

# COMMENTS

## WASTE NOT, WANT NOT: DIVERGENT ENERGY STORAGE MARKETS IN CALIFORNIA AND OREGON

BY  
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*Energy storage resources complement renewable energy technologies and improve electricity grid reliability. But to varying degrees across the United States, the regulatory environment for energy storage providers stymies potential system-wide benefits. California likely will continue to outpace Oregon in energy storage deployment, largely because its federal-model grid administrator enables robust wholesale markets and resource aggregation opportunities. Oregon has no such grid administrator, leaving developers with poor incentives and market barriers to recovering the full value of storage resources.*

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## I. INTRODUCTION

As electricity systems decarbonize across the world, energy storage resources (ESRs)<sup>1</sup> can provide a variety of services to complement renewable energy technologies and improve electricity grid reliability.<sup>2</sup> Thus, ESRs are key to decarbonization efforts.<sup>3</sup> ESR providers are deploying technology with increasing sophistication, cost-effectiveness, and capacity.<sup>4</sup> However, to varying degrees across the United States, the regulatory environment for ESR markets stymies the potential benefits of ESRs within electricity systems. California likely will continue to see greater levels of ESR deployment compared to Oregon because its electricity marketplaces adhere to greater federal regulation. In California, a grid administrator overseen by federal regulators creates robust market opportunities for the technologies necessary to achieve a fully decarbonized grid,<sup>5</sup> including ESRs.<sup>6</sup> Although Oregon's decarbonization requirement is more ambitious than California's,<sup>7</sup> it is largely reliant on two monopolist utility companies to achieve its zero-emissions mandate.<sup>8</sup> Without access to wholesale markets and resource aggregation opportunities like those available in California, ESR developers in Oregon—especially poorly-incentivized independent

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<sup>1</sup> “Energy storage resource” is defined as “a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid.” Non-Discriminatory Open Access Transmission Tariff, 18 C.F.R. § 35.28(b)(9) (2021).

<sup>2</sup> See Richard L. Revesz & Burcin Unel, *Managing the Future of the Electricity Grid: Energy Storage and Greenhouse Gas Emissions*, 42 HARV. ENV'T L. REV. 139, 140 (2018) (listing the services and benefits energy storage provides); INTERNATIONAL ENERGY AGENCY TECHNOLOGY ROADMAP: ENERGY STORAGE 6 (2014); U.S. DEP'T OF ENERGY, GRID ENERGY STORAGE 4–5 (2013), <https://perma.cc/L2FH-VMJW>; GARRETT FITZGERALD ET AL., THE ECONOMICS OF BATTERY ENERGY STORAGE 6 (2015), <https://perma.cc/37FW-28ZF> (“Energy storage deployed at all levels on the electricity system can add value to the grid.”).

<sup>3</sup> Decarbonization, i.e., eliminating fossil fuels and associated greenhouse gas emissions from electricity systems, is imperative to addressing the climate crisis. See Maryam Arbabzadeh et al., *The Role of Energy Storage in Deep Decarbonization of Electricity Production*, NATURE COMM'NS 1–3, 8 (2019) (describing the efforts California and Texas have taken to decarbonize their electric systems and use ESRs).

<sup>4</sup> See, e.g., Andy Colthorpe, *IPP Broad Reach Power Expands into California with 100MWh Enel Project Acquisition*, ENERGY STORAGE NEWS (Nov. 24, 2020), <https://perma.cc/X858-C8YD> (“[T]he [Energy Transition] fund is ‘currently behind 800MW of energy storage projects’”); see also Todd Alexander, *Currents Podcast Ep134: Developing Solar + Storage*, NORTON ROSE FULBRIGHT (Dec. 15, 2020), <https://perma.cc/XLF5-6PNV> (discussing developments in battery storage in ERCOT).

<sup>5</sup> In this Comment “clean” and “carbon-free,” and “renewable” and “decarbonized” energy/electricity are used interchangeably.

<sup>6</sup> See *infra* Part III.A (discussing ESRs in California).

<sup>7</sup> To date, Oregon has the most ambitious of all state and federal decarbonization requirements. *State Renewable Portfolio Standards and Goals*, NAT'L CONF. STATE LEGISLATURES (Aug. 13, 2021), <https://perma.cc/Q42W-8B2J> [hereinafter NCSL]; H.B. 2021, 81st Leg. Assemb., Reg. Sess. (Or. 2021) (amending OR. REV. STAT. §§ 469A.005, 469A.205, 469A.210, 757.247, 757.603, 757.646, 757.649; repealing OR. REV. STAT. § 469A.062).

<sup>8</sup> See *infra* Part III.B (discussing ESRs in Oregon).

parties—remain undercompensated with fewer options to monetize their ESR projects.<sup>9</sup>

The federal government takes a largely laissez-faire approach to ESR market design, leaving states and regional marketplaces to develop participation models for ESRs.<sup>10</sup> Viewed as state policy laboratories, California and Oregon offer lessons about the development and operation of ESRs in light of broader decarbonization efforts. So far, state procurement mandates<sup>11</sup> (rather than market forces) drive ESR development in both California and Oregon.<sup>12</sup> But in California, where federal law and regional grid operation more actively shape the electricity marketplace, diverse ESR business models are becoming increasingly viable.<sup>13</sup>

ESRs will play a key role in decarbonizing reliably and cost-efficiently,<sup>14</sup> and are therefore important to achieving a 100% clean energy grid by 2035—one of President Joe Biden’s central campaign promises.<sup>15</sup> Further, nine out of the eleven states fully within the western grid, called the Western Interconnection,<sup>16</sup> have a renewable portfolio standard or clean energy goal in place.<sup>17</sup> Oregon, California,

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<sup>9</sup> See Joshua C. Macey & Jackson Salovaara, *Rate Regulation Redux*, 168 U. PA. L. REV. 1181, 1238–41 (2020) (describing regulatory barriers that lead to undercompensated clean energy and storage resources).

<sup>10</sup> See *infra* Part II (discussing federal regulation of ESRs).

<sup>11</sup> A “procurement mandate” as used in this Comment refers to state legislation which requires a regulated party (such as an electric utility company) to obtain a specific type and quantity of resource.

<sup>12</sup> See *infra* Part III (discussing ESRs in California and Oregon).

<sup>13</sup> See *infra* text accompanying notes 29, 78–81, 140–145 (discussing ESRs in California’s electricity marketplace). ESRs are more profitable when the “value stack” of a project includes compensation from wholesale market participation, e.g., where resources are compensated through regional “resource adequacy” or “capacity” contracts to support grid reliability. See LINDSEY JOHANNA FORSBERG, MARKET RULES IN TRANSITION: ENERGY STORAGE VALUE AND THE U.S. ELECTRIC GRID 1–2 (May 2019) (unpublished Master’s thesis, University of Minnesota), <https://perma.cc/7QR2-WCV9> (discussing “value stacking” in the energy storage context); FITZGERALD ET AL., *supra* note 2, at 14, 16, 38 (defining “resource adequacy” and “capacity” and identifying wholesale market participation and value stacking as valuable sources of revenue for ESRs).

<sup>14</sup> See SUSTAINABLE DEV. SOLS. NETWORK & FONDAZIONE ENI ENRICO MATTEI, ROADMAP TO 2050: A MANUAL FOR NATIONS TO DECARBONIZE BY MID-CENTURY 15 (2019) (arguing that the “paradigm shift” to renewable energy generation will be primarily supported by electricity storage solutions among other technologies).

<sup>15</sup> John Muyskens & Juliet Eilperin, *Biden Calls for 100 Percent Clean Electricity by 2035. Here’s How Far We Have to Go*, WASH. POST (Jul. 30, 2020), <https://perma.cc/C8XL-QTTM>; see GOLDMAN SCHOOL PUB. POL’Y, UNIV. CAL. BERKELEY, 2035: THE REPORT: PLUMMETING SOLAR, WIND, AND BATTERY COSTS CAN ACCELERATE OUR CLEAN ELECTRICITY FUTURE 11, 16, 33–34 (2020) [hereinafter U.C. BERKELEY] (describing how electricity storage can help support a 90% clean energy grid by 2035 and stating that such storage “plays a critical role in balancing the grid.”).

<sup>16</sup> See *The Western Interconnection*, W. ELEC. COORDINATING COUNS., <https://perma.cc/T4DC-3XCR> (last visited Mar. 3, 2022) (describing the Western Interconnection generally).

<sup>17</sup> See NCSL, *supra* note 7 (describing decarbonization standards in Oregon and California).

Nevada, New Mexico, and Washington are committed to 100% carbon-free energy by or before 2050.<sup>18</sup> Adding to this momentum, eighty municipalities within the Western Interconnection have 100% clean energy commitments of their own.<sup>19</sup>

Decarbonization goals are achievable because of the “plummeting” costs of solar, wind, and battery technologies.<sup>20</sup> As a result, some experts predict that the United States can virtually eliminate fossil fuels from electricity systems by 2035 at no extra cost to consumers.<sup>21</sup> Indeed, progress towards decarbonization goals is already underway, with the vast majority of proposed electricity generation in the West coming from renewable energy technologies.<sup>22</sup>

How to best integrate renewable energy at scale depends in large part on the fate of ESRs,<sup>23</sup> which feature prominently in decarbonization policies.<sup>24</sup> As the D.C. Circuit Court of Appeals recently recognized, ESRs are emerging as “industry disrupters . . . because they obliterate a foundational notion underpinning our electrical systems—that electricity cannot be efficiently stored for later use.”<sup>25</sup> While storing energy for later dispatch is not a novel concept (dam reservoirs being

<sup>18</sup> *Id.*

<sup>19</sup> *Check Out Where We Are Ready for 100%*, SIERRA CLUB, <https://perma.cc/326C-JZYQ> (last visited Mar. 3, 2022).

<sup>20</sup> See U.C. BERKELEY, *supra* note 15, at 2 (“Plummeting costs for wind and solar energy have dramatically changed the prospects for rapid, cost-effective expansion of renewable energy.”). Cf. Benjamin Storrow, *Calif. Sprints to Install Batteries But Can’t Find Parts*, CLIMATEWIRE (Mar. 30, 2022), <https://perma.cc/HM2T-Y8NL>; see also Ethan Howland, *Biden Invokes Defense Production Act to Bolster Domestic Battery Manufacturing for EVs*, *Energy Storage*, UTILITY DIVE (Apr. 1, 2022), <https://perma.cc/2JHD-3PZH> (explaining the ongoing supply chain and geopolitical issues impacting the price of ESRs).

<sup>21</sup> See U.C. BERKELEY, *supra* note 15, at 33. This assertion is controversial because it depends on what constitutes the cost calculation. Billions of dollars are necessary to finance renewables, ESRs, grid modernization and other features of a decarbonized society. But this investment pales in comparison to the costs of *not* decarbonizing our electricity systems and the ensuing climate havoc. Who will ultimately foot the bill for decarbonization is another question, largely dependent on state and federal regulators.

