

The following table classifies all U.S. states by their CWIP adoption status. Panel A presents states classified as Treated, defined as those that enacted CWIP legislation between 2002 and 2012, along with a brief description of the regulatory context surrounding each enactment. Panel B lists Never-Treated states, defined as those that had not adopted CWIP as of the end of the sample period in 2023. Panel C lists Always-Treated states, defined as those where CWIP authorization predates 2001. Always-treated states are excluded from the main difference-in-differences analysis because there is no pre-treatment period available for these firms within the sample window.

Panel A: Treated States (CWIP adopted 2002 to 2012)

State	**Year**	**Background**
Indiana	2002	Indiana passed Senate Bill (SB) 29 in 2002, authorizing CWIP for coal gasification and clean energy facilities.
Florida	2006	Enacted SB 888 directing the Public Service Commission to establish CWIP mechanisms.
Colorado	2007	Enacted SB 07-100 requiring current recovery of a utility's weighted average cost of capital on the balance of CWIP for transmission facilities.
Louisiana	2007	In 2007, the Louisiana Public Service Commission established precedent through a rulemaking order in Docket No. R-29712.
Nevada	2007	The Public Utilities Commission of Nevada may grant CWIP on a case-by-case basis, decided per proceeding rather than by statute.
North Carolina	2007	Enacted CWIP authorization through SB 3, which bundled CWIP provisions with broader clean energy requirements.
South Carolina	2007	South Carolina authorized CWIP through the Base Load Review Act (Act 16 of 2007) to support financing of two new nuclear units at the V.C. Summer Nuclear Station, a project frequently invoked in the policy debate over CWIP.
Kansas	2008	Kansas authorized CWIP through SB 586, primarily to support nuclear power plants.
Michigan	2008	Enacted CWIP authorization through Public Act 286 of 2008, allowing recovery of financing interest on construction work in progress in base rates.
Mississippi	2008	Mississippi authorized CWIP through SB 2793, the Baseload Act, to support Mississippi Power's financing of the Kemper County Energy Facility.
Georgia	2009	Georgia enacted the Georgia Nuclear Energy Financing Act (SB 31) specifically to support Georgia Power's financing of two new nuclear units at Plant Vogtle.
Idaho	2009	Idaho enacted SB 1123, under which a utility can apply to the PUC for a binding order setting CWIP treatment in advance of construction.

Continued on next page

Appendix B continued

South Dakota	2012	In 2012, the South Dakota legislature authorized phase-in rate plans, which let a utility begin recovering the financing cost of a plant addition before it enters service, subject to Public Utilities Commission approval obtained before construction starts. Black Hills Power was the first utility to use the mechanism, filing in December 2012 for the Cheyenne Prairie Generating Station.

Panel B: Never-Treated States (no CWIP as of 2023)

Alaska, Arizona, Arkansas, California, Connecticut, Hawaii, Missouri, Montana, New Hampshire, Ohio, Oklahoma, Pennsylvania, Rhode Island, Wyoming. These states had not enacted CWIP authorization for investor-owned utilities as of the end of the sample period. The absence of CWIP reflects either an explicit legislative or commission decision against it or the fact that adoption was never pursued. These states form the preferred control group in the main analysis, as their utilities were not exposed to CWIP at any point during the sample period.

Panel C: Always-Treated States (CWIP predates 2001)

Alabama (1967), Delaware (1970), District of Columbia (1947), Illinois (1973), Iowa (1975), Kentucky (1958), Maine (1976), Maryland (1923), Massachusetts (1990), Minnesota (1975), Nebraska (1990), New Jersey (1972), New Mexico (1999), New York (1971), North Dakota (1965), Oregon (1974), Tennessee (1972), Texas (1900), Utah (1976), Vermont (1972), Virginia (2000), Washington (1976), West Virginia (1999), Wisconsin (1974). These states established CWIP authorization through early legislation or commission precedent, primarily during the nuclear construction era of the 1960s and 1970s. Because these states have CWIP in place throughout the entire sample period, there is no pre-treatment period available for the difference-in-differences design, and they are excluded from the main analysis.

C Regulatory Control Variables

This appendix describes the state-level regulatory policy variables included as controls in the main analysis.

C.1 Multi-Year Rate Plan (*MYP*)

Multi-year rate plans allow state public utility commissions to set utility rates for a fixed period, typically two to four years, without requiring the utility to file a new rate case in each intervening year. By providing greater revenue certainty over a longer horizon, these plans may independently encourage investment by making future cash flows more predictable.

C.2 Performance Incentive Mechanism (*PIM*)

Performance incentive mechanisms condition a portion of a utility's allowed earnings on measured outcomes against specified benchmarks, which may include reliability targets, energy-efficiency program performance, customer satisfaction scores, or carbon reduction goals. Utilities in states with these mechanisms may therefore show better operational performance for reasons unrelated to CWIP.

C.3 Revenue Decoupling (*Decoupling*)

Revenue decoupling breaks the direct link between a utility's revenues and the volume of electricity it sells, typically by adjusting rates between rate cases to ensure the utility recovers its authorized revenue regardless of whether sales are higher or lower than forecast. Selling less power normally means earning less revenue, so a utility has little reason to fund energy-efficiency programs. Decoupling removes that reason.

C.4 Securitization (*Securitization*)

Securitization allows utilities to recover specific categories of costs, including those arising from project write-offs or storm damage, by issuing asset-backed securities that convert future regulatory receivables into immediate cash. This reduces the risk that a failed or delayed construction project will leave the utility in financial distress, since costs can be ring-fenced and refinanced at lower rates rather than recovered slowly through rate cases. Securitization may therefore independently encourage utility investment by lowering the effective cost of project failure and enabling faster financial recovery after major events.

C.5 Compensation Restriction (*Comp_ Restrict*)

Comp_ Restrict indicates whether the state prohibits the recovery of performance-based executive compensation, such as bonuses tied to financial metrics like net income, through the utility's allowed revenues. Where recovery is barred, the cost of incentive pay falls on shareholders rather than on customers, so variable pay is tied more closely to the returns they earn. The restriction is included as a control because it shapes the incentives managers face when choosing between capital and operating spending, the same margin on which CWIP acts.

C.6 Test Year (*Historical_ Test_ Year*)

Historical_ Test_ Year equals one when the state sets rates using a historical test year, under which the commission sets rates from costs already incurred. Under a forward-looking test year the commission instead sets rates from projected costs and begins recovery sooner. A forward-looking test year therefore eases the same timing problem that CWIP addresses, and is controlled for separately.

C.7 Rate Base Measurement (*Rate_ Base_ Average*)

Rate_ Base_ Average measures the share of states in which the firm operates that set rates on an average rate base over the test period, rather than on the year-end balance. The distinction affects how fully recent plant additions enter the recoverable base, and therefore the return a utility earns on its most recent investment.

C.8 Commissioner Election (*Commission_Elected*)

Commission_Elected captures the share of states in which public utility commissioners are elected by voters rather than appointed by the governor or legislature. The method of commissioner selection affects the independence of the regulatory process and the incentives commissioners face when setting rates and approving utility investments.

C.9 Political Environment (*Governor_R*, *State_Control_R*)

Two political controls enter as the share of the states in which the firm operates that have a Republican governor and the share with full Republican legislative control. They capture the political environment that shapes regulatory appointments, legislative priorities, and state policy toward utility investment.

C.10 Renewable Portfolio Standard (*RPS_Policy*, *RPS_Target_Pct*, *RPS_Voluntary*)

A renewable portfolio standard is a state-level policy that requires utilities and other load-serving entities to procure or generate a specified and rising percentage of retail electricity from qualifying renewable sources, with non-compliance penalties. The RPS indicator equals one in state-years for which an active RPS with a binding annual target is in force. *RPS_Target_Pct* captures the stringency of that standard, measuring the binding target as a share of retail sales in the year, weighted by the firm's electric revenue share across the states in which it operates. *RPS_Voluntary* equals one when the state has only a voluntary, non-binding renewable portfolio standard or goal rather than an enforceable mandate, distinguishing states that signal a renewables preference without imposing compliance penalties.

D Variable Definitions

Variable	Definition
Panel A: Utility-Year Level. Source: FERC-1 unless noted.	
Capex	Capital expenditure scaled by lagged total assets
CWIP_balance	Construction-work-in-progress balance for the electric segment, scaled by lagged total assets
Net_Plant (per MWh Sold)	Net utility plant in service divided by lagged megawatt-hours of electricity sold (FERC-1, EIA-861)
Prod_PPE_Growth	Year-on-year growth rate of production property, plant, and equipment
Construction starts	Number of generating units owned by the utility that began construction in year t (EIA-860)
MW started	Nameplate capacity, in megawatts, of generating units owned by the utility that began construction in year t (EIA-860)
MW built (stock)	Total nameplate capacity, in megawatts, of the utility's built generating units in year t (EIA-860)
Production O&M	Power-production expenses of electric O&M divided by lagged megawatt-hours of electricity sold
Operating expense growth	Year-on-year growth rate of total operating expenses
Operating income growth	Year-on-year growth rate of operating income, defined as operating revenues minus total operating expenses
Net income growth	Year-on-year growth rate of net income
Cash revenue growth	Year-on-year growth rate of cash revenue, defined as operating revenues less the increase in accounts receivable
Cash flow from operations growth	Year-on-year growth rate of cash flow from operations
Any_DRP	Indicator equal to one if the utility operated any DRPs in a given year (EIA-861)
DRP_customers	Number of customers enrolled in DRPs scaled by lagged total number of customers (EIA-861)
Energy_Savings	Megawatt-hours saved through demand response programs in year t scaled by utility's megawatt-hours quantity sold in year $t-1$. I multiply it by 100. (EIA-861)
Ln(Total_Assets)	Natural log of total assets
Leverage	Total debt divided by total assets
ROA	Net income divided by lagged total assets
Revenue growth	Year-on-year growth rate of total electricity sales revenues
Tangibility	Net plant in service divided by total assets
Dividends_d	Indicator equal to one if the utility paid dividends in a given year
Panel B: Utility-State-Year Level. Source: EIA-861 unless noted.	
Customer_Sat_Score	J.D. Power residential customer satisfaction score, measured on a 1,000-point scale, aggregating assessments of power quality, billing, communications, and corporate citizenship (J.D. Power)
Ln(Price_Res)	Natural log of the implied residential price, defined as residential electricity revenue divided by residential megawatt-hours sold (dollars per megawatt-hour)
Ln(Sales_MWh)	Natural log of total retail electricity sales in megawatt-hours by firm i in state s in year t
Ln(Total_Capacity)	Natural log of total nameplate generating capacity in megawatts owned by firm i in state s in year t (EIA-860)

Continued on next page

Appendix D continued

Variable	Definition
Ln(SAIDI)	Natural log of the System Average Interruption Duration Index, defined as total customer-minutes without power in year t divided by the number of customers served by firm i in state s. The index is reported in two versions. The "with Major Events" version includes major event days (storms and other extraordinary disruptions) and the "without Major Events" version excludes them. Data are from the Lawrence Berkeley National Laboratory utility reliability compilation for years through 2012 and EIA Form 861 for 2013 onward.
Ln(SAIFI)	Natural log of the System Average Interruption Frequency Index, defined as the number of separate customer interruptions in year t divided by the number of customers served by firm i in state s. Reported in the same "with Major Events" and "without Major Events" versions as SAIDI and drawn from the same combined Berkeley compilation and EIA Form 861 panel.
Panel C: Generator and Plant Level. Source: EIA-860 unless noted.	
Cancel_before_construction	Indicator equal to one for generators that were proposed but abandoned before construction started, and zero for generators that reached construction (whether they were later canceled or completed). Defined on the sample of generators with an observed proposal year.
Cancel_after_construction	Indicator equal to one for generators that started construction and were then canceled before reaching commercial operation, and zero for generators that started construction and reached commercial operation. Defined on the sample of generators with an observed construction-start year.
Generator_size	Natural log of the capacity of the generating unit in megawatts at the time construction began
Plant_size	Natural log of the total capacity of all generating units at the plant in megawatts at the time construction began. Used as the firm-size control in the plant-year standby specifications (EIA-860).
Post-approval gap	Number of years between commission approval and the start of construction.
Construction time	Number of years between the start of construction and the date the unit reaches commercial operation.
Planned duration	Originally expected duration of the project in years, as filed at the time of approval (originally expected completion year minus the project start year).
Completion delay	Realized commercial-operation year minus the originally filed expected-completion year. Positive values indicate the unit reached operation later than originally planned.
Capital-intensity rank	Integer ordering of a generator's technology by capital cost per kilowatt from the EIA Annual Energy Outlook 2010 cost table, from one (cheapest) to eight (most expensive): (1) gas combustion turbine, (2) oil, (3) gas combined cycle, (4) wind, (5) hydroelectric, (6) coal, (7) solar, and (8) nuclear. A generator is classified as gas combined cycle only if its nameplate capacity is at least 300 megawatts. Oil is not separately priced in the Annual Energy Outlook schedules and is ordered immediately above gas combustion turbine. (EIA AEO, EIA-860)
Capacity factor	Annual gross load divided by the product of nameplate capacity in megawatts and 8,760 hours, for fossil generating units larger than 25 megawatts. (EPA CEMS, EIA-860)
Share days operating	Fraction of the days a unit reported to CEMS in the year on which a fossil unit larger than 25 megawatts generated any power, from the EPA's daily CEMS files. (EPA CEMS, EIA-860)

Continued on next page

Appendix D continued

Variable	**Definition**
Standby share	Share of a plant's installed nameplate capacity that is held in standby or out-of-service (but not retired) status, at the plant-year level and across all fuel types. The numerator is the nameplate capacity of units flagged as standby or out of service. The denominator is the plant's total installed nameplate capacity. (EIA-860)
Panel D: Treatment Variables. Source: Multiple unless noted.	
Treat	An indicator equal to one for firms operating in at least one CWIP-adopting state
Post	An indicator equal to one for years at or after the year of CWIP adoption in the treated state
Const_Post	An indicator equal to one for generators whose construction-start year falls in or after the state's CWIP adoption year, and zero for generators whose construction started before adoption (EIA-860)
Prop_Post	An indicator equal to one for generators or plants first proposed in or after the state's CWIP adoption year, and zero for those proposed before adoption (EIA-860)
RRA	The utility's regulatory-return regime score, built from S&P Global's Regulatory Research Associates state ranking (a nine-level ordinal grade oriented so that higher values denote a more utility-favorable regulatory environment), fixed at its 2011-2013 baseline average and z-scored across states. For utilities operating in more than one state the state grades are weighted by retail electricity sales. (S&P RRA, EIA-861)
Panel E: State-Level Policy Controls. Source: Multiple.	
The indicators *MYP*, *PIM*, *Decoupling*, *Securitization*, and *Comp_Restrict* equal one at the utility-state level if the state has the policy in year t, and at the utility level if any state in which the utility operates does. *Commission_Elected*, *Historical_Test_Year*, *Rate_Base_Average*, *Governor_R*, *State_Control_R*, *RPS_Policy*, and *RPS_Voluntary* are measured at the utility-state level and enter at the utility level as the share of the firm's states with the attribute. *RPS_Target_Pct*, which is continuous, enters at the utility level as the firm's electric-revenue-weighted average across its states. Appendix C defines each policy in full.	
Panel F: Demand Controls. Source: EIA unless noted.	
GDP_real	Natural log of real state GDP
CDD	Natural log of cooling degree days in state s
HDD	Natural log of heating degree days in state s
Storm_Declarations	Natural log of one plus the number of storm-related federal disaster declarations covering state s in year t. Declarations are drawn from the OpenFEMA Disaster Declarations Summaries file, counted once per declaration, dated by the incident begin year, and restricted to storm-type incidents (hurricanes, tropical storms, tornadoes, severe storms, ice and winter storms, floods, and coastal storms). Entered as a control in the reliability specifications, where it conditions on the weather that generates major event days (FEMA)
Lag_State_Sales	One-year lag of total state-level retail electricity sales in megawatt-hours, summed across all distribution utilities reporting to EIA Form 861 in state s (EIA-861)

Continued on next page

Appendix D continued

Variable	**Definition**
Panel G: Credit Ratings, Coupon, and Maturity. Source: S&P.	
S&P LT Rating	S&P long-term issuer credit rating mapped to a 1-22 numeric scale, higher values denoting stronger creditworthiness
Average maturity	Firm-year average maturity at issuance across the fixed-rate bonds the utility newly issued that year, in years
Average coupon	Firm-year average coupon at issuance across the fixed-rate bonds the utility newly issued that year, in percentage points
S&P rating	S&P credit rating on the individual bond issue, on the same 1-22 numeric scale as the issuer rating
Coupon	Coupon on the individual bond issue at issuance, in percentage points
Maturity_at_issuance	Years from the dated date of the bond issue to its stated maturity date. Reported as *Maturity* where it is the dependent variable
Ln(Issue_Amount)	Natural log of the original principal amount of the bond issue, in millions of dollars
Panel H: Financing-Channel Firm Controls. Source: FERC-1 unless noted.	
Leverage_LT	Long-term debt divided by total assets
Ln(Long_Term_Debt)	Natural log of long-term debt
ST_Leverage	Short-term debt (notes payable) divided by total assets
Op_Margin	Operating income divided by total revenue
Loss	Indicator equal to one if income before extraordinary items is negative
Cash_Share	Cash and equivalents divided by total assets
Current_Ratio	Current assets divided by current liabilities
Int_Coverage	Interest coverage, computed as income before extraordinary items plus interest on long-term debt, divided by interest on long-term debt
Cap_Lease_Share	Capital-lease obligations (current plus noncurrent) divided by total assets
SalesGrowth_Vol	Five-year trailing standard deviation of sales growth
OCF_Vol	Five-year trailing standard deviation of cash flow from operations scaled by total assets

Multiple includes S&P RRA, ACEEE, and NARUC reports

Figure 1: Revenue Collection under AFUDC and CWIP

This figure is a schematic showing how the rate base of a single new asset builds up and then runs down over the asset's life under the two cost-recovery rules. Both axes are annual amounts rather than running totals. The left axis is the rate base the asset carries in a given year. The right axis is the revenue collected in that year, which is that rate base multiplied by the allowed rate of return. The two are not the same amount, which is why the axes carry the same shape but not the same units. The vertical dashed line marks the point at which the asset enters service. Under traditional regulation, i.e., AFUDC (Allowance for Funds Used During Construction), nothing the utility spends during construction enters the rate base. The financing charge incurred while the asset is being built is capitalized into its book value instead. The asset therefore enters service carrying its construction cost plus that finance cost, and the utility collects nothing from customers until it does. Under CWIP, construction spending enters the rate base as it is incurred, so collection from customers begins during construction. What customers pay during construction is the return on that growing balance, and not the construction cost itself. That return tracks the financing charge the utility would otherwise capitalize but need not equal it. Because the charge is collected in cash as it accrues rather than capitalized, the completed asset enters service carrying construction cost alone. Once the asset is in service, customers pay depreciation plus a return under both rules, but the book value those are computed on differs. The two horizontal dashed lines mark these two starting values and the gap between them is the finance cost. Both curves reach zero at the end of the asset's life, when the asset is fully depreciated. The figure is not drawn to scale. The finance cost is drawn larger than in practice so the two levels can be told apart. Section 2.2 sets out the mechanics. The figure is adapted from an S&P Regulatory Research Associates (RRA) note that shows the same comparison (Ernst and Hlinka, 2025).

