# BALANCING ON THE GRID EDGE: REGULATING FOR ECONOMIC EFFICIENCY IN THE WAKE OF *FERC V. EPSA*

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## INTRODUCTION

The Federal Power Act ("FPA") is often described as a statute that draws a "bright line" between federal jurisdiction over wholesale markets and state jurisdiction over retail markets.[1] New technologies, such as the demand response program at issue in *Federal Energy Regulatory Commission v. Electric Power Supply Ass'n* ("*EPSA*"),[2] have blurred that bright line. The drafters of the FPA could scarcely have imagined in 1935 that technology today would allow aggregators of retail electricity demand reductions to bid those reductions into wholesale markets in lieu of generation.

The Supreme Court's *EPSA* decision, upholding the Federal Energy Regulatory Commission's ("FERC") jurisdiction over demand response, will likely support the further development of grid-edge technologies that involve two-way flows of electricity services between users and the grid and do not easily fit on one side of an FPA jurisdictional "bright line."[3] Further deployment of these innovations is likely to be beneficial to society, as grid-edge technologies can deliver significant benefits in terms of reduced prices, reduced emissions of

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[1] *See* Robert R. Nordhaus, *The Hazy "Bright Line": Defining Federal and State Regulation of Today's Electric Grid*, 36 ENERGY L.J. 203, 206 (2015).

[2] 136 S. Ct. 760, 767 (2016).

[3] The Supreme Court has the opportunity to further shape the division of state and federal jurisdiction in *Hughes v. Talen Energy Marketing*, argued before the Court on February 24, 2016, which asks whether the FPA preempts a Maryland program to incentivize new generation. Hughes v. Talen Energy Mktg., 136 S. Ct. 382 (Oct. 19, 2015) (No. 14–614). Though the case involves natural gas generation, the decision could affect grid-edge technologies as well. Many have argued that if the Court finds the incentive program to be preempted, it should do so through conflict preemption, rather than field preemption, so that states can retain flexibility to promote policy goals in some circumstances. *See, e.g.*, Matthew R. Christiansen, *FPA Preemption in the 21st Century*, 91 N.Y.U. L. REV. ONLINE 1, 20–24 (2016).

conventional and greenhouse gas pollutants, and increased grid reliability.[4] However, it is not always clear *ex ante* whether a grid-edge innovation will be preferable to a traditional approach in a given case.

This Essay presents a framework for how electricity regulators should decide between proposed projects when the alternatives include a mix of grid-edge technologies and more traditional investments. In particular, this Essay explains that the most economically efficient approach through which regulators should decide between disparate policy options—meaning the approach that will result in the greatest net benefits to society—is a comprehensive benefit-cost analysis.

First, the Essay discusses how grid-edge technologies create a need for regulators who want to maximize social welfare to consider policy options that are outside of their traditional decisionmaking paradigms. Then, the Essay describes how comprehensive benefit-cost analysis, rather than the cost-effectiveness analysis that regulators more typically use, is ideally suited to selecting the policy option that will maximize net benefits to society from among many disparate alternatives. Finally, the Essay describes how regulators in some jurisdictions are on the right track to analyzing evolving grid-edge technologies comprehensively and effectively. If additional jurisdictions follow this approach, they will help secure *EPSA*'s potential to promote substantial efficiency benefits for the grid.

## I. REGULATORS MUST NOT BE CONSTRAINED TO CONSIDERING ONLY DEMAND-SIDE OR ONLY SUPPLY-SIDE POLICY OPTIONS

An assortment of new technologies that blur the line between producers and consumers is proliferating throughout the electricity sector. Over 50 million smart meters have been installed throughout the United States,[5] paving the way for real-time responses by electricity users. Smart thermostats, which make up an increasing proportion of thermostats sold in the United States,[6] allow for individualized demand response in homes and businesses. Rooftop solar is also expanding, comprising about 25 GW, or about 1% of all electricity

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[4] *See, e.g.*, ROCKY MOUNTAIN INST., A REVIEW OF SOLAR PV BENEFIT & COST STUDIES 13–17 (2d ed. 2013); ENVTL. DEF. FUND, WHAT CONSUMERS NEED TO KNOW ABOUT THE SMART GRID AND SMART METERS (2011).