<sup>22</sup> *Generation, Storage, and Hybrid Capacity in Interconnection Queues*, LAWRENCE BERKELEY NAT’L LAB’Y, <https://perma.cc/53UU-G3K3> (last visited Mar. 3, 2022).

<sup>23</sup> See PAUL DENHOLM ET AL., NAT’L RENEWABLE ENERGY LAB’Y, *THE IMPACT OF WIND AND SOLAR ON THE VALUE OF ENERGY STORAGE* 29 (2013) (noting “considerable curtailment of wind and solar generation in systems without added storage.”); ETHAN N. ELKIND ET AL., UNIV. CAL. BERKELEY L., UCLA L., *THE POWER OF ENERGY STORAGE: HOW TO INCREASE DEPLOYMENT IN CALIFORNIA TO REDUCE GREENHOUSE GAS EMISSIONS* 3, 9 (2010) (describing how storage could help renewables integrate with the grid and maintain system reliability).

<sup>24</sup> See, e.g., *The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*, JOEBIDEN.COM, <https://perma.cc/522H-CL6J> (last visited Mar. 3, 2022) [hereinafter *The Biden Plan*] (promising to seek cost reductions for battery storage and to make investments in such systems); Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 40111, 135 Stat. 429, 946 (2021) (ordering Secretary of Energy to conduct study of “energy storage systems”).

<sup>25</sup> Nat’l Ass’n of Regulatory Util. Comm’rs v. Fed. Energy Regulatory Comm’n (*NARUC*), 964 F.3d 1177, 1182 (D.C. Cir. 2020).

the most notable example), many types of ESR, such as utility-scale batteries, only recently saw large-scale deployment.<sup>26</sup> Important for decarbonization, ESRs can pair with wind and solar farms to complement intermittent power generation.<sup>27</sup> The combination of ESRs with renewable energy technologies will be a key ingredient to achieving deep decarbonization without compromising grid reliability.<sup>28</sup> Deployment of these so-called co-located or hybrid resources is an increasingly popular model, particularly in California.<sup>29</sup>

ESRs are emerging as a major factor in bulk power systems because “(1) [ESRs] ‘are demonstrating increasing performance and reliability at lower costs’; (2) stakeholders are increasingly aware of the benefits that [ESRs] can provide; and (3) new installations are proving that [ESRs] can fulfill multiple needs on the grid.”<sup>30</sup> But while ESRs *can* accelerate decarbonization, more ESR capacity does not guarantee such progress. In fact, under some scenarios cheaper storage could increase fossil fuel usage and undermine decarbonization policies.<sup>31</sup> This risk is present in Oregon, for example, where coal- and natural gas-fired power plants still account for almost half of the state’s electricity consumption.<sup>32</sup> Because the rise of ESRs could either have “beneficial or perverse results,” society needs strategic planning and market designs to comport with decarbonization policies.<sup>33</sup>

However, shaping markets for ESR services is difficult because operational characteristics of ESRs create jurisdictional controversy and

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<sup>26</sup> As of 2019, about 94% of the 24 gigawatts of operational energy storage in the U.S. was from pumped hydro storage. But industry forecasters expect battery storage capacity in the U.S. to pass 70 gigawatts by 2030. CALIFORNIA ISO & RENEWABLES GRID INITIATIVE, ENERGY STORAGE PERSPECTIVES FROM CALIFORNIA AND EUROPE 11–12 (Oct. 2019), <https://perma.cc/M8TU-AYG3>.

<sup>27</sup> Melissa Powers, *Small Is (Still) Beautiful: Designing U.S. Energy Policies to Increase Localized Renewable Energy Generation*, 30 WIS. INT’L L. J. 596, 629 (2012); see U.S. DEPT OF ENERGY, ENERGY STORAGE GRAND CHALLENGE: ENERGY STORAGE MARKET REPORT 1 (2020) (describing the potential of stationary energy sources as a cost-effective technology for increasing grid reliability, resilience, and demand management); VOX, *The ‘Duck Curve’ is Solar Energy’s Greatest Challenge*, YOUTUBE (May 9, 2018), <https://perma.cc/8RDL-5LP5>.

<sup>28</sup> See sources cited *supra* note 2.

<sup>29</sup> Of all active interconnection requests in the California’s queue, 47.6% are hybrid resources, and, of those submitted in 2020, 58% are hybrid. Nationally, in 2019 the capacity of hybrid resources in interconnection queues increased by 33 gigawatts, more than doubling in a single year. FED. ENERGY REGULATORY COMM’N, HYBRID RESOURCES WHITE PAPER 4, 22 (2021).

<sup>30</sup> David Schmitt & Glenn M. Sanford, *Energy Storage: Can We Get it Right?*, 39 ENERGY L. J. 447, 449 (2018) (quoting Tom Stanton, *Envisioning State Regulatory Roles in the Provision of Energy Storage*, NAT’L REGUL. RSCH. INST. 2 (2014)).

<sup>31</sup> See Revesz & Unel, *supra* note 2, at 143 (describing a scenario in which coal power could be economically stored for later use).

<sup>32</sup> OR. DEPT ENERGY, 2020 BIENNIAL ENERGY REPORT 4 (2020) [hereinafter Oregon 2020 Energy Report].

<sup>33</sup> Revesz & Unel, *supra* note 2, at 143.

uncertainty among federal, state, and local regulators.<sup>34</sup> Policymakers navigate new challenges as more technologies come online that are capable of providing multiple services across the three traditional regulatory classifications of electricity infrastructure: generation, transmission, and distribution.<sup>35</sup> For example, within one hour the same battery could provide black start services (generation) and frequency regulation (transmission) to the grid manager, and backup power (distribution) to a residential customer.<sup>36</sup>

ESRs can provide up to thirteen different services to regional grid operators, utility companies, and end-use customers.<sup>37</sup> However, regulatory barriers limit the availability and monetization of these services depending on whether the ESR at hand functions at (1) the transmission level, (2) the distribution level, or (3) behind the customer meter.<sup>38</sup> ESRs currently function at all three levels to provide value to electricity systems. Business models adapt to local system characteristics, regulatory constraints, rate structures, and customer profiles.<sup>39</sup> Some analysts posit that the further “downstream” an ESR is, the more services it can provide to the overall system.<sup>40</sup> However, those behind-the-meter ESRs are most encumbered by regulatory barriers.<sup>41</sup>

Part II of this Comment explains the traditional electricity regulatory framework (including recent changes) as it relates to ESR technology. In a fractured regulatory landscape, new policies roll out differently in electricity marketplaces due to varied regulatory structures among states. Part III explores the value of energy storage and how federal and state regulations have influenced ESR markets in California and Oregon.

These two states illustrate how regulatory and commercial uncertainty about opportunities to participate in electricity markets can impact deployment and use of ESRs. So far, resource procurement mandates from state regulators drive ESR development in both states. But federal law more actively shapes California’s electricity marketplace and creates a more attractive environment for ESR deployment, compared to Oregon’s state- and utility-centric approach. So, without access to wholesale market and resource aggregation opportunities like those available in California, ESR deployment in Oregon remains

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<sup>34</sup> See generally Jeffery S. Dennis et al., LAWRENCE BERKELEY NAT’L LAB’Y, Federal /State Jurisdictional Split: Implications for Emerging Electricity Technologies 10–21 (2016) (describing the evolution of case law and legislation regarding the role of federal, state, and local governments in regulating the power sector).

<sup>35</sup> *Id.* at 22; see also LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY 264 (2nd ed. 2018) (defining the three traditional regulatory classifications of electricity infrastructure).

<sup>36</sup> FITZGERALD ET AL., *supra* note 2, at 19.

<sup>37</sup> *Id.*

<sup>38</sup> *Id.* at 20.

<sup>39</sup> *Id.* at 18.

<sup>40</sup> *Id.*

<sup>41</sup> *Id.* at 20.

limited and, consequently, the ratepayers of Oregon remain underserved.

## II. TRADITIONAL AND TRANSITIONING ELECTRICITY REGULATION

Electricity's physical characteristics interact with its regulatory law in important ways.<sup>42</sup> First, electricity is entirely fungible; it is impossible to tell the difference in quality between electricity generated by one resource or another.<sup>43</sup> Second, because electrons travel so quickly, they mingle almost instantaneously.<sup>44</sup> This makes identifying the source or physical path of any electrical current on the grid a fool's errand. Third, electricity is not easily stored, at least historically. Even with recent breakthroughs in ESR technology, plentiful, long-duration electricity storage remains elusive.<sup>45</sup> These physical realities function within a society that expects electricity to be available at the flip of a switch. Regulators have succeeded in creating an environment in which U.S. consumers count on, and arguably take for granted, delivery of safe, reliable, inexpensive, and practically limitless electricity.<sup>46</sup> Regulators now face new challenges, however, as the very fuels that grid stability once relied upon now exacerbate heat waves, wildfires, and other threats to the reliability of electricity systems.<sup>47</sup>

Perhaps surprisingly, the roots of electricity regulation in the United States predate Thomas Edison's invention of the light bulb. In *Brown v. Maryland*,<sup>48</sup> in 1827, Chief Justice John Marshall articulated the first iteration of the "Original Package" doctrine.<sup>49</sup> It began as a relatively narrow rule on state taxation of foreign imports.<sup>50</sup> Courts expanded the doctrine's scope into a broader-reaching rule pertaining to both interstate and foreign commerce under the Dormant Commerce

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<sup>42</sup> DAVIES ET AL., *supra* note 35, at 259.

<sup>43</sup> *Id.*

<sup>44</sup> *See id.* ("[B]ecause electrons travel literally near the speed of light, we cannot identify the source or physical path of the electricity that we consume.").

<sup>45</sup> *See* Andy Colthorpe, *Long-Duration Opportunities Will Grow but Bankability is Main Challenge*, ENERGY STORAGE NEWS (Feb. 24, 2021), <https://perma.cc/ZR5D-JYKH> (observing that in the near future, the majority of ESR development opportunities will remain in the two to four-hour duration segment of the market, while the opportunity for long-duration storage will most likely materialize sometime after 2030); Andrew H. Meyer, *Federal Regulatory Barriers to Grid-Deployed Energy Storage*, 39 COLUM. J. ENV'T. L. 479, 494 (2014) (discussing duration of discharge for energy storage devices, and how storage devices are time and energy limited).

<sup>46</sup> *See generally History of Electricity*, INST. ENERGY RSCH., <https://perma.cc/AQJ9-T8HM> (last visited Apr. 10, 2022) (telling the story of electricity from its early conception to our modern reliance).

<sup>47</sup> *See, e.g.,* Kavya Balaraman, *Western Officials Reckon with Reliability Challenges as Heat and 'Wildcard' Wildfire Threaten Grid*, UTIL. DIVE (July 13, 2021), <https://perma.cc/Z5EV-Q7ZN> (discussing how regulators are struggling to respond to energy demands with cleaner energy in the face of water shortages and heatwaves).

