

# Better Than Net Benefits: Rethinking the *FERC v. EPSA* Test to Maximize Value in Grid-Edge Electricity Markets

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*Energy information and technology has reached a point where the operator of a twenty-first-century grid can balance supply and demand based on value, not cost. Better data, more distributed and dynamic resources, and improvements in supporting infrastructure represent an opportunity for an electric system to operate more reliably with less environmental impact and through competitive markets that yield economically efficient rates. The twentieth-century framework for regulating grid operations advanced last year, when the Supreme Court upheld Federal Energy Regulatory Commission Order 745 and the Commission's authority to pay demand response as much as generation for comparable benefits to the grid. However, the Court also upheld Order 745's net benefits test, which says that demand response is only comparable to generation when it lowers wholesale rates.*

*This Note argues that the net benefits test is a flawed indicator of when demand response is comparably valuable to generation. Moreover, it contravenes the rationale for the Commission's market-based rates authority by focusing on whether rates are low, rather than efficient. This matters because it could unnecessarily limit competition in wholesale markets between traditional generation and non-conventional, demand-side and storage resources, and disproportionately prioritize the interests of market buyers. As an alternative, this Note proposes that the Commission leverage grid-edge data and technology to better define and differentiate between demand resources, and take steps to address externalities. This would promote more efficient market operations, facilitate a just and reasonable balance among the modern electric system's diverse interests, and ensure that demand response receives*

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*equal compensation when it maximizes societal value, rather than minimizes cost.*

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## INTRODUCTION

It may sound paradoxical at first: demand for power in federal wholesale power markets represents a resource that an enterprising seller can offer as an alternative form of supply. Such a demand resource comes in many flavors. Just as power generators range in scale, availability, and responsiveness, different demand-side technologies shed, shift, or “shimmy” need for power to varying degrees.<sup>1</sup> On a hot summer day, a manufacturing facility can shut down its production lines for the afternoon, *shedding* demand for energy that it would have otherwise required to run. An electric vehicle owner can charge a battery pack in her garage during the day, when solar energy production is highest, and plug her car into the battery at night, *shifting* the time when she draws power from the grid. A property manager can program the advanced control systems in his office buildings to dim or brighten the lights in response to short-term

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1. LAWRENCE BERKELEY NAT’L LAB., FINAL REPORT ON PHASE 2 RESULTS: 2015 CALIFORNIA DEMAND RESPONSE POTENTIAL STUDY, CHARTING CALIFORNIA’S DEMAND RESPONSE FUTURE 3-13 to 3-14 (2016) [hereinafter 2015 CALIF. DR STUDY]. This study was commissioned by the California Public Utilities Commission (CPUC) pursuant to Rulemaking 13-09-011, in which the Commission announced a policy intent to bifurcate projections of demand response resources as either “supply-side” resources that can participate in wholesale markets, or “load-modifying” resources that affect projections for demand. *Id.* at 1-2 to 1-4.

imbalances on the grid, *shimmying* energy use just slightly.<sup>2</sup> When it is cheaper to pay a demand-side player to respond than a supply-side generator to produce an equivalent increment of power, competition by demand resources has the simple benefit of lowering the wholesale market price. However, as the proportion of generation by renewable and distributed energy resources grows and the task of balancing the grid becomes more dynamic, demand resources that can shed, shift, or shimmy in concert with the grid's needs hold value beyond reducing rates.<sup>3</sup>

Energy information and technology has reached a point where the operator of a twenty-first-century electric grid can balance supply and demand based on value, not cost. But balancing the interests of the stakeholders who participate in this system of increasing technical complexity is legally more complex as well. A market that once served large, central power plants selling kilowatt-hours to utility companies now must accommodate a diverse slate of new players competing to keep the lights on (or to get paid for turning them off). The twentieth-century framework for regulating the operations of these markets advanced in 2016, when the Supreme Court upheld Federal Energy Regulatory Commission (FERC) Order 745 and FERC's authority to pay demand response as much as generation for comparable benefits to the grid.<sup>4</sup> But in addition to deciding whether to compensate demand response for comparable value, Order 745 defined when demand response is worth as much as generation with a cost-effectiveness formula called the net benefits test.<sup>5</sup> Rather than facilitating competition by a demand resource when it provides comparatively greater value, the net benefits test prevents the resource from participating in a wholesale market unless it lowers costs.

In this Note, I argue that the net benefits test is a flawed indicator of when demand response is comparably valuable to generation. This matters because it could unnecessarily hinder competition in wholesale markets between traditional generation and demand resources such as demand response, energy efficiency, and energy storage. By limiting demand response market participation to situations where it depresses the wholesale rate, the test undermines the ability of competitive markets to yield efficient, just, and reasonable rates that strike a balance between buyer and seller interests and maximize societal value.

To show why the net benefits test is neither essential to FERC's jurisdiction over demand response, nor helpful for leveling the playing field for demand resources generally, I will first discuss how economic theory has informed FERC's evolving role with respect to market-based rates over the past

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2. *Id.*

3. *See id.* at 1-1.

4. FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 763-64 (2016).

5. Order No. 745, *Demand Response Compensation in Organized Wholesale Energy Markets*, 134 F.E.R.C. ¶ 61,187, 76 Fed. Reg. 16,658, 16,659 (2011) (to be codified at 18 C.F.R. pt. 35).

several decades. I will then examine FERC's regulation of demand response as a wholesale supply resource and the legal challenges to its jurisdiction and compensation approach, including the economic arguments set forth for alternatives to the net benefits test. Instead of the various compensation methodologies considered throughout the Order 745 litigation, I will suggest that FERC can fulfill its obligation under the Federal Power Act of 1935 (FPA) to ensure just and reasonable rates by developing market rules that enable more economically efficient competition among these various types of resources.<sup>6</sup> These strategies could include leveraging the new availability of data and technology to more accurately characterize demand resources; developing market mechanisms that differentiate between and enable competition among resources with shed, shift, and shimmy attributes, respectively; and prioritizing efforts to internalize market externalities. By pursuing strategies focused on improving market efficiency, this would by definition improve the ability of transactions in the wholesale power markets to optimize societal value.

## I. BACKGROUND: GRID TECHNOLOGY, REGULATION, AND OPERATIONS

### A. Demand Resource Technologies in the Twenty-First Century

The electricity producers and consumers that connect through the grid today are much more diverse than the integrated public utilities whose customers Congress sought to protect from monopoly pricing during the early 1900s. Today, competition serves as an alternative to the regulatory process for ensuring that prices for electricity are fair, and FERC's regulatory role has shifted from directly regulating rates to ensuring that the markets in which rates are set operate efficiently, without unfair advantage or market control.<sup>7</sup> In addition to the proliferation of independent power generators that occurred after the Public Utilities Regulatory Policies Act of 1978<sup>8</sup> and the recent increase in new renewable energy producers,<sup>9</sup> the modern wholesale market includes another, more complicated breed of competitor: retail electricity consumers selling commitments to measurably reduce their demand for power, a practice known as demand response.<sup>10</sup> Because a grid operator calls on the least-cost available mix of resources to meet demand at any given time,<sup>11</sup> the presence of

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6. See JOEL B. EISEN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT 506–08 (4th ed. 2015); see also Joel B. Eisen, *FERC's Expansive Authority to Transform the Electric Grid*, 49 U.C. DAVIS L. REV. 1783, 1837–43 (2016).

7. Eisen, *supra* note 6, at 1812.

8. See EISEN ET AL., *supra* note 6, at 630–33.

9. FERC, ENERGY PRIMER: A HANDBOOK OF ENERGY MARKET BASICS 49–50 (2015) [hereinafter ENERGY PRIMER].

10. *Id.* at 45.

11. See EISEN ET AL., *supra* note 6, at 695–99. This principle of grid operation is commonly referred to as security-constrained economic dispatch. To meet an incremental increase in demand, a

new competitors that can provide the same marginal change in supply or demand at lower cost generally leads to lower market prices.

Calling on a reduction in demand instead of an increase in supply can have advantages beyond merely enhancing price competition in the wholesale markets. At times when overall demand is high, resources that shed demand can displace production from dirty and expensive “peaking” generators, preventing higher costs, environmental impacts, and stresses to the grid.<sup>12</sup> Conversely, when abundant solar energy resources threaten to oversupply the grid with power during the middle of the day but dwindle as the sun goes down (creating California’s “duck curve” effect), resources that temporally shift or shimmy demand can keep prices stable and relieve strain on generators that would otherwise need to rapidly ramp production up or down.<sup>13</sup> And at any time, reducing demand can reduce the need to produce energy from carbon-intensive sources, yielding environmental benefits as well as cost advantages in the event of carbon regulation.