[5] INST. FOR ELEC. INNOVATION, THE EDISON FOUNDATION, UTILITY-SCALE SMART METER DEPLOYMENTS: BUILDING BLOCK OF THE EVOLVING POWER GRID 1 (2014).

[6] Katherine Tweed, *Smart Thermostats Begin to Dominate the Market in 2015*, GREENTECH MEDIA (July 22, 2015), https://perma.cc/8E35-CHNZ.

in the country, as of the end of 2015.[7] California's energy storage mandate has required the state's three large investor-owned utilities to add 1.3 GW of energy storage to their grids by 2020 and is helping to expand the availability of energy storage technology.[8] Together, these technologies are increasing the potential for homeowners—either individually or in small groups—to serve as local alternatives to power plants.

But when regulators are making decisions that affect—or are affected by—these evolving technologies, the traditional decisionmaking models may prove inadequate to the task.

Modern electricity users do not just consume electricity; in many cases, they also provide services to the grid (e.g., decreased need for new generation capacity, decreased need for new transmission capacity, resiliency services). Regulators must update their decisionmaking mechanisms to account for this evolution of the electricity consumer. Moreover, it makes sense for regulators to be able to treat these demand-side resources as potential substitutes for traditional supply-side resources.

To fulfill its obligation to administer the wholesale markets as efficiently as possible, especially in the wake of the *EPSA* case, FERC must consider the full panoply of market participants that can help to make those markets more robust—not just traditional wholesale generators, but also potential aggregators of demand-side resources like demand response or other distributed energy resources.

Likewise, state regulators may find themselves considering policy options that blur the line between traditional supply-side resources and demand-side resources. For example, a public utility commission might have to decide whether to approve a utility's proposal for building a new substation in a growing neighborhood, when evidence suggests that the same objectives might be achieved through investing in distributed energy resources.

If regulators fail to consider the potential of these grid-edge technologies, they may lose out on opportunities to achieve their objectives more efficiently

[7] CORY HONEYMAN ET AL., GTM RESEARCH & SOLAR ENERGY INDUSTRIES ASSOCIATION, U.S. SOLAR MARKET INSIGHT: EXECUTIVE SUMMARY 6 (3d quarter ed. 2015).

[8] Jeff St. John, *California Passes Huge Grid Energy Storage Mandate*, GREENTECH MEDIA (Oct. 17, 2013), https://perma.cc/R87D-M3RS; Jeff St. John, *The Reality of Energy Storage Policy Is Different from What Solar-Storage Vendors Expect*, GREENTECH MEDIA (July 20, 2015), https://perma.cc/W5RG-S9L5; Gavin Bade, *Inside Southern California Edison's Energy Storage Strategy*, UTILITY DIVE (Sept. 22, 2015), https://perma.cc/39YT-N7S9.

or effectively.[9] That said, it is not clear upon first glance whether traditional technology or newer grid-edge technology will be the better choice to fulfill a policy goal. In making their decisions, regulators must be able to comprehensively and consistently compare between their policy options, even those that blur the line between wholesale and retail and between supply and demand.

## II. BENEFIT-COST ANALYSIS ALLOWS REGULATORS TO SYSTEMATICALLY COMPARE DEMAND-SIDE TECHNOLOGIES TO SUPPLY-SIDE TECHNOLOGIES AND SELECT THE POLICY OPTIONS THAT WILL RESULT IN THE LARGEST NET BENEFITS TO SOCIETY

When a regulator needs to compare between disparate demand- and supply-side options, the most effective approach is to use benefit-cost analysis.[10] Benefit-cost analysis is the most analytically sound way of prioritizing among multiple policy options in a resource-limited world that faces new and evolving challenges.[11] The method of benefit-cost analysis involves calculating and comparing the benefits and costs of alternative policy options, with the goal of selecting the approach that maximizes the net benefits to society.

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[9] *See, e.g.*, Inara Scott, *Teaching an Old Dog New Tricks: Adapting Public Utility Commissions to Meet Twenty-First Century Climate Challenges*, 38 HARV. ENVTL. L. REV. 371, 375–76 (2014).