<sup>48</sup> *Brown v. Maryland*, 25 U.S. (12 Wheat.) 419 (1827).

<sup>49</sup> *Id.* at 441–43.

<sup>50</sup> *Id.*

Clause.<sup>51</sup> In 1927, the Supreme Court held that the Dormant Commerce Clause barred states from regulating interstate wholesale sales of electric power and only Congress could regulate these sales, thereby creating what came to be known as the Attleboro gap.<sup>52</sup> In 1935, Congress closed this regulatory gap by passing the Federal Power Act.<sup>53</sup> At that point, Congress drew “a bright line easily ascertained, between state and federal jurisdiction,” making federal jurisdiction “plenary and extending it to all wholesale sales [of electricity] in interstate commerce.”<sup>54</sup> Congress occasionally adjusts this jurisdictional line, but “it remains the fundamental federal/state division of labor for electric regulation in the United States.”<sup>55</sup> While scholars disagree about how bright the line really is,<sup>56</sup> the Supreme Court recently decided a trio of cases that substantially clarify the jurisdictional split over electricity regulation.<sup>57</sup>

Under the Federal Power Act, the Federal Energy Regulatory Commission (FERC) is authorized to facilitate development of the United States’ electricity grid and wholesale markets.<sup>58</sup> In carrying out its duties, FERC generally maintains its practice of cooperative federalism,<sup>59</sup> its obligation to ensure grid reliability,<sup>60</sup> and its ultimate

<sup>51</sup> U.S. CONST. art. I, § 8, cl. 3; Robert R. Nordhaus, *The Hazy “Bright Line”: Defining Federal and State Regulation of Today’s Electric Grid*, 41 ENERGY L. J. 323, 324 (2020).

<sup>52</sup> *Id.* at 325 (“[S]tates could regulate retail sales and intrastate sales, but—unless Congress acted—no agency had authority to regulate interstate wholesale electric sales.”); *Pub. Utils. Comm’n v. Attleboro Steam & Elec. Co.*, 273 U.S. 83, 90 (1927).

<sup>53</sup> 16 U.S.C. §§ 791a–825r (2018).

<sup>54</sup> *Fed. Power Comm’n v. S. Cal. Edison Co.*, 376 U.S. 205, 215–16 (1964).

<sup>55</sup> Nordhaus, *supra* note 51, at 326.

<sup>56</sup> *See id.* at 326–27 (questioning whether the Federal Power Act’s jurisdictional split is workable in the modern electric grid); *cf.* Matthew R. Christiansen & Joshua C. Macey, *Long Live the Federal Power Act’s Bright Line*, 134 HARV. L. REV. 1360, 1369–71 (2021) (arguing that the Supreme Court remains faithful to the Federal Power Act’s bright line approach in creating a framework that accommodates technological and market developments).

<sup>57</sup> *Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288, 1292 (2016); *Fed. Energy Regulatory Comm’n v. Elec. Power Supply Ass’n (EPSA)*, 136 S. Ct. 760, 766 (2016) (explaining that FERC’s regulatory power is limited to “the sale of electric energy at wholesales in interstate commerce” such that “any other sale” is beyond FERC’s regulatory power) (quoting Federal Power Act, 16 U.S.C. § 824(b)(1) (2018)); *Oneok, Inc. v. Learjet, Inc.*, 135 S. Ct. 1591, 1596 (2015) (explaining that FERC has rate setting authority per the Natural Gas Act); *see also* Joel B. Eisen, *FERC’s Expansive Authority to Transform the Electric Grid*, 49 U.C. DAVIS L. REV. 1783, 1787 (2016) (explaining that under *EPSA*, permissible federal regulation of “‘practices affecting rates’ means the terms, conditions, and rules that govern wholesale markets . . . reach to a wide range of entities whose conduct affects wholesale rates directly and significantly.”).

<sup>58</sup> FERC has authority over the regulation of “‘the sale of electric energy at wholesale in interstate commerce,’ including both wholesale electricity rates and any rule or practice ‘affecting’ such rates.” *EPSA*, 136 S. Ct. at 766 (quoting 16 U.S.C. §§ 824(b), 824e(a)). FERC also has “jurisdiction over all facilities for such transmission or sale of electric energy”. *Federal Regulation and Development of Power*, 16 U.S.C. § 824(b)(1) (2018).

<sup>59</sup> Rich Glick & Matthew Christiansen, *FERC and Climate Change*, 40 ENERGY L. J. 1, 15 (2019).

responsibility to protect the “public interest”<sup>61</sup> and ensure “just and reasonable” electricity rates.<sup>62</sup> Meanwhile, states maintain jurisdiction over certain spheres of electricity systems such as asset procurement, facility siting, and retail ratemaking.<sup>63</sup> States generally exercise these powers through public utility commissions (PUCs) which oversee electric utilities’ “duty to serve” customers.<sup>64</sup>

Electric utilities are primarily privately-owned companies but also include government and non-profit service providers.<sup>65</sup> These utilities operate within some version of a “regulatory compact,” in which a utility typically enjoys a monopoly in a certain service territory, and governments bless that franchise as long as the utility submits to government regulation and adheres to its duty to serve all customers within that territory.<sup>66</sup> The basic assumption underlying this arrangement is that regulators make the monopoly as efficient as competition; ultimately, they create a market that enables the public to pay a fair price for electricity.<sup>67</sup> This system was perhaps most appropriate when the United States had a simple grid: vertically integrated utilities produced power in centralized plants; controlled the transmission and distribution lines; owned relationships with captive ratepayers; and facilitated transactions where electricity only flowed from the utility to the customer.

But times have changed. Aside from profound technological shifts like the rise of ESRs, the regulated utility landscape has split into two main models in the United States. The traditional, vertically integrated utility model exists in states (including Oregon) that view the structure of the electricity industry as one that tends towards a “natural monopoly”<sup>68</sup> in which it is most efficient for production to be permanently concentrated with one provider.<sup>69</sup> Under this traditional model, vertically integrated utilities own and operate generation, transmission, and distribution assets for captive customers. The second model exists in states (including California) that have “restructured” their electricity systems such that the incumbent utility may not actually own the generation plants. Regulators in states with restructured electricity markets challenge the premise that electricity

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<sup>60</sup> *Id.* at 23 (describing FERC’s corresponding obligations to ensure a level playing field for variable energy resources, e.g., solar and wind, and maintain the reliability of the grid).

<sup>61</sup> *Id.* at 45, n. 239 (quoting *Fed. Power Comm’n v. Sierra Pac. Power Co.*, 350 U.S. 348, 355 (1956)) (“[T]he purpose of the power given [FERC] . . . is the protection of the public interest.”).

<sup>62</sup> 16 U.S.C. § 824d(a).

<sup>63</sup> DAVIES ET AL., *supra* note 35, at 32, 330, 623.

<sup>64</sup> Jim Rossi, *The Common Law “Duty to Serve” and Protection of Consumers in an Age of Competitive Retail Public Utility Restructuring*, 51 VAND. L. REV. 1233, 1242 (1998).

<sup>65</sup> DAVIES ET AL., *supra* note 35, at 264.

<sup>66</sup> Heather Payne, *Private (Utility) Regulators*, 50 ENV’T L. 999, 1001 (2020).

<sup>67</sup> *Id.*

<sup>68</sup> Joshua C. Macey, *Zombie Energy Laws*, 73 VAND. L. REV. 1077, 1088 (2020).

<sup>69</sup> DAVIES ET AL., *supra* note 35, at 281–85.

generation is a natural monopoly and assume that the public interest can still be served with diversified asset ownership, allowing generation-related competition to establish electricity prices.<sup>70</sup> However, even in restructured states, transmission and distribution systems are still primarily the domain of regulated monopolies.<sup>71</sup> Regardless of the wisdom of the regulatory compact, it remains a dominant feature of U.S. electricity systems.<sup>72</sup>

While states ultimately decide whether or not to restructure their electricity system, FERC has undertaken various efforts to promote competition in electricity markets. In the 1990s, FERC issued rules recognizing the need to change transmission policy to facilitate wholesale competition.<sup>73</sup> Independent system operators (ISOs) grew out of these rules to enable satisfaction of the requirement to provide non-discriminatory access to transmission services.<sup>74</sup> FERC then pushed for the voluntary formation of substantially similar entities, regional transmission organizations (RTOs), which it saw as key to coordinating markets and further opening up competition in the electricity sector.<sup>75</sup> RTOs and ISOs (RTO/ISOs)<sup>76</sup> have regional footprints and operate within the major U.S. grid “interconnections” and coordinate reliable operation of the grid among “balancing authorities.”<sup>77</sup>

However, despite FERC’s encouragement, approximately one in three electricity customers in the United States still purchases their electricity outside of an RTO/ISO.<sup>78</sup> California Independent System Operator (CAISO), spanning most of California and some of Nevada, is

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<sup>70</sup> Payne, *supra* note 66, at 1004.

<sup>71</sup> *Id.*

<sup>72</sup> While outside the scope of this Comment, the wisdom of the regulatory compact is certainly up for debate. *Id.* at 1006 (arguing that monopoly control of electricity systems fails the public interest because (1) the electricity consumer price index is rising faster than the consumer price index for all items, (2) consumers are asked to pay for record rates of capital spend, and (3) the allowed return on equity rates utilities receive have not varied with underlying debt costs).

<sup>73</sup> Order No. 888, Promoting Wholesale Competition Through Open Access Nondiscriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540, 21,540–01 (May 10, 1996); Order No. 889, Open Access Same-Time Information System and Standards of Conduct, 61 Fed. Reg. 21,737 (May 10, 1996).

<sup>74</sup> *RTOs and ISOs*, Fed. Energy Regulatory Comm’n, <https://perma.cc/SX9Q-LTQX> (last updated Feb. 17, 2022).

<sup>75</sup> Order No. 2000, Regional Transmission Organizations, 65 Fed. Reg. 809 (Jan. 6, 2000); DAVIES ET AL., *supra* note 35, at 411.

<sup>76</sup> The terms ISO and RTO are used interchangeably in this Comment because “[a]n RTO is just a type of ISO” that usually has a broader footprint. MELISSA POWERS, *ELECTRICITY LAW & POLICY* 210 n.3 (2019).

<sup>77</sup> Sara Hoff, *U.S. Electric System Is Made Up of Interconnections and Balancing Authorities*, U.S. ENERGY INFO. ADMIN. (July 20, 2016), <https://perma.cc/7B4L-REKL>.

