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Broadband's Role in Smart Grid's Success: Seven Jurisdictional Challenges

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The phrase "smart grid" refers to an interactive network (including physical facilities and software tying together consumers, the distribution system, and the bulk power system) designed to improve the efficiency of electric utility system operations while empowering consumers to make cost-conscious decisions about the services they desire.[2] Proponents assert that smart grid assets and programs will yield information valuable to utilities, consumers, and third-party providers of new products and services.

As for broadband, my colleague Michael Jung has explained that its main roles in smart grid deployment are to (a) provide the backhaul service for moving aggregated data from last-mile, neighborhood-area networks back to the utility and (b) give those customers with broadband Internet access a means of accessing their utility information via customer energy web portals.[3]

Decisionmakers face the challenge of determining whether, where, how, and when to integrate broadband networks to support smart grid connectivity, for individual utilities and across the nation's three interconnected electric power systems, and how to do so cost-effectively.[4] This effort will require not only billions in investment dollars,[5] but also clear

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[1] B.A. *cum laude*, Yale University; J.D. *magna cum laude*¸ Georgetown University Law Center. This paper expands on a presentation delivered at the Columbia University Institute for Tele-Information in December 2010. The author acknowledges the contributions of Michael Jung, Robert Marritz and Thomas Stanton, but is solely responsible for any shortcomings.

[2] For a variety of definitions of "smart grid," *see* S. Lichtenberg, *Smart Grid Data: Must There Be Conflict Between Energy Management and Consumer Privacy?*, NRRI 10-17 (Dec. 2010), available at http://www.nrri2.org/index.php?option=com_content&task=view&id=305&Itemid=48.

[3] As for technical details, Jung adds: "The term 'broadband' generally refers to high-bandwidth communications, but precise bandwidth specifications vary between organizations. Originally, most defined broadband as being anything faster than the 56 Kilobits per second (Kbps) maximum speed of dial-up modems. The International Telecommunications Union suggests 1.5 to 2.0 Megabits per second (Mbps), and the Federal Communications Commission (FCC) in 2010 defined "basic broadband" as being at least 4 Mbps."

[4] The United States has three interconnections: The Eastern Interconnected System, the Western Interconnected System, and the Texas Interconnected System. These three systems are

guidance from policymakers: guidance about performance expectations and about the roles, responsibilities, and rights of incumbent electric utilities, alternative power suppliers, telecommunications companies, and other service providers. Since policymaking guidance comes from statutes and regulatory actions, guidance clarity will require jurisdictional clarity.

Producing that jurisdictional clarity presents a challenge, given the many decisionmakers involved. There must be consistent decisionmaking among four national entities (Federal Communications Commission, Federal Energy Regulatory Commission, National Institute of Standards and Technology (NIST), and Congress) and at least 104 state entities (52 state and local regulatory agencies[6] and, potentially, 52 state and local legislative bodies). The success of this endeavor will depend on each of these entities' answering—explicitly, consistently, and in advance of major expenditures—at least seven distinct questions:

1. Do they share the same mission, and if not, are the differences compatible?

2. Can each of the policymakers and the industries they oversee carry out a multidiscipline initiative under existing single-discipline statutes?

3. Can the parties execute a coherent national policy within a diverse regulatory system in which the broadest authority resides at the state level?

4. Will policymakers authorize recovery of and returns on investment sufficient to induce long-term capital investments during an era when customers insist on keeping rates low?

5. How do the regulators or legislators induce utility innovation—or penalize its absence?

6. How do policymakers ensure that incumbent utilities plan and operate evenhandedly, where the utility has incentive and opportunity to exploit its special status?

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not synchronized with each other. *See* http://www.eia.doe.gov/electricity/page/prim2/chapter7.html.

[5] The Electric Power Research Institute has estimated the smart grid's cost at $165 billion over a 20-year period. *Smart Grid News*, "Sticker Shock: EPRI Says Smart Grid Will Cost $165 Billion Over 20 Years." http://www.smartgridnews.com/artman/publish/Business_Policy_Regulation_News/Sticker-Shock-EPRI-Says-Smart-Grid-Will-Cost-165-Billion-Over-20-Years-1882.html (Feb. 15, 2010, accessed Jan. 4, 2011). No estimate can be authoritative, given the many unknowns and undecideds concerning purposes, hardware, programming, and operations.

[6] The number "52" comes from 50 states plus the District of Columbia and the City of New Orleans (which acts as the regulator of retail electric service within the city).

7. How can decisionmakers achieve industry-wide acceptance of the smart grid's public-interest prerequisites?

The purpose of this paper is not to answer these questions, but to alert policymakers to the need, if not to answer them, then to assign responsibility to get the answers.