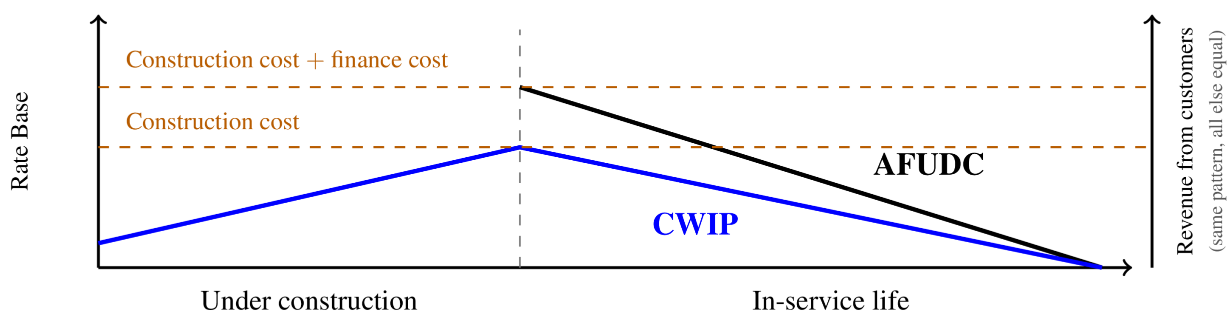


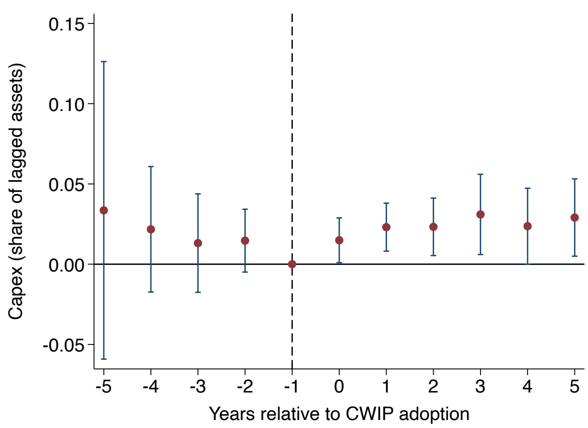
Figure 2: CWIP, Investment Intensity, and Construction Delay: Event Studies

This figure plots the event-time coefficients β_k from an event-study analog of the cross-state stacked difference-in-differences specification in Equation (2) for Panels A and B, and of Equation (3) for Panel C,

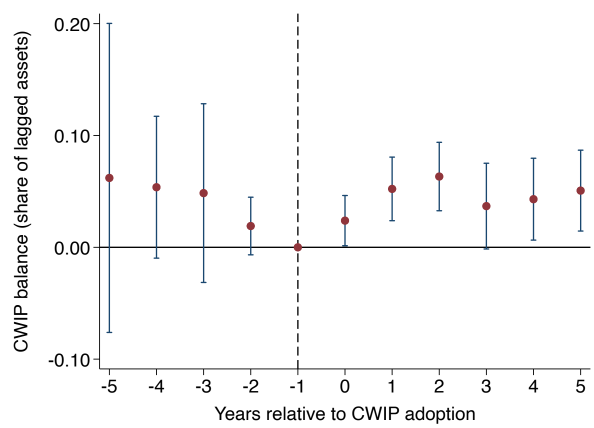
$$Y_{i,c,t} = \sum_{\substack{k=-5 \\ k\neq -1}}^{5} \beta_k \left(Treat_{i,c} \times D^k_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

estimated separately for each panel. $Treat_{i,c}$ equals one for units in the treated regulated arm of cohort c and zero for the never-treated regulated controls. $D^k_{c,t}$ is an event-time indicator equal to one when event year t is k years from cohort c's CWIP adoption year and zero otherwise. The year before adoption, $k = -1$, is omitted and serves as the base period. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, $\alpha_{t\times c}$ a year-by-cohort fixed effect, and $X_{i,c,t}$ the control vector. Panel C additionally includes a state-by-cohort fixed effect, and its time dimension is the year construction started rather than the calendar year. Standard errors are clustered at the utility-by-cohort level. The bars are 90% confidence intervals. Variable definitions are provided in Appendix D.

Panels A and B are estimated on the FERC Form 1 utility-year panel. The dependent variable is annual capital expenditure scaled by lagged total assets in Panel A and the construction-work-in-progress balance scaled by lagged total assets in Panel B. The fixed effects are utility-by-cohort and calendar-year-by-cohort. Panel C is estimated on the generator sample, one observation per generator. The dependent variable is completion delay, the realized completion year minus the completion year originally filed for the project, measured in years, with positive values indicating a delay. The fixed effects are utility-by-cohort, state-by-cohort and construction-start-year-by-cohort.

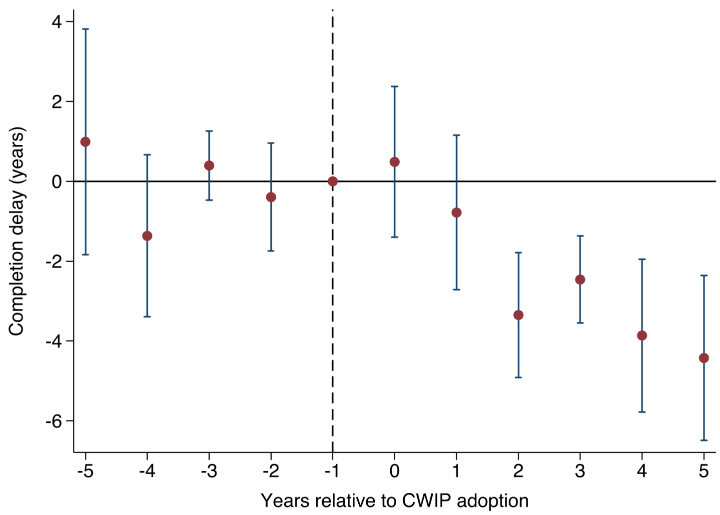


Panel A: Capex (Scaled by Lagged Total Assets)



Panel B: CWIP Balance (Scaled by Lagged Total Assets)

Figure 2 (Continued): CWIP, Investment Intensity, and Construction Delay: Event Studies



Panel C: Completion Delay Relative to Initial Estimate (Years)

Figure 3: Time to First Wind or Solar Investment after a State RPS

This figure plots Kaplan-Meier failure estimates of the time from a state's RPS coming into force to the first wind or solar generator a regulated utility starts in that state. The curves are plotted separately for states that permitted CWIP at the date the RPS took effect and states that did not. The unit is the utility-state, with the number of utility-state cases in each group given in parentheses in the legend. Cases in which the utility starts no wind or solar generator are censored at the last year in which the utility started a generator of any kind in that state. Each case is followed for at most fifteen years after its state's RPS took effect. The horizontal axis measures the number of years since the state's RPS came into force, and the vertical axis gives the cumulative share of cases that have started their first wind or solar generator by that year. The horizontal dotted line marks the halfway point, where each curve crosses its median time to first investment. The two vertical lines mark those crossings, with the median printed at the top of each. They are drawn in different patterns and each is named separately in the legend.

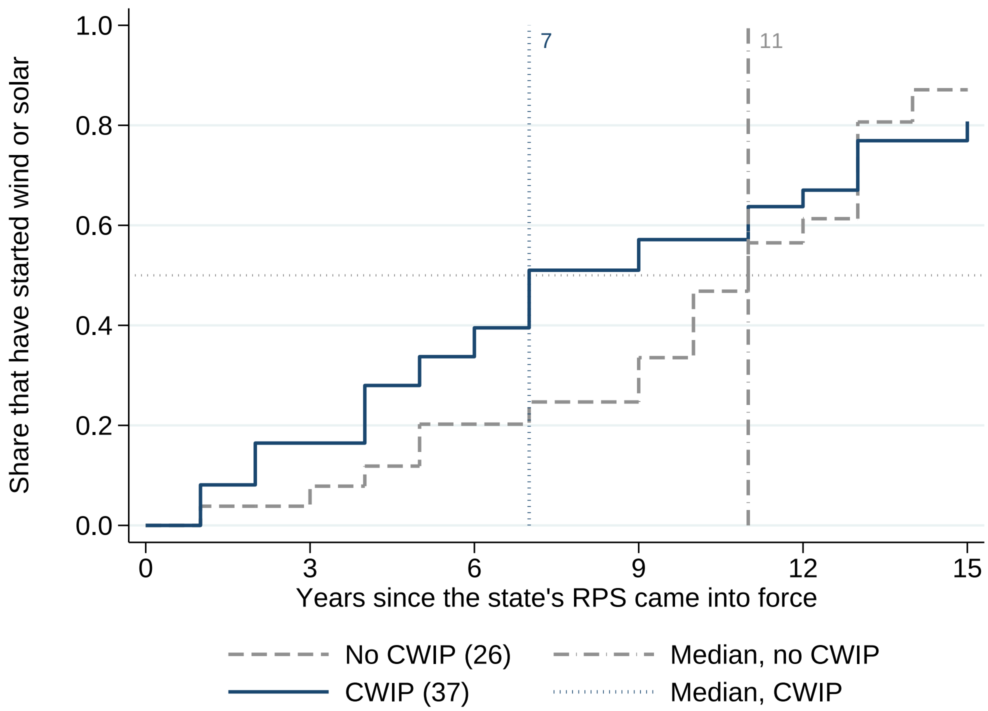


Figure 4: Renewable Share of Newly Started Capacity by Years since the State RPS

This figure reports the wind and solar share of newly started generating capacity for regulated utilities, grouped by how long the state's RPS had been in force. The comparison is made only inside states with an RPS in force, and each state is followed for at most fifteen years after its RPS took effect. The horizontal axis measures the number of years since the state's RPS came into force, grouped into four intervals of zero to two, three to five, six to nine, and ten to fifteen years. The bars are plotted separately for state-years in which CWIP was available and those in which it was not. CWIP is recorded as the rule in force in that year. The vertical axis in Panel A reports wind plus solar nameplate capacity as a percent of all the nameplate capacity the utilities in the respective state-year started. The vertical axis in Panel B reports that capacity in megawatts. The full height of each Panel B bar is all the capacity started and the solid lower segment is the wind and solar part of it. The number of utility-state-years behind each bar is given in parentheses above it in Panel A. The no-CWIP bars in the first two windows are close to zero rather than missing, at 0.3 and 0.7 percent, and the legend's third category appears in Panel B only.

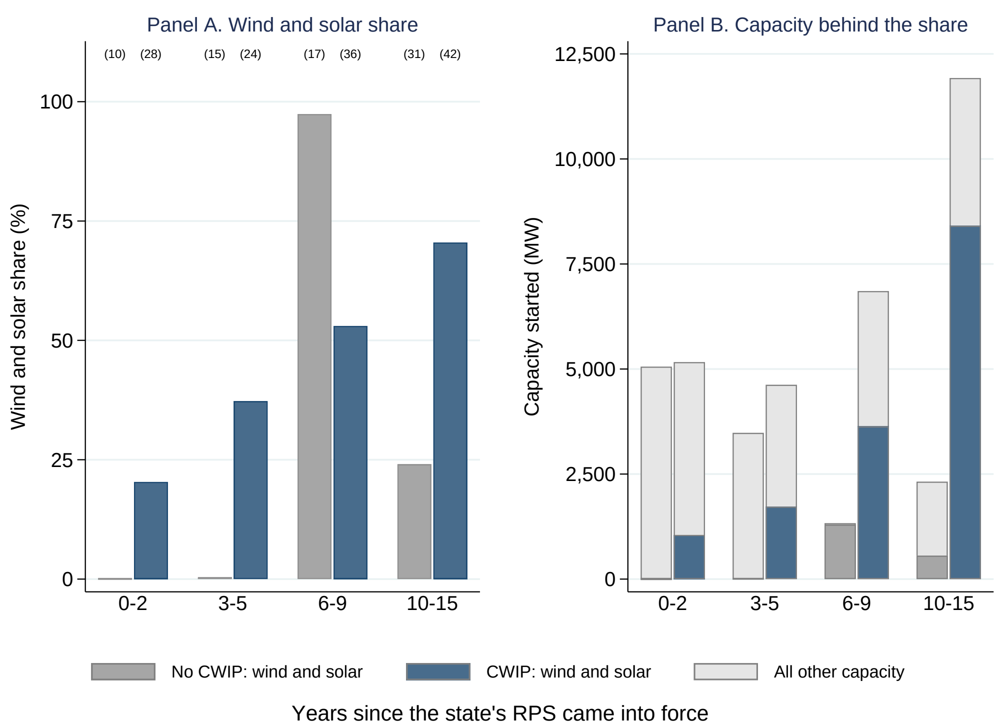


Table 1: Descriptive Statistics

This table reports the number of non-missing observations (N), mean, and standard deviation for the principal analysis variables. Statistics are computed on the distinct observations in the analysis sample, before cohort stacking, with N reported separately for each variable. Regression sample sizes are larger because an observation enters once for each cohort in which it appears. *Reg, Treated* and *Reg, Never-Treated* are the treated and never-treated regulated utilities used in the main analysis. All variable definitions are provided in Appendix D.

	Reg, Treated			Reg, Never-Treated		
	N	Mean	SD	N	Mean	SD
Financials (utility-year; FERC Form 1)						
Levels						
CWIP_ balance	195	0.073	0.069	364	0.038	0.035
Capex	195	0.083	0.039	364	0.069	0.038
Net_ Plant (per MWh Sold)	195	183.87	65.27	364	208.08	179.80
Production O&M	195	43.99	13.55	364	42.61	19.65
Growth rates						
Prod_ PPE_ Growth	192	0.071	0.127	246	0.036	0.228
Revenue growth	195	0.033	0.104	364	0.012	0.117
Operating expense growth	195	0.030	0.111	362	0.010	0.132
Operating income growth	195	0.083	0.226	361	0.064	0.281
Net income growth	190	0.079	0.439	352	0.065	0.451
Cash revenue growth	195	0.037	0.103	363	0.011	0.119
Cash flow from operations growth	193	0.265	1.004	358	0.225	0.875
Construction volume (utility-state-year; EIA Form 860)						
Construction starts	478	0.351	1.255	541	0.580	3.847
MW started	478	75.8	309.6	541	15.1	86.6
MW built (stock)	478	3,496.9	4,709.2	541	2,226.4	2,801.0
Generator construction (generator level; EIA Form 860)						
Post-approval gap	305	0.187	0.533	590	0.119	0.420
Planned duration	286	2.007	2.093	548	1.195	1.258
Construction time	235	1.319	1.309	454	1.744	1.405
Completion delay	204	0.451	1.391	414	1.604	1.986
Capital-intensity rank	305	1.898	1.773	581	4.272	2.863

Table 2: CWIP and Investment

Panel A (Firm-Level Investment) reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, and $\alpha_{t\times c}$ is a year-by-cohort fixed effect. Dependent variables are firm-level investment outcomes: *Capex*, capital expenditure scaled by lagged total assets, and *CWIP_balance*, the construction-work-in-progress balance scaled by lagged total assets.

Panel B (Construction Volume) reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $\alpha_{s\times c}$ is a state-by-cohort fixed effect and all remaining terms are as defined above. Dependent variables are utility-state-year construction-volume outcomes: *Construction starts*, the number of generating units that began construction in the year, *MW started*, the nameplate capacity of those units, in megawatts, and *MW built (stock)*, the total megawatts of the utility's built capacity.

t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

Panel A: Firm-Level Investment

	Capex (1)	*CWIP_balance* (2)
Treat × *Post*	0.011*	0.020*
	(1.93)	(1.83)
N	854	854
Adj. R-squared	0.535	0.364
Unit of Analysis	Utility-Year	
Utility × Cohort FE	Yes	Yes
Year × Cohort FE	Yes	Yes
Controls	Yes	Yes
Clustering	Utility × Cohort	

Table 2 (Continued): CWIP and Investment

Panel B: Construction Volume

	Construction starts (1)	*MW started* (2)	*MW built (stock)* (3)
Treat × *Post*	0.439**	34.743***	201.628**
	(2.27)	(2.99)	(2.14)
N	3,138	3,138	3,138
Adj. R-squared	0.273	0.158	0.972
Unit of Analysis		Utility-State-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table 3: CWIP and Construction Timing

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c} = \delta \left(Treat_{s,c} \times Const\_Post_{i,c} \right) + X'_{i,c}\gamma + \alpha_{u\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c},$$

where $Treat_{s,c}$ equals one for a generator in a state that adopts CWIP in cohort c, $Const\_Post_{i,c}$ equals one for generators whose construction-start year falls on or after the cohort's adoption year, $\alpha_{u\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is a construction-start-year-by-cohort fixed effect, where t denotes generator i's construction-start year. The dependent variables are: year the generator becomes operational minus the original planned operational year (*Completion delay*), the gap in years between regulatory approval and the start of construction (*Post-approval gap*), the time from the start of construction to completion (*Construction time*), and the originally planned project duration (*Planned duration*). The control vector X comprises generator size together with state-level regulatory, political, and economic variables. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

	Completion delay (yrs) (1)	*Post-approval gap* (yrs) (2)	*Construction time* (yrs) (3)	*Planned duration* (yrs) (4)
Treat × Const_Post	−2.010***	−0.959**	−2.950**	−2.482***
	(−2.82)	(−2.15)	(−2.51)	(−4.41)
Generator_size	−0.144***	−0.140***	−0.108	−0.020
	(−3.34)	(−8.39)	(−1.32)	(−0.38)
N	1,377	1,377	1,377	1,377
Adj. R-squared	0.600	0.671	0.497	0.711
Unit of Analysis	Generator-Level			
Utility × Cohort FE	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes
Start Year × Cohort FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Clustering	Utility × Cohort			

Table 4: The Nature of the Investment

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\,(Treat_{s,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{u\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{s,c}$ equals one for a generator in a state that adopts CWIP in cohort c, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, $\alpha_{u\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is a time-by-cohort fixed effect, where the timing variable is the one named in each panel's fixed-effect rows.

Panel A (Capital Intensity) reports the capital-intensity rank, an integer ordering of generator technologies from cheapest to most expensive to construct per kilowatt (lower values indicate cheaper technology), estimated at the generator level. *Post* here is *Const_Post*, equal to one for generators whose construction-start year falls on or after the cohort's CWIP adoption year.

Panel B (Cancellation) reports cancellation outcomes measured before and after construction starts. The dependent variable in column (1) is *Cancel_after_construction*, equal to one for projects that were canceled after construction started and before reaching commercial operation. *Post* here is the same *Const_Post* used in Panel A. The dependent variable in column (2) is *Cancel_before_construction*, equal to one for projects that were proposed but abandoned before construction starts. In column (2) a project may be abandoned before it ever starts construction and so has no construction-start year, so *Post* there is *Prop_Post*, equal to one for projects whose proposal year falls on or after the cohort's CWIP adoption year. Each column includes a fixed effect for the project milestone that dates treatment.

Panel C (Capacity Utilization) reports capacity-utilization outcomes. Columns (1) and (2) are at the generator-year level and cover fossil generating units larger than 25 megawatts. The dependent variables are *Capacity factor* in column (1), the CEMS capacity factor, and *Share days operating* in column (2). *Post* is the calendar-time indicator that turns on in event years on or after adoption. Column (3) is at the plant-year level and reports *Standby share*, the share of installed capacity held in standby or out-of-service status. Here *Post* is *Prop_Post*. This panel is estimated on a ±10-year event-time window rather than the ±5-year window used in Panels A and B.

t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

Table 4 (Continued): The Nature of the Investment

Panel A: Capital Intensity of New Projects

	Capital-intensity rank (1)
Treat × *Const_Post*	−1.574*** (−2.89)
N	2,710
Adj. R-squared	0.730
Unit of Analysis	Generator-Level
Utility × Cohort FE	Yes
State × Cohort FE	Yes
Start Year × Cohort FE	Yes
Controls	Yes
Clustering	Utility × Cohort

Table 4 (Continued): The Nature of the Investment

Panel B: Cancellation Before and After Construction Starts

	Cancel_after_construction (1)	*Cancel_before_construction* (2)
Treat × *Const_Post*	0.149*	
	(1.85)	
Treat × *Prop_Post*		−0.690***
		(−19.29)
N	2,168	1,108
Adj. R-squared	0.138	0.280
Unit of Analysis	Generator-Level	
Utility × Cohort FE	Yes	Yes
State × Cohort FE	Yes	Yes
Start Year × Cohort FE	Yes	No
Proposal Year × Cohort FE	No	Yes
Controls	Yes	Yes
Clustering	Utility × Cohort	

Table 4 (Continued): The Nature of the Investment

Panel C: Capacity Utilization

	Capacity factor	*Share days operating*	*Standby share*
	(1)	(2)	(3)
Treat × Post	−0.096***	−0.033*	
	(−3.52)	(−1.74)	
Treat × Prop_Post			−0.059
			(−1.01)
N	32,915	35,472	11,910
Adj. R-squared	0.390	0.508	0.326
Unit of Analysis	Generator-Year		Plant-Year
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Clustering	Utility × Cohort		

Table 5: Financing Channel: Income-Statement and Cash-Flow Growth

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. The table reports year-over-year growth rates for revenue, operating expense, operating income, net income, cash revenue (operating revenues less the increase in receivables), and cash flow from operations. The control vector X comprises lagged firm financial characteristics together with state-level regulatory, political, and economic variables. Each growth rate is estimated across three symmetric event-time windows around adoption (±5, ±10, and ±15 years). t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

	Treat × *Post*		
	±5	±10	±15
	(1)	(2)	(3)
Revenue growth	0.047**	0.052***	0.052***
	(2.46)	(3.48)	(3.62)
Operating expense growth	0.034	0.045**	0.044**
	(1.44)	(2.46)	(2.54)
Operating income growth	0.025	0.024	0.020
	(0.51)	(0.65)	(0.56)
Net income growth	0.116	0.099	0.057
	(1.56)	(1.35)	(0.79)
Cash revenue growth	0.036*	0.040***	0.037***
	(1.85)	(2.66)	(2.67)
Cash flow from operations growth	−0.073	−0.118	−0.150
	(−0.41)	(−0.82)	(−1.07)
Unit of Analysis		Utility-Year	
Utility × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table 6: Financing Channel: Credit Quality and Price