<sup>78</sup> FED. ENERGY REGUL. COMM’N, *ENERGY PRIMER: A HANDBOOK OF ENERGY MARKET BASICS* 58 (2015); Revesz & Unel, *supra* note 2, at 156.

the only RTO/ISO fully within the Western Interconnection.<sup>79</sup> In areas of the West outside of an RTO/ISO, such as Oregon, *bilateral* contracting, mostly by investor-owned utilities (IOUs), is more prevalent than in the *multilateral* wholesale electricity markets administered by CAISO.<sup>80</sup> At the same time, more service providers in the Western Interconnection continue to join CAISO spot markets, most prevalently the Energy-Imbalance Market (EIM).<sup>81</sup> Federal hydropower and transmission giant Bonneville Power Administration has entered the EIM, as have many major other utility companies in the West.<sup>82</sup> Notable as a policymaking window, the power sales contracts many electricity service providers in the West have with the Bonneville Power Administration expire in 2028.<sup>83</sup>

CAISO, like other RTO/ISOs, is a key facilitator of decarbonizing electricity systems within its footprint. Overall, wholesale electricity markets administered by an RTO/ISO played an important role in carbon emission reductions to date.<sup>84</sup> True, institutions successfully financed capital-intensive clean energy projects and launched an era of renewables in the absence of strong federal carbon policy such as a nation-wide clean electricity standard. But federal policies such as the Public Utility Regulatory Policies Act (PURPA)<sup>85</sup> and investment or production tax credits for renewables have undeniably enabled clean energy development.<sup>86</sup> In addition to these congressional actions, FERC and other federal regulators also actively shape the electricity sector.

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<sup>79</sup> See Chris Westfall, *Western Regional Transmission Organization: Creating A Market to Support Renewable Energy*, 31 GEO. ENV'T L. REV. 409, 416–420 (2019) (discussing CAISO energy production and program expansion across the Western Interconnection).

<sup>80</sup> REBECCA JOHNSON, GRID INTEGRATION IN THE WEST: BULK ELECTRIC SYSTEM RELIABILITY, CLEAN ENERGY INTEGRATION, AND ECONOMIC EFFICIENCY 7 (2015), <https://perma.cc/72WG-WYV9>.

<sup>81</sup> See *About*, W. ENERGY IMBALANCE MKT., <https://perma.cc/6YV6-YW7B> (last visited July 29, 2021) (listing active and pending participants in the EIM).

<sup>82</sup> *Id.* In addition, CAISO expects many of these stakeholders to also participate in its Extended Day-Ahead Market, which is under development. See *Initiative: Extend day-ahead market*, CAISO, <https://perma.cc/HWK6-35YM> (last visited June 10, 2022).

<sup>83</sup> *Provider of Choice*, BONNEVILLE POWER ADMIN., <https://perma.cc/3YNX-DP78> (last visited July 29, 2021).

<sup>84</sup> See Glick & Christiansen, *supra* note 59, at 8 n.24, 33 (discussing the ways that various energy entities—including RTO/ISOs—can combat climate change through carbon reductions); Entities including CAISO have done this by “(1) leveraging the benefits of scale and diversity across broad geographic areas to facilitate the integration of large amounts of wind and solar generation; (2) reducing carbon emissions through more efficient generator dispatch; and (3) hastening the retirement of older, less efficient and more polluting resources by exposing them to the forces of competition.” ARNE OLSEN ET AL., ENERGY & ENV'T ECONS., SCALABLE MARKETS FOR THE ENERGY TRANSITION: A BLUEPRINT FOR WHOLESALE ELECTRICITY MARKET REFORM 8 (2021).

<sup>85</sup> Public Utility Regulatory Policies Act of 1978, Pub. L. 95–617, 92 Stat. 3117 (1978).

<sup>86</sup> Glick & Christiansen, *supra* note 59, at 12, 12 n.47, 38.

In 2018, FERC issued Order 841<sup>87</sup> which requires each RTO/ISO to craft a participation model for ESRs no matter where those resources exist on the grid. The D.C. Circuit Court of Appeals recently upheld this federal storage rule, which is tremendously important to decarbonization and electrification efforts.<sup>88</sup> The D.C. Circuit recognized such FERC action as the sort of permissible direct federal regulation of wholesale electricity sales authorized under the Federal Power Act.<sup>89</sup> Although Order 841 laid out important principles, its ultimate success will depend on its rollout within and outside of organized electricity markets. Compliance with Order 841 is ongoing with some RTO/ISOs, such as CAISO,<sup>90</sup> further along than others.<sup>91</sup>

As it did with Order 841, FERC often writes rules that specifically apply to RTO/ISOs and create compliance obligations within those organized markets.<sup>92</sup> The lack of participation in an RTO/ISO by Oregon means the state is not subject to these FERC rules. FERC's authority does extend beyond RTO/ISO markets, but no federal guidance exists regarding how ESRs will participate in regions of the Western Interconnection without an RTO/ISO.<sup>93</sup> Thus, while CAISO applies Order 841 to California power markets, states like Oregon (without an RTO/ISO) have no obligation to comply with Order 841. Regulatory and commercial uncertainty around ESRs' ability to participate in electricity markets will manifest differently in California compared to Oregon, with California's approach necessarily being closer to the federal model as the state adheres to existing (and future) FERC rules around energy storage.

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<sup>87</sup> Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators (Order 841), 18 C.F.R. § 35.28 (2018).

<sup>88</sup> *NARUC*, 964 F.3d 1177, 1181 (D.C. Cir. 2020). For example, where a city is considering building a fleet of electric busses, one of the factors in the economic viability of such a project is whether those bus batteries, aggregated, could participate as storage resources in the grid and receive compensation for those services.

<sup>89</sup> *Id.* at 1189; FPA, 16 U.S.C. §§ 791a-825r (2018).

<sup>90</sup> See CAISO, BUSINESS REQUIREMENTS SPECIFICATION FERC 841- REQUESTED ADJUSTMENTS (Apr. 2020), <https://perma.cc/ZP8N-J7BX> (discussing FERC acceptance of the CAISO filing with certain revisions).

<sup>91</sup> The effective date of tariff changes in compliance with Order 841 in SPP is August 5, 2021. MISO's Order No. 841 compliant ESR definition and participation model is currently scheduled to become effective in June 2022. On March 4, 2021, MISO filed a request to defer implementation of Order 841 compliance until March 1, 2025. That request was denied. See *Midcontinent Indep. Sys. Operator, Inc.*, 175 FERC ¶ 61,120 1 (May 17, 2021); *Sw. Power Pool, Inc.*, 170 FERC ¶ 61,164, 2 (Feb. 27, 2020); *Midcontinent Indep. Sys. Operator, Inc.*, 169 FERC ¶ 61,137 (Nov. 21, 2019).

<sup>92</sup> See, e.g., 73 Fed. Reg. 64,100 (Oct. 28, 2008) (to be codified at 18 C.F.R. pt. 35) (discussing new compliance requirements to improve the operation of wholesale electric markets).

<sup>93</sup> NAT. RES. DEF. COUNS., MAKING SENSE OF A WESTERN ISO: THE ROLE OF FERC IN TRANSMISSION SERVICE, 4 (2016), <https://perma.cc/L5D8-HYNZ>.

Building on Order 841, FERC issued Order 2222<sup>94</sup> to promote the participation of distributed energy resources (DERs) in organized capacity, energy, and ancillary services markets run by RTO/ISOs.<sup>95</sup> DER technologies include ESRs and small-scale power generation assets located within an electric utility's distribution system, any subsystem thereof, or behind a customer meter.<sup>96</sup> In addition to solar, wind, and ESRs, Order 2222 opened market opportunities for DERs such as demand response, energy efficiency, thermal storage, and electric vehicles and their charging equipment.<sup>97</sup>

Historically, DERs have seen incremental sales and gradual growth through bilateral contracting; for example, rooftop solar panel owners entering net metering agreements with their utility company.<sup>98</sup> Order 2222 may change this. The DER sector in the United States anticipates reaching a total installed capacity of 387 gigawatts by 2025.<sup>99</sup> As RTO/ISOs comply with Order 2222 and create wholesale market opportunities for aggregated DERs, electricity markets will fundamentally change in response to the availability of new value streams.

Notably, the timeline and promises of Order 2222 remain elusive. Nationwide compliance with the Order has been “halting and scattershot.”<sup>100</sup> Upon rehearing requests with FERC, stakeholders critiqued Order 2222 rules regarding participation of demand response

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<sup>94</sup> Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators (Order 2222), 85 Fed. Reg. 67,094 (Oct. 21, 2020) (to be codified at 18 C.F.R. pt. 35).

<sup>95</sup> FERC, FERC ORDER NO. 2222 FACT SHEET: A NEW DAY FOR DISTRIBUTED ENERGY RESOURCES (SEP. 17, 2020), <https://perma.cc/AAZ3-2GZ5>.

<sup>96</sup> *Id.*

<sup>97</sup> *Id.*

<sup>98</sup> See David Roberts, *There's a Revolution Happening in Electricity. Utilities Need to Keep Up.*, VOX (Jan. 19, 2017) <https://perma.cc/V5BS-SL9Z> (explaining the relationship between utilities, DERs, and their users).

<sup>99</sup> Kavya Balaraman, *California PUC Opens 'Mother of all Proceedings' to Prepare the Grid for New Wave of DERs*, UTIL. DIVE (July 6, 2021), <https://perma.cc/BLH9-TU42> (“For context, coal and nuclear power today have a combined capacity of roughly 330 [gigawatts].”).

<sup>100</sup> As of July 2021:

[t]he New York Independent System Operator (NYISO) and [CAISO] already have DER aggregation programs but will need to make some tweaks to ensure that their programs are in compliance with all of Order No. 2222's directives. The other RTOs/ISOs . . . PJM Interconnection (PJM), ISO-New England (ISO-NE), Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) have each requested extensions as they work through their stakeholder processes. The compliance deadline is now in February 2022 for PJM and ISO-NE, and in April 2022 for MISO and SPP.

Hampden T. Macbeth & Jessica R. Bell, *The DER Future Is Nearly Here? Stuck in the Weeds on Order No. 2222 Implementation*, UTIL. DIVE (July 15, 2021), <https://perma.cc/T28J-C934>.

resources as established in Order 719.<sup>101</sup> Order 719 allows state and local regulators to block demand response participation in the wholesale market.<sup>102</sup> This generous opt-out provision undermines FERC's attempt to promote demand response resources.

By comparison, Order 2222 applied to RTO/ISO territories more strictly.<sup>103</sup> Order 2222 appeared to create ESR market participation opportunities for the vast majority of customers served by an RTO/ISO. But, challengers confronted FERC with the question of whether states and other authorities can opt out of DER aggregations that include some demand response (termed heterogenous DER aggregations).<sup>104</sup> In other words, whether the wholesale market participation of these aggregators is subject to their state or local regulator's opt-out. FERC initially answered "no" in Order 2222-A but then changed course in Order 2222-B.<sup>105</sup> In Order No. 2222-A, FERC declined to extend Order 719's opt-out to heterogeneous DER aggregations that included demand response, but applied it to DER aggregations comprised only of demand response resources.<sup>106</sup> In Order 2222-B, issued in June 2021, FERC clarified that heterogeneous DER aggregations that include demand response are subject to the opt-out.<sup>107</sup> In another current proceeding, FERC is further investigating the demand response opt-out.<sup>108</sup> The impact of the opt-out and the fate of Order 2222 will continue to unfold as initial compliance filings extend into 2022.<sup>109</sup>

Various other federal regulations indirectly impact ESRs. FERC Orders 719 and 745 guide market opportunities for demand response

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<sup>101</sup> Demand Response Compensation in Organized Wholesale Energy Markets, 134 FERC ¶ 61,187 (2011); see also Katherine O'Konski & Russell Kooistra, *FERC Issues Order No. 2222-B, Setting Demand Response Opt-Out for Further Consideration*, WASH. ENERGY REP. (June 29, 2021), <https://perma.cc/M2LX-A9PB> (describing issues with FERC's Order 2222 relating to legal precedent and previous FERC orders).