I. Do All Parties Have the Same Mission in Mind?

Proponents of smart grid have articulated at least eight distinct missions: (1) increasing efficiency in utility operations, including asset utilization and O&M in generation, transmission, distribution, and customer service; (2) increasing system security and reliability, including reduced numbers, severity, and duration of outages; (3) improved power quality where required for modern electronic equipment and essential public services; (4) reducing fossil fuel use and emissions; (5) enhancing customer choices, including dynamic rate offerings to allow customers to respond to power system operating conditions and thereby to reduce their costs; (6) inducing customer cooperation to reduce peak loads; (7) improving utility planning quality and accuracy; and (8) developing a "smarter" energy economy and growing jobs.

Not every regulatory agency active in smart grid has specified its missions explicitly. Even after specifying missions, it is necessary to weigh them by priority, in terms of investment dollars and timing. Further, not every agency has statutory authority to pursue each of these missions. Since smart grid involves state-level and multi-state networks, interactions among those networks, mission clarity, and statutory clarity, within and across jurisdictions, is necessary for success.

II. How Can Regulators Carry Out Multidisciplinary Initiatives Under Single-Purpose Statutes?

Since at least 2007,[7] national economic and energy policy has promoted smart grid to make more efficient the production, delivery, and use of electricity and to grow business opportunities and jobs for the nation. Toward these ends, the FCC and FERC have promulgated policies intended to recognize their respective jurisdictions and responsibilities. In matters unrelated to utility regulation, NIST, an agency of the Department of Commerce, is leading the challenging task of setting forth standards to ensure that all elements of the smart grid, both inter-utility and utility-to-customer, are interoperable.[8]

[7] The Energy Independence and Security Act of 2007, Pub. L. 110-140, included Title XIII, addressing the Smart Grid.

[8] "The U.S. grid, which is operated by over 3100 electric utilities using equipment and systems from hundreds of suppliers, historically has not had much emphasis on standardization and thus incorporates many proprietary interfaces and technologies that result in the equivalents

The FCC's document *Connecting America: The National Broadband Plan* contains a Chapter 12 entitled "Energy and the Environment." There the FCC asserts that "[a] smarter grid is necessary if America wants to lead in the shift toward vehicle electrification,"[9] and that "... it is important to shift energy usage away from the cripplingly expensive times of peak demand."[10] It warns that "[t]he lack of a mission-critical wide-area broadband network capable of meeting the requirements of the Smart grid threatens to delay its implementation."[11] The FCC then parcels out recommended roles to various agencies:

> "The U.S. Department of Energy, in collaboration with the FCC, should study the communications requirements of electric utilities to inform federal Smart grid policy."[12]
>
> "The Federal Energy Regulatory Commission should adopt consumer digital data accessibility and control standards as a model for states."[13]
>
> "The FCC should start a proceeding to improve the energy efficiency and environmental impact of the communications industry."[14]

These statements raise three categories of legal questions. First, the FCC has no authority over providers of electric service. Neither the Communications Act of 1934 nor the Telecommunications Act of 1996 authorizes the FCC to cause its jurisdictional utilities to carry out an energy agenda, including "energy efficiency" or "environmental impact."[15] The FCC devotes Section 17.3 of its National Broadband Plan to the "legal framework for the FCC's implementation of [the] Plan." There it poses two alternatives: regulation under Title I

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of stand-alone silos." *See* G. Arnold, *National Leadership Toward an Interoperable Smart Grid—A Progress Report*, at http://www.electricitypolicy.com/Arnold-12-30-10.pdf.

[9] National Broadband Plan, at 268.

[10] *Id*.

[11] *Id.* at 269.

[12] *Id.*, Recommendation 12.6.

[13] *Id.*, Recommendation 12.8.

[14] *Id.*, Recommendation 12.11.

[15] The FCC is obligated to create a "plan for use of broadband infrastructure and services in advancing[,]" among other things, "energy independence and efficiency." American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 6001(k)(2)(D), 123 Stat. 115, 516 (2009) (Recovery Act). But that obligation to write a plan does not grant the FCC authority to order other actions to advance that goal or any of its other general goals.

(information services) or Title II (telecommunications services). However, neither approach gets the FCC comfortably into energy efficiency or electric reliability.

Second, the Federal Power Act grants FERC no authority with respect to electric utilities, or others, when in the business of providing telecommunications service. Nor does FERC have authority to regulate utilities' retail rate designs, their retail energy-efficiency programs, their gathering of retail consumer data access, or "vehicle electrification," all of which the FCC sees as essential to realizing the benefits of the smart grid.