Amory Lovins coined the term “negawatt” over thirty years ago as a way to communicate the concept of demand reductions as a resource that could be bought and sold to balance the grid in the same way as generation.<sup>14</sup> Today, there are a range of markets for grid-balancing resources into which demand resources can be sold, including markets for energy, ancillary services, and capacity. In energy markets, participants buy and sell commitments to supply power during certain hours of the day, based on day-ahead predictions and real-time balancing needs.<sup>15</sup> Demand-side resources that shed load can participate in these markets by committing to supply an incremental amount of demand reductions during a defined time period.<sup>16</sup> In ancillary service markets, participants buy and sell commitments for resources that can respond within minutes or seconds to short-term imbalances on the grid. These resources include frequency regulation resources, which provide rapid changes in generation output within a few-second time span needed to keep electric current in the grid at sixty hertz, and operating reserves, which can come online

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grid operator will dispatch the next available resource that can provide the needed power at the lowest marginal cost, subject to operational and reliability constraints. *Id.* at 695–96.

12. ENERGY PRIMER, *supra* note 9, at 44.

13. See e.g., 2015 CALIF. DR STUDY, *supra* note 1, at 2-1 to 2-4. The duck curve effect describes the shape of a graph depicting net load over the course of a day in a system with a significant amount of solar energy generation. The graph will show a dip during the middle of the day, when solar insolation is at its peak, forming the belly of the duck. The graph will then show a steep ramping increase in the late afternoon, as the sun goes down and consumption rises, creating the duck’s neck. Both the midday dip and the late afternoon ramp pose grid management challenges, and represent opportunities for shed, shift, and shimmy demand response resources to smooth the shape of the duck. *Id.* at 2-4.

14. See Amory B. Lovins, *Saving Gigabucks with Negawatts*, PUB. UTILS. FORTNIGHTLY 19 (Mar. 21, 1985), <https://www.fortnightly.com/fortnightly/1985/03/saving-gigabucks-negawatts-1985>.

15. ENERGY PRIMER, *supra* note 9, at 59–61.

16. See *id.* at 59; 2015 CALIF. DR STUDY *supra* note 1, at 4-3.

in response to an unexpected outage.<sup>17</sup> Fast-responding demand resources that shimmy load can participate in these ancillary service markets.<sup>18</sup> Finally, forward-looking markets for capacity in some parts of the country allow participants to sell commitments to build or otherwise obtain the capacity to produce energy months or years in the future.<sup>19</sup> Energy efficiency, a demand resource that “shapes” load,<sup>20</sup> can sometimes participate in these capacity markets. For example, a program administrator can sell a commitment to reduce system-wide demand in the future by promising to provide a given amount of incentives to retail customers to purchase more efficient equipment.<sup>21</sup> Although demand resources that shift consumption, such as energy storage, can technically participate in these markets as a shedding, shimming, or shaping resource, none of these markets are presently set up to compensate a resource specifically for the service of shifting demand.<sup>22</sup>

Several trends suggest that demand-side resources may become more serious drivers of competition within these wholesale markets. First, improvements in monitoring and control technology, collectively known as energy management information systems, allow energy savings to be tracked and quantified more reliably at the point of consumption.<sup>23</sup> Traditionally, energy management information system technologies have been used as a program evaluation tool to verify and project the impact of retail energy efficiency programs on long-term energy consumption trends.<sup>24</sup> However, these tools could be repurposed to more accurately measure demand reductions in the context of wholesale markets, making it easier to buy and sell resources

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17. See ENERGY PRIMER, *supra* note 9, at 55.

18. 2015 CALIF. DR STUDY *supra* note 1, at 4-3.

19. See e.g., *Forward Capacity Market*, ISO NEW ENG., <https://www.iso-ne.com/markets-operations/markets/forward-capacity-market> (last visited Mar. 17, 2017); *Capacity Market (RPM)*, PJM, <http://www.pjm.com/markets-and-operations/rpm.aspx> (last visited Mar. 17, 2017).

20. 2015 CALIF. DR STUDY, *supra* note 1, at 3-13 to 3-14.

21. See ENERGY PRIMER, *supra* note 9, at 46; Brendon Baatz, *Energy Efficiency Lowers Costs in Recent PJM Capacity Auction*, ACEEE (June 1, 2016, 10:00 AM), <http://aceee.org/blog/2016/06/energy-efficiency-lowers-costs-recent>.

22. 2015 CALIF. DR STUDY, *supra* note 1, at 5-24 to 5-25.

23. See e.g., AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (ACEEE), *HOW INFORMATION AND COMMUNICATIONS TECHNOLOGIES WILL CHANGE THE EVALUATION, MEASUREMENT, AND VERIFICATION OF ENERGY EFFICIENCY PROGRAMS* at v (2015); Dian Grueneich & David Jacot, *Scale, Speed, and Persistence in an Analytics Age of Efficiency: How Deep Data Meets Big Savings to Deliver Comprehensive Efficiency*, 27 ELEC. J. 77, 78 (2014) (listing as notable market trends the proliferation of advanced metering infrastructure, state-level efficiency targets, and independent investment in analytics software and technology by commercial and industrial customers).

24. Tom Eckman & Mark Sylvia, *EM&V 2.0—New Tools for Measuring Energy Efficiency Program Savings*, ELEC. LIGHT & POWER (Feb. 12, 2014), <http://www.elp.com/Electric-Light-Power-Newsletter/articles/2014/02/em-v-2-0-new-tools-for-measuring-energy-efficiency-program-savings.html>.

with smaller effects on load.<sup>25</sup> Second, utility companies have begun to execute contracts for large-scale energy storage facilities in anticipation of retiring base load generation facilities and replacing them with intermittent renewable resources.<sup>26</sup> Despite the current lack of mechanisms to buy and sell resources that shift load in wholesale markets, these bilateral contracts indicate that utility-scale load shifting resources will increasingly be available to service grid needs and could participate as a wholesale resource once the markets develop proper mechanisms.<sup>27</sup> Finally, deployment of and improvements in advanced “smart” metering infrastructure and upgrades to the grid itself allow signals to be sent more quickly, facilitating better communication and enabling more dynamic management of diverse resources on the grid.<sup>28</sup>

Collectively, these trends—better data, more distributed and dynamic resources, and improvements in the supporting infrastructure—have been referred to as the “grid edge.”<sup>29</sup> The grid edge represents an opportunity for the electric systems of the twenty-first century to operate more reliably, with less environmental impact, and through more competitive markets that facilitate just and reasonable rates for power. But it also presents a challenge: adapting the regulatory framework and market rules that have governed grid operations for the past century to facilitate efficient markets for the resources of today.

### B. Rate Regulation from the Twentieth Century

The FPA authorizes federal regulation over the sale of electricity at wholesale in interstate markets, defining a wholesale transaction as a “sale of electric energy to any person for resale.”<sup>30</sup> The regulation of “any other sale,”

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25. It is worth noting that the goals of program evaluation and demand resource characterization can serve complementary purposes, particularly in regions where long-term commitments to shape the demand curve through retail energy efficiency programs can be bought and sold on a capacity market.

26. See Tom Randall, *Tesla Wins Massive Contract to Help Power the California Grid*, BLOOMBERG (Sept. 15, 2016, 11:21 AM), <http://www.bloomberg.com/news/articles/2016-09-15/tesla-wins-utility-contract-to-supply-grid-scale-battery-storage-after-porter-ranch-gas-leak>.

27. See e.g., 2015 CALIF. DR STUDY, *supra* note 1, at 5-24 to 5-25. Market rules to enable participation by energy storage resources may in fact be imminent. FERC recently initiated an energy storage rulemaking pursuant to its Section 206 authority that proposes to require ISOs and RTOs to establish market rules that recognize the physical and operational characteristics of electric storage resources and accommodate aggregators of distributed energy resources as market participants. *Notice of Proposed Rulemaking, Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 F.E.R.C. ¶ 61,121 (2016).