<sup>102</sup> See Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators, 86 Fed. Reg. 33,853, 33,854 (June 28, 2021) (to be codified at 18 C.F.R. pt. 35) (clarifying that Order 719 authorizes regulatory authorities to prohibit retail customers' demand response from being incorporated into RTO/ISO markets).

<sup>103</sup> Order No. 2222-A, 174 FERC ¶ 61,197 at 22; see generally, U.S. DEP'T OF ENERGY, DEMAND RESPONSE AND ENERGY STORAGE INTEGRATION STUDY (Mar. 2016), <https://perma.cc/68LB-DKP4> (analyzing the potential integration value of demand response and energy storage in the western United States, including areas served by an RTO/ISO where the balancing authorities establish capacity markets to facilitate procurement of sufficient capacity, at the right locations, to meet forecasted electricity demand plus the planning reserve margin).

<sup>104</sup> Order No. 2222-B, 175 FERC ¶ 61,227 at 14–15.

<sup>105</sup> *Id.* at 26.

<sup>106</sup> *Id.*

<sup>107</sup> *Id.*

<sup>108</sup> Participation of Aggregators of Retail Demand Response Customers in Markets Operated by Regional Transmission Organizations and Independent System Operators, 174 FERC ¶ 61,198 at 1–2.

<sup>109</sup> See THE STATE ENERGY & ENVIRONMENTAL IMPACT CENTER, NYU SCHOOL OF LAW, *Are We There Yet? Getting Distributed Energy Resources to Markets* 2–3 (2021), <https://perma.cc/L5FK-GEM4>.

programs.<sup>110</sup> These programs become more accessible as ESRs give customers more flexibility to reduce their energy consumption. With Orders 890 and 1000,<sup>111</sup> FERC took aim at regional and interregional transmission planning.<sup>112</sup> The scale and location of ESR and renewable energy deployment will profoundly impact transmission needs over the coming decades.<sup>113</sup> FERC has also promulgated rules that guide transactions involving types of services ESRs can provide directly: frequency regulation under Order 755<sup>114</sup> and ancillary services under Order 784.<sup>115</sup> The impact of these regulations and other federal energy programs extends beyond RTO/ISOs. However, areas of the country within an RTO/ISO footprint, such as California, are best positioned to benefit from the combination of nationwide rules and organized-market-specific rules such as Orders 841 and 2222. The relative positions of Oregon and California illustrate this disparity.

### III. DIVERGENT MARKETS IN CALIFORNIA AND OREGON

The great differences between California and Oregon make it difficult to compare their (however similar) policies and extrapolate the regulatory schemes' relative successes. While just over four million people live in Oregon, almost forty million people reside in California.<sup>116</sup> The electricity corollary—gross annual revenue from retail electricity sales—in California was more than \$40 billion in 2019 compared to just under \$5 billion dollars in retail sales in Oregon.<sup>117</sup> California is also

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<sup>110</sup> Wholesale Competition in Regions with Organized Electric Markets, 125 FERC ¶ 61,071, 9–12 (2008); Demand Response Compensation in Organized Wholesale Energy Markets, 134 FERC ¶ 61,187, 6–7 (2011).

<sup>111</sup> Preventing Undue Discrimination and Preference in Transmission Service, 72 Fed. Reg. 12,266, 12,279 (2007); Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. 49,842 (2011). In July 2021, FERC initiated a rulemaking process which has the potential to revise these prior rules and significantly transform transmission planning and development. Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection, 86 Fed. Reg. 40,266, 40,267 (proposed July 27, 2021).

<sup>112</sup> See generally Benjamin U. Criswell, *Zap the Sleeping Giant: Revamping Order 1000 to Facilitate Decarbonization Across the Western United States*, 51 ENV'T L. 1301, 1304–05, 1319–20 (2021) (highlighting how Order 1000 set many standards to implement more regional and interregional planning but it has not lived up to its ambitious principles in the Western Planning Regions).

<sup>113</sup> *Id.* at 1315–16; Alexandra B. Klass, *Expanding the U.S. Electric Transmission and Distribution Grid to Meet Deep Decarbonization Goals*, 47 ENV'T L. REP. 10749, 10754 (2017).

<sup>114</sup> Frequency Regulation Compensation in the Organized Wholesale Power Markets (Order No. 755), 76 Fed. Reg. 67,260 (Oct. 31, 2011).

<sup>115</sup> Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies (Order No. 784), 78 Fed. Reg. 46,178 (July 30, 2013).

<sup>116</sup> *QuickFacts United States; Oregon; Washington; California; Nevada; Arizona*, U.S. CENSUS BUREAU, <https://perma.cc/X7XC-E5E2> (last visited June 15, 2021).

<sup>117</sup> *State Electricity Profiles*, U.S. ENERGY INFO. ADMIN. (Nov. 4, 2021), <https://perma.cc/V8VH-JVHT>.

geographically distinct and home to the world's fifth-largest economy.<sup>118</sup> Indeed, it may be unsurprising to learn that California has more than 1,000 times more installed ESR capacity than Oregon.<sup>119</sup> While this asymmetry is noteworthy, it misses a key distinction.

A more fundamental difference offers a richer lens to compare ESR regulation between the two states—California's restructured, ISO-administered grid versus Oregon's traditional electricity system. These regulated market structures interact with various other factors to determine the value of energy storage in California and Oregon respectively. This Part will explain some of the key state initiatives in Oregon and California shaping ESR market opportunities and then contrast the two states' relationship with federal energy regulators.

Before turning to California and Oregon policies, it may be helpful to expand on how economists value energy storage. Storage is exceptionally valuable for its ability to support grid reliability.<sup>120</sup> The principal metric to determine the extent to which resources, especially intermittent or energy-limited resources, can ensure grid reliability is called effective load carrying capability (ELCC).<sup>121</sup> ELCC is not a new concept, but grid planners have found it increasingly relevant in the past decade.<sup>122</sup> Essentially, the ELCC of a resource is the “measurement of that resource's ability to produce energy when the grid is most likely to experience electricity shortfalls.”<sup>123</sup> ELCC is usually represented as a percentage of a resource's capacity—for instance, a wind farm with a rated power (output capacity) of 100 megawatts with an ELCC of 30% could make a 30 megawatt contribution to reliability requirements.

Two primary factors affect ELCC calculations: (1) a resource's technical capabilities, i.e., when it can provide electricity and how much; and (2) when electricity shortages are most likely to occur.<sup>124</sup> As a charged ESR can dispatch electricity to the grid at any time, including

<sup>118</sup> *California State Profile and Energy Estimates*, U.S. ENERGY INFO. ADMIN., <https://perma.cc/XUX4-CCBG> (last updated Feb. 18, 2021).

<sup>119</sup> Of ESR projects listed as operational in November 2020, California had over four gigawatts of capacity (also called “rated power”) while Oregon had only 1,300 megawatts. *DOE EO Global Energy Storage Database*, U.S. DEPT OF ENERGY, <https://perma.cc/VP8C-3XQV> (last visited June 15, 2021).

<sup>120</sup> Mark Specht, *To Understand Energy Storage, You Must Understand ELCC*, UNION OF CONCERNED SCIENTISTS: THE EQUATION (June 14, 2021), <https://perma.cc/39D6-YAWV>.

<sup>121</sup> Mark Specht, *ELCC Explained: The Critical Renewable Energy Concept You've Never Heard Of*, UNION OF CONCERNED SCIENTISTS: THE EQUATION (Oct. 12, 2020), <https://perma.cc/7348-6BS3>.

<sup>122</sup> See L. L. Garver, *Effective Load Carrying Capability of Generating Units*, 85 IEEE TRANSACTIONS ON POWER APPARATUS & SYS. 910, 910–12 (1966) (reviewing ELCC work done by others in the field and adding new technique for estimating unit addition effects); Specht, *supra* note 121.

<sup>123</sup> Specht, *supra* note 121; See NICK SCHLAG ET AL., ENERGY & ENV'T ECONS., CAPACITY AND RELIABILITY PLANNING IN THE ERA OF DECARBONIZATION 1 (2020) (explaining ELCC is computed using probabilistic modeling and “is derived directly from the loss-of-load probability modeling that system planners have long utilized to determine the Planning Reserve Margin . . . that is necessary to ensure reliable electric service.”).

<sup>124</sup> Specht, *supra* note 121.

when the grid is most likely to experience electricity shortfalls, its ELCC is typically much higher than that of a similar-scale intermittent resource.<sup>125</sup> “Because energy usage patterns and the resources already on the grid can significantly influence the likely timing of shortages, they heavily impact the outcome of ELCC calculations.”<sup>126</sup> The “diminishing ELCC phenomenon,” or diminishing rate of return, occurs with overbuilding specific types of resources.<sup>127</sup> But the value of additional ESRs starts to flatline only when California adds approximately 40 gigawatts of storage, which is about ten times the amount on the grid today.<sup>128</sup> Thus, ESRs can go a long way to ensuring grid reliability, within limits.

In California, the state’s prominent “duck curve,” a characteristic of high levels of solar energy generation, inflates the value of ESRs.<sup>129</sup> Lots of short-term batteries are very helpful, for example, on a Los Angeles summer evening when utilities can dispatch solar energy stored during the middle of the day, rather than meeting a peak in demand by turning on additional natural gas plants. By contrast, in the Pacific Northwest, the marginal ELCC value of a four-hour battery drops precipitously compared to other parts of the country.<sup>130</sup> Because Oregon already has so much energy storage built into hydropower systems, adding more short-term storage simply does not do much for grid reliability.<sup>131</sup> Further, hydropower is a comparatively inexpensive resource, and short-duration ESRs may remain uneconomic in Oregon when compared to other resource options.<sup>132</sup> Long-duration storage, whether achieved through new technologies or aggregating existing ESRs, could still be cost-effective in Oregon.<sup>133</sup> Yet aggregation opportunities are limited in Oregon because service providers cannot access a market administered by an RTO/ISO.<sup>134</sup>

Accurate ELCC calculations are critical to grid reliability and economic efficiency both within and outside of an RTO/ISO.<sup>135</sup> Improper use of ELCC can lead to a system that fails to meet reliability targets or,

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<sup>125</sup> Specht, *supra* note 120.

<sup>126</sup> Specht, *supra* note 121.