Third, state utility regulatory commissions, in contrast to the FCC and FERC, have authority over both energy and telecommunications utilities. That authority is broader in some respects than those of the FCC or FERC. It includes authority over entry and exit, planning, financing, corporate, and capital structures, as well as traditional authority over retail rates and retail quality of service; and in a growing number of states the statutory purposes animating these statutes include energy efficiency and environmental responsibility.[16] But each state's authority is only intrastate in scope. Even within state boundaries, state regulators will need to address several jurisdictional questions. Specifically, can a state regulator order telecommunications utilities to provide particular kinds of broadband access? Can it order electric utilities to provide particular kinds of broadband access? Can it order telecommunications and electric utilities to carry out certain joint activities necessary to producing smart grid benefits? Despite broad public-interest language in regulatory statutes, the answers to these questions are not clear. In fact, the U.S. Supreme Court has warned agencies away from using their statutes' "public interest" language to reach outside their statutory authority.[17]

Resolving these statutory uncertainties will require action by state legislatures and Congress. Doing so at different times, without coordination and animated by different purposes, will not produce the result sought by the 2007 Congress.

[16] For important insights on the growth in the universe of subjects addressed by state commissions, and some of the legal struggles arising from that growth, see E. Filipink, *Serving the "Public Interest:" Traditional vs. Expansive Utility Regulation*, NRRI 10-02 (Dec. 2009).

[17] *See National Association for the Advancement of Colored People v. Federal Power Commission*, 425 U.S. 662 (1976) ("public interest" phrase in the Federal Power Act did not authorize Federal Power Commission to issue a rule prohibiting racial discrimination by utilities). Yet the FCC has pursued diversity in employment in and ownership of jurisdictional facilities. *See, e.g., Metro Broadcasting v. Federal Communications Commission*, 497 U.S. 547 (1990).

III. Can Our Divided Regulatory System Shape Smart Grid Policy?

A. The FCC's goals

How can state or federal regulators help shape a national policy, given our divided utility regulatory system, where the broadest authority over utilities lies at the state level? The FCC's National Broadband Plan addresses this question in several ways.

1. Access to consumer data

The FCC's Broadband Plan asserts that

> "[s]tates should require electric utilities to provide consumers access to, and control of, their own digital energy information, including real-time information from smart meters and historical consumption, price and bill data over the Internet. If states fail to develop reasonable policies over the next 18 months, Congress should consider national legislation to cover consumer privacy and the accessibility of energy data."[18]

It adds that "DOE should consider consumer data accessibility policies when evaluating smart grid grant applications, report on the states' progress toward enacting consumer data accessibility and develop best practices guidance for states."[19]

2. Efficiency-oriented retail ratemaking

The National Broadband Plan presses states on demand management, rate design, utility profitability, and market diversity:

> "... [I]t is important to shift energy usage away from the cripplingly expensive times of peak demand."[20]

> "... [S]tate regulators are increasingly looking to change the structure of retail rates—which are mostly flat today—to time varying or dynamic rates that better reflect the cost of supplying power. A smarter grid is necessary to communicate those prices to consumers and help them manage their energy use."[21]

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[18] National Broadband Plan at 265.

[19] *Id*. at 266.

[20] National Broadband Plan, at 268.

[21] National Broadband Plan at 268.

"PUCs should also consider letting recurring network operating costs qualify for a rate of return similar to capitalized utility built networks."[22]

"States should reduce impediments and financial disincentives to using commercial service providers for smart grid communications."[23]

3. Communications network objectivity

The FCC's *National Broadband Plan* raises concerns about network design, ownership, and control:

"A commercial network that can ensure service continuity would be capable of supporting additional mission-critical applications. However, many large utilities have economic disincentives to use commercial networks and may be making suboptimal choices. As rate of return regulated utilities, they typically earn guaranteed profits on the assets they deploy—including private communications networks—but only receive cost recovery if they use commercial networks."[24]

"Public utility commissions (PUCs) must ensure that utilities' incentives do not lead them to make suboptimal communications and technology decisions. State regulators should carefully evaluate a utility's network requirements and commercial network alternatives before authorizing a rate of return on private communications systems."[25]

Ensuring network design undistorted by utility financial motives requires states to ensure that a utility does not favor its own business plans over those of potential competitors. The FCC's Broadband Plan notes, at 271:

"Several examples already exist of networks that are being shared successfully by public safety entities and utilities. Southern LINC, a subsidiary of the Southern Company, provides commercial wireless service in the Southeast and voice communications for Southern Company itself. Because the network was built to very high reliability standards, almost a quarter of Southern LINC's customers are public safety and other public agencies. Another example is the Nevada Shared Radio System, which is jointly operated by two Nevada utilities and the Nevada Department of Transportation (the Nevada State Patrol is also a customer)."