28. See Jeff St. John, *U.S. Smart Meter Deployments to Hit 70M in 2016, 90M in 2020*, GREENTECH MEDIA (Oct. 26, 2016), <http://www.greentechmedia.com/articles/read/US-Smart-Meter-Deployments-to-Hit-70M-in-2016-90M-in-2020>.

29. Greentech Media first proposed the term “grid edge” in 2013 as a more inclusive replacement for “smart grid” that refers to grid modernization as well as distributed generation trends. Rick Thompson, *The Grid Edge: How Will Utilities, Vendors and Energy Service Providers Adapt?*, GREENTECH MEDIA (Oct. 7, 2013), <http://www.greentechmedia.com/articles/read/the-grid-edge-how-will-utilities-vendors-regulators-and-energy-service-prov>.

30. Federal Power Act of 1935 § 201, 16 U.S.C. § 824(d) (2012).

including retail sales of electricity, is reserved to the states.<sup>31</sup> Section 205 of the FPA requires FERC to ensure that rates for wholesale sales of energy and regulations affecting those rates are “just and reasonable.”<sup>32</sup> Section 206 empowers FERC with the authority to remedy rates it finds to be “unjust, unreasonable, unduly discriminatory[,] or preferential.”<sup>33</sup>

In the context of traditional cost-of-service ratemaking, through which a public utility files its rates with FERC as part of a regulatory process, FERC approves rates as just and reasonable by balancing investor and consumer interests.<sup>34</sup> The goal is to keep rates as low as possible—in the interest of the consumer—while still allowing a utility to earn a reasonable rate of return and maintain its services to the public.<sup>35</sup> This balancing act affords FERC broad authority and flexibility to determine whether rates are just and reasonable, and does not require it to use any single pricing formula.<sup>36</sup>

The just and reasonable doctrine of energy price regulation emerged during the first half of the twentieth century. At that time, economists viewed the electricity industry as a natural monopoly in which a single firm could provide lower-cost services than multiple competing firms for power generation, transmission, and local distribution.<sup>37</sup> In exchange for a governmental grant of monopoly power over a specific geographic territory, a public utility was obligated to provide open access to these services at reasonable, regulated rates.<sup>38</sup> However, in the latter half of the twentieth century, rising energy costs spurred congressional action to introduce competition in the wholesale generation component of electric service. After the passage of the Public Utilities Regulatory Policies Act of 1978, many states restructured their electric markets to allow for competition by independent wholesale generators, and FERC adopted new regulatory strategies to allow competition, rather than regulation, to set wholesale rates.<sup>39</sup>

Today, two-thirds of the nation’s electricity moves through competitive interstate markets, which are administered by regional entities known as

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31. § 824(b)(1).

32. § 824d.

33. § 824e(a).

34. *Fed. Power Comm’n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944). Today, market competition largely sets the rates for wholesale generation service, but utility companies still file rates for transmission service for approval through a regulatory process before FERC. *See EISEN ET AL.*, *supra* note 6, at 626–27.

35. *See Bluefield Waterworks & Improvement Co. v. Pub. Serv. Comm’n of W. Va.*, 262 U.S. 679 (1923). Specifically, rates should be “reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.” *Id.* at 693.

36. *Mobil Oil Expl. & Producing Se. Inc. v. United Distrib. Cos.*, 498 U.S. 211, 224 (1991).

37. *See EISEN ET AL.*, *supra* note 6, at 60–62.

38. *See id.*

39. *See id.* at 630–33.

independent system operators (ISOs) or regional transmission organizations (RTOs).<sup>40</sup> In order to facilitate restructuring and introduce competition into the national electric industry, FERC established these organizations by order in the late 1990s and early 2000s, along with orders prohibiting discrimination against independent generators by the monopoly utility owners of transmission lines. These orders allowed independent generators to move and sell power across service territories at a fixed rate and provided a platform managed by the RTOs where electricity could be bought and sold.<sup>41</sup>

Wholesale rates in these markets are set through competition, based on the least-cost mix of resources available to meet demand, rather than through a FERC regulatory process. FERC has broad authority to approve these rates so long as they do not violate Section 206 by being unjust, unreasonable, or unduly preferential.<sup>42</sup> As the D.C. Circuit has explained, in the absence of cost-of-service regulation, FERC's role is to confirm that market forces will keep prices in check.<sup>43</sup> The court reasoned that in a competitive market, so long as buyers and sellers have relatively equal bargaining power, they will enter into terms that strike a reasonable balance between each of their interests.<sup>44</sup> It could therefore infer that the prices set in a competitive market will approach marginal costs while yielding a reasonable rate of return for the seller, satisfying the historic *Bluefield* test for just and reasonable rates.<sup>45</sup>

By determining that competition will produce just and reasonable rates, FERC and the courts rely on a basic premise of economics: that efficient markets operate to maximize societal value. Economic theory envisions an ideal world, in which rational consumers and producers have perfect information about the costs and benefits associated with a particular good or service and can negotiate a price that reflects the best outcome for both parties to a transaction.<sup>46</sup> Economists describe this ideal transaction as maximizing

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40. Robert R. Nordhaus, *The Hazy "Bright Line": Defining Federal and State Regulation of Today's Electric Grid*, 36 ENERGY L. J. 203, 209 (2015).

41. Order No. 2000, *Regional Transmission Organization*, 89 F.E.R.C. ¶ 61,285, 65 Fed. Reg. 810 (2000) (to be codified at 18 C.F.R. pt. 35); Order No. 888, *Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities*, 75 F.E.R.C. ¶ 61,080, 61 Fed. Reg. 21,540 (1996) (to be codified at 18 C.F.R. pts. 35, 385); see also EISEN ET AL., supra note 6, at 625–60 (overviewing the rise of power market competition and open-access to transmission); ENERGY PRIMER, supra note 9, at 39–40.

42. See EISEN ET AL., supra note 6, at 507.

43. *Tejas Power Corp. v. FERC*, 908 F.2d 998, 1005 (D.C. Cir. 1990). Specifically, the issue in *Tejas* was whether FERC had determined, upon the basis of substantial evidence, that a party lacked significant market power. If the party had significant market power, FERC could not infer that the market-based price would be just and reasonable.

44. *Id.*

45. See *id.* at 1004.

46. See R. KERRY TURNER ET AL., ENVIRONMENTAL ECONOMICS: AN ELEMENTARY INTRODUCTION 22 (1993). Consumer surplus is the difference between how much a consumer values a good and how much they pay for it, and producer surplus is the difference between the cost of producing a good and the price for which it sells. In competitive markets, prices tend to approach marginal costs.

societal value, which is defined as the sum of consumer and producer surplus.<sup>47</sup> When prices on an open, competitive market strike this optimal balance between buyer and seller, economists describe the market as efficient.<sup>48</sup>

In the real world, of course, market failures exist, leading to inefficient rates that do not optimally balance buyer and seller interests. For example, when a seller exerts monopoly power over a given market, it can overcharge consumers for its services. Similarly, if a seller does not account for environmental damage associated with producing a good, it can undercharge for its product. This type of market failure is called an “externality” because it is external to both the costs borne by the seller and the benefits that a consumer takes into account when considering how much it is willing to pay.<sup>49</sup> FERC’s regulatory role with respect to market-based rates has come to focus on mitigating monopoly power and facilitating market conditions that improve the efficiency of transactions.<sup>50</sup>

Regulating competition in today’s wholesale power markets is complicated by the increasing complexity of players and transactions they involve. The FPA grants FERC authority over wholesale transactions and reserves regulation of all other retail transactions to the states.<sup>51</sup> However, the emergence of state-level distributed generation policies and tariffs and the federal regulation of demand response has increasingly blurred the FPA’s dividing “bright line” between state and federal authority.<sup>52</sup> For example, FERC declines to exercise jurisdiction over the “net metering” of distributed generation, a practice by which the owner of a distributed solar photovoltaic panel sells her power back to the electric distribution grid, and the local utility resells it to other customers.<sup>53</sup> Although this type of transaction technically comprises a “sale for resale,” FERC has left its regulation up to the states.<sup>54</sup> Yet FERC now regulates demand response, the providers of which do not sell power at all, but rather a commitment by retail customers to reduce energy consumption when called.

The distinction between net metering and demand response illustrates both the breadth and the potential limitations of FERC’s modern authority under the

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47. *See id.*

48. *See id.*

49. *Id.* at 74–75.

50. *See* EISEN ET AL., *supra* note 6, at 506–08.