<sup>127</sup> Specht, *supra* note 120.

<sup>128</sup> ZACH MING ET AL., ENERGY & ENV’T ECONS., LONG-RUN RESOURCE ADEQUACY UNDER DEEP DECARBONIZATION PATHWAYS FOR CALIFORNIA 37 (2019).

<sup>129</sup> See Vox, *supra* note 27 (describing the complexities of fluctuating demands of solar energy); NICK SCHLAG ET AL., *Moving Beyond ‘Rules of Thumb’ for Smart, Cost Effective Storage Deployment*, UTIL. DIVE (Apr. 30, 2019), <https://perma.cc/CQZ7-7BSK>.

<sup>130</sup> NICK SCHLAG ET AL., *supra* note 123.

<sup>131</sup> *Id.*

<sup>132</sup> Oregon 2020 Energy Report, *supra* note 32, at 1.

<sup>133</sup> *Cf.* Ming et al., *supra* note 128, at 57–58 (examining future electricity system resource adequacy in California). Whether long-duration storage technologies will in fact be cost-effective in Oregon depends on various factors, including the composition of the evolving electricity generation portfolio and the costs of ESR component materials.

<sup>134</sup> *Energy Efficiency and Electric Infrastructure in the State of Oregon*, U.S. ENV’T PROT. AGENCY, <https://perma.cc/F9CC-2TWG> (last visited Apr. 10, 2022).

<sup>135</sup> NICK SCHLAG ET AL., *supra* note 123, at 1.

conversely, one that is overly reliable and burdened with unnecessary costs.<sup>136</sup> Further, overestimating the value of ESRs' contributions could jeopardize grid reliability, while underestimating them would hinder investment in ESRs and slow decarbonization.<sup>137</sup> Complex interactions between intermittent resources make calculating ELCC a challenging exercise,<sup>138</sup> and those interactions are characteristic of a deeply decarbonized electricity system.<sup>139</sup> Therefore, electricity consumers stand to benefit from the use of ELCC by shrewd, well-resourced system administrators who can create market rules accordingly.

### *A. California Energy Storage Policy*

California leads the nation in ESR policy. For context, it is the most populous state in the country and is second only to Texas in total energy consumption.<sup>140</sup> To meet this demand sustainably, California enacted a Renewable Portfolio Standard that requires an increasing percentage of in-state electricity retail sales to come from eligible renewable resources.<sup>141</sup> In 2019, qualifying renewables generated approximately 36% of California's retail electricity sales<sup>142</sup> and California had the highest level of in-state renewable electricity generation in the nation.<sup>143</sup> The California legislature also adopted various storage policy initiatives over the past decade that represent the state's conclusion that ESRs will continue to play a crucial role integrating renewables, maintaining grid reliability, and balancing energy supply and demand.<sup>144</sup> With over 200 operational projects constituting over 4 gigawatts of installed ESR capacity, California leads the country in experience demonstrating both ESR policy solutions and operational viability.<sup>145</sup>

California's energy storage policy is a blend of executive directives, legislation, and regulatory decisions. The Governor, state legislature, California PUC, California Energy Commission, CAISO, and other stakeholders all coordinate their efforts regarding storage policy.<sup>146</sup>

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<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> *See, e.g.,* NICK SCHLAG ET. AL., *supra* note 123, at 1, 12, 13 (offering suggestions for centralized capacity market design using the "Delta Method," a framework to credit resource-specific ELCCs to fairly recognize the synergistic and antagonistic interactions of each resource with the broader portfolio).

<sup>139</sup> *Id.* at 18.

<sup>140</sup> U.S. ENERGY INFO. ADMIN, *supra* note 118.

<sup>141</sup> CAL. PUB. UTILS. CODE §§ 399.11, 399.15 (2019); CAL. PUB. UTILS. CODE § 454.43 (2019).

<sup>142</sup> U.S. ENERGY INFO. ADMIN, *supra* note 118.

<sup>143</sup> *Id.*

<sup>144</sup> *California Energy Storage Policy*, DOE OE GLOBAL ENERGY STORAGE DATABASE 2, [hereinafter DOE] <https://perma.cc/B44J-T6HA> (last visited Feb. 2, 2022).

<sup>145</sup> CALIFORNIA ISO & RENEWABLES GRID INITIATIVE, ENERGY STORAGE PERSPECTIVES FROM CALIFORNIA AND EUROPE, 12 (Oct. 2019), <https://perma.cc/DJ3W-2HVT>.

<sup>146</sup> *See generally*, JESSICA INTRATOR ET AL., UNIV. CAL. BERKELEY L., UCLA, AND UCSD, 2020 STRATEGIC ANALYSIS OF ENERGY STORAGE IN CALIFORNIA, (Nov. 2011),

Their combined suite of storage policy positions California as the most mature ESR market in the United States.<sup>147</sup> As explained below, procurement mandates, rather than free market forces, are primarily responsible for the California's progress to date.

In 2010, California became the first jurisdiction in the United States to mandate statewide ESR procurement with Assembly Bill 2514 (AB 2514).<sup>148</sup> In 2013, the California PUC implemented this mandate and required the state's three IOUs (Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric) to procure a total of 1,325 megawatts of energy storage by 2024.<sup>149</sup> Consistent with AB 2514, the California PUC policy stated three purposes:

- 1) The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
- 2) The integration of renewable energy; and
- 3) The reduction of greenhouse gas emissions to 80% below 1990 levels by 2050, per California's goals.<sup>150</sup>

This goal-defining legislation and implementing regulation not only created the ESR market in California but also set an example for other states.<sup>151</sup>

The California PUC's rulemaking in response to AB 2514 also set sub-targets for the utilities to procure certain quantities of transmission-level, distribution-level, and behind-the-customer-meter ESRs.<sup>152</sup> The California PUC defined these targets in terms of power capacity (megawatts): not technology, ramp-up time, amount of energy, or duration.<sup>153</sup> This open-ended definition left room for the market to determine which types of ESR are most cost-effective and valuable to the system. The California PUC excluded pumped hydropower storage

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<https://perma.cc/3YRL-EN3P> (presenting a strategic analysis of energy storage for California and how it can be executed).

<sup>147</sup> DOE, *supra* note 144, at 5.

<sup>148</sup> *Id.*; Energy Storage Systems, Cal. Assemb. B. 2514 2009-2010 Leg., Reg. Sess. (Cal 2010) (enacted) (amended CAL. PUB. UTILS. CODE § 9620).

<sup>149</sup> Decision Adopting Energy Storage Procurement Framework and Design Program (Cal. Pub. Util. Comm'n, Oct. 17, 2013) (D. 13-10-040) at 2 [hereinafter *Decision*].

<sup>150</sup> *Id.* at 9–10.

<sup>151</sup> DOE, *supra* note 144, at 5.

<sup>152</sup> See *Decision*, *supra* note 149, at 2–3 (establishing other targets for the three companies to aim for).

<sup>153</sup> *But see* CAL. PUB. UTILS. COMM'N, CPUC INTEGRATED RESOURCE PLANNING (IRP): SCOPING PLAN WORKSHOP 6 (June 2021), <https://perma.cc/8KKS8-BESH> (noting the most current California IRP process does specifically distinguish storage assets by duration and call for long-duration storage).

from AB 2514's procurement mechanism,<sup>154</sup> but otherwise emphasized that the objective of AB 2514 is to spur emerging ESR technologies.<sup>155</sup>

The California legislature followed AB 2514 with several other laws directly and indirectly impacting in-state deployment of ESRs.<sup>156</sup> California now has a policy offering financial incentives for ESR development; planning DER development; and addressing multiple use applications for ESRs, utility ownership of ESRs, and interconnection requirements for ESRs.<sup>157</sup> California also revised its retail rate structures to encourage customers to use behind-the-meter ESRs and participate in net metering programs.<sup>158</sup>

To date, the California PUC has approved more than 1,500 megawatts of new ESR capacity for development in California, of which over 500 megawatts are operational in 2021.<sup>159</sup> Cumulatively, the three California IOUs exceeded the AB 2514 procurement target and satisfied nearly all sub-targets.<sup>160</sup> While this progress is impressive, it remains tied to state law procurement mandates and does not yet represent an independently robust ESR market. However, such a market is emerging, bolstered by CAISO efforts in compliance with FERC regulations.

Evident in FERC's acceptance of CAISO's Order 841 compliance filing, CAISO seemingly took meaningful steps to remove barriers to ESR deployment.<sup>161</sup> In its filing, CAISO explained that it has three market participation models available to ESRs: (1) the Non-Generator Resources model, (2) the Pumped-Storage Hydro Unit model, and (3) the Demand Response model.<sup>162</sup> CAISO noted that, depending on its characteristics, an ESR might choose among these three models.<sup>163</sup>

Significantly, CAISO designed the Non-Generator Resource model specifically for ESRs and this option is now the primary model for common storage technologies like lithium-ion batteries.<sup>164</sup> More broadly,

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<sup>154</sup> *Decision, supra* note 149, at 25, 34 (noting that the size of pumped storage projects would "dwarf" other ESRs and hamper AB 2514's "market transformation goals").

<sup>155</sup> *Id.* at 32; DOE, *supra* note 144, at 12.

<sup>156</sup> DOE, *supra* note 144, at 6–10.

<sup>157</sup> *Id.* at 1.

<sup>158</sup> U.S. ENERGY INFO. ADMIN., BATTERY STORAGE IN THE UNITED STATES: AN UPDATE ON MARKET TRENDS 24 (2020).

<sup>159</sup> *Energy Storage*, CAL. PUB. UTILS. COMM'N, <https://perma.cc/AKF8-859U> (last visited Apr. 10, 2022).

<sup>160</sup> *Id.* (noting the California PUC's preferred resource mix includes 2,565 megawatts of storage capacity in 2022 and over 10 gigawatts by 2024. Although the PUC decision does not dictate that this new procurement must be storage, in practice it will be mostly storage with some renewables); *see also* Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes, (Cal. Pub. Utils. Comm'n, Aug. 17, 2021) (No. R.20-05-003).

<sup>161</sup> Order on Compliance Filing, 169 FERC ¶ 61,126, at 1 (Nov. 21, 2019) (Docket Nos. ER19-468-000, ER19-468-001).

<sup>162</sup> *Id.* at 6–7.

<sup>163</sup> *Id.* at 8–9.

<sup>164</sup> *Id.* at 7.