[10] Benefit-cost analysis is appropriate when a regulator must select between different options, for example when a state Public Utilities Commission chooses between ordering a utility to build a new substation or promote the development of local microgrids, in order to accommodate neighborhood growth, or when a regional transmission organization, under FERC oversight, decides which transmission projects to approve. In contrast, some decisions involving grid-edge technologies do not require regulators to pick a particular option, but instead allow the market to decide how much of a resource to use. (FERC's Order 745 is such an example.) In these cases, the approach that will maximize net benefits is not benefit-cost analysis, but is instead allowing the full range of possible suppliers (both demand- and supply-side) to compete on equal footing in the market. This means that externalities (such as pollution) should be priced into the market, and subsidies should be eliminated. *See* Guarini Center on Environmental and Land Use Law & Institute for Policy Integrity, Comments on the ConEdison Storm Hardening and Resilience Report 6, 14 (Jan. 10, 2014); Denise A. Grab & Burcin Unel, Comments on White Paper on Benefit-Cost Analysis in the Reforming Energy Vision Proceeding 3, 9 (Aug. 21, 2015). *See generally* N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 204–07 (5th ed. 2008).

[11] *See* OFFICE OF MGMT. AND BUDGET, CIRCULAR A-4 at 2 (Sept. 2003) [hereinafter CIRCULAR A-4] ("Where all benefits and costs can be quantified and expressed in monetary units, benefit-cost analysis provides decision makers with a clear indication of the most efficient alternative, that is, the alternative that generates the largest net benefits to society (ignoring distributional effects).").

Typically, a benefit-cost analysis includes several steps. First, decisionmakers identify the benefits and costs that are expected to result from each proposed policy alternative. Because the objective is to choose the alternative that maximizes net social welfare, decisionmakers must account for any benefits or costs that could affect the ultimate decision, including any externalities.[12] An externality is a benefit or cost imposed by a transaction upon a third party who is not directly involved in the transaction. For example, greenhouse gas pollution from power generation is a classic example of an externality.[13] Once the analysts have catalogued all significant impacts, they quantify and monetize each effect, to the extent possible, using a common metric (like dollars) in order to facilitate comparison among various policy alternatives.[14] Then, the analyst subtracts costs from benefits to find the net benefits of each approach. The decisionmaker can then select the policy option that generates the greatest net benefits to society.[15]

The principal alternative to a benefit-cost framework is cost-effectiveness analysis, which has historically tended to be less comprehensive and less readily capable of comparing between supply-side and demand-side decisions.[16] A cost-effectiveness analysis assesses how to achieve a given policy goal most cheaply and does not allow for easy comparison of distinct policy options that provide different types of benefits to society.[17] In contrast, benefit-cost analysis assesses a number of potential policy options to determine which combination of the options will result in the greatest net benefits (that is, total benefits, minus total costs) to society, including producers, consumers, and third parties.[18]

Traditionally, in deciding whether to approve a new supply-side project for capitalization into the rate base, regulators would focus on whether the pro-

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[12] *Id.* at 2–3; *see also* Grab & Unel, *supra* note 10, at 2–3.

[13] *See* CIRCULAR A-4, *supra* note 11, at 4.

[14] The analysts use established economic methodologies to quantify and monetize various effects, including impacts to health, safety, and the environment. *See id.* at 18–26. Where quantification is not possible, the analysts will describe the likely effects qualitatively, and the decisionmaker should still consider those factors in the analysis. *See id.* at 27.

[15] Decisionmakers may also balance economic efficiency with other goals, like distributional fairness. *See* CIRCULAR A-4, *supra* note 11, at 5

[16] *See, e.g.*, TIM WOOLF ET AL., ADVANCED ENERGY ECONOMY INSTITUTE, BENEFIT-COST ANALYSIS FOR DISTRIBUTED ENERGY RESOURCES 1 (2014) (describing a number of inadequacies with “the standard cost-effectiveness tests” and recommending a more comprehensive benefit-cost analysis to address concerns).

[17] *See* CIRCULAR A-4, *supra* note 11, at 9–12.

