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Energy Storage: To Be, or Not To Be . . . What, Exactly? That Is the Real Question

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In 2016, almost every country in the world signed and ratified the Paris Agreement, the most significant concerted action toward mitigating climate change to date.[1] While noteworthy and ambitious, the Paris Agreement's goal of keeping global warming below the scientific consensus threshold of two degrees Celsius continues to become less realistic absent more substantial actions to achieve a low-carbon energy infrastructure.[2] One strategy debated in recent years involves using

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[1] UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, *Paris Agreement – Status of Ratification*, http://unfccc.int/paris_agreement/items/9444.php (last visited Dec. 28, 2017).

[2] *See* Alvin Chang & David Roberts, *Show this cartoon to anyone who doubts we need huge action on climate change*, VOX (Jan. 5, 2018, 8:10 AM), https://www.vox.com/energy-and-environment/2016/10/17/13190036/global-climate-change-facts-effects-cartoon (stating that for a 66% chance of limiting warming to two degrees Celsius, we must have zero emissions by 2065 followed by negative emissions).

natural gas as a "bridge fuel" to a low-carbon energy economy.[3] The main argument in its favor is that it is a cleaner, conventional, and cost-effective substitute to coal.[4] However, recent studies have concluded that this strategy might actually "exacerbate the climate change problem" because of methane leakage associated with natural gas and by "delaying deployment of renewable energy technologies."[5] Still, proponents of the "bridge fuel" strategy argue that natural gas is needed until we solve the two major problems of renewables: intermittency and cost.[6] These "bridge fuel" proponents claim that dispatchable sources like natural gas, coal, nuclear, and hydro are necessary to ensure grid reliability because they can be stored and switched on at a moment's notice whenever required.[7] The inherent intermittent quality of renewables arguably makes those sources less reliable and not as dispatchable compared to

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[3] Joel B. Stronberg, *Natural Gas: Bridge or Barrier to a Clean Energy Future?*, RENEWABLE ENERGY WORLD (June 24, 2016), http://www.renewableenergyworld.com/articles/2016/06/natural-gas-bridge-or-barrier-to-a-clean-energy-future.html.

[4] *Id.*

[5] Dana Nuccitelli, *Natural gas killed coal – now renewables and batteries are taking over*, THE GUARDIAN (Jan. 29, 2018, 6:00 AM), https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/jan/29/natural-gas-killed-coal-now-renewables-and-batteries-are-taking-over?utm_source=SolarWakeup&utm_campaign=15724e0fe0-SolarWakeup_2_182_16_2013&utm_medium=email&utm_term=0_5eaa0aab62-15724e0fe0-44240353&mc_cid=15724e0fe0&mc_eid=5cece66daf.

[6] *See* Zeke Hausfather, *Is Natural Gas a Bridge Fuel?*, YALE CLIMATE CONNECTIONS (Aug. 23, 2016), https://www.yaleclimateconnections.org/2016/08/is-natural-gas-a-bridge-fuel/ ("The challenge is that although renewables are increasingly cost competitive with coal in some parts of the country, on average, they are still more expensive. Renewables are also often intermittent, producing less power when the sun doesn't shine or the wind doesn't blow.").

[7] *Id.*; Jason Deign, *Intermittent Renewables Are Up. So Where is All of The Gas?*, GREENTECH MEDIA (Oct. 13, 2017), https://www.greentechmedia.com/articles/read/intermittent-renewables-are-up-so-where-is-all-the-gas#gs.ay4=7uY.

supposed "baseload" sources.[8] The traditional concept of baseload sources is that they "operate continuously to meet the minimum level of power demand 24/7," with nuclear and coal power used as prime examples.[9]

Energy storage is increasingly able to pair with renewable sources at competitive costs to traditional coal and natural gas plants. This, combined with recent projects proving that renewables-plus-storage are even more dispatchable and flexible than traditionally reliable fossil fuel sources, has the potential to drastically disrupt the energy market and eliminate the arguments for a natural gas "bridge" to a low-carbon energy future.[10] In order to achieve a low-carbon energy future as soon as possible, energy storage must be allowed to reach its full potential and perform every possible service it is capable of, thereby unleashing all of its conceivable benefits.[11]

This essay will first address one of the biggest barriers to

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[8] Andrew H. Meyer, *Federal Regulatory Barriers to Grid-Deployed Energy Storage*, 39 COLUM. J. ENVTL. L. 479, 502 (2014); Hausfather, *supra* note 6.