CAISO explained that DERs (including ESRs) in California may aggregate into a single “virtual resource” and participate in the CAISO markets as Non-Generator Resources.<sup>165</sup> While CAISO’s compliance filings for Order 2222 are forthcoming, its Non-Generator Resource model appears to be the type of market structure that would satisfy the Order’s requirements.<sup>166</sup> Continuing in 2022, CAISO is addressing stakeholder concerns as it administers markets for DER owners and operators.<sup>167</sup>

Additionally, in 2021, the California PUC opened the “mother of all proceedings” to institute rulemaking concerning grid management in light of the wave of DERs enabled by Order 2222.<sup>168</sup> In California, regulators forecast “behind-the-meter solar generation, behind-the-meter storage capacity, and electric vehicle demand will increase by 260%, 770% and 370% respectively from 2019 to 2030.”<sup>169</sup> Social and economic pressures will continue to influence this deployment, as will the PUC’s statutory mandate: to obtain the lowest possible electricity rates for public utility customers while maintaining reliable and safe service levels.<sup>170</sup>

### *B. Oregon Energy Storage Policy*

Oregon’s ESR policy exists alongside two dominant features of the Pacific Northwest: hydropower and electricity exports. In Oregon, hydroelectric dams typically account for more than half of electricity generation and less than half of electricity consumption.<sup>171</sup> In 2018, electricity producers in Oregon exported 12% of solar, 38% of hydropower, and 68% of wind energy generation, mostly to California consumers.<sup>172</sup> Oregon has many clean energy resources and the state has enacted a Renewable Portfolio Standard, among other pieces of climate legislation.<sup>173</sup> In July 2021, Oregon leap-frogged California’s

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<sup>165</sup> *Id.* at 9.

<sup>166</sup> Rich Heidorn Jr., *FERC OKs Delay on Order 2222 Compliance*, RTO INSIDER (Apr. 11, 2021), <https://perma.cc/LX4B-P4WC> (noting Order 2222 compliance filings are due July 19, 2021. So far, FERC has granted three RTO/ISOs’ request for an extension. CAISO does not appear to be seeking an extension, perhaps needing to make only minimal changes to its Non-Generator Resource model to satisfy Order 2222).

<sup>167</sup> CAL. ISO, ENERGY STORAGE ENHANCEMENTS 3, 4 (2021); *Initiative: Energy Storage Enhancement*, CAISO, <https://perma.cc/5DZ8-2EJQ> (last visited June 10, 2022).

<sup>168</sup> Balaraman, *supra* note 99.

<sup>169</sup> *Id.*

<sup>170</sup> See Public Utilities Act, CAL. PUB. UTILS. CODE § 309.5 (2019) (stating the goal of the Public Advocate’s Office of the Public Utilities Commission).

<sup>171</sup> *Oregon State Profile and Energy Estimate*, U.S. ENERGY INFO. ADMIN., <https://perma.cc/J8PB-UF5C> (last updated Feb. 17, 2022); Oregon 2020 Energy Report, *supra* note 32, at 9.

<sup>172</sup> Oregon 2020 Energy Report, *supra* note 32, at 26.

<sup>173</sup> OR. REV. STAT. § 469A.025 (2019); see *Renewable Portfolio Standard*, OR. DEPT OF ENERGY, <https://perma.cc/T6NC-24N8> (last visited Apr. 10, 2022) (listing wind, solar, wave, tidal, ocean thermal, geothermal, thermal, biogas small hydropower, and certain

decarbonization target by five years, setting a zero-emissions date of 2040.<sup>174</sup> Oregon still trails California in ESR policy and deployment, however, with only a few commercial ESR projects currently operational.<sup>175</sup> Nonetheless, like California, Oregon state procurement mandates are primarily responsible for ESR development to date.

Like California, Oregon's energy storage policy is a blend of executive directives, legislation, and regulatory decisions. The Oregon Governor, state legislature, Oregon PUC, Oregon Department of Energy, and other stakeholders all influence storage policy. Given Oregon's traditional, vertically integrated utility model, the state's two largest electricity IOUs—Portland General Electric (PGE) and Pacific Power (a branch of PacifiCorp, subsidiary of Berkshire Hathaway Energy)—have considerable political sway. Together, these IOUs supplied more than 60% of Oregon's electricity sales to end-use customers in 2019.<sup>176</sup>

In 2015, the Oregon legislature passed HB 2193.<sup>177</sup> This law required PGE and PacifiCorp to each procure one or more ESR with the capacity to store at least 5 megawatt-hours of electricity by 2020.<sup>178</sup> HB 2193 allowed the IOUs to recover their ESR procurement costs upon approval from the Oregon PUC.<sup>179</sup> Further, the law provided for ESR project selection through a competitive bidding process which was open to various ownership models including self-build, build-transfer, and power purchase agreements.<sup>180</sup> HB 2193 is also “technology agnostic,” meaning it does not express preference between types of ESRs.

The Oregon PUC then issued Order 16-504 in 2016, which established the process for PGE and PacifiCorp to submit their ESR procurement proposals and comply with HB 2193.<sup>181</sup> The Order adopted project guidelines, proposal rules, storage evaluation requirements, and competitive bidding requirements to encourage “multiple, differentiated projects that test varying technologies or applications.”<sup>182</sup> The Order also encouraged PGE and PacifiCorp to consider strategically-located

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biomass products among the renewable energy sources that qualify for Renewable Energy Certificates under Oregon's Renewable Portfolio Standard).

<sup>174</sup> NCSL, *supra* note 7.

<sup>175</sup> *Energy Storage*, OR. DEP'T OF ENERGY, <https://perma.cc/AWR7-CGRP> (last visited Apr. 10, 2022).

<sup>176</sup> MEGAN DECKER ET AL., OR. PUB. UTILS. COMM'N, 2019 OREGON UTILITY STATISTICS 12 (2019), <https://perma.cc/EKL5-ANBF>.

<sup>177</sup> H.B. 2193, 78th Leg. Assemb., Reg. Sess. (Or. 2015).

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> Order Implementing Energy Storage Program Guidelines Pursuant to House Bill 2193 (Or. Pub. Utils. Comm'n, Dec. 28, 2016) (No. 16-504) [hereinafter Order Pursuant to House Bill 2193].

<sup>181</sup> U.S. DEP'T OF ENERGY, OFF. OF ENERGY, GLOB. ENERGY STORAGE DATABASE, OREGON ENERGY STORAGE POLICY 2 (2019), <https://perma.cc/C9LX-XBZA>; Order Pursuant to House Bill 2193, *supra* note 180, at 1.

<sup>182</sup> U.S. DEP'T OF ENERGY, *supra* note 181, at 4.

projects, acknowledging that the value of energy storage differs based on its physical location within the grid.<sup>183</sup>

HB 2193 succeeded in spurring early ESR development in Oregon. The state's first operational utility-scale storage facility, PGE's Salem Smart Power Center, is a standalone lithium-ion battery and inverter system with 5 megawatts of capacity and 1.25 megawatt-hours of stored energy.<sup>184</sup> PGE's newly commissioned Wheatridge Renewable Energy Facility is also operational, with co-located wind and solar facilities alongside a lithium-ion battery with 30 megawatts of capacity and 120 megawatt-hours of storage (four hours of dispatch).<sup>185</sup> This development push exceeds the requirements of HB 2193, and utilities and developers are poised to add several more utility-scale ESRs to the grid in the coming decade.<sup>186</sup> Most of the ESR projects currently under development are hybrid facilities: storage paired with solar, wind, or natural gas generation.<sup>187</sup> No standalone, utility-scale battery projects are currently in Oregon's ESR project pipeline.<sup>188</sup> However, two pumped hydropower facilities with 400 megawatts and 600 megawatts of capacity, respectively, are under consideration.<sup>189</sup>

This next wave of storage development in Oregon will be shaped by the state's newest piece of climate legislation, HB 2021.<sup>190</sup> Following a controversial predecessor bill,<sup>191</sup> HB 2021 requires utilities to "eliminate greenhouse gas emissions associated with serving Oregon retail electricity consumers by 2040."<sup>192</sup> In addition to setting aggressive decarbonization targets for Oregon's electricity consumption, this law requires utilities to involve communities in clean energy planning and environmental justice considerations.<sup>193</sup> Like HB 2191, HB 2021 primarily affects Oregon's two largest IOUs: PGE and PacifiCorp. These companies must submit clean energy plans which include annual,

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<sup>183</sup> *Id.*

<sup>184</sup> Oregon 2020 Energy Report, *supra* note 32, at 41.

<sup>185</sup> *Wheatridge Renewable Energy Facility*, PORTLAND GEN. ELEC., <https://perma.cc/YQX5-JY3U> (last visited Apr. 10, 2022); David Brown et al., *Additional Comments on Battery Storage for the Oregon PUC Investigation into Capacity*, Docket UM 2011 1 (2021), <https://perma.cc/8ZGS-AA74>.

<sup>186</sup> Oregon 2020 Energy Report, *supra* note 32, at 41–42.

<sup>187</sup> *Id.* at 42.

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> H.B. 2021, 81st Leg. Assemb., Reg. Sess. (Or. 2021) (discussing, among other things, "community-based renewable energy" which addresses "storage systems or demand response measures").

<sup>191</sup> U.S. DEP'T OF ENERGY, *supra* note 181, at 6 ("[Senate Bill] 2020 was scheduled for a vote among the Oregon Senate, but 11 Republican state senators effectively derailed the legislation through a 'walk out' intended to deny the rest of the Senate the necessary 20-person quorum required to move the bill to a vote. The main goal of the bill . . . was to set up a cap-and-trade program that would dramatically and rapidly lower greenhouse-gas emissions across the entire economy, reaching an 80% reduction below 1990 target level by 2050.")

<sup>192</sup> H.B. 2021, 81st Leg. Assemb., Reg. Sess. § 2 (Or. 2021).

<sup>193</sup> *Id.* § 6.

incremental goals towards meeting the 2030, 2035, and 2040 targets for review by the Oregon PUC and the Oregon Department of Environmental Quality.<sup>194</sup> The utilities must also coordinate their clean energy plans with their integrated resource plan (IRP).<sup>195</sup>

An IRP is a utility's operational biannual plan considering a service territory's electricity supply and demand projections for future years.<sup>196</sup> In areas of the country outside of an RTO/ISO, the IRP processes of vertically integrated utilities are the primary fora for planning the development and management of large-scale electricity systems. Neighboring utilities coordinate their IRPs with varying degrees of success and balkanization.<sup>197</sup> In Oregon, a utility's IRP is subject to Oregon PUC approval. If the Oregon PUC "acknowledges" the IRP, then the utility may proceed with actions and expenditures to meet the utility customers' forecasted needs.<sup>198</sup> Oregon PUC acknowledgement does not constitute pre-approval of specific resource acquisitions. Rather, after acquiring a new resource the utility may seek to recover the associated cost by proving the action was prudent and in the public interest.<sup>199</sup> To demonstrate these two qualities a utility will generally (1) minimize deviation from its acknowledged IRP and (2) ensure cost-effectiveness by soliciting project bids from third parties through a request for proposals.<sup>200</sup>

In both PGE and PacifiCorp's current IRP process, solar plus storage facilities are among the most competitive projects under consideration.<sup>201</sup> In 2016, neither PGE nor PacifiCorp identified utility-scale storage in their IRP's preferred portfolios.<sup>202</sup> In 2019, both companies included substantial ESRs in their plans.<sup>203</sup> PGE's preferred plan includes nearly 240 megawatts of battery storage capacity by 2024.<sup>204</sup> PacifiCorp's preferred plan includes almost 600 megawatts of

<sup>194</sup> *Id.* §§ 3, 4.