51. Federal Power Act of 1935, 16 U.S.C. § 824 (2012).

52. *See generally* Nordhaus, *supra* note 40.

53. *SunEdison LLC*, 129 F.E.R.C. ¶ 61,146 (2009). In prior decisions, FERC has found that “no sale” for the purposes of the FPA takes place when a generating station supplies its own power but accounts for its usage through netting with another party. *MidAmerican*, 94 F.E.R.C. ¶ 61,340, at p. 62,263 (2001). Analogizing to these decisions, FERC has found that “no sale for resale occurs” when a homeowner or business installs generation and uses netting to account for its usage with the local utility. 129 F.E.R.C. ¶ 61,146, at ¶¶ 19–20.

54. *See* 129 F.E.R.C. ¶ 61,146, at ¶¶ 10, 19–20.

FPA. FERC may regulate practices that impact the actual operations of the wholesale market operations, for example, by facilitating more economically efficient competition among market participants. However, it may not regulate practices that are only tangentially related to the operations of these markets.<sup>55</sup>

## II. EQUAL COMPENSATION FOR COST-EFFECTIVE DEMAND RESPONSE: FERC ORDER 745

### A. *Regulating Demand Response as a Wholesale Resource*

FERC's regulation of demand response as a wholesale resource began as the result of a congressional policy directive to remove technological and infrastructural barriers to demand response in energy markets.<sup>56</sup> In 2008, FERC issued Order 719, which required the regional wholesale energy markets to accept bids from demand response providers unless state law provided otherwise.<sup>57</sup> Three years later, FERC went further, issuing Order 745 to require that demand response resources be compensated on a comparable basis when they are comparable to generation resources. Reasoning that markets operate effectively only when both supply and demand can meaningfully participate, FERC found that this comparable compensation approach was necessary to ensure just and reasonable rates in the wholesale markets.<sup>58</sup> FERC argued that adopting a uniform approach to compensation across the wholesale markets was necessary to remove barriers to entry for demand response and increase competition in wholesale markets.<sup>59</sup>

Understanding the Order 745 equal compensation rule requires a brief discussion of how prices are set in the wholesale power markets. Prices in wholesale energy markets are set by way of an auction process, where typically the ISO or RTO market operator matches offers for supply from energy generators (market sellers) with requests for demand from load-serving entities (market buyers, typically utility companies who resell power to homes and businesses).<sup>60</sup> The market operator accepts supply bids from lowest to highest

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55. See Eisen, *supra* note 6, 30–31 (detailing this characterization of FERC's modern FPA authority and summarizing how this authority has been judicially construed over the past decades).

56. Energy Policy Act of 2005, Pub. L. No. 109–58, § 1252(f), 119 Stat. 965, 966 (2005) (directing that “technology and devices that enable electricity customers to participate in . . . demand response systems shall be facilitated, and unnecessary barriers to demand response participation in energy . . . markets shall be eliminated”).

57. Order No. 719, *Wholesale Competition in Regions with Organized Electric Markets*, 125 F.E.R.C. ¶ 61,071, at ¶ 158 (2008).

58. Order 745, *supra* note 5, at 16,658–59.

59. *Id.*

60. See ENERGY PRIMER *supra* note 9, at 60. Just because a resource clears the auction process does not necessarily guarantee it will actually run to meet demand in real time. Subsequent to the auction process, the system operator calls and dispatches resources to meet demand in real time according to a more complicated algorithm known as security-constrained economic dispatch. Because reliability requirements factor into this algorithm, as well as unanticipated changes in both actual supply

price until all demand is met.<sup>61</sup> The highest cost resource accepted by the market operator in a given hour for a given location establishes the market-clearing price, which is paid to all resources actually dispatched in that hour.<sup>62</sup> This market-clearing price constitutes the locational marginal price (LMP).<sup>63</sup> LMP is therefore not a fixed rate, but one that correlates with demand: When demand increases, wholesale prices do too. And when a market operator accepts a bid for demand response that is priced lower than the next highest priced increment of supply, wholesale rates decrease across the board.

To be deemed comparable to generation under Order 745 and therefore receive comparable compensation in the form of LMP, a demand response resource must satisfy two requirements. First, it must have the capability to actually curtail electric demand. Second, it must be cost effective as defined by the net benefits test.<sup>64</sup> These prerequisites to comparability can be analogized to a buy-in at a card game. By meeting the capability requirement, a demand response resource earns a seat at the table: the ability to play in the wholesale markets in the first place. However, the cost effectiveness requirement applies to screen out participants in every round of play: the daily or hourly auction through which power is bought and sold. If a demand response resource cannot pass the net benefits test, it must sit out the round, which is to say that Order 745 does not mandate comparable compensation.<sup>65</sup>

Earning a seat at the table through the capability requirement is relatively straightforward. To participate as a resource in wholesale markets, demand response resources must be able to demonstrate that they are capable of actually curtailing electric demand.<sup>66</sup> At present, a demand response resource meets this requirement by following procedures to determine its baseline energy use and to quantify the degree to which it can curtail its energy use relative to that baseline if called.<sup>67</sup> These procedures to establish resource capability vary among the regional markets and are set individually by each RTO or ISO.<sup>68</sup>

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and demand, not all resources that clear the auction will be called to run. *See e.g., FAQs: Day-Ahead Energy Market—Commitment, Scheduling, and Dispatch*, ISO NEW ENG., INC. <https://www.iso-ne.com/participate/support/faq/da-market-commitment> (last visited Mar. 17, 2017).

61. *See* ENERGY PRIMER *supra* note 9, at 60.

62. *See id.*

63. *See id.*

64. Order 745, *supra* note 5, at 16,659.

65. *See id.*

66. *Id.*

67. *Id.* at 16,672.

68. *See e.g., 10-Day Average Baseline and “Day-Of” Adjustment*, SO. CAL. EDISON, [https://www.sce.com/wps/wcm/connect/c47fe131-45a5-4456-b3ad-f8a781a42bd6/10+Day+Avg+Baseli+ne+%26+Day+Of+Adj\\_+NR-2225-V1-0413.pdf?MOD=AJPERES](https://www.sce.com/wps/wcm/connect/c47fe131-45a5-4456-b3ad-f8a781a42bd6/10+Day+Avg+Baseli+ne+%26+Day+Of+Adj_+NR-2225-V1-0413.pdf?MOD=AJPERES) (last visited Mar. 17, 2017); *Transmission, Markets and Services Tariff [Market Rule 1], Section III.8a.1-.3*, ISO NEW ENGLAND, [https://www.iso-ne.com/static-assets/documents/2014/12/mr1\\_sec\\_1\\_12.pdf](https://www.iso-ne.com/static-assets/documents/2014/12/mr1_sec_1_12.pdf); Xu Chen & Andrew N. Kleit, *Money for Nothing? Why FERC Order 745 Should Have Died*, 37 ENERGY J. 201 (2016).

Qualifying to play a round by passing the net benefits test is conceptually more difficult. In theory, the net benefits test operates to prevent dispatching demand response resources at times when it might actually increase the wholesale price due to low overall demand.<sup>69</sup> This could hypothetically occur when the sale of a demand response resource causes a wholesale energy buyer to not need to purchase energy and to instead drop out of the market for that round of play. In that situation, even though accepting a lower-priced demand response bid would by definition reduce the price that clears the market, the remaining buyers would each need to pay a greater portion of the total cost of compensating sellers. This is the so-called “billing unit effect.”<sup>70</sup> Order 745 ruled that demand response resources are only comparable to generation under conditions where the billing unit effect does not occur.<sup>71</sup> In practice, the net benefits test allows individual RTOs and ISOs to establish a price threshold for LMP, below which demand response resources may not participate in wholesale markets.<sup>72</sup>

By requiring that all the RTOs and ISOs adopt the same compensation approach, Order 745 rejected other compensation formulas previously used in some markets, namely a formula referred to as LMP-G. This formula calculates payment for demand response providers by taking the LMP and subtracting the avoided costs of retail generation, G. When a demand response provider reduces its consumption in exchange for compensation in a wholesale market, it also saves money equivalent to the cost it would have otherwise incurred to purchase that energy at retail prices. Therefore, the financial incentive for a demand response participant to *not* use a unit of energy and sell it as a megawatt resource instead is equal to LMP plus the retail price of energy. The LMP-G

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69. Order 745, *supra* note 5, at 16,659.