[18] *Id.*

posed project was a cost-effective means of achieving the proposed goal.[19] Similarly, in evaluating demand-side resources, for example in the energy efficiency context, state public utility commissions would look to a variety of ratio-based cost-effectiveness tests, none of which has the scope and consistency of the benefit-cost analysis test described above.[20] The "Ratepayer Impact Measure" test would focus only on the impact on ratepayers, while the "Utility Cost Test" would focus only on the impact to the utility.[21] The "Total Resource Cost" test would consider the effects of a proposed project on both ratepayers and utilities, but would not consider the effects of externalities from proposed projects on the rest of society.[22] The newer "Societal Cost Test" does take into account externalities, which is a significant step in the right direction, but it is often still calculated as a ratio, rather than looking at total benefits, which distorts the desirability of project proposals based upon their size.[23]

Using a comprehensive benefit-cost analysis, rather than cost-effectiveness analysis, will allow regulators to directly compare all of the potential effects (including externalities) of a variety of policy options, both demand-side approaches and supply-side approaches. Because benefit-cost analysis uses the common metric of dollars to evaluate different alternatives, it will allow regulators to rigorously compare grid-edge technology options against traditional capital investment options in a way that traditional cost-effectiveness analysis does not allow.

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[19] *See, e.g.*, CONSOLIDATED EDISON CO. OF N.Y., INC., STORM HARDENING AND RESILIENCY COLLABORATIVE REPORT 118 (2013) ("Traditionally, [supply-side] capital investment decisions have been based on the most cost-effective manner to reduce risk on the power systems.").

[20] *See* WOOLF ET AL., *supra* note 16, at 9–10; *see also* CAL. PUB. UTILS. COMM'N, CALIFORNIA STANDARD PRACTICE MANUAL: ECONOMIC ANALYSIS OF DEMAND-SIDE PROGRAMS AND PROJECTS 21 (2001).

[21] WOOLF ET AL., *supra* note 16, at 10.

[22] *Id.*

[23] *Id.* at 6, 22. To use a very simplified example, spending $1 to get $10 in benefits has a much higher benefit-to-cost ratio (10:1) than spending $1 million to get $3 million in benefits (3:1); yet from the perspective of net benefits, the $2 million netted by the second project is clearly a much better deal than the $9 total offered by the first alternative. A ratio-based test could mask differences in scale, offering misleading results.

## III. States Have Taken Steps Toward Implementing Comprehensive Benefit-Cost Analysis When Evaluating Electricity-Sector Investments

A number of states have moved toward instituting a comprehensive benefit-cost analysis procedure to consider grid-edge investments. New York is the leading state in this regard. New York's Reforming the Energy Vision ("REV") proceeding seeks to "align[] markets and the regulatory landscape with the overarching state policy objectives of giving all customers new opportunities for energy savings, local power generation, and enhanced reliability to provide safe, clean, and affordable electric service."[24] As one of the key components of this proceeding, the New York Public Service Commission ("PSC") is implementing a benefit-cost analysis process that will allow state regulators to determine which prospective projects provide the most societal value.[25]

As the PSC recognized in its order adopting a framework for the REV process, "As beneficial technologies and market opportunities continue to develop, it may often be the case that the most socially desirable outcome and the least cost outcome are the same. Where they are not, a [benefit-cost analysis] will inform the development of tariffs and other transactions to achieve the best result for the public."[26] The PSC touted the potential of benefit-cost analysis to "evaluat[e] [distributed energy resources] alternatives as substitutions for traditional utility solutions, and against each other."[27] It further discussed the importance of the analysis "reflect[ing] consideration of social values, also known as externalities, quantifiably when feasible and qualitatively when not."[28]

It remains to be seen whether other states will follow New York's lead in terms of fundamentally overhauling their utility business model and approach

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[24] *Reforming the Energy Vision: About the Initiative*, N.Y. State Dep't of Pub. Serv., https://perma.cc/QL2P-YY62.

[25] N.Y. Pub. Serv. Comm'n, Case 14-M-0101, Order Adopting Regulatory Policy Framework and Implementation Plan 44–45 (Feb. 26, 2015) (including as one of the 15 market-design guidelines "[f]air valuation of benefits and costs—include portfolio-level assessments and societal analysis with credible monitoring and verification"). The Commission also recognized that "coordination with wholesale markets" was an important market principle, including "align[ing] [distributed system platform] market operations and products with wholesale market operations *to reflect full value of services*." *Id.* at 45 (emphasis added).

[26] *Id.* at 125.

[27] N.Y. Pub. Serv. Comm'n, Case 14-M-0101, Order Establishing the Benefit Cost Analysis Framework 3 (Jan. 21, 2016).