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[22] *Id*. at 270.

[23] *Id*. at 265.

[24] *Id.* at 270.

[25] *Id*.

It takes nothing away from the public safety goal to note that that the entities achieving commercial success in these two contexts are incumbent public utilities. The question for state, and possibly federal, regulators is whether smart grid benefits will arrive more quickly and economically if nonutility players have a nondiscriminatory shot at these opportunities. Part VI offers more thoughts on this market structure question.

B. State-federal jurisdictional questions

Broadband's role in smart grid touches both the bulk power and retail service aspects of electric utility operations. Successful deployment will depend on clarity and coordination concerning the state-FERC regulatory relationship. Here are several examples of challenges:

1. Prudence findings: Assume FERC, in reviewing practices affecting facilities subject to its jurisdiction, finds particular features to be prudent.[26] How does that finding affect state ratemaking decisions? For utilities who have joined regional transmission organizations, FERC's decision would cause the RTO (which is the FERC-jurisdictional "public utility" providing transmission service to the region's utilities and other load-serving entities) to include the utility's smart grid investment in the RTO's rates paid by the region's utilities.[27] The Federal Power Act would preempt the state commission from disallowing those costs. But what if the utility is not a member of an RTO, but instead provides traditional retail service (where the transmission costs are included with all other costs for ratemaking purposes)? FERC might decide, in the context of an unbundled transmission rate case,[28] that a smart grid investment is prudent for Federal Power Act purposes. Could a state disallow these costs from retail rates? For a multi-state utility, if FERC approves an allocation of costs among the states, does that decision bind the states?

2. The transmission-local distribution-nonlocal distribution distinction: Section 201(b) of the Federal Power Act places "transmission" within FERC's jurisdiction, but cedes "local distribution" to state regulation, outside FERC's jurisdiction. These distinctions will prove

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[26] FERC would likely have jurisdiction over transmission-related fiber networks used for wide-area-networks connecting synchophasors for monitoring transmission, but would not likely have any say over "last-mile" neighborhood-area networks connecting meters, switches, and transformers.

[27] FERC has found that when a transmission-owning utility joins an RTO, thereby transferring functional control of its transmission assets to the RTO, transmission service becomes "unbundled." The jurisdictional effect is make the transmission costs FERC-jurisdictional rather than state-jurisdictional. For additional detail, see W. Steinhurst, "The Electric Industry at a Glance," published by NRRI, at Part III, available at http://nrri.org/pubs/electricity/NRRI_electricity_at_a_glance_jan11-04.pdf. Part III was authored by the present author.

[28] Even a traditional retail utility is required to provide "Order 888" transmission service to others.

outdated when policymakers wish to encourage retail-level behavior to improve bulk power-level operations. Two examples: First, what happens when broadband networks used for bulk power system reliability or grid optimization require connection and communication at both transmission and distribution levels? Must the network owner seek approval at both FERC and multiple states? Second, if some customers bypass utility state-regulated smart grid neighborhood-area-networks and instead enjoy direct access to their utility's FERC-regulated broadband smart grid backbone, and customers agree to have their appliances or air conditioning shut off in tight power situations in return for a bill credit, does this customer's contribution to the bulk power network trigger federal jurisdiction, state jurisdiction, or both? Will FERC have to clarify the meaning of "local distribution" so as to leave itself room to regulate in this area? Will its doing so trigger arguments that FERC has stepped outside its "interstate commerce" jurisdiction?

IV. Can Regulators Win Acceptance of Long-Term Investments When Consumers Insist on Keeping Rates Low?

The smart grid's success at saving energy depends in part on changing customers' rate structures—setting higher charges for customers who consume larger blocks of energy and charging all customers higher rates when system costs are higher. Both measures are intended to reduce demand—the former to reflect that incremental resources to be built or acquired cost more than existing generation; the latter to discourage power use at times when system power costs are high. Both measures also have the effect of increasing customer interest in energy efficiency. Further, customers will need to pay for the investments necessary to produce the hoped-for benefits. Is regulation ready to deliver this "tough love" to high-use residential customers? What about those who use large amounts of energy because they live in poorly insulated dwellings that they can't afford to weatherize? The answers depend on whether regulators recognize and remove four obstacles. If they do that, they possess five regulatory responses that can help achieve the desired objectives.[29]

A. Four obstacles: blurred mission, lulled customers, skeptical public, utility hesitance

Why is there tension between achieving regulation's purpose and making rates and rate structures promote more efficient energy use? There are four reasons.