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\,(\mathit{Treat}_{i,c} \times \mathit{Post}_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $\mathit{Treat}_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, $\mathit{Post}_{c,t}$ equals one in event years on or after the cohort's adoption year, $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. The table reports three credit-market outcomes: the S&P long-term issuer rating on a 1-22 numeric scale in columns (1) and (2), the firm-year average maturity at issuance on newly issued fixed-rate bonds in years in columns (3) and (4), and the firm-year average coupon at issuance on newly issued fixed-rate bonds in percentage points in columns (5) and (6). For each outcome the first column adds fixed effects only and the second adds the full control vector, X, which comprises firm financial characteristics together with state-level regulatory, political, and economic variables. All columns are estimated on a symmetric ±10-year event-time window around adoption. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

	S&P LT Rating		*Average maturity*		*Average coupon*	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	0.573	0.228	−2.243	−4.250**	0.015	−0.106
	(1.09)	(0.54)	(−1.04)	(−2.17)	(0.07)	(−0.48)
N	1,852	1,852	943	943	953	953
Adj. R-squared	0.546	0.700	0.148	0.241	0.508	0.589
Unit of Analysis	Utility-Year					
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Clustering	Utility × Cohort					

Table 7: Regulatory-Regime Moderation of the CWIP Response

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta_1 \left(Treat_{i,c} \times Post_{c,t} \right) + \delta_2 \left(Treat_{i,c} \times Post_{c,t} \times RRA_i \right) + X'_{i,c,t}\gamma + \alpha_{i \times c} + \alpha_{t \times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, and RRA_i is the utility's regulatory-return regime score, built from S&P Global's Regulatory Research Associates state ranking (a nine-level ordinal grade oriented so that higher values denote a more utility-favorable regulatory environment), fixed at its 2011 to 2013 baseline average, sales-weighted across states for multi-state utilities, and z-scored. The *Treat* × *RRA* interaction and the level terms are absorbed by the fixed effects, leaving *Post* × *RRA* as the only lower-order interaction the design identifies. It is reported beneath the triple interaction in each block. Each dependent variable is a three-row block across three event-time windows (±5, ±10, and ±15 years). Outcomes are the capital margins (capital expenditure and the electric construction-work-in-progress balance, each scaled by lagged total assets) and production operating-and-maintenance expense per lagged megawatt-hour sold. The control vector X comprises lagged firm financial characteristics together with state-level regulatory, political, and economic variables. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

	Event-time window		
	±5 (1)	±10 (2)	±15 (3)
Capex			
Treat × *Post*	0.005	0.011*	0.011*
	(0.76)	(1.74)	(1.73)
Treat × *Post* × *RRA*	0.025***	0.025***	0.025***
	(3.08)	(3.84)	(3.77)
Post × *RRA*	−0.008	−0.010	−0.010
	(−0.86)	(−0.22)	(−0.15)
CWIP_balance			
Treat × *Post*	0.006	0.007	0.008
	(0.42)	(0.60)	(0.70)
Treat × *Post* × *RRA*	0.027*	0.026*	0.028**
	(1.75)	(1.98)	(2.30)
Post × *RRA*	−0.001	−0.002	−0.003
	(−0.28)	(−0.61)	(−1.03)
Production O&M			
Treat × *Post*	1.316	3.694**	3.584*
	(0.66)	(2.04)	(1.91)
Treat × *Post* × *RRA*	−3.858*	−6.071***	−6.017***
	(−1.94)	(−2.83)	(−2.78)
Post × *RRA*	2.982	3.738	3.884
	(0.52)	(0.14)	(0.37)
Unit of Analysis		Utility-Year	
Utility × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table 8: Historical-Test-Year Moderation of the CWIP Response

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c} = \delta_1 \left(Treat_{s,c} \times Const\_Post_{i,c} \right) + \delta_2 \left(Treat_{s,c} \times Const\_Post_{i,c} \times Historical\_Test\_Year_s \right) + X'_{i,c}\gamma + \alpha_{u\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c},$$

where $Treat_{s,c}$ equals one for a generator in a state that adopts CWIP in cohort c, $Const\_Post_{i,c}$ equals one for generators whose construction-start year falls on or after the cohort's adoption year, $\alpha_{u\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is a construction-start-year-by-cohort fixed effect, where t denotes generator i's construction-start year. *Historical_ Test_ Year* equals one for states that set rates from actual past-year costs rather than projected costs. The *Treat* × *Historical_ Test_ Year* interaction and the level terms are absorbed by the fixed effects, leaving *Const_ Post* × *Historical_ Test_ Year* as the only lower-order interaction the design identifies. It is reported beneath the triple interaction. The dependent variables are two construction-timing outcomes, the pre-construction gap between approval and the start of construction (*Post-approval gap*) and the overall completion delay (*Completion delay*). The control vector X comprises generator size together with state-level regulatory, political, and economic variables. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

	Post-approval gap (yrs) (1)	*Completion delay* (yrs) (2)
Treat × *Const_ Post*	0.370	−0.175
	(0.86)	(−0.26)
Treat × *Const_ Post* × *Historical_ Test_ Year*	−1.727**	−2.205**
	(−2.52)	(−2.10)
Const_ Post × *Historical_ Test_ Year*	0.463	0.128
	(0.84)	(0.22)
N	1,377	1,377
Adj. R-squared	0.675	0.600
Unit of Analysis	Generator-Level	
Utility × Cohort FE	Yes	Yes
State × Cohort FE	Yes	Yes
Start Year × Cohort FE	Yes	Yes
Controls	Yes	Yes
Clustering	Utility × Cohort	

Table 9: CWIP, Customer Outcomes, and Demand Response

This table reports estimates of the following stacked difference-in-differences design:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is a year-by-cohort fixed effect. The control vector X comprises utility size together with state-level regulatory, political, and economic variables. All panels are restricted to investor-owned distribution utilities.

Panel A (Power Outages) reports the two industry-standard outage metrics at the utility-state-year level. *SAIDI* (System Average Interruption Duration Index) measures the total minutes without power per customer per year. *SAIFI* (System Average Interruption Frequency Index) measures the number of separate interruptions per customer per year. Each metric enters twice, once including major event days ("with Major Events," the industry term for storms, ice events, and other extraordinary disruptions) and once excluding them ("without Major Events," the normal-conditions measure). All four outcomes are in log form. Outcomes are reported in rows and the three columns are symmetric event-time windows around CWIP adoption, ±5 years in column (1), ±7 years in column (2), and ±10 years in column (3). These specifications additionally control for *Storm_Declarations*, the log of one plus the number of storm-related federal disaster declarations in the utility's state and year.

Panel B (Residential Customer Satisfaction) reports the J.D. Power residential overall satisfaction score, *Customer_Sat_Score*, measured on a 1,000-point scale and restricted to the post-2006 sample, estimated on a symmetric ±5 event-time window around CWIP adoption. Column (1) omits controls. Column (2) adds the control vector. Column (3) additionally conditions on the log of implied residential price as a post-treatment mediator. Column (3) drops *Lag_State_Sales*, which is mechanically collinear with implied residential price, from the control vector.

Panel C (Demand-Response Programs) reports demand-response program activity from EIA Form 861 at the utility-year level, estimated on the same ±5 event-time window. Columns (1) and (2) report *Any_DRP* (an indicator equal to one if the utility operates any demand-response program). Columns (3) and (4) report *DRP_customers* (customers enrolled in demand-response programs scaled by lagged total customers). Columns (5) and (6) report *Energy_Savings* (megawatt-hours saved through demand-response programs scaled by lagged total sales, in percent). Within each pair, the first column omits controls and the second adds the control vector. This specification excludes $\alpha_{s\times c}$, the state-by-cohort fixed effect.

t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Appendix D.

Table 9 (Continued): CWIP, Customer Outcomes, and Demand Response

Panel A: Power Outages

	Event-time window		
	±5	±7	±10
	(1)	(2)	(3)
Ln(SAIDI), with Major Events			
Treat × Post	0.217	0.399	0.308
	(0.74)	(1.15)	(1.41)
N	1,019	1,522	2,290
Adj. R-squared	0.199	0.155	0.130
Ln(SAIDI), without Major Events			
Treat × Post	0.093	0.063	0.060
	(1.61)	(1.17)	(1.09)
N	2,028	2,712	3,559
Adj. R-squared	0.037	0.039	0.041
Ln(SAIFI), with Major Events			
Treat × Post	0.166	0.217*	0.197*
	(1.32)	(1.87)	(1.86)
N	960	1,390	1,989
Adj. R-squared	0.170	0.123	0.088
Ln(SAIFI), without Major Events			
Treat × Post	0.046	0.007	−0.002
	(0.81)	(0.14)	(−0.04)
N	2,024	2,708	3,551
Adj. R-squared	0.043	0.029	0.024
Unit of Analysis		Utility-State-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Storm declarations	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table 9 (Continued): CWIP, Customer Outcomes, and Demand Response

Panel B: Residential Customer Satisfaction

	Customer_Sat_Score		
	(1)	(2)	(3)
Treat × Post	−14.929***	−12.556***	−12.684***
	(−5.27)	(−3.03)	(−2.93)
Ln(Price_Res)			−24.273***
			(−2.97)
Lag_State_Sales		48.537***	
		(3.66)	
N	477	343	343
Adj. R-squared	0.910	0.920	0.916
Unit of Analysis		Utility-State-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Clustering		Utility × Cohort	

Table 9 (Continued): CWIP, Customer Outcomes, and Demand Response

Panel C: Demand-Response Programs

	Any_DRP		*DRP_customers*		*Energy_Savings*	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	0.014	−0.130*	−0.032***	−0.061***	−0.010	−0.025***
	(0.25)	(−1.85)	(−4.34)	(−4.31)	(−1.39)	(−2.64)
N	3,514	3,189	3,507	3,189	3,507	3,189
Adj. R-squared	0.721	0.761	0.398	0.447	0.539	0.635
Unit of Analysis	Utility-Year					
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Clustering	Utility × Cohort					

Table 10: The Announced Generation Pipeline by CWIP Status: The Data-Center-Driven Wave

This table describes the announced generation pipeline as of 2024, grouping states by their CWIP status. Five groups are shown. The first is Virginia, the state with the largest concentration of data centers, reported on its own. The second is the three first-time adopters, Arkansas, Missouri, and Oklahoma, which are never-treated in the paper's design and enacted CWIP for the first time in the current wave. The third is the 36 long-standing CWIP states, which allowed CWIP before the current wave. This group combines the 13 states treated in the paper's difference-in-differences design, which adopted between 2002 and 2012, with the 23 other always-treated jurisdictions, 22 states and the District of Columbia, whose CWIP authority predates 2001 and which are therefore excluded from the estimation sample. Virginia, also always-treated, is reported on its own row and is not included in this group. The fourth and fifth are the never-treated states, split at the group median 2024 summer peak into 6 large and 5 small systems.

Panel A covers regulated utilities (the Electric Utility sector), for which CWIP recovery applies. Panel B covers independent power producers (IPPs), which are not rate-regulated and finance construction on their own balance sheets.

Proposed capacity is the combined capacity of all announced units, both those planned and those already under construction, reported in megawatts and as a percent of the group's 2024 summer peak demand. Capacity is measured under summer operating conditions so that it is stated on the same basis as the summer peak demand it is scaled by. Gas share is the megawatt share of that capacity whose primary energy source is natural gas. The final column reports capacity that became operational during 2020-24, also as a percent of peak, as a recent-build benchmark.

	States (N)	Proposed cap. (MW)	Proposed cap. (% of peak)	Gas share (%)	Operational 2020-24 (% of peak)
Panel A: Regulated utilities (Electric Utility sector)					
Virginia (data-center epicenter)	1	4,287	16.0	0.0	5.0
First-time adopters (AR, MO, OK)	3	3,033	3.7	98.1	4.2
Long-standing CWIP	36	33,905	4.4	60.8	4.9
Large never-treated	6	1,480	0.7	16.3	1.1
Small never-treated	5	632	7.4	0.0	14.8
Panel B: Independent power producers					
Virginia (data-center epicenter)	1	3,472	12.9	0.1	10.4
First-time adopters (AR, MO, OK)	3	6,129	7.6	0.1	6.1
Long-standing CWIP	36	169,491	22.1	4.1	12.9
Large never-treated	6	51,758	23.5	10.3	18.0
Small never-treated	5	8,600	100.8	0.0	25.9

Online Appendix of

Cash Now, Current Later: Energy Investment in the AI Era

Sonakshi Agrawal

Sep 2026

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O.1 Variable Definitions

Variable	Definition
Panel A: Utility-Year Level. Source: FERC-1 unless noted.	
Capex	Capital expenditure scaled by lagged total assets
CWIP_balance	Construction-work-in-progress balance for the electric segment, scaled by lagged total assets
Net_Plant (per MWh Sold)	Net utility plant in service divided by lagged megawatt-hours of electricity sold (FERC-1, EIA-861)
Prod_PPE_Growth	Year-on-year growth rate of production property, plant, and equipment
Construction starts	Number of generating units owned by the utility that began construction in year t (EIA-860)
MW started	Nameplate capacity, in megawatts, of generating units owned by the utility that began construction in year t (EIA-860)
MW built (stock)	Total nameplate capacity, in megawatts, of the utility's built generating units in year t (EIA-860)
Production O&M	Power-production expenses of electric O&M divided by lagged megawatt-hours of electricity sold
Operating expense growth	Year-on-year growth rate of total operating expenses
Operating income growth	Year-on-year growth rate of operating income, defined as operating revenues minus total operating expenses
Net income growth	Year-on-year growth rate of net income
Cash revenue growth	Year-on-year growth rate of cash revenue, defined as operating revenues less the increase in accounts receivable
Cash flow from operations growth	Year-on-year growth rate of cash flow from operations
Any_DRP	Indicator equal to one if the utility operated any demand-response programs (DRPs) in a given year (EIA-861)
DRP_customers	Number of customers enrolled in DRPs scaled by lagged total number of customers (EIA-861)
Energy_Savings	Megawatt-hours saved through demand response programs in year t scaled by utility's megawatt-hours quantity sold in year $t-1$. I multiply it by 100. (EIA-861)
Ln(Total_Assets)	Natural log of total assets
Leverage	Total debt divided by total assets
ROA	Net income divided by lagged total assets
Revenue growth	Year-on-year growth rate of total electricity sales revenues
Tangibility	Net plant in service divided by total assets
Dividends_d	Indicator equal to one if the utility paid dividends in a given year
Panel B: Utility-State-Year Level. Source: EIA-861 unless noted.	
Customer_Sat_Score	J.D. Power residential customer satisfaction score, measured on a 1,000-point scale, aggregating assessments of power quality, billing, communications, and corporate citizenship (J.D. Power)
Ln(Price_Res)	Natural log of the implied residential price, defined as residential electricity revenue divided by residential megawatt-hours sold (dollars per megawatt-hour)
Ln(Sales_MWh)	Natural log of total retail electricity sales in megawatt-hours by firm i in state s in year t
Ln(Total_Capacity)	Natural log of total nameplate generating capacity in megawatts owned by firm i in state s in year t (EIA-860)

Continued on next page

Section O.1 continued

Variable	**Definition**
Ln(SAIDI)	Natural log of the System Average Interruption Duration Index, defined as total customer-minutes without power in year t divided by the number of customers served by firm i in state s. The index is reported in two versions. The "with Major Events" version includes major event days (storms and other extraordinary disruptions) and the "without Major Events" version excludes them. Data are from the Lawrence Berkeley National Laboratory utility reliability compilation for years through 2012 and EIA Form 861 for 2013 onward.
Ln(SAIFI)	Natural log of the System Average Interruption Frequency Index, defined as the number of separate customer interruptions in year t divided by the number of customers served by firm i in state s. Reported in the same "with Major Events" and "without Major Events" versions as SAIDI and drawn from the same combined Berkeley compilation and EIA Form 861 panel.
Panel C: Generator and Plant Level. Source: EIA-860 unless noted.	
Cancel_before_construction	Indicator equal to one for generators that were proposed but abandoned before construction started, and zero for generators that reached construction (whether they were later canceled or completed). Defined on the sample of generators with an observed proposal year.
Cancel_after_construction	Indicator equal to one for generators that started construction and were then canceled before reaching commercial operation, and zero for generators that started construction and reached commercial operation. Defined on the sample of generators with an observed construction-start year.
Generator_size	Natural log of the capacity of the generating unit in megawatts at the time construction began
Plant_size	Natural log of the total capacity of all generating units at the plant in megawatts at the time construction began. Used as the firm-size control in the plant-year standby specifications (EIA-860).
Post-approval gap	Number of years between commission approval and the start of construction.
Construction time	Number of years between the start of construction and the date the unit reaches commercial operation.
Planned duration	Originally expected duration of the project in years, as filed at the time of approval (originally expected completion year minus the project start year).
Completion delay	Realized commercial-operation year minus the originally filed expected-completion year. Positive values indicate the unit reached operation later than originally planned.
Capital-intensity rank	Integer ordering of a generator's technology by capital cost per kilowatt from the EIA Annual Energy Outlook 2010 cost table, from one (cheapest) to eight (most expensive): (1) gas combustion turbine, (2) oil, (3) gas combined cycle, (4) wind, (5) hydroelectric, (6) coal, (7) solar, and (8) nuclear. A generator is classified as gas combined cycle only if its nameplate capacity is at least 300 megawatts. Oil is not separately priced in the Annual Energy Outlook schedules and is ordered immediately above gas combustion turbine. (EIA AEO, EIA-860)
Age at retirement	Age of the generating unit in years at the time it retires, computed as the retirement year minus the year the unit entered service
Share of plant retired	Nameplate capacity retired in the event as a share of the plant's total nameplate generating capacity

Continued on next page

Variable	**Definition**
Ln(Plant capacity at retirement)	Natural log of one plus the operating nameplate capacity of the plant (in megawatts) at the time a generator at the plant retires; i.e., $\ln(1 +$ plant operating capacity$)$. Plants recorded with zero operating capacity in the year before the retirement is filed enter at $\ln(1) = 0$.
Capacity factor	Annual gross load divided by the product of nameplate capacity in megawatts and 8,760 hours, for fossil generating units larger than 25 megawatts. (EPA CEMS, EIA-860)
Share days operating	Fraction of the days a unit reported to CEMS in the year on which a fossil unit larger than 25 megawatts generated any power, from the EPA's daily CEMS files. (EPA CEMS, EIA-860)
Standby share	Share of a plant's installed nameplate capacity that is held in standby or out-of-service (but not retired) status, at the plant-year level and across all fuel types. The numerator is the nameplate capacity of units flagged as standby or out of service. The denominator is the plant's total installed nameplate capacity. (EIA-860)
Panel D: Treatment Variables. Source: Multiple unless noted.	
Treat	An indicator equal to one for firms operating in at least one CWIP-adopting state
Post	An indicator equal to one for years at or after the year of CWIP adoption in the treated state
Const_Post	An indicator equal to one for generators whose construction-start year falls in or after the state's CWIP adoption year, and zero for generators whose construction started before adoption (EIA-860)
Prop_Post	An indicator equal to one for generators or plants first proposed in or after the state's CWIP adoption year, and zero for those proposed before adoption (EIA-860)
RRA	The utility's regulatory-return regime score, built from S&P Global's Regulatory Research Associates state ranking (a nine-level ordinal grade oriented so that higher values denote a more utility-favorable regulatory environment), fixed at its 2011-2013 baseline average and z-scored across states. For utilities operating in more than one state the state grades are weighted by retail electricity sales. (S&P RRA, EIA-861)
CWIP_Policy	Indicator equal to one if the state currently permits CWIP cost recovery: one for the always-treated states and for adopter states from the CWIP-adoption year onward, and zero otherwise
RRA_Fav	State-year regulatory-favorability score, defined as ten minus the state's numeric S&P RRA grade in the most recent monthly rating within the year, so that higher values denote a more utility-favorable environment (S&P RRA)
Panel E: State-Level Policy Controls. Source: Multiple.	

The indicators *MYP*, *PIM*, *Decoupling*, *Securitization*, and *Comp_Restrict* equal one at the utility-state level if the state has the policy in year t, and at the utility level if any state in which the utility operates does. *Commission_Elected*, *Historical_Test_Year*, *Rate_Base_Average*, *Governor_R*, *State_Control_R*, *RPS_Policy*, and *RPS_Voluntary* are measured at the utility-state level and enter at the utility level as the share of the firm's states with the attribute. *RPS_Target_Pct*, which is continuous, enters at the utility level as the firm's electric-revenue-weighted average across its states. Appendix C of the main paper defines each policy in full.