<sup>195</sup> *Id.* § 4.

<sup>196</sup> See, e.g., *Energy – Planning: Integrated Resource Planning*, OR. PUB. UTILS. COMM'N, <https://perma.cc/X63L-TPF6> (last visited Apr. 10, 2022) [hereinafter *Energy – Planning*] (describing IRPs as a utility company's effort to meet the needs of energy users with the resources available).

<sup>197</sup> See JOHNSON, *supra* note 80, at 4, 5, 41 (discussing the West's interconnected electrical system and the need for change for future reliability).

<sup>198</sup> *Energy – Planning*, *supra* note 196.

<sup>199</sup> *Id.*

<sup>200</sup> OR. ADMIN. R. 860-089-0250(3)(g) (Or. Pub. Utils. Comm'n, Aug. 30, 2018); See, e.g., *Energy Supply Request for Proposals*, PACIFICORP, <https://perma.cc/NUM7-6LJL> (last visited July 30, 2021) (detailing the requirements for PacifiCorp's project bidding process and active/past bids).

<sup>201</sup> Request for Acknowledgment of Final Shortlist of Bidders in 2020 All-Source Request for Proposals at 1, 40–42, PacifiCorp Application for Approval of 2020 All-Source Requests for Proposals (Or. Pub. Utils. Comm'n, June 15, 2021) (UM 2059); *LC 73–Portland General Electronic Company, 2019 Integrated Resource Plan Update*, PORTLAND GENERAL ELECTRIC (Jan. 29, 2021), <https://perma.cc/4CSW-EF5P>.

<sup>202</sup> Oregon 2020 Energy Report, *supra* note 32, at 43.

<sup>203</sup> *Id.*

<sup>204</sup> *Id.*

battery storage capacity by 2023, all co-located with solar generation facilities.<sup>205</sup> The final shortlist for PacifiCorp's 2020 all-resource request for proposal includes 210 megawatts of solar paired with 52.5 megawatts of installed battery capacity in Oregon.<sup>206</sup> Contracts to build these facilities will be awarded through the IOU's request for proposal bidding process.<sup>207</sup>

Without a successful IRP project bid, large-scale ESR developers in Oregon have one other option available—build a Qualifying Facility under PURPA.<sup>208</sup> But this choice is unlikely in the current regulatory environment. The Oregon PUC has not clarified several open questions relevant to PURPA developers seeking to integrate storage into their projects.<sup>209</sup> The resulting commercial uncertainty is not offset by other incentives. The federal solar plus storage Investment Tax Credit currently aids ESR developers, as does Oregon's Solar + Storage Rebate Program.<sup>210</sup> To date, such perks were insufficient to produce more than a few ESR projects in Oregon.

PGE and PacifiCorp *may*, but are not required to, include ESRs as part of their IRP/clean energy plan to comply with HB 2021. As written, HB 2021 is commendably ambitious, it is not prescriptive about energy generation, storage, and transmission technologies, and it did not tamper with Oregon's existing Renewable Portfolio Standard.<sup>211</sup> Oregon is still locked-in to its regulatory compact with IOUs outside of RTO/ISO membership and is thus beholden to a small number of monopoly service providers to deploy the technology necessary to achieve HB 2021's decarbonization goals. Without an RTO/ISO, utilities are primarily responsible for identifying a need for a resource and initiating a competitive bidding process to meet that need with the least-cost,

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<sup>205</sup> *Id.*

<sup>206</sup> *PacifiCorp Trims RFP Bids into Final Shortlist*, CLEARING UP (June 18, 2021), <https://perma.cc/5W3Z-7MMY>.

<sup>207</sup> See, e.g., *PacifiCorp's 2020 All-Source Request for Proposals*, PACIFICORP, <https://perma.cc/426Z-3TDS> (last accessed Aug. 19, 2021) (detailing PacifiCorp's bid proposal request, deadlines, and needs for the proposal).

<sup>208</sup> Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (1978) (codified as amended at 16 U.S.C. § 824a-3 (2018)).

<sup>209</sup> See Order on Investigation into PURPA Implementation, at 10–11 (Or. Pub. Utils. Comm'n, Feb. 19, 2019) (UM 2000) (leaving open questions like, does the nameplate capacity of a facility include both generation and storage capacity combined? Does storage capacity affect a project's eligibility for standard rates or interconnection procedures? Must buyers pay renewable energy rates for dispatch from ESRs charged with renewable energy? Are Qualifying Facilities with ESRs eligible for compensation for grid-related services such as frequency regulation?).

<sup>210</sup> NAT'L RENEWABLE ENERGY LAB'Y, FEDERAL TAX INCENTIVES FOR ENERGY STORAGE SYSTEMS (2018) <https://perma.cc/69QA-JZ77>; *Oregon Solar + Storage Rebate Program*, OR. DEPT. OF ENERGY, <https://perma.cc/2E8T-34JN> (last visited Apr. 10, 2022).

<sup>211</sup> OR. REV. STAT. § 469A.025 (2019); *Renewable Portfolio Standard*, *supra* note 173 (discussing applicable renewable energy resources to comply with the Renewable Portfolio Standard).

least-risk project (as required by the Oregon PUC).<sup>212</sup> Thus, Oregon substantially relies on PGE and PacifiCorp to drive future ESR development. Of course, the Oregon PUC can shape that development. Vertically integrated utilities have anti-competitive incentives to protect their monopoly status and limit Oregon's ability to "create a market" for ESRs. Even with a state procurement mandate like HB 2193, PacifiCorp and PGE largely dictate ESR development in Oregon. Do these companies have any incentive to allow new market participants to aggregate distributed energy resources or diverse ESR owners to use privately-owned transmission and distribution systems?<sup>213</sup>

The Oregon legislature, with FERC's approval, could restructure its electricity system and create market opportunities for ESRs like those in CAISO. Alternatively, Oregon could reform its financial incentives and PURPA rules to make ESR projects more attractive. Finally, developers may be able to build an ESR as part of a "community renewable energy project" with funding under Section 30 of H.B. 2021.<sup>214</sup> Beyond these options, ESR project development in Oregon is currently unlikely outside of a utility IRP.

#### IV. CONCLUSION

Oregon and California illustrate how regulatory uncertainty about opportunities to participate in electricity markets can impact deployment of ESRs. These two states have seen divergent levels of ESR investment despite having similarly ambitious decarbonization goals. As noted above, procurement mandates (rather than market forces) drive ESR development in both states. In California, where CAISO and federal law more actively shape the electricity marketplace, diverse, third-party ESR business models are becoming increasingly viable. As a result, California likely will continue to see greater levels of ESR deployment compared to Oregon's state- and utility-centric approach. This Comment posits that the fundamental reason for this disparity is the asymmetry between the two states' models of electricity regulation.

Undoubtedly, these regulatory frameworks exist with economic realities. The value of storage in Oregon is different than the value of storage in California not only because of the divergent approaches to electricity regulation in the two states. ELCC measurements for identical ESRs will have different values in different parts of the country because of each electricity system's distinct circumstances. To decarbonize electricity in each state of the United States, a unique blend of ESRs and clean energy facilities will necessarily assume

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<sup>212</sup> Order on Investigation into Integrated Resource Planning, No. 07-047, app. A at 1-2 (Or. Pub. Utils. Comm'n, Feb. 9, 2007).

<sup>213</sup> See Ari Peskoe, *Is the Utility Transmission Syndicate Forever?*, 42 ENERGY L.J. 1, 4 (2021) (describing the decision of states to grant market control for local providers to monopolize the power industry).

<sup>214</sup> H.B. 2021, 81st Leg. Assemb., Reg. Sess. § 30 (Or. 2021).

responsibility for grid reliability. ESRs are a key part of future grid stability and, perhaps, *overbuilding* renewable energy generation will be, too.<sup>215</sup> In addition, long-duration ESRs continue to drum up considerable investment and government support for their potential contribution to grid reliability.<sup>216</sup> Whatever the eventual resource blend, metrics such as ELCC can help grid planners deploy technologies strategically and cost-efficiently.<sup>217</sup>

Ultimately, decisionmakers should apply both regulations and ELCC methodologies to effectively achieve rapid and equitable decarbonization<sup>218</sup> plus cost-efficient technology deployment, business case certainty, and clear price signals for investors.<sup>219</sup> California, with CAISO administering its grid, is well-positioned to balance these considerations. Given the limitations Oregon faces without an RTO/ISO, calls to form a western RTO appear timely.<sup>220</sup>

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<sup>215</sup> ZACH MING ET AL., ENERGY & ENV'T ECONs., RESOURCE ADEQUACY IN THE PACIFIC Northwest, at ii–iii (2019).

<sup>216</sup> Jason Plautz, *Form Energy's \$20/kWh, 100-Hour Iron-Air Battery Could Be a 'Substantial Breakthrough'*, UTIL. DIVE (Jul. 26, 2021), <https://perma.cc/8W95-2NJZ>; Jason Plautz, *DOE Initiative Seeks to Drop Long-Duration Storage Cost 90% in a Decade*, UTIL. DIVE (Jul. 14, 2021), <https://perma.cc/X9C5-2VRR>.

<sup>217</sup> SCHLAG ET AL., *supra* note 123, at 1.

<sup>218</sup> The fight to fully decarbonize the electricity grid within the next few decades will require a “war-time mobilization effort.” SAUL GRIFFITH ET AL., REWIRING AMERICA: A FIELD MANUAL FOR THE CLIMATE FIGHT 6 (2020). This historic juncture holds the opportunity to simultaneously rebuild the modern electrical grid, mitigate the worst impacts of climate change, and enact programs to rectify discriminatory wealth disparities.

<sup>219</sup> See MING ET AL., *supra* note 128, at 22, 41, 43 (finding that an 80% reduction in California's greenhouse gas emissions by 2050 is possible with significant investment in energy efficiency and storage improvement). Cf. Cynthia Mitchell & Sashwat Roy, *E3's Finding that Gas Peakers are Least Cost and Needed for PNW Reliability is Outdated and Flawed*, RENEWABLE NORTHWEST, <https://perma.cc/Z35X-794V> (last visited Apr. 10, 2022) (arguing that renewables are becoming increasingly cost efficient, reducing much of the uncertainty for investors).

<sup>220</sup> Catherine Morehouse, *Heatwave, Wildfires Heighten Urgency for Western RTO: Glick, Clements*, UTIL. DIVE (Jul. 16, 2021), <https://perma.cc/KLT8-REVV>; see Westfall, *supra* note 79, at 413–14 (arguing the Pacific Northwest should integrate into a Western RTO and espousing the benefits of RTOs). Cf. OLSEN ET AL., *supra* note 84, at 58 (arguing that significant redesign of energy markets is not required for decarbonization).

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