1. Blurred mission: Utility regulation has a "consumer protection" component. But protection from what? In traditional markets, consumers depend on a single seller, so "protection" means protection from excessive prices and insufficient quality or quantity of energy. Have we allowed this "consumer protection" purpose to transmogrify from protection against monopoly inefficiency to protection against high costs in general? Some regulators define their effectiveness by where their states' rates rank in relation to other states. Others

[29] This section draws from the author's essay of January 2009. *See* http://www.nrri2.org/index.php?option=com_content&task=view&id=158&Itemid=38.

inveigh against climate change legislation or supportive measures because they will raise rates. However, rate rankings do not necessarily indicate whether rates are appropriate; consumer protection does not mean protection from the right rates. In any case, as older coal-fired plants are replaced in a utility's portfolio, a resource that replaces them will almost certainly be higher in cost.

2. Lulled customers: Those years-long rate freezes that shielded electricity customers in some states from the real cost of service also lulled the public into thinking that rate stability is an entitlement. When, after ten years of below-cost rates, a commission finds it necessary to re-align rates with costs, we know what happens: (1) Voters don't offer thanks for the prior windfall, but protest the new levels, loudly. (2) Politicians fan these flames, making rational policymaking difficult. (3) The compromise arrives, usually more pain-deferral than pain-sharing, often skirting the underlying problem—the public's lack of acceptance that electricity costs need to rise. What works in politics—mediating between positions—rarely works in regulation, where the midpoint between two wrong answers is often a third wrong answer.

3. A skeptical public: A utility rate increase triggers public skepticism, because the public is reflexively skeptical of bigness and monopolies. The public reaction is asymmetrical: Citizens do not talk positively of the near-miracles of low-cost electricity service, water treatment, gas storage and supply, and instant telecommunications, or the rarity of outages. They rage at rate increases.

This skepticism has valid roots: the utility that swears that the $100 million increase is necessary for "viability," only to settle, satisfied, at $65 million; the merger proposal that cites "synergies" that evaporate; the persistent resource asymmetry that allows utilities to fill the most space in the public hearing record. In regulation, trust requires verification; verification requires resources. If the public thinks all rate increases are rip-offs, efforts to explain lack traction.

4. Utility hesitance: The utility has its reputation at risk. It does not enjoy raising rates—headlines, commission audits, legislators' castigations. There also is financial risk. Some utilities hesitate to make infrastructural investments without prior, project-specific regulatory commitments. This reluctance is potentially a dereliction of the utility's duty: A utility may not avoid making needed infrastructure investment based on fears that the regulator will avoid its rate-setting obligation. The utility must perform *its* duties, then take a duty-averse commission to court, if necessary.

B. Five regulatory responses: management effectiveness, regulatory resources, cost recovery commitment, rate design, political leadership, communication

How can regulators create acceptance of infrastructure necessitating rate increases?

1. Management effectiveness: Regulators should require their utilities to produce an inventory of and justification for all capital needs, as well as their cost and a proposed schedule for their deployment. This information should be regularly updated. The public should see a comprehensive system improvement plan before it hears of rate increases.

2. Regulatory resources: Regulatory staff must be sufficient in size, compensation, and expertise to evaluate billion-dollar proposals and multi-year performance. Insufficient staff means passive or inadequate oversight—an oxymoron.

3. Cost recovery commitment: When should regulators commit ratepayer dollars—at project commencement, project completion, or project milestones? Each choice has tradeoffs. Regulators must commit if utilities are to commit. What counts is not cost recovery certainty but policy clarity.

4. Rate design: Until the late 1980s, ratemaking focused on making the utility whole: Regulators calculated the utility's revenue requirement, then allocated fixed costs among customer categories, thence to customers through rates, based on some combination of customer usage and political sensitivity (the latter being the common practice of deviating from equiproportionality by allocating some portion of residential customers' share of fixed costs to commercial and industrial customers). Economic efficiency made a fleeting appearance in the debate—remember the arguments for "marginal cost pricing" in the 1980s?—but quickly faded. Prior to the 1980s, decades of declining power generation costs gave no hint of today's situation, with marginal costs greatly exceeding embedded costs.

Today, with no low-cost power options in sight, rate design is the key to consumer protection. To moderate cost increases, regulators must moderate the demands that cause costs. Rate design offers the double anti-oxymoron: Appropriate price increases *are*, in fact, consumer protection, because price increases depress demand, encourage energy efficiency, and lower total costs.

5. Political leadership: Leadership requires that all responsible parties commit to the mission.[30] Commissions must build understandings with legislatures about the capital program, the utilities' obligations, and the commission's role and need for funding to be effective. Those understandings will reduce surprises while discouraging those episodic, opportunistic, and often uniformed efforts by legislatures to anoint some technologies or capital programs over others without basis in careful cost comparisons. Legislative appreciation of the regulator's goals may also facilitate the creation of poverty assistance programs, thus relieving regulators of the pressure to shield all consumers from today's higher costs.