Continued on next page

Section O.1 continued

Variable	**Definition**
Panel F: Demand Controls. Source: EIA unless noted.	
GDP_real	Natural log of real state GDP
CDD	Natural log of cooling degree days in state s
HDD	Natural log of heating degree days in state s
Storm_Declarations	Natural log of one plus the number of storm-related federal disaster declarations covering state s in year t. Declarations are drawn from the OpenFEMA Disaster Declarations Summaries file, counted once per declaration, dated by the incident begin year, and restricted to storm-type incidents (hurricanes, tropical storms, tornadoes, severe storms, ice and winter storms, floods, and coastal storms). Entered as a control in the reliability specifications, where it conditions on the weather that generates major event days (FEMA)
Lag_State_Sales	One-year lag of total state-level retail electricity sales in megawatt-hours, summed across all distribution utilities reporting to EIA Form 861 in state s (EIA-861)
Panel G: Pre-Adoption Demand-Growth Heterogeneity Controls. Source: EIA-861.	
Pre_Summer_Peak_CAGR	Four-year compound annual growth rate of state-level summer peak electricity demand over the years immediately preceding the cohort's adoption year, z-scored to mean zero and standard deviation one across the pooled sample of eligible treated and never-treated state-cohort cells. (EIA-861)
Pre_Winter_Peak_CAGR	Four-year compound annual growth rate of state-level winter peak electricity demand over the years immediately preceding the cohort's adoption year, z-scored to mean zero and standard deviation one across the pooled sample of eligible treated and never-treated state-cohort cells. (EIA-861)
Pre_Ind_MWh_CAGR	Four-year compound annual growth rate of state-level industrial electricity sales in megawatt-hours over the years immediately preceding the cohort's adoption year, z-scored to mean zero and standard deviation one across the pooled sample of eligible treated and never-treated state-cohort cells. (EIA-861)
Panel H: Credit Ratings, Coupon, and Maturity. Source: S&P.	
S&P LT Rating	S&P long-term issuer credit rating mapped to a 1-22 numeric scale, higher values denoting stronger creditworthiness
Average maturity	Firm-year average maturity at issuance across the fixed-rate bonds the utility newly issued that year, in years
Average coupon	Firm-year average coupon at issuance across the fixed-rate bonds the utility newly issued that year, in percentage points
Panel I: Financing-Channel Firm Controls. Source: FERC-1 unless noted.	
Leverage_LT	Long-term debt divided by total assets
Ln(Long_Term_Debt)	Natural log of long-term debt
ST_Leverage	Short-term debt (notes payable) divided by total assets
Op_Margin	Operating income divided by total revenue
Loss	Indicator equal to one if income before extraordinary items is negative
Cash_Share	Cash and equivalents divided by total assets
Current_Ratio	Current assets divided by current liabilities

Continued on next page

Section O.1 continued

Variable	**Definition**
Int_Coverage	Interest coverage, computed as income before extraordinary items plus interest on long-term debt, divided by interest on long-term debt
Cap_Lease_Share	Capital-lease obligations (current plus noncurrent) divided by total assets
SalesGrowth_Vol	Five-year trailing standard deviation of sales growth
OCF_Vol	Five-year trailing standard deviation of cash flow from operations scaled by total assets
Ln(Issue_Amount)	Natural log of the original principal amount of the security at issuance (S&P)
Maturity_at_issuance	Maturity at issuance of the security, in years (S&P)
Fixed_Coupon	Indicator equal to one if the security carries a fixed coupon rate (S&P)
Panel J: Public-Parent Variables. Source: Compustat, CRSP, and EIA-861 via PUDL.	
CWIP_Exposure	Share of the listed parent's total megawatt-hours sold (retail plus sales-for-resale) that originated in states that had adopted CWIP by year t, built by rolling subsidiary-level EIA-861 sales up to SEC filers through the PUDL Exhibit 21 parent-subsidiary map
Annual Return	Parent's compounded annual stock return (CRSP)
Annual Excess Return	Parent's compounded annual stock return less the compounded market return over the same year (CRSP)
Δ*Capex / Lagged ME*	Year-over-year change in capital expenditure divided by the lagged market value of equity
Δ*Gross_Plant / Lagged ME*	Year-over-year change in gross property, plant, and equipment divided by the lagged market value of equity
Δ*Income / Lagged ME*	Year-over-year change in income before extraordinary items divided by the lagged market value of equity
Δ*Assets / Lagged ME*	Year-over-year change in total assets divided by the lagged market value of equity
Δ*Debt / Lagged ME*	Year-over-year change in total debt divided by the lagged market value of equity
Lagged Market Leverage	Lagged total debt divided by lagged total debt plus the lagged market value of equity

Multiple includes S&P RRA, ACEEE, and NARUC reports

O.2 Data Construction Details

This section describes detailed data-construction and cleaning steps behind variables used in the paper.

O.2.1 The CEMS-to-EIA-860 Crosswalk

The realized-utilization and emissions variables come from the EPA Continuous Emissions Monitoring System (CEMS), which records operating and emissions data for each combustion unit, a smaller piece of equipment within a generator (our main unit of analysis). The two do not line up one-to-one. A generator can contain several combustion units, and some plants share equipment across multiple generators. Linking the two therefore requires a crosswalk rather than a direct merge.

I match CEMS units to EIA-860 generators using a public EPA crosswalk,[1] keeping only exact matches and dropping ambiguous ones to keep the linked sample clean. Where equipment is shared across generators, I group the linked units so shared output is counted once rather than duplicated.

O.2.2 CEMS Utilization Variables

The CEMS data linked to EIA generators in Section O.2.1 are collected by the EPA under its Clean Air Markets program. Federal air rules require every fossil-fired combustion unit above 25 megawatts to run a continuous monitor and report its operation to the EPA, so the data cover the coal, gas, and oil units that make up a utility's fossil generating capacity.[2] The monitors record at high frequency, but I use the EPA's daily files, which report each unit's totals for the day, over 2000 through 2024.[3] Each daily record is one combustion unit on one day. From these records I use two fields, the unit's gross electrical output (gross load) in megawatt-hours and its operating time, and I aggregate them to the combustion-unit-year by summing gross output across the days,

[1] The crosswalk is the EPA Clean Air Markets Division (CAMD) to EIA crosswalk, a public mapping from each CAMD plant and combustion-unit identifier to its EIA-860 plant and generator identifier. It is available at `https://github.com/USEPA/camd-eia-crosswalk`.

[2] The program's reporting cutoff is 25 megawatts, so smaller units generally do not appear in CEMS. The reporting units include coal steam, gas combined-cycle, gas combustion-turbine, oil steam, oil combustion-turbine, and biomass units.

[3] The daily files are the daily-emissions extract from the EPA Clean Air Markets Program Data (CAMPD), available at `https://campd.epa.gov`. The EPA also publishes an hourly extract, but because every CEMS outcome in the paper is annual, the daily extract is sufficient.

counting the days the unit reports, and counting the days it operates.[4] These annual totals and day counts are the inputs to the utilization variables defined next.

Two utilization variables are built at the generator level from the linked panel. The capacity factor is annual gross load in megawatt-hours divided by the product of nameplate capacity in megawatts and the 8,760 hours in a year, and is left missing where nameplate capacity is non-positive.[5] The share of days operating is the number of days on which the unit generated any power divided by the number of days it reported to CEMS in that year. Capacity factors outside the interval $[0, 1.5]$ are set to missing, and generator-years reporting fewer than 350 days to CEMS are flagged as partial-year observations.[6]

At the utility-year level, these two variables are formed by first summing each generator's annual operating totals across the utility, after deduplicating by connected set so that a combined-cycle set's shared output is counted once. The utility-year capacity factor is the summed gross load divided by the product of summed nameplate capacity and 8,760 hours, which is equal to a capacity-weighted average of the generator-level capacity factors. The utility-year share of days operating is a capacity-weighted average of the generator-level shares. Only generator-years with matched CEMS data enter these aggregates.

O.2.3 Regulatory-Return Regime Score

The regulatory-return regime score (RRA) used in the regulatory-regime moderation test of Section 4.4.2 summarizes how favorable a state's regulatory environment is to utilities, drawing on the S&P Global Regulatory Research Associates (RRA) state regulatory rankings. RRA places each state on a nine-level ordinal scale, running from *AA1* (most favorable) down through the *A* and *BA* tiers to *BA3* (least favorable). I map each grade to an integer from nine to one, oriented so that higher values denote a more utility-favorable environment.

[4] Gross load and the Form 861 sales figures are both measured in megawatt-hours but are different quantities. Gross load is what a utility's fossil units generate, metered before the plant's own consumption. Form 861 sales are what the utility bills its customers, drawn from all sources and net of losses, so the two do not reconcile one to one.

[5] Generator-years with a zero or blank nameplate rating, which occur before a unit is operational and after it retires or is mothballed, are set to missing.

[6] Metered load can sit slightly above the maximum implied by nameplate capacity, so the upper bound is set above one, and values above 1.5 are treated as reporting error. The bounds are a fixed plausibility screen rather than a data-driven cutoff.

My RRA data begin in 2011,[7] so the grade cannot vary over the full sample period. I therefore fix each state's grade at its 2011-2013 average and treat that baseline as a time-invariant attribute of the state's regulatory environment. For a utility operating in a single state, the score is that state's baseline grade. For a utility operating in more than one state, I take a weighted average of its states' baseline grades, weighting each state by the utility's retail electricity sales there. The resulting utility-level grade is standardized to mean zero and unit standard deviation, so the triple-interaction coefficient in Table 7 is read per one-standard-deviation move in the regime score.

Because each state's grade is fixed over time, the unit-by-cohort fixed effect absorbs its level, and the moderation is identified from how the treated-state response after adoption varies with the score. The RRA methodology also partly rewards allowing CWIP cost recovery itself, so the score is in part downstream of treatment.

Table O.2.1 reports the diagnostic. The regressor of interest is an indicator that the state currently permits CWIP cost recovery, coded one for always-treated states and for adopters from the adoption year onward. The three columns add successively richer sets of state controls.

The CWIP indicator explains only a small share of the variation in the regime score, and its coefficient, while significant, is small across specifications. This is consistent with CWIP-permitting states not being concentrated at the favorable end of the distribution, and with most of the score's variation reflecting rate-case timing and structure rather than CWIP itself. The regime measure therefore reflects regulatory features largely distinct from CWIP adoption.

[7] The S&P RRA state rankings extend back to the late 1990s, but my access to the underlying grades begins only in 2011.

Table O.2.1: S&P Regulatory Research Associates (RRA) Regime Score and CWIP Presence

This table reports estimates of the following specification:

$$RRA\_Fav_{s,t} = \beta\, CWIP\_Policy_{s,t} + X'_{s,t}\gamma + \alpha_t + \varepsilon_{s,t},$$

where RRA_Fav is ten minus the state's numeric RRA grade in the most recent monthly rating within the year, so higher values denote a more utility-favorable environment. $CWIP\_Policy_{s,t}$ equals one if CWIP policy is active in state s in year t, and zero otherwise. The panel covers fifty states and DC from 2011 through 2024. Column (1) includes year fixed effects only. Column (2) adds a vector of state-level regulatory attributes: commissioner-selection method, rate-base timing, test-year policy, merger-policy code, rate-case-duration code, and a forward-test-year indicator. Column (3) further adds economic controls (population, real GDP, cooling- and heating-degree days), political controls (Democratic governor indicator, Democratic legislative majority indicator), demand controls (log customers, log sales, retail price), and renewable-portfolio-standard controls (present indicator and final target percentage). The row *Incremental* R^2 *from CWIP_Policy* reports the difference between each column's raw R^2 and the R^2 from the same specification with the CWIP indicator dropped. α_t is a year fixed effect, included in every column. Standard errors are clustered at the state level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Dependent Variable	*RRA_Fav*		
	(1) CWIP indicator only	(2) + Regulatory controls	(3) + Full controls
CWIP_Policy	0.765* (1.98)	0.804** (2.22)	0.696* (1.96)
Incremental R^2 from *CWIP_Policy*	0.045	0.040	0.022
N	713	713	713
Adj. R^2	0.026	0.266	0.432
Unit of Analysis		State-Year	
Year FE	Yes	Yes	Yes
Regulatory controls	No	Yes	Yes
Economic controls	No	No	Yes
Political controls	No	No	Yes
Demand controls	No	No	Yes
RPS controls	No	No	Yes
Clustering		State	

O.3 Robustness by Outcome Family

This section reports the robustness of each main result to alternative inference and sample choices, one panel per outcome family in Table O.3.1. For every outcome I show only the coefficient of interest on the cross-state design, $Treat \times Post$.

The columns are common across families. The *Main* column repeats the estimate reported in the main paper. The *State clust.* column re-estimates the same specification with standard errors clustered at the state level. The ± 7, ± 10, and ± 15 columns re-estimate the main specification at each symmetric event-time window around cohort adoption, holding the rest of the specification fixed. The native window is ± 5 years for the generation, customer, and demand-response outcomes and ± 10 years for the CEMS utilization and cost-of-capital outcomes, so the *Main* column reproduces the corresponding window column for most families. Coefficients carry the t-statistic in parentheses beneath.

Table O.3.1: Robustness by Outcome Family

This table reports the coefficient of interest for each outcome in the main paper. Panel A reports firm-level investment, matching Table 2, Panel A. Panel B reports construction volume, matching Table 2, Panel B. Panel C reports generator-level stage durations, matching Table 3 and estimated on the strict sample. Panel D reports capital intensity, matching Table 4, Panel A. Panel E reports cancellation before and after construction starts, matching Table 4, Panel B. Panel F reports capacity utilization, matching the two CEMS utilization outcomes of Table 4, Panel C, both at the generator-year level with a native window of ±10 years. Panel G reports the three credit-market outcomes of columns (1)-(6) of Table 6, each with a native window of ±10 years: the S&P issuer rating, average bond maturity, and average bond coupon. Panel H reports customer satisfaction, the residential-satisfaction outcome of Table 9, Panel B. Panel I reports demand response, the demand-response outcomes of Table 9, Panel C. The window robustness columns (±7, ±10, ±15) retain the native utility-by-cohort clustering. The "State clust." column is left blank in Panel A and throughout Panel I, because those outcomes are measured at the utility level, so clustering at the coarser state level is not meaningful. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Outcome	Variable of Interest	Main	State clust.	±7	±10	±15
Panel A: Firm-Level Investment						
CWIP_ balance	*Treat* × *Post*	0.020*		0.021**	0.018*	0.018*
		(1.83)		(2.06)	(1.77)	(1.67)
Capex	*Treat* × *Post*	0.011*		0.009	0.011*	0.011*
		(1.93)		(1.59)	(1.87)	(1.77)
Panel B: Construction Volume						
Construction starts	*Treat* × *Post*	0.439**	0.439**	0.427***	0.285**	0.074**
		(2.27)	(2.14)	(2.60)	(2.22)	(2.31)
MW started	*Treat* × *Post*	34.743***	34.743**	24.415***	22.623***	24.756***
		(2.99)	(2.38)	(2.99)	(2.95)	(2.93)
MW built (stock)	*Treat* × *Post*	201.628**	201.628***	170.564**	186.542**	222.551**
		(2.14)	(2.95)	(2.01)	(2.06)	(2.17)
Panel C: Stage Durations						
Completion delay	*Treat* × *Const_ Post*	−2.010***	−2.010***	−1.267*	−0.645**	−0.287***
		(−2.82)	(−4.46)	(−1.96)	(−2.38)	(−2.79)
Post-approval gap	*Treat* × *Const_ Post*	−0.959**	−0.959**	−0.431	0.116	0.315
		(−2.15)	(−2.13)	(−0.93)	(0.38)	(1.16)
Construction time	*Treat* × *Const_ Post*	−2.950**	−2.950***	−2.088**	−0.721	−0.850*
		(−2.51)	(−4.53)	(−2.19)	(−1.14)	(−1.67)
Planned duration	*Treat* × *Const_ Post*	−2.482***	−2.482***	−1.660***	−0.500	−0.252
		(−4.41)	(−4.65)	(−3.50)	(−1.31)	(−0.82)
Panel D: Capital Intensity						
Capital-intensity rank	*Treat* × *Const_ Post*	−1.574***	−1.574**	−1.288***	−1.235***	−0.908**
		(−2.89)	(−2.46)	(−2.91)	(−2.60)	(−2.16)
Panel E: Cancellation Before and After Construction Starts						
Cancel_ after_ construction	*Treat* × *Const_ Post*	0.149*	0.149*	0.120*	0.108**	0.102***
		(1.85)	(1.74)	(1.78)	(2.21)	(2.68)
Cancel_ before_ construction	*Treat* × *Prop_ Post*	−0.690***	−0.690***	−0.286***	−0.261**	−0.219***
		(−19.29)	(−66.95)	(−3.84)	(−2.14)	(−2.62)

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Table O.3.1 continued

Outcome	Variable of Interest	Main	State clust.	±7	±10	±15
Panel F: Capacity Utilization						
Capacity factor	*Treat* × *Post*	−0.096***	−0.096***	−0.078***	−0.096***	−0.095***
		(−3.52)	(−3.65)	(−3.42)	(−3.52)	(−2.90)
Share of days operating	*Treat* × *Post*	−0.033*	−0.033*	−0.019	−0.033*	−0.033
		(−1.74)	(−1.74)	(−1.16)	(−1.74)	(−1.45)
Panel G: Credit-Market Outcomes						
S&P issuer rating	*Treat* × *Post*	0.228	0.228	0.375	0.220	0.152
		(0.54)	(0.52)	(0.91)	(0.55)	(0.32)
Average maturity	*Treat* × *Post*	−4.250**	−4.250**	−3.784**	−4.250**	−4.160**
		(−2.17)	(−2.21)	(−2.03)	(−2.22)	(−2.32)
Average coupon	*Treat* × *Post*	−0.106	−0.106	0.047	−0.100	−0.196
		(−0.48)	(−0.41)	(0.21)	(−0.58)	(−0.82)
Panel H: Customer Satisfaction						
Satisfaction score	*Treat* × *Post*	−12.556***	−12.556***	−14.075***	−20.082***	−21.529***
		(−3.03)	(−2.93)	(−2.77)	(−4.44)	(−5.54)
Panel I: Demand Response						
DRP indicator	*Treat* × *Post*	−0.130*		−0.159**	−0.133**	−0.068
		(−1.85)		(−2.29)	(−1.99)	(−0.96)
DRP customers	*Treat* × *Post*	−0.061***		−0.072***	−0.072***	−0.051***
		(−4.31)		(−5.03)	(−5.10)	(−3.82)
Energy savings	*Treat* × *Post*	−0.025***		−0.033***	−0.033***	−0.024**
		(−2.64)		(−3.25)	(−3.10)	(−2.18)

O.4 Within-State Specification

This section reports the within-state estimates corresponding to four cross-state results in the main paper. Because independent power producers do not file FERC Form 1, the within-state design is limited to outcomes drawn from EIA Forms 860 and 861.

The within-state design compares regulated utilities to independent power producers (IPPs) in the same state-year:

$$Y_{j,s,t} = \delta \left(Reg_j \times Post_{s,t} \right) + X'_{j,s,t}\gamma + \alpha_{s \times t} + \alpha_j + \varepsilon_{j,s,t}, \tag{O.1}$$

where Reg_j equals one for regulated utilities and zero for IPPs, $Post_{s,t}$ equals one once CWIP is active in state s, $\alpha_{s\times t}$ is a state-by-year fixed effect, and α_j is a unit fixed effect. For outcomes estimated at the generator level, $Post_{s,t}$ is replaced with $Const\_Post_{s,t}$, equal to one for generators whose construction-start year falls on or after CWIP adoption in state s.

The state-by-year fixed effect absorbs any shock common to regulated utilities and independent power producers in the same state and year, including the demand, policy, and weather conditions of that state-year. Identification then rests only on the differential response of the regulated arm, the arm that CWIP actually reaches. This is a direct defense against the adoption-timing confound.

The design's cost is its comparison group. Independent power producers differ from regulated utilities for structural reasons unrelated to CWIP. They tilt toward merchant gas and renewable capacity, and they turn over assets on a market-driven rather than a rate-base schedule. For outcomes where that structural difference is large, such as fuel mix and asset retirement, the within-state comparison is weaker, and I place more weight on the cross-state estimate. For the construction-volume, capital-intensity, and cancellation outcomes reported in this table, both designs are available, and agreement between them is reassuring because the two rely on different identifying assumptions and would fail in different ways. Section O.5 reports a separate check on the adoption-timing confound for the cross-state design.

I keep the two as separate designs rather than combining them into a triple-difference. The treated regulated cell is small, and independent power producers in never-treated states are unevenly spread, so a triple-difference would ask a thin cell to survive three layers of differencing. It would also require both underlying comparisons to hold at once, that regulated utilities and independent producers share trends within a state and that the regulated-minus-producer gap shares trends across treated and never-treated states. Keeping the designs separate lets each rest on its own assumption and lets the reader see whether they agree, which the construction outcomes in this table do.

Table O.4.1: Descriptive Statistics: Within-State Comparison Group

This table reports descriptive statistics for the two groups compared in the within-state design of Table O.4.2, regulated utilities and independent power producers, both in CWIP-treated states. Independent power producers do not file FERC Form 1, so this table is restricted to the EIA-sourced construction-volume and generator-construction outcomes. Variable definitions are provided in Section O.1.