70. *See id.*

71. *See id.* The billing unit effect of demand response is analogous to the effect of declining power sales on retail rates. When a utility sells power at retail to homes and businesses, it passes on its fixed costs—such as building new power plants, or maintaining power lines—through a surcharge on each unit of energy sold. If customers become so efficient that total sales decrease, the utility must spread its costs over fewer units. In California, sales of electricity by all three major investor-owned utilities have declined in recent years. Energy efficiency is only one factor in this overall decrease: others include growth in rooftop solar and an increase in retail competition by community choice aggregators. Although California has decoupled utility revenues from sales of power, a decline in sales coupled with increases in utility costs could lead to increases in volumetric retail rates. This increases the retail rate or cost per kilowatt-hour. *See* CAL. PUB. UTIL. COMM’N, ACTIONS TO LIMIT UTILITY COST AND RATE INCREASES: PUBLIC UTILITIES CODE SECTION 913.1 REPORT TO THE GOVERNOR AND LEGISLATURE 8–9 (2016).

72. CAL. INDEP. SYS. OPERATOR, DEMAND RESPONSE NET BENEFITS TEST 2 (2011), [https://www.caiso.com/Documents/FinalProposal\\_Appendix-DemandResponseNetBenefitsTest.pdf](https://www.caiso.com/Documents/FinalProposal_Appendix-DemandResponseNetBenefitsTest.pdf) (“Demand response should be dispatched only when the clearing price is above the threshold price.”). Mathematically, this price threshold is determined by assessing whether there is a point on the supply curve where the cost of dispatching demand response (the price of a unit of demand response times the quantity of units dispatched) exceeds its benefits in depressing wholesale prices (the quantity of reduction in demand times the concurrent reduction in marginal price).

compensation approach attempts to remove this hidden subsidy by subtracting this avoided cost benefit from the compensation paid to a demand response provider.<sup>73</sup>

In the legal battle that ensued following Order 745, objectors to the order focused not only on FERC's jurisdictional authority to regulate demand response as a wholesale resource in the first place, but also on the economic rationale for these two competing compensation approaches: comparable compensation subject to the net benefits test, or LMP-G.

*B. Legal Challenges to FERC's Jurisdiction and Compensation Approach*

Commissioner Moeller dissented to Order 745's final rule. He disagreed generally with FERC taking an affirmative role to establish uniform compensation for demand response across the organized markets, preferring to let the markets continue to develop their own rules.<sup>74</sup> He argued that the final rule provided preferential treatment to demand resources by compensating them at LMP rather than LMP-G, while also being unduly discriminatory by requiring demand resources to pass the net benefits test before receiving this compensation.<sup>75</sup> Commissioner Moeller observed that it would make sense for demand response to receive comparable compensation when it provides an identical balancing service to the grid as generation.<sup>76</sup> However, he noted that might not happen under the final configuration of Order 745 because a demand response resource will only receive comparable compensation if it has a "price-lowering effect."<sup>77</sup> "In no other circumstance," he wrote, "is a resource required to show that its participation will depress the market price."<sup>78</sup>

As the subsequent challenge to Order 745 wound its way through the courts, the case turned on two primary issues. The first involved a jurisdictional question: whether FERC could order equal payment for demand response under the FPA. And the second focused on a procedural point: when FERC could order equal payment for demand response. Specifically, the question was whether paying demand response equal compensation when it passed the net benefits test was arbitrary and capricious within the meaning of the Administrative Procedure Act (APA). Even though demand response does not technically involve a sale for resale, FERC argued that because demand response "directly affects" wholesale rates and because the participants involved in demand response are direct participants in wholesale markets,

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73. For example, prior to Order 745, PJM Interconnection paid demand response resources the LMP minus the generation and transmission portions of the retail rate. See Order 745, *supra* note 5, at 16,661.

74. *Id.* at 16,679 (Comm'r Moeller, dissenting).

75. *Id.*

76. *Id.* at 16,680.

77. *Id.*

78. *Id.*

Sections 205 and 206 of the FPA allow the agency to regulate their participation in these markets.<sup>79</sup> The industry associations primarily argued that Order 745 impermissibly “lure[d]” participants into wholesale markets to create jurisdiction for FERC.<sup>80</sup> The D.C. Circuit agreed with the industry associations on the jurisdictional issue, vacating Order 745 as *ultra vires*.<sup>81</sup> Although it declined to address the merits of the procedural issue, the D.C. Circuit noted that the “potential windfall to demand response resources [resulting from equal compensation] seems troubling.”<sup>82</sup>

The Supreme Court disagreed, reversing the D.C. Circuit in *FERC v. Electric Power Supply Association (FERC v. EPSA)*. On the jurisdictional issue, Justice Kagan wrote for the majority, stating that FERC had regulatory authority to issue Order 745 for three reasons. First, FERC can regulate wholesale demand response as a practice “directly affecting” the wholesale rate because demand response is “all about reducing the wholesale rate.”<sup>83</sup> Second, Order 745 does not impermissibly intrude into the state’s authority over retail rates because it focuses on impacts to the wholesale market. The Court emphasized the importance of the “target at which [a] law aims,”<sup>84</sup> and also noted that Order 745’s veto provision for states characterized a situation of “cooperative federalism, in which the States retain the last word.”<sup>85</sup> Finally, Justice Kagan reasoned that since state commissions cannot regulate demand response prices in wholesale markets, the practice of wholesale demand response would fall entirely into a regulatory gap if FERC lacked jurisdiction.

The Court also held that FERC’s decision to compensate demand response providers at the same level as generators was not arbitrary and capricious under the APA. The compensation scheme met this threshold review because FERC reasoned that demand-side resources provide comparable value to the grid as new generation and explained that the compensation scheme would enhance competition.<sup>86</sup> The Court based this finding primarily on FERC’s comparability

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79. *Id.* at 11,676 (tasking FERC with ensuring that “all rules and regulations ‘affecting’ . . . [wholesale rates] are just and reasonable”); see *Elec. Power Supply Ass’n v. FERC*, 753 F.3d 216, 221 (D.C. Cir. 2014).

80. *Elec. Power Supply Ass’n*, 753 F.3d at 221.

81. *Id.* at 225.

82. *Id.* In a detailed dissent to the D.C. Circuit opinion, Justice Edwards argued that “responsive demand is a necessary component of a well-functioning wholesale market, and FERC understood that its obligation to ensure just and reasonable rates required it to facilitate an adequate level of demand response participation in its jurisdictional markets” and stated that he would uphold the price mandate under Order 745 because “FERC concluded that mandating LMP would provide the proper incentives for demand response resources to overcome these barriers to participation in the wholesale market.” *Id.* at 239.

83. *FERC v. Elec. Power Supply Ass’n*, 136 S. Ct. at 774, 784.

84. *Id.* at 776 (quoting *Oneok, Inc. v. Learjet, Inc.*, 135 S. Ct. 1591, 1599 (2015)).

85. *Id.* at 780.

86. As described by Justice Kagan, the Commission’s rationale was that “comparable value is what ought to matter given FERC’s goal of strengthening competition in the wholesale market: [r]ates

argument: Generation and demand response can equally balance supply and demand on the grid cost effectively, meaning “in a way that lowers costs for wholesale purchasers.”<sup>87</sup> The Court noted that the net benefits test added support to FERC’s overall rationale because it identified a situation in which demand response does not provide the same value as generation due to the billing unit effect.<sup>88</sup> Applying “great deference” to FERC’s decision, the Court observed that FERC had relied on an eminent regulatory economist’s views (the late Alfred Kahn) and that the Commission had “responded at length” to contrary views, fulfilling its obligations under the APA.<sup>89</sup>

Justices Scalia and Thomas dissented, arguing that because demand response providers do not resell electricity, FERC lacks authority to regulate them as purchasers at wholesale.<sup>90</sup> Furthermore, the dissent argued, by providing incentives to retail customers to conserve energy, the practice of demand response “effectively” increases retail rates because it adds an opportunity cost to retail customers’ decisions to purchase electricity.<sup>91</sup>

### III. VALUE OVER COST: RETHINKING THE *FERC v. EPSA* APPROACH FOR EFFICIENT MARKETS

#### A. *The Net Benefits Test Supports Neither Efficient Markets nor Just and Reasonable Rates*

The core holding of *FERC v. EPSA*—that demand response should receive comparable compensation for delivering comparable value to the grid—lays an important foundation for wholesale market rules that facilitate meaningful competition between supply and demand to provide just and reasonable rates. However, the net benefits test runs counter to the rationale underlying market-based rates, because it defines comparable value in terms of when demand response makes wholesale prices lower, rather than when it makes wholesale markets more efficient.