All those involved—regulators, commission staff, utilities, legislators, regulatory practitioners, and the public—must share this clear understanding: Infrastructure upgrades and system modernization are essential. They must happen and they will cost.

[30] *See* Garry Wills, *Uncertain Trumpets: The Nature of Leadership* (2007).

V. How Can Regulators Induce Utility Innovation?

Should the electric utility's participation in the smart grid be voluntary or mandatory?

A. Seven obstacles on the path to performance[31]

1. Docket control: Most docket items arise from utility proposals, which commissions must process within a statutory time limit. This combines with commission staff constraints to crowd out commission-initiated performance reviews. Docket items put the regulator in a passive, reactive mode. Performance reviews require commissions to be proactive, but this ultimately benefits the utility by providing clear signals that foster improved utility performance.

2. Commissioner turnover and expertise: With terms averaging less than four years, most commissioners have less experience than most utility executives whose performance they must judge. That inexperience can be offset somewhat by commission staff expertise, but its net effect is to blunt regulators' ability to assess utility performance. A credible performance reviewer needs expertise equal to the utility. Because performance review has not enjoyed regulatory priority, this level of expertise has not become part of the regulatory infrastructure.

3. Resource gap: It remains regulation's unaddressed irony that commissions face hiring freezes and budget cuts to save taxpayer money, while utilities are free to hire all the experts they need, using ratepayer money. The resulting resource gap severely limits performance reviews.[32]

4. Judicial restrictions: Some courts have limited commissions' authority to challenge or prescribe utility activities, citing the "managerial prerogative."[33] At their most confining, these judicial strictures cause regulators to forsake standard setting or performance reviews, leaving cost-recovery disallowance as their only tool—an action regulators hesitate to take for fear of weakening the utility financially.

5. Performance-finance tension: Utilities require capital, and sources of capital require predictable returns. Performance penalties cause capital markets to frown. How to signal capital markets that ratepayer dollars will flow, while conditioning that flow on high-quality performance, is a chronic struggle for regulators. The investment community's golden fleece is

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[31] This section draws from the author's essay of August 2010. *See* http://www.nrri2.org/index.php?option=com_content&task=view&id=281&Itemid=38.

[32] For more on this problem resource gaps, see the author's two essays on "Regulatory Resources: Does the Differential Make a Difference?" at http://www.nrri2.org/index.php?option=com_content&task=view&id=134&Itemid=38; and http://www.nrri2.org/index.php?option=com_content&task=view&id=141&Itemid=38.

[33] *See* Strauss, Schwarz, and Lippman, *Are Utility Workforces Prepared for New Demands? Recommendations for State Commission Inquiries*, NRRI 10-01 ((Jan. 2010) at 28-38, available at http://www.nrri.org/pubs/multiutility/NRRI_graying_jan10-01.pdf.

the "hospitable regulatory environment." Financial analysts strip-search commission decisions for evidence of unobstructed dollar flow. There is a tendency to equate regulatory assessment with animosity, inquiry with inhospitability. This tendency, associated with short-term financial metrics, discourages commissions from assessing long-term performance.

6. Lack of consensus on standards or metrics: There is no regulatory consensus on how to define or measure performance. Credible metrics are hard to design, and relevant data can be hard to gather. These difficulties deter regulators' efforts to compare performance among utilities, or to track their improvement or degradation over time. The problem perpetuates itself: Absent consensus on performance parameters, there is no performance conversation; absent conversation there is no progress on measuring and improving performance.

7. The competition-confidentiality connection: Even utilities with monopoly service face competitive entry—some dramatically so (such as wireline incumbents facing competition from wireless sellers). For these utilities, survival as monopoly providers can depend on their competitive success. Sharing data on their strengths and weaknesses creates competitive risk.

B. Five ways to reach a better balance

The above seven obstacles to effective regulation can leave gaps, causing variation in the attention commissions give to performance. The risk is that performance review occurs not continuously, incrementally, and professionally, but only after a major outage or cost overrun, when headlines and political intervention make objective analysis difficult. What are regulators' options and tools?

*1. Define the desired performance***.** Performance covers many subject areas—safety, customer service, financial ratios, operating cost, plant output, innovation, asset management, management vision, work force efficiency. Because advancing some objectives can detract from others, specifying priorities involves hard tradeoffs. But the exercise produces a consensus on expectations, giving the utility clear guidance and enabling the commission to hold its utilities accountable.