	Reg, Treated			IPP, Treated		
	N	Mean	SD	N	Mean	SD
Construction volume (utility-year; EIA Form 860)						
Construction starts	478	0.351	1.255	6,139	0.111	0.706
MW started	478	75.8	309.6	6,139	5.1	47.0
MW built (stock)	478	3,496.9	4,709.2	6,139	184.1	457.8
Generator construction (generator level; EIA Form 860)						
Post-approval gap	305	0.187	0.533	978	0.191	0.754
Planned duration	286	2.007	2.093	925	1.042	1.250
Construction time	235	1.319	1.309	787	1.080	0.595
Completion delay	204	0.451	1.391	557	0.713	1.274
Capital-intensity rank	305	1.898	1.773	953	2.355	2.149

Table O.4.2: Within-State Estimates

This table reports within-state estimates of the effect of CWIP adoption on construction volume (Panel A), construction-stage durations (Panel B), capital intensity of new projects (Panel C), and mid-construction cancellation (Panel D), using the within-state design defined in Equation (O.1) above. The dependent variables in Panel A match Table 2, Panel B: the count of new construction starts, the megawatts of new construction starts, and the total megawatts of the utility's built capacity, at the utility-year level. The dependent variables in Panel B match Table 3: the realized operational year minus the original filed plan (completion delay), the gap in years between regulatory approval and the start of construction (post-approval gap), the time from the start of construction to completion (construction time), and the originally planned project duration (planned duration), each estimated at the generator level. The dependent variable in Panel C matches Table 4, Panel A, the capital-intensity rank, estimated at the generator level. The dependent variables in Panel D match Table 4, Panel B: *Cancel_after_construction* in column (1), equal to one for a generator that started construction and was then canceled before commercial operation, and *Cancel_before_construction* in column (2), equal to one for a generator proposed but abandoned before ever starting construction, both estimated at the generator level. The independent variable of interest is *Reg* × *Post* in Panel A, *Reg* × *Const_Post* in Panels B and C, and, in Panel D, *Reg* × *Const_Post* for cancellation after construction starts (column 1) and *Reg* × *Prop_Post* for cancellation before construction starts (column 2). Utility and state-by-year fixed effects are included in every column of Panels A, B, and C. Panel D instead absorbs a state fixed effect and a pooled event-time fixed effect built from the exact offset that defines *Post* (the construction-start year less the adoption year in the after column and the proposal year less the adoption year in the before column), so the *Post* main effect is collinear with the event-time fixed effect and drops from the model. In Panels A, B, and C, the state-policy, political, weather, and renewable-portfolio-standard controls used in the cross-state design are absorbed by the state-by-year fixed effect and are omitted from the table; in Panels A and B only the log of total nameplate capacity survives and is reported. Standard errors are clustered at the utility level throughout. *t*-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Table O.4.2 (Continued): Within-State Estimates

Panel A: Construction Volume

	Construction starts (1)	MW started (2)	MW built (stock) (3)
Reg × *Post*	0.317***	57.376*	175.698*
	(2.94)	(1.79)	(1.79)
Ln(Total_Capacity)	0.182***	40.215***	895.940***
	(2.83)	(2.75)	(3.03)
N	6,922	6,922	6,922
Adj. R-squared	0.146	0.125	0.858
Unit of Analysis		Utility-Year	
Utility FE	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes
Clustering		Utility	

Table O.4.2 (Continued): Within-State Estimates

Panel B: Construction Timing

	Completion delay (1)	Post-approval gap (2)	Construction time (3)	Planned duration (4)
Reg × Const_Post	−0.275**	−0.976**	−0.235	−1.276**
	(−2.01)	(−2.53)	(−0.44)	(−2.19)
Ln(Total_Capacity)	0.108**	−0.006	0.021	0.012
	(2.02)	(−0.08)	(0.28)	(0.15)
N	483	483	483	483
Adj. R-squared	0.886	0.898	0.845	0.895
Unit of Analysis	Generator Level			
Utility FE	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Clustering	Utility			

Table O.4.2 (Continued): Within-State Estimates

Panel C: Capital Intensity of New Projects

	Capital-intensity rank (1)
Reg × *Const_Post*	−0.155 (−0.44)
N	1,252
Adj. R-squared	0.840
Unit of Analysis	Generator Level
Utility FE	Yes
State × Year FE	Yes
Clustering	Utility

Table O.4.2 (Continued): Within-State Estimates

Panel D: Mid-Construction Cancellation

	Cancel_after_construction (1)	*Cancel_before_construction* (2)
Reg × *Const_Post*	0.089*	
	(1.69)	
Reg × *Prop_Post*		−0.032**
		(−2.17)
Ln(Total_Capacity)	0.036***	0.064*
	(2.66)	(1.95)
N	1,157	291
Adj. R-squared	0.530	0.801
Unit of Analysis	Generator Level	
Utility FE	Yes	Yes
State FE	Yes	
Event-time FE	Yes	
Clustering	Utility	

O.5 Pre-Adoption Demand Growth

The investment results in Table 2 raise a specific identification concern. If the same rising demand that leads a state to adopt CWIP also spurs utilities to invest, part of the post-adoption increase in building could reflect that demand shock rather than the rule itself. This section reports a partial check on that concern. If the demand shock were doing the work, the investment response should be larger in treated states where demand was already growing faster before adoption. Table O.5.1 augments the cross-state design in the main paper with a triple interaction between treatment and a continuous measure of a state's pre-adoption demand growth, *Mod*.

$$Y_{i,c,t} = \delta\left(\mathit{Treat}_{i,c} \times \mathit{Post}_{c,t} \times \mathit{Mod}_{i,c}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t}, \qquad \text{(O.2)}$$

Mod is measured three ways: the compound annual growth rate of summer peak demand (column (1)), of winter peak demand (column (2)), and of industrial megawatt-hour sales (column (3)), each computed over the four years before the cohort's adoption year and z-scored to mean zero and standard deviation one across the pooled sample of eligible treated and never-treated state-cohort cells.

The triple interaction is indistinguishable from zero in 13 of the 15 cells. Neither *CWIP_ balance* nor capital expenditure is moderated by any of the three demand measures. Among the construction-volume outcomes, construction starts respond more where pre-adoption industrial sales growth was higher, and MW built (stock) responds more where summer peak demand growth was higher. Both point in the direction a demand-driven explanation would predict. MW started shows no moderation, and all three of its interactions are negative, the opposite of that prediction. The test gives no sign of systematic moderation by pre-adoption demand growth in the investment response of Table 2, so this check is reassuring rather than dispositive.

This test draws its identifying variation only from the treated side of the sample, where pre-adoption demand growth is a realized state characteristic rather than a feature of the cohort design. A computable pre-adoption demand-growth measure is available for only ten treated states (ten treated state-cohort cells) in Panel A and 12 treated states (12 treated state-cohort cells) in Panel B. With that few clusters on the identifying side, the test has limited power to detect a moderate-sized moderation effect even where one is present, so the pattern above is suggestive rather than conclusive.

Table O.5.1: Pre-Adoption Demand Growth and the CWIP Investment Response

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t} \times Mod_{i,c}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of a cohort, $Post_{c,t}$ equals one in event years on or after the cohort's adoption year, and *Mod* is the column's pre-adoption demand-growth stratifier, z-scored to mean zero and standard deviation one across the pooled sample of eligible treated and never-treated state-cohort cells: the four-year compound annual growth rate of summer peak demand (column (1)), winter peak demand (column (2)), and industrial megawatt-hour sales (column (3)); the control vector $X_{i,c,t}$ additionally includes every constituent lower-order interaction of the triple. Panel A reports the two firm-level investment outcomes of Table 2, Panel A, on the same constant estimation sample (utility-years with both outcomes non-missing). Panel B reports the three construction-volume outcomes of Table 2, Panel B, on their own constant estimation sample. Both panels include the same control vector as their Table 2 counterpart. *t*-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Panel A: Firm-level investment

	Summer peak CAGR (1)	Winter peak CAGR (2)	Industrial MWh CAGR (3)
CWIP_balance			
Treat × *Post*	0.012	0.015	0.012
	(0.60)	(0.93)	(0.95)
Treat × *Post* × *Mod*	0.000	−0.010	0.002
	(0.00)	(−0.46)	(0.12)
Capex			
Treat × *Post*	0.005	0.014	0.011
	(0.44)	(1.48)	(1.47)
Treat × *Post* × *Mod*	0.007	−0.016	0.001
	(0.70)	(−1.00)	(0.10)
N	665	665	665
Unit of Analysis		Utility-Year	
Utility × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table O.5.1 (Continued): Pre-Adoption Demand Growth and the CWIP Investment Response

Panel B: Construction volume

	Summer peak CAGR (1)	Winter peak CAGR (2)	Industrial MWh CAGR (3)
Construction starts			
Treat × *Post*	−0.406	−0.522	−0.783*
	(−1.08)	(−1.50)	(−1.81)
Treat × *Post* × *Mod*	−0.199	0.039	0.636*
	(−0.39)	(0.09)	(1.91)
MW started			
Treat × *Post*	81.935*	44.713	41.619
	(1.95)	(1.10)	(1.05)
Treat × *Post* × *Mod*	−93.497	−42.303	−32.928
	(−0.90)	(−1.53)	(−1.64)
MW built (stock)			
Treat × *Post*	−230.797	195.653	174.275
	(−1.45)	(0.98)	(0.89)
Treat × *Post* × *Mod*	881.660*	71.720	141.925
	(1.74)	(0.51)	(1.25)
N	2,803	2,803	2,803
Unit of Analysis		Utility-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Clustering		Utility × Cohort	

O.6 Capital-Intensity Robustness

This section reports two robustness checks that corroborate the capital-intensity result of Table 4, Panel A.

O.6.1 Capital Intensity Priced at Actual Overnight Cost

The capital-intensity result in Table 4, Panel A, uses *cap_rank*, an integer that orders generator technologies from the cheapest per kilowatt (rank 1, gas combustion turbines) to the most expensive (rank 8, nuclear). This section checks whether the result survives when the ordering is replaced with each technology's overnight capital cost per kilowatt, drawn from three vintages of the EIA Annual Energy Outlook (AEO) cost assumptions. Overnight cost is what a unit of capacity would cost to build if it could be built instantly, so it counts construction cost alone and excludes the financing charges that accumulate while the plant is being built.

Each generator is assigned the overnight cost per kilowatt of its technology from three vintages of the AEO assumptions: AEO 2003, AEO 2010, and the February 2020 AEO addendum. Two technologies are not priced directly from the published schedules: AEO 2003 reports no hydroelectric row, so hydro is priced at the AEO 2010 figure deflated to 2001 dollars, and oil, which is not separately reported in any vintage, is priced at the gas combustion turbine throughout. All three columns score the same construction decisions; what changes across them is only the relative-price lens through which the technology mix is valued. The 2003 and 2010 schedules are the price environment contemporaneous with the decisions in the sample, 2003 being the ex-ante costs utilities faced when filing pre-treatment plans and 2010 the schedule at the middle of the treatment window, so they reflect the cost trade-offs against which the technology choices were actually made. The 2020 schedule post-dates most of those decisions. Because every generator of a given technology is priced at that technology's vintage cost rather than its own actual project cost, the measure isolates the shift in technology mix, not cost overruns or savings on individual projects. The specification, sample, controls, fixed effects, and clustering are those of Table 4, Panel A.

Table O.6.1 reports the estimates. The rank result from column (1) reappears in columns (2) and (3). Valuing the technology mix at the 2003 and 2010 cost schedules gives the same negative, statistically significant result, with treated utilities building capacity that is roughly \$715 and

$1,089 per kilowatt cheaper. Column (4), which values the same technology mix at 2019 prices, is negative but not statistically distinguishable from zero. Solar and wind construction costs fell sharply between 2010 and 2019, so the 2020 schedule reorders technologies that are peripheral to the gas-versus-coal shift the rank result picks up. Gas remains the cheapest option in every vintage, and coal and nuclear remain more expensive than gas in every vintage. Dollar magnitudes are not comparable across columns, which are priced in different base years.

Table O.6.1: Capital Intensity Priced at Actual Overnight Cost: Vintage Anchors

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(\mathit{Treat}_{i,c} \times \mathit{Const\_Post}_{i,c}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $\mathit{Treat}_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $\mathit{Const\_Post}_{i,c}$ equals one for generators whose construction-start year falls in or after the cohort's CWIP-adoption year. Column (1) reproduces the reported outcome, *cap_rank*, an integer ordering of generator technologies from cheapest (1) to most expensive (8) per kilowatt. Columns (2)-(4) replace the rank with the overnight capital cost per kilowatt of each generator's technology, taken from three vintages of the EIA Annual Energy Outlook (AEO) capital-cost assumptions: AEO 2003, Table 40 (2001 dollars); the AEO 2010 capital-cost estimates, Table 1 (2010 dollars); and the February 2020 Sargent & Lundy AEO addendum, Table 1 (2019 dollars). The sample and controls match Table 4, Panel A. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cap.-int. rank	*Overnight capital cost ($/kW)*		
		AEO 2003 (2001 $)	AEO 2010 (2010 $)	AEO 2020 (2019 $)
	(1)	(2)	(3)	(4)
Treat × *Const_Post*	−1.574***	−715.479***	−1,088.776***	−451.865
	(−2.89)	(−2.63)	(−3.24)	(−1.35)
N	2,710	2,710	2,710	2,710
Adj. R-squared	0.730	0.772	0.754	0.371
Unit of Analysis	Generator Level			
Utility × Cohort FE	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes
Start × Cohort FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Clustering	Util × Coh			

O.6.2 Fuel Mix of New Capacity

This section tests whether CWIP adoption shifted utilities' construction toward gas and away from coal. Gas-fired plants are cheaper to build per kilowatt than coal or nuclear plants, so a shift toward gas is a second, concrete piece of evidence for the same cheaper-capacity tilt that the capital-intensity rank in Section 4.3.1 summarizes across eight generator technologies. I report only the cross-state design, in which the gas share of operating capacity rises and the coal share falls after CWIP adoption. The sample period coincides with a national move from coal to gas that is not specific to CWIP. The never-treated control group should net out this trend to the extent it affects treated and control states equally, but if treated states shifted toward gas faster for reasons unrelated to CWIP, the estimate would still pick up part of that shift. I therefore read this shift as consistent with, rather than dispositive of, the cheaper-capacity interpretation. Table O.6.2 reports the estimates.

Table O.6.2: CWIP and Fuel Mix

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variables are the gas share of operating capacity, the coal share of operating capacity, and gas capacity in megawatts, each measured at the utility-year level. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. *t*-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Gas share of capacity (1)	Coal share of capacity (2)	Gas capacity (MW) (3)
Treat × Post	0.067***	−0.044**	268.487*
	(3.12)	(−2.10)	(1.94)
MYP	0.030	−0.061	807.984
	(0.67)	(−1.49)	(1.00)
PIM	−0.024**	0.040***	−38.073
	(−2.41)	(3.17)	(−0.72)
Decoupling	0.029*	−0.053***	−61.568
	(1.92)	(−3.03)	(−1.16)
Securitization	−0.065***	0.071***	27.548
	(−2.75)	(2.88)	(0.17)
Comp_Restrict	0.002	0.017*	115.786**
	(0.21)	(1.78)	(2.51)
State_Control_R	0.045***	−0.062***	−94.413**
	(2.89)	(−3.50)	(−2.04)
Governor_R	0.010*	−0.009	69.784***
	(1.72)	(−1.51)	(2.91)
CDD	0.007***	−0.007***	21.853**
	(2.85)	(−2.69)	(2.37)
HDD	−0.013	0.017	255.669
	(−0.44)	(0.61)	(1.22)
GDP_real	−0.130*	0.158**	−320.742
	(−1.84)	(2.19)	(−1.18)
Lag_State_Sales	0.169*	−0.244***	−197.601
	(1.97)	(−2.67)	(−0.69)
RPS_Policy	−0.003	−0.017	−71.693*
	(−0.23)	(−1.42)	(−1.66)
RPS_Target_Pct	0.125	0.213	1,261.096
	(0.66)	(1.13)	(1.48)
RPS_Voluntary	0.008	−0.008	348.112***
	(0.80)	(−0.76)	(4.32)
Ln(Total_Capacity)	0.020	0.056**	218.792***
	(1.03)	(2.05)	(4.16)
N	3,075	3,075	3,138
Adj. R-squared	0.940	0.938	0.921
Unit of Analysis		Utility-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Clustering		Util × Coh	

O.7 Construction Stages and Cost Recovery

Table O.7.1: Construction Stages and Cost Recovery under AFUDC and CWIP

This table describes the four stages of a generating-plant construction project and contrasts cost recovery and risk allocation under traditional AFUDC accounting and under CWIP. Under AFUDC the utility recovers construction financing costs only once the plant enters service, accruing instead as a non-cash return that is capitalized into the asset's cost. Under CWIP the construction-work-in-progress balance can be placed in rate base during construction, so the utility bills customers a cash return before the plant operates. The stages correspond to the milestones in the construction-timing analysis of Section 4.2. This table is descriptive and reports no estimates.

Stage	Description	Under AFUDC	Under CWIP
1. Application and approval	The utility files for permission to build, stating the project's expected cost and schedule, and the commission decides whether to authorize it.	*Cash flow.* None; the utility recovers nothing until the plant is authorized to build under either regime. *Risk.* Pre-approval development spending is at the shareholders' expense under both regimes.	
2. Pre-construction (approval to construction start)	The project is authorized but not yet under way. The utility arranges financing, permits, and equipment before construction starts. The length of this phase is the post-approval gap.	*Cash flow.* Early costs accrue a non-cash allowance (AFUDC) that is added to the asset's cost and collected only after the plant operates. *Risk.* The utility carries the financing cost until then.	*Cash flow.* Once spending enters the construction-work-in-progress balance, that balance can be placed in rate base and begins earning a cash return billed to current customers. *Risk.* Customers begin funding the project before it operates.
Before Construction Start			
After Construction Start			
3. Construction (construction start to operation)	The plant is built. The length of this phase is the construction span, and a project abandoned here never enters service.	*Cash flow.* The utility funds the build from its own capital and earns no cash return until completion. *Risk.* If the project is canceled mid-build, the accumulated cost is recovered only if regulators later allow it, so shareholders bear the failure.	*Cash flow.* The utility bills customers a cash return on the growing balance throughout construction. *Risk.* Because much of the spending is recovered as it occurs, a canceled project leaves customers, not shareholders, having funded the abandoned cost.
4. Commercial operation	The plant enters service and begins serving customers.	*Cash flow.* The completed cost, including the AFUDC capitalized during the build, enters rate base and earns a return plus depreciation over the asset's life. *Risk.* Ordinary operating and regulatory risk.	*Cash flow.* The balance transfers from construction-work-in-progress to plant in service; the return already collected is not earned again. *Risk.* Ordinary operating and regulatory risk, so the two regimes converge from here.

O.8 Composition of Cancellations by Stage

Table O.8.1: Composition of Cancellations by Stage

This table describes the composition of canceled projects by the stage at which they were abandoned, across event-time windows of the cross-state design. Each cell reports the share of canceled generators that had started construction before cancellation, equal to the mean of *Cancel_after_construction* among canceled generators, with the number of canceled generators in parentheses. Columns split event years into those before CWIP adoption (*Pre-adoption*) and those on or after it (*Post-adoption*), and the third column reports the within-arm change. Rows compare treated regulated utilities to never-treated regulated utilities, and each panel's final row reports the difference-in-differences. Panel A reports the ±5 (Main) event-time window of the cross-state design in Table 4, Panel B; Panels B and C repeat the same comparison at ±10 and ±15. All variable definitions are provided in Section O.1.