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should reflect not the costs that each market participant incurs, but instead the services it provides.” *Id.* at 772.

87. *Id.* at 782.

88. *Id.* at 783.

89. *Id.* at 782 (quoting *Morgan Stanley Capital Grp. v. Pub. Util. Dist. of Snohomish No. 1*, 554 U.S. 527, 532 (2008)). Sharon Jacobs observes that the Court’s standard of review on complex energy decisions, such as ratemaking or evaluating market conditions, constitutes energy “super deference,” although notes that the *FERC v. EPSA* court was unusually willing to go into the weeds on the economists’ testimony. Sharon Jacobs, *Energy Deference*, 40 HARV. ENVTL. L. REV. FORUM 49, 53–54 (2016).

90. *FERC*, 136 S. Ct. at 786 (Scalia, J., dissenting) (“The demand-response bidders here indisputably do not resell energy to other customers. It follows that the rule does not regulate electric-energy sales ‘at wholesale,’ and 16 U.S.C. § 824(b)(1) therefore forbids FERC to regulate these demand-response transactions.”).

91. *Id.* at 786 (Scalia, J., dissenting).

In the absence of a net benefits test, the principles of security-constrained economic dispatch under which the wholesale power markets operate should lead to an economically efficient market clearing price, whereby the auction process serves as its own cost-effectiveness test.<sup>92</sup> By definition, prices set in efficient markets maximize the societal value of each transaction, reflecting the point at which no alternative allocation would leave both buyers and sellers cumulatively better off.<sup>93</sup> FERC relies on this premise when it entrusts market forces to set just and reasonable rates, reasoning that so long as a market is functioning properly, rational market participants will agree to prices that strike the appropriate balance between buyer and seller interests.<sup>94</sup> Provided that the prices at which market participants submit bids for resources are undistorted by power imbalances or imperfect information, the hourly LMP should reflect the lowest-cost mix of resources available to balance supply and demand on the grid: no net benefits test required.

However, in *FERC v. EPSA*, the Supreme Court consistently emphasized not just and reasonable or efficient rates, but *low* rates. In its jurisdictional holding, the Court reasoned that demand response is a practice directly affecting wholesale rates because it reduces wholesale rates.<sup>95</sup> In upholding the compensation approach, the Court suggested that demand response only provides comparable value to generation when it lowers the market-clearing price.<sup>96</sup> As Justice Kagan put it, the purpose of the net benefits test is to ensure that accepting a demand response bid will actually “save LSEs (i.e., wholesale purchasers) money.”<sup>97</sup>

The net benefits test generated robust criticism from Order 745’s inception. Commissioner Moeller found the test “troubling” on legal grounds, saying it could be viewed as “equating the concept of a just and reasonable rate with a lower price.”<sup>98</sup> He observed that no other resource is required to show that its participation will depress market prices.<sup>99</sup> Robert Borlick, an economist writing in support of the Electric Power Supply Association, critiqued the test on economic grounds. Echoing Commissioner Moeller’s legal argument, he

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92. See Order 745, *supra* note 5, at 16,680 (Comm’r Moeller, dissenting) (referencing a technical conference held on the net benefits tests, at which a “clear majority” of the witnesses objected to the test. The witnesses argued that the test was “unnecessary” because “the market clearing function in a wholesale market, by definition, serves to guarantee that the resource that clears the market is the lowest-cost resource.”).

93. See TURNER ET AL., *supra* note 46, at 22; *see also* Brief of Robert L. Borlick et al. as Amici Curiae Supporting Respondents at 29, *FERC v. EPSA*, 136 S. Ct. 760 (2016) (Nos. 14-840, 14-841) [hereinafter Borlick Brief].

94. *Tejas Power Corp. v. FERC*, 908 F.2d 998, 1004 (D.C. Cir. 1990).

95. *FERC*, 136 S. Ct. at 784.

96. *Id.* at 783.

97. *Id.* at 771.

98. Order 745, *supra* note 5, at 16,681 (Comm’r Moeller, dissenting).

99. *Id.* at 16,680.

noted that the test focused on “whether prices are *lower*, rather than whether they are *efficient*.”<sup>100</sup>

The Supreme Court referenced the net benefits test in both the jurisdictional and the procedural holdings of *FERC v. EPSA*. However, these critiques suggest that the net benefits test was not essential to either of these holdings, and it in fact departs from FERC’s obligation to ensure just and reasonable rates. The Court effectively reasoned that FERC has jurisdiction over demand response as a practice that lowers rates. However, the provision of the FPA on which it based its reasoning gives FERC jurisdiction over practices *affecting* rates, which it has an obligation to ensure are just and reasonable.<sup>101</sup> Similarly, the Court upheld the compensation approach by finding that demand response only provides comparable services to generation when it reduces wholesale rates.<sup>102</sup> But such a limited definition of comparable value misconstrues FERC’s role. It suggests that FERC is responsible solely for ensuring that wholesale prices are low, rather than ensuring that markets in which wholesale prices are set operate efficiently. Given that the markets are set up to accept the most cost-effective resources through the LMP auction process, placing an effective bid floor on demand response resources at best distorts markets, and at worst, undermines FERC’s role to ensure just and reasonable rates.

This nuance is troubling in light of the complex dynamics between participants in modern power markets. On one hand, monopsony (single-buyer) power poses just as much of a concern as monopoly power in terms of potential price distortion.<sup>103</sup> Buyers in wholesale power markets are generally utility companies that may hold exclusive monopolies over the resale of power in their respective service territories. On the other hand, after *FERC v. EPSA*, sellers in these markets are sometimes retail customers (or their representatives) offering to supply demand-side resources. Making matters more complicated, the same

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100. Borlick Brief, *supra* note 93, at 29.

101. *FERC*, 136 S. Ct. at 767. (“In particular, the FPA obligates FERC to oversee all prices for those interstate transactions and all rules and practices affecting such prices. The statute provides that ‘[a]ll rates and charges made, demanded, or received by any public utility for or in connection with’ interstate transmissions or wholesale sales—as well as ‘all rules and regulations affecting or pertaining to such rates or charges’—must be ‘just and reasonable.’”).

102. See Order 745, *supra* note 5, at 16,659 (“[D]epending on the change in LMP relative to the size of the energy market, dispatching demand response resources may result in an increased cost per unit (\$/MWh) to the remaining wholesale load associated with the decreased amount of load paying the bill. This is the case because customers are billed for energy based on the units, MWh, of electricity consumed. We refer to this potential result as the billing unit effect of dispatching demand response. By contrast, dispatching generation resources does not produce this billing unit effect because it does not result in a decrease of load.”).

103. See John S. Moot, *Subsidies, Climate Change, Electric Markets and the FERC*, 35 ENERGY L.J. 345, 351–52 (2014) (“I believe that buyer-side market proceedings present some of the most difficult issues we face at the Commission.”) (quoting Commissioner LaFleur’s concurrence in *New England States Commission on Electricity v. ISO New England*, 142 F.E.R.C. ¶ 61,108).

utility company that purchases power from a wholesale market may also participate as a seller, by offering either generation from power plants that it owns or demand response from programs that it administers directly,<sup>104</sup> effectively standing on both sides of a transaction. These conditions make it even more important for FERC to promote efficient market operations that balance the interests of these diverse market participants, rather than to depress rates.