2. Condition approvals on performance. Rate increases may be required by statute, but performance is as well. To grant rate increases when asked, but to assess performance only when things go awry, is asymmetrical. Every utility request—whether for a certificate to build, a rate increase, a merger, or a divestiture—should be premised on a promise of improved performance. Every commission pre-approval of actions should be conditioned on the utility committing to specific performance; every commission approval of cost recovery should be conditioned on evidence of that performance.

3. Embed performance in commission organization and processes. Successful businesses have processes devoted to quality control. Regulators should incorporate this process within commissions as a means of tracking accountability. A commission can put each utility on a schedule for performance reviews, tracking improvement over time. Within a region served by the same multi-state company state commissions can create interstate committees that pool their

knowledge and processes, even as the states vary in their weightings. Such an approach would spread best practices among the affected commissions but might require authorizing legislation in some cases.

4. Frame regulatory proceedings as performance inquiries; frame regulatory opinions as performance assessments. A commission is not a supermarket where parties shop for benefits; it is, rather, a regulatory agency obligated to establish and enforce performance standards. While statutes entitle parties to make requests and require commissions to respond, the commission's response need not be confined by the party's request. That is the central difference between courts and commissions. Courts are confined to the parties' pleadings and evidence; commissions are obliged to advance a larger public interest.[34] It takes extra work, but on receiving a request for a rate increase, a commission can require not only evidence of the cost of utility operations and finances, but also evidence of performance in areas identified by the commission.

5. Bring Wall Street along. An Oregon utility executive once said, "Thank goodness for regulators; they save us from ourselves." In the long run, investor interests and ratepayer interests should be aligned. Investors don't benefit from poor utility performance, or from a regulatory system that overlooks it. Because no monopoly position is permanent, strong utility performance is market protection. If regulators send clear signals about their expectations and consequences, this rigor will produce more benefit than cost for both utilities and investors.

VI. How Can Regulators Induce Utility Evenhandedness When the Utility Has Incentive and Opportunity to Exploit Its Special Status?

U.S. antitrust law has articulated the "essential facility" doctrine (sometimes called the "bottleneck facility") doctrine as follows:

> "[T]he essential facilities doctrine imposes [antitrust law] liability when one firm, which controls an essential facility, denies a second firm reasonable access to a product or service that the second firm must obtain in order to compete with the first."[35]
> "Where facilities cannot practicably be duplicated by would-be competitors, those in possession of them must allow them to be shared on fair terms. It is illegal restraint of trade to foreclose the scarce facility."[36]

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[34] See the author's essay *Commissions Are Not Courts; Regulators Are Not Judges* at http://www.nrri2.org/index.php?option=com_content&task=view&id=69&Itemid=38.

[35] *Alaska Airlines, Inc. v. United Airlines, Inc.*, 948 F.2d 536, 542 (9th Cir. 1991).

[36] *Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992 (D.C. Cir. 1977).

In the broadband-smart grid context, there are at least three potential bottleneck facilities: a utility's transmission system, its distribution systems, and its customer data. It is possible that other elements of the smart grid, both hardware and software, could become "facilities [that] cannot practicably be duplicated by would-be competitors."[37] Regulators therefore will need to ask whether facility owners have the opportunity to discriminate against customers by—

1. Pricing service based on their willingness or ability to pay;

2. Slowing or refusing to carry some types of traffic;

3. Failing to disclose their network management practices;

4. Declining to serve particular classes of customers; or

5. Tying competitive products or services to the non-competitive transportation service.

The FCC's Broadband Plan (Chapter 12) appears to recognize this possibility:

> "States should reduce impediments and financial disincentives to using commercial service providers for Smart Grid communications."[38]
>
> "A commercial network that can ensure service continuity would be capable of supporting additional mission-critical applications. However, many large utilities have economic disincentives to use commercial networks and may be making suboptimal choices. As rate of return regulated utilities, they typically earn guaranteed profits on the assets they deploy—including private communications networks—but only receive cost recovery if they use commercial networks."[39]
>
> "As more residential, commercial and industrial customers upgrade to smart meters, the number of customers that can participate in such virtual power plants will expand, but only if these customers and their vendors have access to real-time digital energy information."[40]

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[37] *Id.*

[38] National Broadband Plan at 265.

[39] *Id.* at 270.

[40] *Id.* at 272.

And as FCC Chairman Genachowski has explained:

> "Consumers do need basic protection against anticompetitive or otherwise unreasonable conduct by companies providing the broadband access service (e.g., DSL, cable modem, or fiber) to which consumers subscribe for access to the Internet, [and] . . . the FCC needs backstop authority to prevent these companies from restricting lawful innovation or speech, or engaging in unfair practices, as well as the ability to develop policies aimed at connecting all Americans to broadband, including in rural areas."[41]

Before approving major utility investments in a smart grid, regulators should ask, for each product and service that the regulators seek to encourage, the standard market structure questions:

1. Is the product or service more efficiently provided by a competitive market or by a monopoly?

2. If by a competitive market, what steps should regulators take to create that market? What entry barriers exist that require removal?