Share of canceled generators that had started construction before cancellation (N canceled generators in parentheses)			
	Pre-adoption	*Post-adoption*	*Post − Pre*
Panel A: ±5 **(Main)**			
Never-treated regulated	0.182 (192)	0.143 (426)	−0.039
Treated regulated	0.065 (31)	0.523 (44)	0.458
Difference-in-differences			0.497
Panel B: ±10			
Never-treated regulated	0.188 (272)	0.152 (546)	−0.035
Treated regulated	0.184 (38)	0.554 (56)	0.369
Difference-in-differences			0.405
Panel C: ±15			
Never-treated regulated	0.186 (295)	0.159 (578)	−0.027
Treated regulated	0.184 (38)	0.515 (68)	0.330
Difference-in-differences			0.358

O.9 Capacity Utilization: Additional Evidence

O.9.1 Utility-Year Estimates

Table O.9.1: Realized Utilization (CEMS), Utility-Year Level

This table is the utility-year analog of the generator-year estimates in Table 4, Panel C, for fossil generating units larger than 25 megawatts aggregated to the utility-year, with the full control-coefficient vector, and reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variables are the CEMS capacity factor and the share of days operating. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Capacity factor		Share days operating	
	(1)	(2)	(3)	(4)
Treat × Post	−0.022***	−0.022***	−0.010**	−0.010**
	(−2.99)	(−2.87)	(−2.46)	(−2.49)
MYP	−0.052	−0.052***	−0.085**	−0.085***
	(−1.60)	(−3.09)	(−2.55)	(−3.52)
PIM	0.004	0.004	0.017	0.017
	(0.32)	(0.19)	(1.20)	(0.66)
Decoupling	−0.000	−0.000	−0.014	−0.014
	(−0.02)	(−0.01)	(−1.34)	(−0.68)
Securitization	−0.000	−0.000	0.012	0.012
	(−0.03)	(−0.02)	(0.70)	(0.56)
Comp_ Restrict	0.031**	0.031	0.035***	0.035*
	(2.58)	(1.58)	(2.65)	(1.74)
State_ Control_ R	0.019	0.019	0.017	0.017
	(1.16)	(0.60)	(1.14)	(0.50)
Governor_ R	−0.024***	−0.024	−0.031***	−0.031*
	(−3.04)	(−1.69)	(−3.78)	(−1.93)
CDD	0.041***	0.041***	0.023**	0.023
	(4.83)	(3.67)	(2.14)	(1.30)
HDD	−0.046*	−0.046	−0.040	−0.040
	(−1.65)	(−0.94)	(−1.28)	(−0.80)
GDP_ real	0.066	0.066	−0.026	−0.026
	(0.78)	(0.47)	(−0.30)	(−0.15)
Lag_ State_ Sales	−0.216***	−0.216*	−0.119*	−0.119
	(−3.61)	(−1.73)	(−1.71)	(−0.77)
RPS_ Policy	−0.023**	−0.023	−0.041***	−0.041*
	(−2.08)	(−1.09)	(−3.36)	(−1.84)
RPS_ Target_ Pct	−0.144	−0.144	0.081	0.081
	(−0.84)	(−0.57)	(0.50)	(0.28)
RPS_ Voluntary	−0.035**	−0.035*	−0.049***	−0.049**
	(−2.20)	(−1.78)	(−2.64)	(−2.37)
Ln(Total_ Capacity)	0.048	0.048	0.073**	0.073
	(1.53)	(1.21)	(2.25)	(1.63)
N	3,393	3,393	3,393	3,393
Adj. R-squared	0.838	0.838	0.810	0.810
Unit of Analysis	Utility-Year			
Utility × Cohort FE	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes
Clustering	Util × Coh	State × Coh	Util × Coh	State × Coh

O.9.2 Decomposition by Generator Type

Utilization differs sharply across kinds of generating unit. A unit that is cheaper to build is generally more expensive to run, so it is called on only at peak demand. Section 4.3.1 shows that CWIP shifts construction toward less capital-intensive capacity. Part of the utilization decline may therefore run through what utilities build rather than through how hard each unit runs. Table O.9.2 separates the two. The mix of generating units is itself a response to CWIP. Holding it constant therefore does not test the estimate. It splits the total effect into the part that operates through the composition of capacity and the part that operates within a given kind of unit.

The columns add a fixed effect for the unit's fuel, then a further one for its machine type. Fuel alone changes little. Adding the machine type reduces the capacity-factor coefficient by about 60 percent, and what remains is still statistically significant. The decline in the share of days operating does not survive.

Table O.9.2: Realized Utilization (CEMS) by Generator Type

This table decomposes the generator-year utilization estimates of Table 4, Panel C by the kind of generating unit, for fossil generating units larger than 25 megawatts, and reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variable is the CEMS capacity factor in columns (1) to (3) and the share of days operating in columns (4) to (6). Columns (1) and (4) report the specification of Table 4, Panel C; columns (2) and (5) add a fixed effect for the unit's fuel; columns (3) and (6) add a further fixed effect for the unit's machine type. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Capacity factor			Share days operating		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	−0.096***	−0.089***	−0.041**	−0.033*	−0.026	−0.011
	(−3.52)	(−3.17)	(−2.46)	(−1.74)	(−1.31)	(−0.72)
N	32,915	32,915	32,915	35,472	35,472	35,472
Adj. R-squared	0.390	0.441	0.716	0.508	0.632	0.717
Unit of Analysis	Generator-Year					
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Fuel FE	No	Yes	Yes	No	Yes	Yes
Machine-Type FE	No	No	Yes	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Util × Coh					

O.10 Retirement Decisions

The same incentive to build new capacity may also change retirement decisions. Utilities in the traditional vertically integrated model are already slow to retire capacity, holding older units in service so that they continue to earn a return (Gowrisankaran et al., 2026). The age at retirement offers a further angle on the question of Section 4.3. If the additional capacity corrects earlier under-investment, CWIP lowers the cost of putting a replacement in place, so units should retire younger. If instead it is over-investment, the new units grow the rate base rather than replace anything and the utility has little reason to retire the old ones, so units should retire older. The sign therefore separates the two readings.

The sample is generators that retired during the analysis window. Table O.10.1 reports the estimates, in its *Main* column, on three outcomes: the share of the plant's capacity retired in the event, the plant's operating capacity at retirement, and the age at retirement. The share retired in a single event is higher under CWIP, though not significantly so in the main specification. The plant has significantly less capacity still running when the retirement is recorded, consistent with plants that are wound down first and retired in one step rather than unit by unit. That second result is driven by generators recorded with zero capacity in the year before formal retirement, so the outcome tracks when a retirement is recorded more closely than when generation ends.

The third outcome speaks to timing. Generators in treated regulated states retire about 22 years older than those in never-treated regulated states, but this estimate is the least stable of the three. It holds at the native window and under state-level clustering, yet it is not distinguishable from zero at the seven- and ten-year windows and reverses sign at the 15-year window. Only the reduction in capacity at retirement is significant in every robustness column; the share retired keeps its positive sign throughout and reaches significance at the wider windows. The assets stay on the books longer, though the evidence does not show them continuing to serve load. Because the only outcome that holds across every check is also the one that reflects recording practice, the main paper reads these results as corroborating rather than leading.

Table O.10.1: Generator Retirement, Robustness

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The sample is generators retired in 2001 or later. This table reports the coefficient of interest, *Treat* × *Post*, for three outcomes: the share of the plant retired, the log of plant capacity at retirement, and the age at retirement, under the same robustness variants used in Section O.3. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. The native window is ±5 years. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Outcome	Variable of Interest	Main	State clust.	±7	±10	±15
Share of plant retired	*Treat* × *Post*	0.111	0.111	0.261	0.567**	0.600***
		(0.39)	(0.37)	(1.09)	(2.61)	(4.56)
Ln(Plant capacity at retirement)	*Treat* × *Post*	−14.196***	−14.196***	−3.946***	−3.180***	−2.934***
		(−4.15)	(−5.04)	(−2.69)	(−3.23)	(−3.81)
Age at retirement	*Treat* × *Post*	22.142***	22.142**	1.569	−3.982	−9.203***
		(2.97)	(2.35)	(0.41)	(−1.17)	(−2.63)

O.11 Robustness: Credit Quality and Price

This section collects robustness tests for the main-paper credit results (Table 6), which find that CWIP adoption shortens the maturity of a utility's new debt while leaving its coupon at a given term and its S&P rating statistically unchanged.

O.11.1 Principal-Weighted Coupon and Maturity

The main-paper credit table averages a utility's coupon and maturity across its new securities giving each bond equal weight, so a small note and a large benchmark bond count the same. This section re-weights the two averages by the face value of each bond, measured as the original principal amount in millions of dollars. Only bonds that report a positive face value can be weighted. Face value is reported for about four in five fixed-rate securities, and the principal-weighted average is computed on that subsample.

Table O.11.1 repeats the firm-year design of the main table for the coupon and the maturity, and shows each outcome two ways. The first column is the equal-weighted average on the full sample, which reproduces the main-table estimate. The second weights the subsample of bonds that report a positive face value by that face value.

The maturity result is unchanged. The shortening is 4.25 years equal-weighted on the full sample and 4.49 years once that subsample is weighted by face value, both statistically significant, so the shortening is not an artifact of many small bonds receiving equal weight. The coupon remains indistinguishable from zero in both columns.

Table O.11.1: Principal-Weighted Credit Averages

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(\mathit{Treat}_{i,c} \times \mathit{Post}_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $\mathit{Treat}_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $\mathit{Post}_{c,t}$ equals one in event years on or after the cohort's adoption year. The weight is the bond's original principal amount in millions of dollars. The table is at the utility-year level and reports the average coupon (columns (1)-(2)) and the average maturity (columns (3)-(4)). Within each outcome the first column is equal-weighted on the full strict sample, matching the main table. The second weights the subsample of bonds that report a positive face value by that face value. The independent variable of interest is *Treat* × *Post*. All columns include $\alpha_{i\times c}$, a utility-by-cohort fixed effect, $\alpha_{s\times c}$, a state-by-cohort fixed effect, and $\alpha_{t\times c}$, a year-by-cohort fixed effect, together with the full state-policy and firm-finance control blocks. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State			
	Average coupon		*Average maturity*	
	(1)	(2)	(3)	(4)
Treat × *Post*	−0.106	−0.002	−4.250**	−4.485**
	(−0.48)	(−0.01)	(−2.17)	(−2.17)
N	953	946	943	936
Adj. R-squared	0.589	0.679	0.241	0.211
Unit of Analysis	Utility-Year			
Weighting	Equal	Principal	Equal	Principal
Bond sample	All	Wtble	All	Wtble
Clustering	Util × Coh			

O.11.2 Credit Outcomes at the Security Level

This section re-estimates the three main-paper credit outcomes (Table 6) at the level of the individual bond issue rather than the firm-year, using the same design, control progression, and clustering. Table O.11.2 reports the S&P rating (columns (1)-(3)), maturity at issuance (columns (4)-(6)), and coupon at issuance (columns (7)-(9)), all on a single constant sample of 1,933 fixed-rate issues with non-missing values on every outcome and control.[8] The rating estimate is positive in all three columns and significant once controls enter: 0.497 with fixed effects alone, 1.118 adding state-policy and political controls, and 1.307 once the firm-finance block enters, with controls moving the estimate further from zero rather than toward it. The maturity estimate is significant in columns (5) and (6). The coupon estimate is indistinguishable from zero throughout.

Column (3) is the more reliable read of the rating result, since it is the only specification that holds fixed firm-level financial characteristics, such as size, leverage, and cash holdings, that can differ across states for reasons unrelated to CWIP and can separately affect a security's rating. That estimate is larger than the firm-year estimate in the main text (0.23, indistinguishable from zero), and its significance is sensitive to inference. It holds clustering on utility by cohort, as in the table, but not clustering on the 24 states, where the interval widens to −0.44 to 3.05. An ordered logit on the raw notch scale, estimated with cohort and state main effects only, gives the same sign but is not significant. I therefore read column (3) as suggestive rather than established evidence that credit quality improves.

The comparison could also understate the effect. Two of its firm-finance controls, the short-term-leverage and capital-lease shares, are themselves shown in Section O.12 to change after CWIP adoption. If CWIP's effect on the rating runs partly through those balance-sheet changes, column (3) nets part of the true effect out along with the confound, so the estimate is better read as a lower bound.

[8]Roughly 42 percent of these issues carry a taxable indicator that cannot be corroborated either way from the fields available. Rather than reassign them, I bracket the column (3) estimates. Restricting to the 1,091 confirmed taxable issues gives 1.414, 1.172 and 0.167 for the rating, maturity and coupon. Dropping only the 30 confirmed tax-exempt issues gives 1.288, −3.720 and 0.004. The smallest effect column (3) can detect with 80 percent power is 1.77 notches on the rating, 4.70 years on the maturity and 62 basis points on the coupon, so the design has limited power against modest effects on any of the three outcomes.

Table O.11.2: Credit Outcomes at the Security Level

This table reports estimates of the following specification:

$$Y_{b,i,c,t} = \delta \left(Treat_{i,c} \times Post_{c,t} \right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{b,i,c,t},$$

where the unit of observation is bond issue b of utility i in cohort c issued in year t, $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c, and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variable is the S&P rating on the individual security on a numeric scale (columns (1)-(3)), the maturity at issuance in years (columns (4)-(6)), and the coupon at issuance in percentage points (columns (7)-(9)). The rating scale runs from 1 for the lowest rated category to 22 for AAA, so a higher value is a better rating and a positive coefficient is an upgrade. All three outcomes are estimated on the same 1,933 bond issues, so the columns are directly comparable to one another. The unit of analysis is the bond issue, and the fixed effects are at the issue-year rather than the utility-year level. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an issue-year-by-cohort fixed effect. Each outcome adds fixed effects, then state-policy controls, then firm-finance controls across its three columns; only the coefficient of interest is reported, and the fixed-effect and control-block rows below indicate each column's specification. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State								
	S&P rating at issuance			Maturity at issuance			Coupon at issuance		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat × *Post*	0.497	1.118*	1.307**	−2.431	−3.409**	−3.434**	−0.154	−0.234	−0.086
	(0.56)	(1.84)	(2.07)	(−1.48)	(−2.08)	(−2.05)	(−0.79)	(−1.08)	(−0.38)
N	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933
Adj. R-squared	0.253	0.420	0.474	0.131	0.150	0.167	0.371	0.425	0.562
Unit of Analysis	Bond Issue								
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Issue-year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security controls	No	No	Yes	No	No	Yes	No	No	Yes
State controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm-finance controls	No	No	Yes	No	No	Yes	No	No	Yes
Clustering	Util × Coh								

O.11.3 Decomposition of the Coupon Effect

The coupon column of the main-paper credit table and columns (7)-(9) above both control for the term of the security, so they report what the utility pays for a bond of a given maturity. Because CWIP shortens the term of new debt, and shorter debt carries a lower coupon, the coupon a utility actually pays can fall even when the coupon at a given term does not. This section separates the two. Table O.11.3 sets out the arithmetic in five rows.

The decomposition is estimated on the same 1,933 issues as Table O.11.2. Because every security in that sample has all three outcomes, the coupon and maturity equations are estimated on identical issues and the decomposition is exact rather than approximate. Rows (c) and (d) sum to row (e), the coupon effect estimated without a term control. Confidence intervals come from a paired cluster block bootstrap over utility by cohort, in which every equation is re-estimated on the same draw of clusters, so the product in row (c) carries the covariance between its two inputs rather than treating them as independent.

A year of additional term costs about 4.6 basis points of coupon, and CWIP shortens the term by 3.43 years, so the shortening on its own implies a reduction of roughly 16 basis points. The part that remains once the term is held fixed adds a further 8.6 basis points, though its interval is wide enough that it is not distinguishable from zero. The total reduction in the coupon the utility pays is therefore 24.4 basis points, about two thirds of which runs through the term of its debt rather than through a change in the price of credit at a given term.

Table O.11.3: Decomposition of the Coupon Effect

This table decomposes the effect of CWIP adoption on the coupon a utility pays into the part that follows mechanically from the shortening of the term of its new debt and the part that remains once the term is held fixed. All quantities are estimated on the sample of 1,933 bond issues used in Table O.11.2, under the cross-state stacked-cohort design of the main paper's Equation (2), with the full control vector, utility-by-cohort, state-by-cohort and issue-year-by-cohort fixed effects, and clustering on utility by cohort. Row (a), the effect of CWIP on the term, is the *Treat* × *Post* coefficient of Table O.11.2, column (6). Row (b), the coupon a year of additional term costs, is the coefficient on *Maturity_at_issuance* in the coupon regression of column (9). That regression reports only its coefficient of interest, so row (b) is the one place this quantity is shown. Row (c) is the product of rows (a) and (b). Row (d) is the *Treat* × *Post* coefficient of Table O.11.2, column (9), which is the coupon effect estimated with the term controlled. Row (e) is the coupon effect estimated without a term control, and because the coupon and maturity equations are estimated on identical securities, it is exactly the sum of rows (c) and (d). Row (e) carries a wider interval than row (c), since it inherits the imprecision of row (d). Confidence intervals are the estimate plus and minus 1.96 standard errors, where the standard error is the dispersion across a paired cluster block bootstrap over utility by cohort with 400 replications, in which every equation is re-estimated on the same draw of clusters. All variable definitions are provided in Section O.1.

	Estimate	95% CI
Inputs		
(a) Effect of CWIP on term (years)	−3.43	[-6.97, 0.10]
(b) Coupon per year of term (basis points per year)	4.6	[4.2, 5.0]
Effect of CWIP on the coupon (basis points)		
(c) Implied by the shortening = (a) × (b)	−15.8	[-32.0, 0.4]
(d) Remaining at a given term	−8.6	[-62.9, 45.7]
(e) Total coupon effect = (c) + (d)	−24.4	[-76.5, 27.7]
N	1,933	
Unit of Analysis	Bond Issue	
Clustering	Util × Coh	

O.12 Capital Structure

The main-paper financing table (Table 6) shows that CWIP adoption leaves a utility's credit quality unchanged and shortens only its debt maturity. This section checks the robustness of that reading against the rest of the balance sheet, applying the same cross-state stacked-cohort design to four FERC Form 1 balance-sheet outcomes: long-term leverage, *Leverage_ LT*, the log level of long-term debt, *Ln(Long_ Term_ Debt)*, short-term leverage, *ST_ Leverage*, and the capital-lease share, *Cap_ Lease_ Share*, reported in Table O.12.1.

Total long-term leverage does not move, consistent with leverage also being fixed in the rate case. The composition does shift. Short-term leverage falls in every specification and the capital-lease share rises once controls enter, a tilt from short-term notes payable toward capital leases with the total unchanged.

The fall in short-term leverage and the shorter maturity of new debt look like they point in opposite directions. Both follow from the same change in when cash arrives. Under AFUDC the utility borrows short term to fund construction until the plant enters service. CWIP replaces that borrowing with ratepayer money, so short-term leverage falls. Recovery also starts sooner, so new debt is issued at a shorter term. Paying off short-term notes lengthens the debt profile and issuing shorter bonds shortens it. I therefore read these as a change in the mix of financing, not in overall maturity.

Table O.12.1: Capital Structure, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variables are *Leverage_LT* (long-term debt over total assets), *Ln(Long_Term_Debt)*, *ST_Leverage* (short-term notes payable over total assets), and *Cap_Lease_Share* (capital-lease obligations over total assets). Each outcome reports a fixed-effects-only column and a full-control column; the intermediate specification that adds only the state-policy controls is omitted here. The firm-finance control vector excludes the three leverage measures (*Leverage_LT*, *ST_Leverage*, *Cap_Lease_Share*). The independent variable of interest is *Treat* × *Post*. *t*-statistic appears in parentheses beneath its coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Leverage_LT		*Ln(Long_Term_Debt)*		*ST_Leverage*		*Cap_Lease_Share*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat × *Post*	−0.000	0.004	0.317***	0.068	−0.010***	−0.008***	0.007	0.014**
	(−0.00)	(0.40)	(3.37)	(1.54)	(−4.29)	(−3.10)	(1.57)	(2.17)
N	1,882	1,882	1,882	1,882	1,882	1,882	1,882	1,882
Adj. R-squared	0.436	0.557	0.934	0.980	0.250	0.323	0.580	0.693
Unit of Analysis	Utility-Year							
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm-finance controls	No	Yes	No	Yes	No	Yes	No	Yes
Clustering	Util × Coh							

O.13 Evidence from the Listed Parent Companies

Section 4.4.1 in the main paper tests the financing channel from the debt investors' point of view. It says nothing about the shareholder. Shareholders hold equity at the holding-company level. Therefore, the test in this section is at the parent-company level. It does not use the paper's research design.

I measure CWIP's impact at the parent-company level using a continuous measure of parent-level exposure. *CWIP_Exposure* is the share of a parent's total megawatt-hours sold that originated in states that had adopted CWIP by year t, built by rolling subsidiary-level sales from EIA Form 861 up to SEC filers through the PUDL Exhibit 21 parent-subsidiary map. It runs between zero and one and ratchets upward as states adopt, rising from a sample mean of about 0.44 in 2001 to about 0.72 from 2014 onward as the 13 in-window adopting states completed their transitions. Its within-parent standard deviation is 0.213, which is the scale on which the coefficients below should be read.

Several features of this design limit what the estimates can support. The treatment is continuous rather than binary, and its timing is common across parents operating in the same states, so the comparison is between more and less exposed parents in the same year rather than between a treated and an untreated arm. The exposure measure is coarse, since it is built from where electricity is sold rather than from which construction projects actually received CWIP treatment, so parents are placed on a continuum with error. It also does not reflect that some parents run substantial businesses outside regulated electricity distribution. *CWIP_Exposure* is therefore a noisier proxy of policy exposure for those parents. The sample is also small, at 49 parents.[9] I therefore report the test as an association and do not describe it as an estimate of a treatment effect.