*B. LMP-G Is Still an Inefficient Compensation Approach*

Throughout the Order 745 litigation, critics of the net benefits test, including the D.C. circuit majority, the *FERC v. EPSA* dissent, and Commissioner Moeller, also criticized the equal compensation approach, largely on economic grounds. These criticisms, detailed in amici briefs by Borlick and other economists in support of EPSA, characterized LMP as an amount that overcompensates demand response due to the “unacknowledged subsidy” reflected in the avoided costs of retail generation.<sup>105</sup> In essence, these arguments cast the negative operating costs associated with demand response as an externality or market failure for which market prices should account. In order to internalize this unacknowledged subsidy, these commentators preferred the alternative compensation approach employed by some ISOs and RTOs of paying demand response resources LMP-G.<sup>106</sup>

What these arguments fail to recognize is that the markets are rife with externalities, such as resources that place excess stress on the grid or produce environmental pollutants.<sup>107</sup> Demand response can alleviate some of these externalities by shedding, shifting, or shimmying load in place of or in concert with certain generation resources,<sup>108</sup> and it was in recognition of these benefits that Congress encouraged FERC to further facilitate its practice.<sup>109</sup> In its Notice of Proposed Rulemaking for Order 745, FERC justified the LMP compensation strategy by describing the benefits demand response delivers to the grid and to the environment.<sup>110</sup> In other words, rather than providing a

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104. See Anne Hoskins & Paul Roberti, *The Essential Role of State Engagement in Demand Response*, 40 HARV. ENVTL. L. REV. FORUM 14, 17 (2016) (describing how Maryland authorizes its investor-owned utilities to sell aggregated demand response commitments into FERC-regulated wholesale markets).

105. Borlick Brief, *supra* note 93, at 11, 19–20.

106. *Id.* at 21; see also Order 745, *supra* note 5, at 16,680 (Comm’r Moeller, dissenting).

107. See e.g., STEVEN WEISSMAN & ROMANY WEBB, UNIV. OF CAL., BERKELEY, CTR FOR LAW, ENERGY AND THE ENV’T, ADDRESSING CLIMATE CHANGE WITHOUT LEGISLATION: HOW THE FEDERAL ENERGY REGULATORY COMMISSION CAN USE ITS EXISTING LEGAL AUTHORITY TO REDUCE GREENHOUSE GAS EMISSIONS AND INCREASE CLEAN ENERGY USE 2–3 (2014), [https://www.law.berkeley.edu/files/CLEE/FERC\\_Report\\_FINAL.pdf](https://www.law.berkeley.edu/files/CLEE/FERC_Report_FINAL.pdf).

108. See generally 2015 CALIF. DR STUDY, *supra* note 1.

109. See Energy Policy Act of 2005, Pub. L. No. 109–58, §1252(f), 119 Stat. 965, 966 (2005).

110. Order 745, *supra* note 5, at 16,661.

subsidy to demand response, LMP in fact helps to internalize existing externalities and promote a more efficient allocation of demand response in the marketplace.<sup>111</sup>

Admittedly, not all demand response is created equal. The amici briefs submitted by Borlick and other economists in support of EPSA detailed the potential downsides of inefficiently pricing demand response, such as inducing customers to shed their demand when it does not result in overall greater social value, or switching to dirty backup generators that do not meet emissions standards.<sup>112</sup> Other economists have argued that paying LMP for demand response might create a financial incentive for a customer to take advantage of opportunities to game the system, artificially increasing its load in order to profit by later reducing it.<sup>113</sup> (Going forward, I will refer to this as the “faux” demand response problem.) Along similar lines, a customer might respond to a demand response event not by curtailing consumption, but by instead turning on a dirty backup generator that does not meet emissions standards.<sup>114</sup> (I will refer to this as the “dirty” demand response problem.)

However, the problems that Borlick and others characterize as the result of inefficiently overcompensating demand response actually stem from two issues with current market rules. First, the technical mechanisms for quantifying demand response resources are inadequate for detecting faux demand response and differentiating between different types of resources. Second, the wholesale power markets have no way to distinguish between clean demand response resources from dirty ones because prices fail to account for pollution externalities. Reducing compensation levels for demand response does not eliminate these problems, but rather, only decreases the degree to which they occur.<sup>115</sup> After *FERC v. EPSA*, a demand response resource can receive an appropriate incentive for its participation in a wholesale market. However, the markets themselves lack mechanisms to ensure that its participation is efficient,

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111. See Moot, *supra* note 103, at 349 (explaining why it is hard to characterize a government intervention that promotes demand response as a subsidy because of the counterargument, which is that such interventions simply counteract implicit subsidies given to fossil fuel generators in the absence of carbon regulation).

112. Borlick Brief, *supra* note 93, at 19–20.

113. See generally Chen & Kleit, *supra* note 68 (arguing that compensation for wholesale demand response creates opportunities for moral hazard, adverse selection, behind-the-meter switching to dirty backup generators, and “idiosyncratic demand bidding strategy” to manipulate baseline determinations); Hung-Po Chao, *Demand Response in Wholesale Electricity Markets: The Choice of Customer Baseline*, 39 J. OF REGULATORY ECON. 68 (2011) (noting that compensating LMP for demand response could induce excessive demand reductions by participating customers).

114. Borlick Brief, *supra* note 93, at 20.

115. See generally Chen & Kleit, *supra* note 68 (conceding that real-time data would help to address baseline manipulation problems); Chao, *supra* note 113 (proposing that a two-sided contractual customer baseline could prevent excessive demand reductions and restore economic efficiency in lieu of real-time pricing).

and that the mix of resources ultimately deployed to balance the grid maximizes societal value.

*C. FERC Can Use the Order 745 Capability Requirement to Facilitate More Efficient Market Operations*

Instead of the net benefits test, FERC could focus its efforts on mechanisms that allow the market to establish marginal prices based on the least-cost resource available to deliver comparable value. Order 745 already has a mechanism that can be refined to serve this purpose: the capability requirement, which says that resources must be able to demonstrate that they are capable of actually curtailing electric demand.<sup>116</sup> FERC could leverage the capability requirement to ensure baselining and registration processes exclude faux demand response. It could also develop rules for better product differentiation in the wholesale energy markets so that resources can be bought and sold based on the unique capabilities they provide to the grid, including the shedding, shimming, and shifting of supply and demand.

At present, demand response resources meet the capability requirement by fulfilling market-specific baseline determination and registration processes that earn them the aforementioned seat at the table to play in wholesale markets. The quantitative approaches to these baseline processes can vary dramatically based on regional market rules, and they typically target market participants who engage in demand response reactively, responding to periodic events called by the market operator. For example, the PJM grid operator calculates customer baselines by averaging the four highest uses of the five most recent weekdays in a forty-five-day period in which PJM has not called a demand response event.<sup>117</sup> The California ISO calculates customer baselines using a ten-day average, in which it averages all hours in the ten days preceding a demand response event to establish an hourly average baseline.<sup>118</sup> ISO-NE also averages ten days' worth of data, but it selects these days from thirty of the previous non-event weekdays, and establishes a baseline using five-minute increments.<sup>119</sup> These differences in calculating baselines, as well as other factors like adjusting for seasonal variations or changes in weather, can mean that the same physical action to reduce load by a consumer can have a different value in different markets.

FERC can leverage current trends in energy information technology and analysis to both encourage greater consistency in how demand resources are quantified for the purposes of the capability requirement and improve the ability for markets to identify and compensate different demand response

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116. Order 745, *supra* note 5, at 16,659.

117. Chen, *supra* note 68, 202-03.

118. SO. CAL. EDISON, *supra* note 68.

119. ISO NEW ENGLAND, *supra* note 68.

resources based on the value each provides. As discussed earlier in this Note, advances in energy management information systems and the increasing availability of smart meter data have unlocked opportunities to more consistently and accurately verify energy savings data.<sup>120</sup> FERC could look to recent data science research conducted by the energy efficiency evaluation community to assess opportunities to repurpose these measurement and verification research tools and methodologies to establish customer baselines and verify reductions in demand for participation in wholesale markets.<sup>121</sup> These methodologies will likely translate best when quantifying commitments by resources that shed consumption; further research may be needed in order to similarly compensate resources like energy storage for commitments that shift demand instead.<sup>122</sup> However, improving the accuracy and consistency of market rules addressing demand response capability could be a step towards addressing the faux demand response problem anticipated (but not solved) by the LMP-G economists' arguments.

Further developing the capability requirement to incorporate better data and information about demand resources could also support greater product differentiation, giving a market operator the ability to more effectively accept and dispatch resources based on the value they provide to the grid within any given hour. For example, a traditional shed demand response resource is most valuable at times when demand for energy is peak proportional to the rest of the day. On the other hand, shift or shimmy resources can provide greater value if they commit to run over periods when renewable energy production starts out high but declines rapidly as the sun goes down, as represented in California's projected "duck curve" effect.<sup>123</sup> FERC already requires compensation for reliability resources in the ancillary service markets in which shimmy resources can technically participate to reflect the different values these resources provide to the grid, such as faster ramping time and response accuracy.<sup>124</sup> By making the capability requirement more robust and requiring demand resources to provide more detailed and accurate information in order to earn a seat at the

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120. See Eckman & Sylvia, *supra* note 24; St. John, *supra* note 28.