[28] *Id.*

to benefit-cost analysis.[29] However, a number of states have taken steps toward conducting a more robust economic analysis of grid-edge technologies. For example, although they have not yet adopted full benefit-cost analysis frameworks, many states have expanded the scope of their energy efficiency cost-effectiveness tests to consider externalities.[30] Likewise, with respect to setting compensation rates for distributed generation, at least ten states have embarked upon programs to assess the actual benefits and costs of distributed generation, rather than simply defaulting to a net metering or demand charge pricing approach.[31]

This phenomenon is not limited to states. Some regional transmission organizations have adopted economic analysis procedures to help them assess potential transmission projects. For example, the California Independent System Operator issued its Transmission Economic Assessment Methodology.[32] While not perfect, this approach takes many steps in the right direction, for example, by assessing demand-side resources as an alternative to building new transmission, and, in some cases, considering projected externality effects, such as pollution.[33]

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[29] *See* David Roberts, *New York's Revolutionary Plan to Remake its Power Utilities*, VOX (Oct. 5, 2015), https://perma.cc/2NSM-37ZW.

[30] Jurisdictions that use the Societal Cost Test as at least part of their analysis include Arizona, California, Delaware, the District of Columbia, Georgia, Iowa, Maryland, Michigan, Minnesota, Missouri, Montana, Nevada, New Jersey, Oklahoma, Vermont, and Wyoming. *Evaluation, Measurement, & Verification, State and Local Policy Database*, AM. COUNCIL FOR AN ENERGY EFFICIENT ECON., https://perma.cc/MT96-Y9FB. Of these, Arizona, the District of Columbia, Iowa, Minnesota, and Vermont use the Societal Cost Test as their primary test for energy efficiency cost-effectiveness. *Id.*

[31] N.C. CLEAN ENERGY TECH. CTR. & MEISTER CONSULTANTS GRP., INC., THE 50 STATES OF SOLAR: 2015 POLICY REVIEW AND Q4 QUARTERLY REPORT 19 (2016). These states vary in terms of the comprehensiveness of their analysis. In order to truly maximize the benefits of the program to society, their analyses must include not just the direct effects on consumers and utilities, but also the indirect impacts of externalities. *See, e.g.*, Richard L. Revesz & Burcin Unel, *Managing the Future of the Electricity Grid: Distributed Generation and Net Metering* 42–43 (Inst. for Policy Integrity, Working Paper No. 2016/1, 2016).

[32] CAL. INDEP. SYS. OPERATOR, TRANSMISSION ECONOMIC ASSESSMENT METHODOLOGY (TEAM) (2004).

[33] *See* Mohamed Labib Awad et al., *Using Market Simulations for Economic Assessment of Transmission Upgrades: Application of the California ISO Approach*, *in* RESTRUCTURED ELECTRIC POWER SYSTEMS: ANALYSIS OF ELECTRICITY MARKETS WITH EQUILIBRIUM MODELS 241, 249–65 (Xiao-Ping Zhang ed., 2010). ISO New England similarly considers "environmental emissions analysis" in its transmission economic studies. S. FINK ET AL., NAT'L RENEWABLE ENERGY LAB., A SURVEY OF TRANSMISSION COST ALLOCATION METHODOLOGIES FOR REGIONAL TRANSMISSION ORGANIZATIONS 36 (2011).

Of course, to effectively conduct this comprehensive benefit-cost analysis, the electricity regulators in question must be able to consider all of the significant effects of the policy option, including externalities. The authorizing statutes for a number of state Public Utility Commissions allow the consideration of externalities.[34] Likewise, scholars have argued that FERC and regional transmission organizations have the authority to consider externalities in their analysis.[35]

Given the promise of benefit-cost analysis to help regulators maximize net gains to society, even where the policy options fall outside of traditional regulatory paradigms, states, Regional Transmission Organizations/Independent System Operators, and FERC would benefit from continuing to develop the use of this tool.

## CONCLUSION

The outcome in *EPSA* is likely to catalyze a significant growth in grid-edge investments. These investments have tremendous potential to reduce pollution and cost while increasing reliability. However, for regulators to maximize net benefits to society, they must consider all options available to them, not just whether any particular option is a good investment. Benefit-cost analysis provides the best framework for regulators to choose among a variety of grid-edge and more traditional investment options.

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[34] *See* Revesz & Unel, *supra* note 31, at 58.

[35] STEVEN WEISSMAN & ROMANY WEBB, ADDRESSING CLIMATE CHANGE WITHOUT LEGISLATION § 3.2.1 (2014).