Following Faulkender and Wang (2006), I measure investment as the change in capital expenditure, scaled by lagged market equity. The coefficient reads directly in dollars of shareholder value per dollar of investment. The object of interest is the interaction with exposure, which is a

[9] That count exceeds the 39 publicly traded parents reported in Section 3.1 of the main paper because it counts every parent observed at any point between 2001 and 2023, while the Edison Electric Institute figure is a count at the end of 2023.

difference in slopes and does not require the level of exposure to predict anything:

$$\begin{aligned} Ret_{i,t} = \beta_1 \frac{\Delta Inv_{i,t}}{ME_{i,t-1}} + \beta_2 \left(\frac{\Delta Inv_{i,t}}{ME_{i,t-1}} \times CWIP\_Exposure_{i,t} \right) \\ + \beta_3\, CWIP\_Exposure_{i,t} + \Delta X'_{i,t}\gamma + \alpha_i + \delta_t + \varepsilon_{i,t}, \end{aligned} \tag{O.3}$$

where α_i is a parent fixed effect and δ_t a year fixed effect. The change controls follow Faulkender and Wang (2006). They are the changes in income before extraordinary items, in total assets, and in total debt, each scaled by lagged market equity, together with lagged market leverage. All continuous variables are winsorized at the 1st and 99th percentiles. Capital expenditure is used as the investment measure. The estimating sample is the 871 parent-years with both accounting and market data, covering 49 listed parents.

Table O.13.1, Panel A, reports the estimates. On annual returns with the full control vector, a dollar of investment is associated with about 23 cents of shareholder value at zero exposure, and that association is about 53 cents weaker per unit of exposure. The two terms sum to about negative 30 cents at full exposure. I report that sum as the natural summary of the two coefficients, not as an estimate that a CWIP-era construction dollar destroys 30 cents of value. Annual excess returns show the same pattern with less precision. The association between investment and shareholder value is weaker where more of the parent's electricity is sold in adopting states.

The coefficient on the level of exposure is positive and significant throughout. It is the same level-of-exposure term introduced at the start of this section. It is reported only because the interaction is a difference in slopes and needs the main effect in the regression. No claim in this paper rests on it.

Capital expenditure is used rather than the change in gross plant, because Compustat gross plant tracks building poorly. Its growth is dominated by acquisitions, retirements, disposals, and transfers between affiliates, and only about 12 percent of the within-parent variation in gross-plant growth is capital expenditure. Panel B reports this diagnostic. Screening out the parent-years with the largest gaps moves the interaction coefficient toward the capital-expenditure estimate, which is consistent with measurement error rather than a genuine difference between the two variables.

The result is directionally stable but not always precisely estimated. The interaction is negative in every robustness cut I run, including leave-one-parent-out, alternative winsorization thresholds, and excluding the financial crisis years. The estimate depends on year fixed effects rather than parent fixed effects, which fits utility returns being dominated by common shocks to rate expectations rather than by within-parent variation in exposure.

Table O.13.1: The Marginal Value of Investment at the Listed Parent

This table reports continuous-exposure two-way fixed-effect regressions on the parent-year panel of listed utility holding companies. Panel A estimates

$$Ret_{i,t} = \beta_1 \frac{\Delta Inv_{i,t}}{ME_{i,t-1}} + \beta_2 \left(\frac{\Delta Inv_{i,t}}{ME_{i,t-1}} \times CWIP\_Exposure_{i,t} \right) + \beta_3\, CWIP\_Exposure_{i,t} + \Delta X'_{i,t}\gamma + \alpha_i + \delta_t + \varepsilon_{i,t},$$

where *CWIP_ Exposure* is the share of the parent's total megawatt-hours sold that originated in states having adopted CWIP by year t, $Ret_{i,t}$ is the parent's annual stock return, and the investment measure is capital expenditure scaled by lagged market equity. The coefficient of interest is the interaction Δ*Capex / Lagged ME* $\times$ *CWIP_ Exposure*. *Sum at full exposure* is the linear combination of the investment term and the interaction evaluated at *CWIP_ Exposure* = 1, with its p-value in brackets, and is reported for the columns carrying the full control vector. Panel B substitutes the change in gross plant for capital expenditure and screens the sample on the absolute wedge between gross-plant growth and capital expenditure, scaled by lagged assets. *Reliability* is the within-firm R^2 from regressing gross-plant growth on capital expenditure in each screened sample. α_i is a parent fixed effect and δ_t is a year fixed effect. Standard errors are clustered two ways, on parent and on year, falling back to one-way clustering on parent in column (1), where that covariance matrix is not positive semi-definite. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

Table O.13.1 (Continued): The Marginal Value of Investment at the Listed Parent

Panel A: Marginal value of investment

	Annual return		Annual excess return	
	(1)	(2)	(3)	(4)
Capex / Lagged ME	0.1813	0.2331**	0.0911	0.1756
	(1.04)	(2.08)	(0.62)	(1.19)
CWIP_ Exposure	0.0637***	0.0558**	0.0601***	0.0504**
	(2.73)	(2.30)	(2.89)	(2.30)
Capex / Lagged ME × CWIP_ Exposure	−0.5956**	−0.5300**	−0.5308	−0.4651
	(−2.41)	(−2.15)	(−1.70)	(−1.60)
Sum at full exposure		−0.297		−0.289
		[p = 0.071]		[p = 0.138]
N	871	871	871	871
Adj. R-squared	0.414	0.474	0.474	0.534
Parents	49	49	49	49
Unit of Analysis	Parent-Year			
Parent FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Change controls	No	Yes	No	Yes
Clustering	Parent	Parent + Year		

Table O.13.1 (Continued): The Marginal Value of Investment at the Listed Parent

Panel B: Gross plant, attenuation diagnostic (annual return)

	Wedge screen				
	None (1)	≤ 0.15 (2)	≤ 0.10 (3)	≤ 0.075 (4)	≤ 0.05 (5)
Δ*Gross_ Plant / Lagged ME* $\times$ *CWIP_ Exposure*	−0.1007 (−1.09)	−0.1939 (−1.46)	−0.2093 (−1.39)	−0.2509 (−1.48)	−0.2608 (−1.42)
Reliability of Δ*Gross_ Plant*	0.119	0.329	0.470	0.588	0.645
N	866	824	803	778	746
Unit of Analysis			Parent-Year		
Parent FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Change controls	Yes	Yes	Yes	Yes	Yes
Clustering			Parent + Year		

O.14 Operating Expenses by Functional Area

Section 4.4.2 reports that adoption is associated with higher per-unit production operation-and-maintenance (O&M) expense, an estimate that strengthens at wider event windows, and that the regulatory-return regime moderates this response. The full functional detail behind the level result is collected in Table O.14.1. Total electric O&M rises after adoption, and the increase is positive across the generation, transmission, and distribution functions. I read the per-unit increase as the operating-cost counterpart to the utilization compression in Section 4.3.3. Treated utilities maintain more generating capacity, built at lower capital intensity and run below its counterfactual utilization against unchanged sales, so the fixed cost of the expanded capacity is carried by each sold megawatt-hour.

Table O.14.1: CWIP and Operating Expenses by Functional Area

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where *Treat* equals one for utilities in the states treated in a cohort's adoption year and *Post* equals one in event years on or after adoption. O&M is the portion of operating cost that utilities recover without a regulated return (it excludes depreciation, amortization, and taxes), so it is the operating margin the capital-versus-operating asymmetry acts on. Column (1) is total electric O&M; columns (2)-(4) report its functional components, generation (power production), transmission, and distribution, each in dollars per megawatt-hour of electricity sold. The production-O&M component and its moderation by the regulatory-return regime are analyzed in Section 4.4.2. The table reports *Treat* × *Post* across the symmetric ±5, ±7, ±10, and ±15 event-time windows, estimated on the cross-state design only; control coefficients are included in every specification. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State			
	Electric O&M ($/MWh) (1)	Generation ($/MWh) (2)	Transmission ($/MWh) (3)	Distribution ($/MWh) (4)
Treat × Post by event window				
±5	3.890*	1.907	1.449**	0.626***
	(1.71)	(1.02)	(2.25)	(2.98)
±7	5.955**	2.996	1.423**	0.741***
	(2.47)	(1.64)	(2.10)	(2.93)
±10	7.010***	4.143**	0.802	0.692**
	(2.90)	(2.31)	(1.18)	(2.42)
±15	7.753***	4.452**	0.541	0.817**
	(3.14)	(2.50)	(0.80)	(2.53)
Adj. R-squared (±5)	0.816	0.765	0.590	0.794
Unit of Analysis	Utility-Year			
Utility × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes
Clustering	Utility × Cohort			

O.15 Investment Response per Percentage Point of Return

CWIP raises the return a utility earns on construction. This section offers a rough sense of how large that increase is. The computation uses the data from treated utilities. Panel A reports the inputs. The AFUDC accrual rate is total AFUDC divided by the average construction balance, over the years before the utility's state adopts CWIP. The allowed rate of return is the mean return granted in the rate cases those utilities' commissions decided.

Table O.15.1: Investment Response per Percentage Point of Return
Panel A: Measured inputs

	Value	Remarks
Average allowed rate of return (%)	7.20	All years (only four precede adoption)
Realized AFUDC accrual rate (%)	4.64	Pre-adoption (CWIP depresses it after)
Δ Capex (% of lagged assets)	0.8	$8.5 - 7.7$
Planned construction duration (years)		Post-adoption
Simple mean	2.1	
Capacity-weighted mean	3.4	
Capacity-weighted 75th percentile	6.0	
Capacity-weighted 90th percentile	9.0	
Abandoned during construction (%)	16.7	Pre-adoption

Next, I compute the internal rate of return (IRR) of a construction project under each regime. I assume that the project spends an equal amount in each year of construction and that the resulting asset depreciates on a straight line over a 30-year service life. Under CWIP it earns the allowed return whatever the construction length. Under AFUDC it earns less, and less the longer construction lasts. Panel B sets out the two cash flows for a five-year project.

Table O.15.1 (Continued)
Panel B: Illustrating IRR on one dollar of construction spending per year, over a five-year build

	AFUDC	CWIP	
Under construction			
Year 1	−1.00	−1.00	Nothing has yet been committed to bill a return on
Year 2	−1.00	−0.93	CWIP bills 7.20% on the one dollar committed so far
Year 3	−1.00	−0.86	$-1.00 + 7.20\% \times 2.00$ =-0.86
Year 4	−1.00	−0.78	
Year 5	−1.00	−0.71	
Asset entering service	5.49	5.00	AFUDC adds the carrying charge accrued during construction
In service			
Year 6	0.58	0.53	Straight-line depreciation plus 7.20% on the undepreciated balance
Year 7	0.56	0.51	
⋮			
Year 35	0.20	0.18	The thirtieth and last year of service
IRR (%)	6.71	7.20	An increase of 0.49 percentage points

In Panel C I then look at how the IRR varies with construction duration. The CWIP row is flat at 7.20 percent, while the AFUDC row falls from 7.06 percent at a planned length of two years to 6.29 percent at ten. The upper block assumes every project reaches service. Many do not, and 16.7 percent of the units these utilities started before adoption were abandoned during construction.[10] The lower block allows for that, assuming the commission lets the utility keep 70 percent of the stranded balance under AFUDC and 80 percent under CWIP. Both returns fall, but the AFUDC return falls further, so the gap widens at every length. The AFUDC row now runs from 6.39 percent at two years to 5.81 percent at ten, while the CWIP row runs from 6.76 to 6.93 percent, so the increase rises from 0.37 to 1.12 percentage points.

Dividing the change in capital expenditure by the gap gives the investment response per percentage point of return. The answer depends on the length assumed, and planned duration averages 2.1 years, or 3.4 years weighted by project capacity as the change in capital expenditure is weighted, reaching six and nine years at the 75th and 90th percentiles.[11]

Table O.15.1 (Continued)

Panel C: Implied investment response, by planned construction length

	Planned years of construction			
	2	3	5	10
Assuming every project is completed				
IRR under AFUDC (%)	7.06	6.93	6.71	6.29
IRR under CWIP (%)	7.20	7.20	7.20	7.20
Increase (percentage points)	0.14	0.27	0.49	0.91
Capital expenditure per percentage point of return	5.4	2.8	1.5	0.8
Allowing for abandonment, with greater recovery under CWIP				
IRR under AFUDC (%)	6.39	6.29	6.12	5.81
IRR under CWIP (%)	6.76	6.79	6.84	6.93
Increase (percentage points)	0.37	0.49	0.71	1.12
Capital expenditure per percentage point of return	2.1	1.5	1.1	0.7

The response is sensitive both to the length assumed and to how much of a stranded balance the utility is allowed to keep, so Panel D reports it across construction lengths and recovery assumptions. I further add a column that blends the observed mix of lengths, since a utility typically has a portfolio of projects of different lengths under way at once.[12]

Table O.15.1 (Continued)

Panel D: Sensitivity to the recovery assumption and to the mix of construction lengths

	Planned years of construction				
	2	3	5	10	Observed mix
Capital expenditure per percentage point of return					
Assuming every project is completed	5.4	2.8	1.5	0.8	2.4
Allowing for abandonment, equal recovery	4.9	2.6	1.4	0.8	2.2
Allowing for abandonment, greater CWIP recovery	2.1	1.5	1.1	0.7	1.4

[10] Abandonment hurts the utility under both regimes, but it hurts less under CWIP, because the cash already billed to customers is difficult to claw back.

[11] Duration is the length the utility planned at the start. Panel A measures it after adoption, because under AFUDC a longer project earns a lower return, so the lengths chosen before adoption are themselves shortened by the rule under study, while CWIP leaves the return flat in length.

[12] The blend weights planned lengths by capacity, across the 157 units totaling 37,474 MW that these utilities started after adoption. Twenty-four percent of that capacity was planned to finish within a single year and 41 percent to take four years or more. One IRR is solved on the blended cash flows, which is not the same as averaging the four columns to its left.

Reading down the observed-mix column, the response falls from 2.4 percentage points of capital expenditure per percentage point of return when every project is assumed to reach service, to 2.2 once abandonment is allowed for, and to 1.4 once CWIP is also credited with the more favorable prudence review, so roughly 1 to 2 percentage points is the range the exercise supports.

The panels to this point measure the gain as an increase in the utility's own IRR, holding the allowed return fixed. A commission may find the opposite question also useful. How much higher an allowed return would it have to grant under AFUDC to leave the utility as well off? Panel E reports that compensating differential for the same scenarios, lengths and mixes. On the observed mix it runs from 0.37 to 0.72 percentage points depending on the recovery assumption, and it widens with construction length, because a percentage point of allowed return is paid on a rate base that depreciates to zero while the construction spending goes out at the start.

Table O.15.1 (Continued)
Panel E: The same scenarios measured as a compensating differential

	Planned years of construction				
	2	3	5	10	Observed mix
Increase in the allowed return that would match CWIP (percentage points)					
Assuming every project is completed	0.15	0.31	0.63	1.55	0.37
Allowing for abandonment, equal recovery	0.20	0.40	0.83	2.00	0.49
Allowing for abandonment, greater CWIP recovery	0.44	0.63	1.05	2.19	0.72

This calculation is descriptive rather than an estimate. Every input is either a sample mean or arithmetic on the inputs in Panel A, and the share of a stranded balance a commission allows the utility to keep is a judgment rather than a measured quantity, so no interval is reported and no causal weight is carried beyond what Section 4.1 supports. What the exercise does give is a sense of how large the return CWIP adds is, and of how much investment moves with it. These magnitudes are consistent with existing evidence. Dunkle Werner and Jarvis (2026) find that utilities hold two to four percent more capital for each additional percentage point of allowed return on equity. The differential in Panel E is worth about one percentage point of return on equity at the equity shares these commissions granted, and the increase in capital expenditure reported here accumulates to two to three percent of utility plant over a comparable period.

O.16 Full Control Coefficients for the Main-Paper Tables

Table O.16.1: Firm-Level Investment, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the states treated in cohort c's adoption year and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variable in column (1) is capital expenditure scaled by lagged total assets, and in column (2) the construction-work-in-progress balance scaled by lagged total assets. The main-paper Table 2, Panel A, reports only *Treat* × *Post*; the full control coefficients are reported here. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect and $\alpha_{t\times c}$ is a year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Capex (1)	*CWIP_balance* (2)
Treat × Post	0.011*	0.020*
	(1.93)	(1.83)
Ln(Total_Assets)	−0.050***	−0.019
	(−2.93)	(−0.90)
Leverage	0.086*	0.057
	(1.82)	(0.78)
ROA	0.124*	0.026
	(1.80)	(0.29)
Dividends_d	0.002	0.001
	(0.50)	(0.36)
Revenue growth	−0.007	−0.010
	(−0.79)	(−0.83)
Tangibility	0.008	0.049
	(0.37)	(1.50)
CDD	−0.012***	0.001
	(−2.73)	(0.28)
HDD	0.009	0.040
	(0.48)	(1.57)
GDP_real	−0.088**	−0.148**
	(−2.25)	(−2.18)
Lag_State_Sales	−0.003	0.017
	(−0.09)	(0.43)
MYP	0.029**	0.057***
	(2.27)	(3.26)
PIM	−0.003	0.009
	(−0.48)	(1.12)
Decoupling	0.007	−0.000
	(1.48)	(−0.02)
Securitization	−0.006	−0.015
	(−0.78)	(−1.09)
Comp_Restrict	0.014**	0.014
	(2.21)	(1.49)
Commission_Elected	0.005	0.054
	(0.13)	(1.13)
Historical_Test_Year	0.047**	−0.023
	(2.45)	(−0.72)
Governor_R	−0.020***	−0.044***
	(−3.74)	(−6.30)
State_Control_R	0.031***	0.080***
	(4.43)	(7.19)
RPS_Target_Pct	0.340***	0.443**
	(2.92)	(2.11)
RPS_Policy	−0.012*	−0.030***
	(−1.71)	(−2.75)
RPS_Voluntary	−0.002	0.018
	(−0.12)	(0.55)
N	854	854
Adj. R-squared	0.535	0.364
Unit of Analysis	Utility-Year	
Utility × Cohort FE	Yes	Yes
Year × Cohort FE	Yes	Yes
Clustering	Utility × Cohort	

Table O.16.2: Construction Volume, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the states treated in cohort c's adoption year and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variables are the count of new construction starts in column (1), the megawatts of new construction starts in column (2), and the total megawatts of the utility's built capacity in column (3), all measured at the utility-state-year level. The main-paper Table 2, Panel B, reports only *Treat* × *Post*; the full control coefficients are reported here. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$, $\alpha_{s\times c}$, and $\alpha_{t\times c}$ are unit-by-cohort, state-by-cohort, and year-by-cohort fixed effects. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Construction starts (1)	*MW started* (2)	*MW built (stock)* (3)
Treat × *Post*	0.439**	34.743***	201.628**
	(2.27)	(2.99)	(2.14)
MYP	0.477	209.079	78.732
	(0.62)	(1.04)	(0.28)
PIM	0.333	46.118*	91.568
	(1.35)	(1.69)	(1.09)
Decoupling	0.225	12.111	−228.520***
	(1.22)	(0.80)	(−2.61)
Securitization	0.076	7.304	18.916
	(0.28)	(0.18)	(0.09)
Comp_ Restrict	0.895	−15.843	190.543***
	(1.48)	(−0.99)	(3.42)
State_ Control_ R	0.095	−38.027**	−317.815***
	(0.32)	(−2.13)	(−4.30)
Governor_ R	−0.042	22.469***	93.473**
	(−0.53)	(2.99)	(2.53)
CDD	0.155***	11.753	3.531
	(2.70)	(1.19)	(0.18)
HDD	1.243	71.435	223.647
	(0.99)	(0.47)	(1.00)
GDP_ real	−1.630	52.581	−131.705
	(−0.91)	(0.60)	(−0.30)
Lag_ State_ Sales	−1.528	31.683	−291.974
	(−1.15)	(0.44)	(−0.62)
RPS_ Policy	−1.380**	−29.360	43.838
	(−2.36)	(−1.42)	(0.73)
RPS_ Target_ Pct	28.354**	209.687	−54.565
	(2.13)	(0.95)	(−0.06)
RPS_ Voluntary	−0.228	−29.914	400.552***
	(−0.93)	(−1.18)	(3.54)
Ln(Total_ Capacity)	0.476*	15.427***	1,057.791***
	(1.79)	(2.85)	(7.22)
N	3,138	3,138	3,138
Adj. R-squared	0.273	0.158	0.972
Unit of Analysis		Utility-State-Year	
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Clustering		Utility × Cohort	