121. See generally ACEEE, *supra* note 23.

122. See 2015 CALIF. DR STUDY, *supra* note 1, at 5-25 ("Identifying appropriate and accurate baselines against which to compare response when there are not days *without* Shift also presents a significant challenge. Baseline estimation already poses a barrier to measurement and compensation of Peak Shed DR resources that are only dispatched a handful of times a year. It remains unclear whether compliance obligations would need to be restructured to qualify aggregations of shiftable loads to allow Shift-type resources to participate in flexible capacity markets.").

123. *Id.* at 2-1 to 2-4.

124. Order No. 755, *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, 137 F.E.R.C. ¶ 61,064, at ¶¶ 1-3 (2011) (finding that since resources providing regulation services differ in their ramping ability and response accuracy, uniform payments across these resources are unjust and unreasonable, and requiring system operators to base payments on the performance of each resource).

table, FERC could facilitate product differentiation and make compensation more commensurate with value in the energy and capacity markets as well.

Instead of setting effective bid floors through the net benefits test or selectively subtracting the costs of retail generation from LMP, FERC can exercise its jurisdiction over practices affecting rates to create market rules and mechanisms that improve competition in wholesale markets.<sup>125</sup> By facilitating competition between resources based on value rather than cost, FERC can ensure rates are efficient and optimize social welfare.

*D. Efficient Markets Call for Practices to Address Externalities*

The second category of less valuable demand response resources is “dirty” demand response, which is best understood as an externality problem. Demand response that comes from backup generators with unregulated emissions creates costs that other types of demand response do not, but these costs are not reflected in the market prices for these resources.<sup>126</sup> A demand response provider can bid this type of dirty resource at the same price as it would any other type of demand response resource, such as shedding, shifting, or simply powering its consumption with a renewable, behind-the-meter generation source. However, in a perfect market with externalities internalized, this dirtier resource would have to be priced higher to account for environmental costs and would likely not be accepted through the market-clearing process.

Other federal agencies or state regulations may play a role in internalizing these externalities by placing limitations or prohibitions on providers that seek to profit from dirty demand response. The D.C. Circuit recently vacated and remanded to the Environmental Protection Agency (EPA) its rules allowing unregulated emergency generators to participate in markets as a demand response resource.<sup>127</sup> The EPA previously allowed backup generators to bid up to 100 hours of demand response into wholesale markets without meeting emissions permitting requirements.<sup>128</sup> The D.C. Circuit held that the rule was arbitrary and capricious per the APA because the EPA failed to address intervenor concerns about the impacts of these resources on the wholesale markets.<sup>129</sup> The court rejected the EPA’s argument that contemplating

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125. The good news is that *FERC v. EPSA* appears to reinforce FERC’s jurisdiction to promulgate further market rules around grid-edge resources as “practices affecting rates.” *See generally* Eisen, *supra* note 6. Although FERC’s recently opened storage rulemaking focuses on developing market rules for storage, the capability of storage resources to provide shed, shift, and shimmy demand response suggests that these rules could also support the optimization and differentiation of demand resources described in this Note. *See* 157 F.E.R.C. ¶ 61,121, *supra* note 27.

126. *See e.g.*, Del. Dept. of Nat. Res. v. EPA, 785 F.3d 1, 14 (D.C. Cir. 2015) (testimony of PSEG Power, asserting that backup generators are “economic resource[s]” that “comp[ ]ete[ ] directly with other forms of capacity, most particularly generation”).

127. *Id.* at 18.

128. *Id.* at 4–5.

129. *Id.* at 14.

implications for capacity markets fell outside its jurisdiction: “EPA seeks to excuse its inadequate responses by passing the entire issue off onto a different agency. Administrative law does not permit such a dodge.”<sup>130</sup> The court encouraged the EPA to solicit comments from FERC on remand with respect to the reliability question, creating an opportunity for both agencies to align on enforcement with respect to both the reliability issue and the emissions question.<sup>131</sup> Similarly, at the state level, California recently decided to prohibit fossil fuel backup generators from participating in all but the most critical of demand response events. This rule will take effect in 2018.<sup>132</sup>

*FERC v. EPSA* makes it clear that FERC maintains broad latitude to regulate practices directly affecting rates in wholesale markets, even if those regulations also have effects on retail rates.<sup>133</sup> Similarly, the D.C. Circuit has held that FERC may regulate practices with effects on generation so long as those practices have a “significant and direct effect” on rates otherwise within FERC’s jurisdiction, regardless of FERC’s underlying motive.<sup>134</sup> In *Connecticut Department of Public Utility Control*, the court observed that the current market context could effectively compel prospective bidders in ISO New England’s capacity market to construct new generation facilities as a result of FERC’s Installed Capacity Requirement.<sup>135</sup> However, it reasoned that if these bidders felt compelled, it was the result only of “internalization of the true costs of the alternatives, which is not only a requirement for efficient market outcomes, but, again, something the Commission may concededly pursue.”<sup>136</sup>

After *FERC v. EPSA*, the Supreme Court has made it clear that compensation for demand response directly affects wholesale rates. Indeed, according to Justice Kagan, “it is hard to think of a practice that does so more.”<sup>137</sup> It is not necessary for FERC to ensure that these practices always lower wholesale rates, so long as they make the markets operate more efficiently to allow resources to compete against one another in a way that maximizes value overall.

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130. *Id.* at 16.

131. *Id.* at 18.

132. *Decision Adopting Guidance for Future Demand Response Portfolios and Modifying Decision 14-12-024*, Cal. Pub. Util. Comm’n (Decision 16-09-056), at 94–95 (2016).

133. *FERC v. Elec. Power Supply Ass’n*, 136 S. Ct. at 776 (“When FERC regulates what takes place on the wholesale market, as part of its charge to improve how that market runs, then no matter the effect on retail rates, § 824(b) imposes no bar.”).

134. *Conn. Dept. of Pub. Util. Control v. FERC*, 569 F.3d 477, 480, 484 (D.C. Cir. 2009) (citing *Muns. of Groton v. FERC*, 587 F.2d 1296, 1302 (D.C. Circuit 1978)) (“We thought it irrelevant that the deficiency charges were ‘designed as an incentive’ for the purchase or construction of adequate capacity so long as the charges affected transmission rates otherwise within the Commission’s jurisdiction.”).

135. *Id.* at 481.

136. *Id.* at 482–83.

137. *FERC*, 136 S. Ct. at 775.

## CONCLUSION

Today's markets are set up to dispatch the least-cost resource that provides the value needed to balance supply and demand on the grid. FERC can take actions to make these markets more efficient so the process of market-clearing prices and economic dispatch acts to maximize economic value. Some have proposed that FERC go a step further and act to internalize externalities through something like a carbon adder to reflect the cost of carbon emissions in wholesale electricity rates.<sup>138</sup> Even those who disagree with FERC's ability to do this proactively agree that FERC can at least approve market designs proposed by individual regions or states that do so, as in California.<sup>139</sup> Others have recommended that to balance grid-edge resources, at least in the context of capacity markets, benefit-cost analysis is superior to a least-cost test.<sup>140</sup> Ultimately, there are many externalities associated with electricity markets, including a wide array of subsidies that distort the economics of resources sold on those markets.<sup>141</sup> As the regulatory model evolves to facilitate more efficient competition between supply and demand in an increasingly complex grid-edge system, FERC can maintain its obligation to ensure this competition produces just and reasonable rates by seeking not solely to lower costs, but to maximize value to society overall.

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138. See WEISSMAN & WEBB, *supra* note 107, at 3.

139. Moot, *supra* note 103, at 348.

140. Denise A. Grab, *Balancing on the Grid Edge: Regulating for Economic Efficiency in the Wake of FERC v. EPSA*, 40 HARV. ENVTL. L. REV. FORUM 32, 33 (2016).

141. See *e.g.*, Moot, *supra* note 103, at 348.

**We welcome responses to this Note. If you are interested in submitting a response for our online journal, *Ecology Law Currents*, please contact [cse.elq@law.berkeley.edu](mailto:cse.elq@law.berkeley.edu). Responses to articles may be viewed at our website, <http://www.ecologylawquarterly.org>.**