3. If by a monopoly, what steps should regulators take to select the best entity? How should regulators avoid simply defaulting to the incumbent utility?

4. Looking at the utility's proposal: Does commission approval give the utility an unearned first-mover advantage in potentially competitive markets for any of the desired products or services?

VII. How Might Regulators Produce Acceptance of the Smart Grid's Public-Interest Prerequisites?

State and federal regulators should agree on public-interest prerequisites for the smart grid *before* utilities make proposals. If regulators do so, they will achieve a higher likelihood of consistency across jurisdictions and a lower likelihood of financial disappointment.

As to costs, questions to which answers would be welcome, if not essential, are these: What are the expected costs for each major area of smart grid improvements? How realistic are the cost predictions? Who bears the risks and benefits of cost overruns or savings? Does the proposal properly allocate costs, risks, and benefits among customers, the utility, and third-party service providers so as to produce alignment of benefit and burden, risk, and reward?

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[41] J. Genachowski, *The Third Way: A Narrowly Tailored Broadband Framework* (May 6, 2010).

Below is a list of eleven areas of inquiry.[42] In each major area of proposed smart grid performance improvement, regulators should ask: What tangible benefits will the proposed project produce? How definite and assured are those benefits, and to whom do they accrue? As to cost recovery, who gets paid, when, how much, and through what mechanisms?

1. What are expected efficiency gains in distribution utility operations?

2. What is the expected improvement in system reliability, including reduced numbers and duration of outages?

3. What reductions in fossil fuel use and emissions are projected?

4. What enhanced customer choices will be offered, including rate offerings to shape customer behavior and load?

5. What are the projected changes in customer consumption patterns?

6. How will data collection and information gathered be used to support utility planning?

7. What economic development and jobs creation may be expected?

8. What is the plan for utility performance measurement?

9. How is cost recovery associated with utility performance?

10. What are the mechanisms for cost recovery?

11. Will cost recovery be timed to align customer bills with customer benefits?

Regulators should view these eleven areas of inquiry through the lens of these seven accepted regulatory principles:

Performance metrics: Are there clear performance metrics, with cost recovery connected appropriately to them?

Customer education: Does the proposal define customer education goals appropriately, while assigning sufficient resources to make sure the benefits occur?

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[42] This section is drawn from S. Hempling and T. Stanton, *Smart Grid: How Can State Commission Orders Produce the Necessary Utility Performance?* (presented to the NARUC-FERC Smart Grid Collaborative in November 2010), available at http://www.nrri2.org/index.php?option=com_content&task=view&id=297&Itemid=48.

Customer data: How does the proposal address the tradeoffs between the utility or other power provider accessing data and protecting customer privacy?[43]

Security: How does the proposal address the tradeoffs between accessibility and security?[44]

Open infrastructure: Does the proposal promote a flexible, nonproprietary, open infrastructure?[45]

Third-party access: Will the systems be open to customer-authorized third parties to provide energy management services?[46]

Monitoring and evaluation: Does the proposal include independent monitoring and evaluation?

Conclusion

The key to smart grid's success is performance. Performance means producing the desired results, cost-effectively. Because smart grid involves assets and services subject to multiple regulatory jurisdictions, performance guidance requires regulatory coordination. Policymakers aiming to authorize or induce investment billions must make their missions clear, then coordinate their regulatory actions to ensure performance. Current regulatory statutes, many enacted in the 1930s, do not state clear methods for interagency coordination of goals and evaluations. There is risk, therefore, that the desire to deploy smart grid quickly will outpace regulators' readiness. This paper has identified some key areas of interjurisdictional blurriness that, if clarified, will help reduce this risk. Future papers can dig into each jurisdiction's present authority and make specific recommendations for aligning that authority with the nation's smart grid goals.

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[43] For a detailed discussion of this question, see S. Lichtenberg, *Smart Grid Data: Must There Be Conflict Between Energy Management and Consumer Privacy?* NRRI 10-17 (Dec. 2010), available at http://www.nrri2.org/index.php?option=com_content&task=view&id=305&Itemid=48.

[44] *See* National Institute of Standards and Technology, *Guidelines for Smart Grid Cyber Security* (Sept. 2010) http://www.nist.gov/smartgrid/.

[45] Natl. Assn. Reg. Util. Commrs, Resolution on Smart Grid, July 2010.

[46] *Id.*