Table O.16.3: Capital Intensity of New Projects, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Const\_Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Const\_Post_{c,t}$ equals one for generators whose construction-start year falls on or after the cohort's adoption year. The dependent variable is the capital-intensity rank, an integer ordering of generator technologies from cheapest to most expensive per kilowatt, estimated at the generator level. The main-paper Table 4, Panel A, reports only *Treat* × *Const_Post*; the full control coefficients are reported here. The independent variable of interest is *Treat* × *Const_Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Capital-intensity rank (1)
Treat × *Const_Post*	−1.574***
	(−2.89)
MYP	2.525
	(1.56)
PIM	−0.883
	(−1.08)
Decoupling	−0.982
	(−1.56)
Securitization	−1.801*
	(−1.96)
Comp_Restrict	−0.032
	(−0.07)
State_Control_R	−0.972**
	(−2.22)
Governor_R	−0.621
	(−1.40)
CDD	0.319
	(0.99)
HDD	1.432
	(0.85)
GDP_real	−7.455
	(−1.54)
Lag_State_Sales	−3.147
	(−0.54)
RPS_Policy	−3.781***
	(−5.78)
RPS_Target_Pct	15.704**
	(2.28)
RPS_Voluntary	−1.708
	(−0.99)
N	2,710
Adj. R-squared	0.730
Unit of Analysis	Generator Level
Utility × Cohort FE	Yes
State × Cohort FE	Yes
Start × Cohort FE	Yes
Clustering	Utility × Coh

Table O.16.4: Cancellation Before and After Construction Starts, Full Control Coefficients

This table reports the full control-coefficient vector for the cancellation outcomes of Table 4, Panel B, and reports estimates of the following specification:

$$Y_{i,c} = \delta\left(Treat_{i,c} \times Post_c\right) + X'_{i,c}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{\tau\times c} + \varepsilon_{i,c},$$

where the dependent variable in column (1) is *Cancel_after_construction*, equal to one for generators that started construction and were then canceled before reaching commercial operation, and *Post* is *Const_Post*, equal to one for generators whose construction-start year falls on or after the cohort's CWIP adoption year. In column (2), the dependent variable is *Cancel_before_construction*, equal to one for generators that were proposed but abandoned before construction started, and *Post* is *Prop_Post*, equal to one for generators whose proposal year falls on or after the cohort's CWIP adoption year. The independent variable of interest is *Treat* × *Const_Post* in column (1) and *Treat* × *Prop_Post* in column (2). $\alpha_{i\times c}$ is a utility-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{\tau\times c}$ is a saturated event-time-by-cohort fixed effect built from the exact offset that defines *Post* in each column. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cancel_after_construction (1)	*Cancel_before_construction* (2)
Treat × *Const_Post*	0.149*	
	(1.85)	
Treat × *Prop_Post*		−0.690***
		(−19.29)
MYP	−0.147	
	(−1.10)	
PIM	0.221**	9.398***
	(2.45)	(9.82)
Decoupling	0.096**	−7.132***
	(2.02)	(−9.52)
Securitization	−0.160*	−2.463***
	(−1.85)	(−19.47)
Comp_Restrict	0.075	−3.158***
	(1.30)	(−6.28)
State_Control_R	0.160*	0.718***
	(1.78)	(8.04)
Governor_R	−0.105	
	(−1.49)	
CDD	0.005	13.437***
	(0.17)	(6.63)
HDD	−0.081	−3.687***
	(−0.59)	(−28.53)
GDP_real	0.306	−37.516***
	(1.09)	(−13.24)
Lag_State_Sales	0.390	
	(0.51)	
RPS_Policy	−0.009	
	(−0.06)	
RPS_Voluntary	0.113	
	(1.10)	
RPS_Target_Pct	−0.167	
	(−0.21)	
Ln(Total_Capacity)	0.004	0.105***
	(0.38)	(2.68)
N	2,168	1,108
Adj. R-squared	0.138	0.280
Unit of Analysis	Generator Level	
Utility × Cohort FE	Yes	Yes
State × Cohort FE	Yes	Yes
Start year × Cohort FE	Yes	No
Proposal year × Cohort FE	No	Yes
Clustering	Utility × Cohort	

Table O.16.5: Capacity Utilization and Standby, Full Control Coefficients

This table reports the full control-coefficient vector for the capacity-utilization and standby outcomes of Table 4, Panel C, estimated on the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. Columns (1) and (2) report the two generator-year CEMS outcomes, the capacity factor and the share of days operating, measured on the calendar-time panel where $Post_{c,t}$ turns on in event years on or after adoption. Column (3) reports the plant-year share of installed capacity held in standby or out-of-service status, measured on the build-vintage panel where *Post* is replaced by *Prop_Post*, which separates plants first proposed on or after adoption from those proposed before it. The firm-size control is the log generator nameplate capacity (*Generator_size*) in the generator-year columns and the log plant nameplate capacity (*Plant_size*) in the plant-year column. The standby column additionally includes the election-year, rate-base, and historical-test-year controls, each dropped for collinearity with the fixed effects and so not reported. The independent variable of interest is *Treat* × *Post* in columns (1) and (2) and *Treat* × *Prop_Post* in column (3). $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. *t*-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Capacity utilization (calendar)		Standby (vintage)
	Capacity factor (1)	Share days operating (2)	Standby share (3)
Treat × Post	−0.096***	−0.033*	
	(−3.52)	(−1.74)	
Treat × Prop_Post			−0.059
			(−1.01)
MYP	−0.164***	−0.125***	0.015
	(−5.36)	(−4.71)	(0.86)
PIM	0.037*	0.029**	−0.028***
	(1.87)	(2.15)	(−2.80)
Decoupling	0.029**	0.022**	−0.012
	(2.15)	(2.09)	(−1.28)
Securitization	0.066**	0.032	−0.019**
	(2.31)	(1.60)	(−2.40)
Comp_Restrict	0.015	0.016	−0.029***
	(0.93)	(1.30)	(−3.44)
State_Control_R	−0.022	−0.010	0.014
	(−1.31)	(−0.85)	(0.84)
Governor_R	−0.010	−0.023***	−0.004
	(−1.29)	(−3.52)	(−0.60)
CDD	0.011	−0.009	0.017***
	(0.76)	(−0.79)	(5.71)
HDD	−0.007	−0.024	−0.017*
	(−0.21)	(−0.99)	(−1.75)
GDP_real	0.140	−0.096	−0.105***
	(1.04)	(−1.04)	(−2.74)
Lag_State_Sales	−0.287***	−0.060	−0.047
	(−2.61)	(−0.80)	(−1.31)
RPS_Policy	−0.091***	−0.076***	−0.046***
	(−5.50)	(−5.70)	(−3.95)
RPS_Target_Pct	0.422	−0.104	0.337***
	(1.51)	(−0.46)	(3.80)
RPS_Voluntary	0.019	−0.028	0.011
	(0.55)	(−0.96)	(0.96)
Generator_size	0.226***	0.235***	
	(17.79)	(26.91)	
Plant_size			−0.009***
			(−2.88)
N	32,915	35,472	11,910
Adj. R-squared	0.390	0.508	0.326
Unit of Analysis	Generator-Year		Plant-Year
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Clustering		Util × Coh	

Table O.16.6: Credit Outcomes at the Firm-Year Level, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\left(Treat_{i,c} \times Post_{c,t}\right) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variable is the S&P long-term issuer rating on a 1-22 numeric scale (columns (1)-(2), corresponding to Table 6, columns (1)-(2)), the average maturity at issuance in years (columns (3)-(4), corresponding to Table 6, columns (3)-(4)), and the average fixed-rate coupon in percentage points (columns (5)-(6), corresponding to Table 6, columns (5)-(6)). Each outcome reports a fixed-effects-only column and a full-control column; the intermediate specification that adds only the state-policy controls is omitted here. The full-control column for the rating additionally reports *Rate_ Base_ Average* and *Historical_ Test_ Year*, each dropped for collinearity with the fixed effects in the maturity and coupon columns and so not reported there. A blank cell otherwise indicates a control excluded from that column's specification rather than one absorbed by the fixed effects. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect, $\alpha_{s\times c}$ is a state-by-cohort fixed effect, and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State					
	S&P LT Rating		*Average maturity*		*Average coupon*	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × *Post*	0.573	0.228	−2.243	−4.250**	0.015	−0.106
	(1.09)	(0.54)	(−1.04)	(−2.17)	(0.07)	(−0.48)
MYP		0.153		7.921***		0.226
		(0.48)		(2.90)		(0.67)
PIM		−0.166		−1.540		−0.291
		(−0.70)		(−1.09)		(−1.52)
Decoupling		−0.089		0.320		−0.216
		(−0.67)		(0.27)		(−0.97)
Securitization		−0.251		0.674		−0.964***
		(−0.95)		(0.36)		(−4.13)
Comp_ Restrict		−0.226		3.698**		0.157
		(−0.90)		(2.52)		(0.86)
Rate_ Base_ Average		−0.492				
		(−0.97)				
Historical_ Test_ Year		1.102**				
		(2.56)				
State_ Control_ R		−0.652**		−1.335		0.414**
		(−2.30)		(−0.89)		(2.30)
Governor_ R		0.178		0.060		−0.024
		(1.49)		(0.05)		(−0.22)
CDD		0.001***		0.007**		0.001**
		(2.91)		(2.14)		(2.08)
HDD		0.000**		0.008***		0.001***
		(2.37)		(6.36)		(6.93)
GDP_ real		−0.000***		0.000		0.000
		(−7.13)		(1.08)		(1.15)
Lag_ State_ Sales		−3.282***		−4.721		−0.228
		(−5.53)		(−1.29)		(−0.41)
RPS_ Policy		−0.785***		2.078		−0.041
		(−3.12)		(1.59)		(−0.26)
RPS_ Target_ Pct		13.691***		44.814		−5.059*
		(4.16)		(1.63)		(−1.83)
RPS_ Voluntary		0.247		2.874		−0.387
		(0.47)		(0.48)		(−0.53)

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Table O.16.6 continued

	Cross-State					
	S&P LT Rating		*Average maturity*		*Average coupon*	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Total_ Assets)		−0.211		−3.273		−0.636**
		(−0.58)		(−1.61)		(−2.43)
Leverage_ LT		−0.505		22.628**		2.155*
		(−0.49)		(2.29)		(1.66)
Dividends_ d		0.259***		1.142		0.003
		(3.95)		(1.50)		(0.03)
Revenue growth		0.426		11.434***		−0.392
		(1.15)		(3.44)		(−0.57)
ST_ Leverage		6.877**		−16.229		−3.652
		(2.55)		(−0.65)		(−1.11)
Op_ Margin		3.409***		17.371**		−0.717
		(3.09)		(2.57)		(−0.94)
Loss		−0.474*		−1.946		−1.041***
		(−1.68)		(−0.96)		(−6.33)
Cash_ Share		−2.467		−8.339		0.833
		(−1.00)		(−0.70)		(0.36)
Current_ Ratio		0.159**		−1.819**		−0.056
		(2.30)		(−2.24)		(−0.53)
Int_ Coverage		−0.033		0.624**		0.037*
		(−0.80)		(2.45)		(1.76)
Tangibility		−0.964**		−4.026		−1.979**
		(−2.19)		(−0.61)		(−2.17)
Cap_ Lease_ Share		−11.011***		13.057		−1.132
		(−5.58)		(0.72)		(−0.63)
SalesGrowth_ Vol		−1.289*		−3.506		−0.231
		(−1.82)		(−0.66)		(−0.37)
OCF_ Vol		0.344		−67.688**		10.264***
		(0.10)		(−2.22)		(3.92)
N	1,852	1,852	943	943	953	953
Adj. R-squared	0.546	0.700	0.148	0.241	0.508	0.589
Unit of Analysis	Utility-Year					
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Clustering	Util × Coh					

Table O.16.7: Grid Reliability, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variables are the two industry-standard reliability metrics, the System Average Interruption Duration Index (SAIDI, columns (1)-(2)) and the System Average Interruption Frequency Index (SAIFI, columns (3)-(4)), each in log form and reported both including major event days ("with Major Events") and excluding them ("without Major Events"). All four columns are estimated on the ±5 event-time window, the window reported in Table 9, Panel A. The main-paper Table 9, Panel A shows only *Treat* × *Post* and repeats it across the ±5, ±7, and ±10 windows; the remaining control coefficients are reported here. *Storm_ Declarations*, the log of one plus the number of storm-related federal disaster declarations in the utility's state and year, is part of the control vector in every reliability specification; it conditions on the weather that generates major event days and, as the panel shows, loads roughly ten times harder on the with-major-event duration measure than on the normal-conditions measure. State-policy indicators absorbed by the state-by-cohort fixed effects (*Commission_ Elected*, *Rate_ Base_ Average*, and *Historical_ Test_ Year*) are omitted from the panel; a control that is additionally absorbed in an individual column, as *MYP* is in columns (1) and (3), is left blank in that column, so a blank cell here indicates absorption rather than exclusion. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$, $\alpha_{s\times c}$, and $\alpha_{t\times c}$ are unit-by-cohort, state-by-cohort, and event-year-by-cohort fixed effects. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Ln(SAIDI)		*Ln(SAIFI)*	
	with Major Events (1)	without Major Events (2)	with Major Events (3)	without Major Events (4)
Treat × *Post*	0.217	0.093	0.166	0.046
	(0.74)	(1.61)	(1.32)	(0.81)
MYP		-0.139^{**}		-0.100
		(-2.21)		(-1.57)
PIM	-0.106	-0.054	0.048	-0.060^{**}
	(-0.63)	(-1.57)	(0.66)	(-2.06)
Decoupling	0.410^{***}	0.043	0.089^{**}	0.007
	(4.59)	(1.45)	(2.21)	(0.32)
Securitization	-0.064	0.120^{***}	-0.031	0.121^{***}
	(-0.55)	(4.06)	(-0.60)	(4.11)
Comp_ Restrict	-0.297^{**}	0.042	-0.122^{***}	-0.002
	(-2.05)	(1.35)	(-2.72)	(-0.08)
State_ Control_ R	0.435^{***}	0.062^{***}	0.175^{***}	0.081^{***}
	(4.10)	(2.65)	(4.93)	(3.20)
Governor_ R	-0.042	0.025	0.005	0.032
	(-0.48)	(1.18)	(0.16)	(1.62)
Ln(Sales_ MWh)	1.138^{***}	-0.100	0.247^{*}	-0.061
	(3.19)	(-1.10)	(1.73)	(-0.60)
CDD	0.288^{**}	-0.031	0.354^{***}	-0.024
	(2.22)	(-0.76)	(6.01)	(-0.67)
HDD	-1.008^{**}	-0.057	-0.253^{*}	-0.130
	(-2.22)	(-0.52)	(-1.77)	(-1.48)
GDP_ real	1.312	0.401	0.917^{**}	0.127
	(1.20)	(1.33)	(2.10)	(0.56)
Storm_ Declarations	0.487^{***}	0.049^{***}	0.112^{***}	0.072^{***}
	(10.43)	(4.46)	(4.89)	(5.69)
N	1,019	2,028	960	2,024
Adj. R-squared	0.199	0.037	0.170	0.043
Unit of Analysis	Utility-State-Year			
Utility × Cohort FE	Yes	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes
Clustering	Utility × Cohort			

Table O.16.8: Residential Customer Satisfaction, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(Treat_{i,c} \times Post_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{s\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $Treat_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $Post_{c,t}$ equals one in event years on or after the cohort's adoption year. The dependent variable is *Customer_ Sat_ Score*, the J.D. Power residential overall satisfaction score. Column (1) omits controls, column (2) adds the demand-side, policy, and political control vector, and column (3) additionally conditions on the log implied residential price as a post-treatment mediator, dropping *Lag_ State_ Sales*, which is collinear with implied residential price. The main-paper Table 9, Panel B shows only *Ln(Price_ Res)* and *Lag_ State_ Sales*; the remaining control coefficients are reported here. The independent variable of interest is *Treat × Post*. $\alpha_{i\times c}$, $\alpha_{s\times c}$, and $\alpha_{t\times c}$ are unit-by-cohort, state-by-cohort, and event-year-by-cohort fixed effects. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State		
	Customer_ Sat_ Score		
	(1)	(2)	(3)
Treat × Post	−14.929***	−12.556***	−12.684***
	(−5.27)	(−3.03)	(−2.93)
Ln(Price_ Res)			−24.273***
			(−2.97)
PIM		4.852	2.277
		(0.96)	(0.47)
Decoupling		−1.744	−2.636
		(−0.60)	(−0.94)
Securitization		−8.259**	−3.078
		(−2.22)	(−1.06)
Comp_ Restrict		−16.283**	−19.528**
		(−2.24)	(−2.61)
State_ Control_ R		−4.764	−5.855*
		(−1.39)	(−1.76)
Governor_ R		−3.914	−5.930***
		(−1.54)	(−2.67)
Ln(Sales_ MWh)		−2.056	−2.122
		(−0.04)	(−0.04)
CDD		−0.770	1.731
		(−0.10)	(0.24)
HDD		17.605	24.561*
		(1.35)	(1.96)
GDP_ real		−2.429	21.432
		(−0.08)	(0.72)
Lag_ State_ Sales		48.537***	
		(3.66)	
RPS_ Target_ Pct		−10.773	62.723
		(−0.10)	(0.61)
RPS_ Policy		8.691***	7.060***
		(2.94)	(2.69)
N	477	343	343
Adj. R-squared	0.910	0.920	0.916
Unit of Analysis	Utility-State-Year		
Utility × Cohort FE	Yes	Yes	Yes
State × Cohort FE	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Bill-Pass-Through Mediator	No	No	Yes
Clustering	Utility × Cohort		

Table O.16.9: Demand-Response Programs, Full Control Coefficients

This table reports estimates of the following specification:

$$Y_{i,c,t} = \delta\,(\mathit{Treat}_{i,c} \times \mathit{Post}_{c,t}) + X'_{i,c,t}\gamma + \alpha_{i\times c} + \alpha_{t\times c} + \varepsilon_{i,c,t},$$

where $\mathit{Treat}_{i,c}$ equals one for utilities in the treated regulated arm of cohort c and $\mathit{Post}_{c,t}$ equals one in event years on or after the cohort's adoption year. Columns (1) and (2) report *Any_DRP*, columns (3) and (4) report *DRP_customers*, and columns (5) and (6) report *Energy_Savings*; within each pair the odd column omits controls and the even column adds the full control vector. The main-paper Table 9, Panel C reports only *Treat* × *Post*; the full control coefficients are reported here. The independent variable of interest is *Treat* × *Post*. $\alpha_{i\times c}$ is a unit-by-cohort fixed effect and $\alpha_{t\times c}$ is an event-year-by-cohort fixed effect. Standard errors are clustered at the utility-by-cohort level. t-statistics are reported in parentheses beneath each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels. All variable definitions are provided in Section O.1.

	Cross-State					
	Any_DRP		*DRP_customers*		*Energy_Savings*	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × Post	0.014	−0.130*	−0.032***	−0.061***	−0.010	−0.025***
	(0.25)	(−1.85)	(−4.34)	(−4.31)	(−1.39)	(−2.64)
Ln(Sales_MWh)		0.004		0.036**		0.003
		(0.22)		(2.47)		(0.66)
CDD		−0.001		0.011***		−0.006
		(−0.15)		(3.37)		(−1.13)
HDD		−0.175*		−0.095**		0.024
		(−1.96)		(−2.18)		(1.16)
GDP_real		−0.204		−0.062		0.032
		(−0.90)		(−0.90)		(1.60)
MYP		−0.184**		−0.049**		−0.013
		(−2.26)		(−1.97)		(−1.62)
PIM		0.312***		0.039***		0.036**
		(6.06)		(3.80)		(2.58)
Decoupling		0.058*		−0.023***		0.004
		(1.71)		(−2.68)		(1.00)
Securitization		−0.064		0.012		−0.005
		(−1.31)		(0.50)		(−1.07)
Comp_Restrict		−0.013		0.023		0.003
		(−0.34)		(1.59)		(0.72)
Commission_Elected		1.531***		−0.523		−0.042**
		(4.83)		(−1.45)		(−2.55)
Historical_Test_Year		−1.243***		0.020		−0.004
		(−9.44)		(0.66)		(−0.26)
Governor_R		0.072**		−0.019**		0.013**
		(2.40)		(−2.50)		(2.52)
State_Control_R		−0.023		0.011		−0.003
		(−0.79)		(1.00)		(−0.88)
Lag_State_Sales		−0.222		0.017		−0.064*
		(−1.24)		(0.40)		(−1.83)
RPS_Target_Pct		−0.400		−0.267*		0.182
		(−0.66)		(−1.72)		(1.33)
RPS_Policy		−0.095**		−0.012		−0.027***
		(−2.21)		(−1.34)		(−2.81)
RPS_Voluntary		0.058		0.417**		−0.015
		(0.35)		(2.21)		(−1.20)
N	3,514	3,189	3,507	3,189	3,507	3,189
Adj. R-squared	0.721	0.761	0.398	0.447	0.539	0.635
Unit of Analysis	Utility-Year					
Utility × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Year × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Clustering	Utility × Cohort					

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