[9] Brigham A. McCown, *Baseload Power Will Keep The Lights On*, FORBES (July 27, 2017, 11:47 AM), (internal quotations omitted), https://www.forbes.com/sites/brighammccown/2017/07/27/baseload-power-will-keep-the-lights-on/#21fca8f52c5b.

[10] *See* Nuccitelli, *supra* note 5 (quoting Union of Concerned Scientists senior energy analyst Laura Wisland, "rapidly falling costs are already making renewables and battery storage cost-competitive with natural gas, and cheaper than coal. If we're going to succeed in avoiding the most dangerous climate change consequences, that transition away from all fossil fuels and towards clean energy can't happen soon enough."); *see also* Robert Walton, *Report: Tesla's Australian battery project steps in after coal units fail*, UTILITY DIVE (Jan. 2, 2018), https://www.utilitydive.com/news/report-teslas-australian-battery-project-steps-in-after-coal-units-fail/513870/ (reporting that a Tesla battery facility "supplied grid power at 'record pace'" after two coal plant units tripped offline).

[11] *See* Meyer, *supra* note 8, at 482 ("Among other benefits, energy storage resources can reduce our dependence on inefficient peaking plants, increase the capacity factor of existing generation and transmission infrastructure, and facilitate the integration of renewable resources—typically with zero direct emissions.").

unlocking energy storage's full potential in the United States ("U.S."): the regulatory uncertainty created by the Federal Energy Regulatory Commission's ("FERC") current method of classifying energy storage and how that uncertainty hinders greater investment in energy storage projects and technology.[12] It will then examine Order No. 841, FERC's recent final rule on energy storage and distributed energy resources ("DERs"), in light of the issue of regulatory classification and its impact on the future classification of energy storage and DERs.[13] Finally, it will conclude by analyzing how the implications of Order No. 841 and the main possible outcomes could affect state actions and the U.S.' ability to quickly transition to a low-carbon future.

I. The Problem of FERC's Current Energy Resource Classification Structure

The current U.S. energy regulatory structure is divided between FERC and state authority.[14] FERC's federal jurisdiction stems from the Federal Power Act of 1935 (the "FPA"), in which Congress granted FERC "plenary jurisdiction to regulate the 'transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce,'" where "sale of electric energy at wholesale" means "a sale of electric energy to any person for resale."[15] The FPA extends FERC

[12] Amy L. Stein, *Reconsidering Regulatory Uncertainty: Making a Case For Energy Storage*, 41 FLA. ST. U. L. REV. 697, 716 (2014) ("[S]takeholders repeatedly point to regulatory uncertainty as one of the primary barriers to energy storage's further deployment.").

[13] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶ 61,127 (Feb. 15, 2018) (to be codified at 18 C.F.R. pt. 35).

[14] Meyer, *supra* note 8, at 505.

[15] *Id.* (quoting The Federal Power Act of 1935, 16 U.S.C. §§ 824(a), (d) (2018)).

jurisdiction "to those matters which are not subject to regulation by the States."[16] Moreover, the FPA left states with full jurisdiction "over facilities used for the generation of electric energy [and] over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce."[17] Although this seems like a bright-line delineation, FERC and state electricity jurisdictional issues are heavily litigated and FERC jurisdiction ultimately covers most electricity in the U.S. at some point before consumption.[18]

Energy resources are classified based on three asset categories: (1) generation; (2) transmission; and (3) distribution.[19] While traditional energy resources are typically easy to identify in a single category, energy storage has the unique ability to function in all three.[20] This creates uncertainty for project developers and investors because the classification of a resource affects how that project recovers costs and realizes its value streams within overlapping FERC and state jurisdictions.[21] Energy storage also creates uncertainty for regulators who want to prevent energy storage projects from "double-counting" in multiple categories and thus obtaining unfair cost recovery.[22] This uncertainty is a major barrier to unlocking energy storage's full potential because "[f]irms are less willing to invest where the returns are uncertain . . . [and they] cannot accurately

[16] 16 U.S.C. § 824(a).

[17] 16 U.S.C. § 824(b)(1).

[18] Meyer, *supra* note 8, at 484.

[19] Stein, *supra* note 12, at 718.

[20] *Id.*

[21] *Id.*

[22] *Id.*

predict future regulatory conditions."[23]

Until Order No. 841, FERC maintained its traditional three-category classification structure regarding energy storage projects by handling all energy storage issues on a "case-by-case basis."[24] FERC has admitted "that electricity storage devices . . . do not readily fit neatly into one of the traditional asset functions of generation, transmission or distribution."[25] Over the past few years, this classification dilemma can be seen through various FERC rulemakings in instances where FERC classified energy storage projects in different categories.[26] For generation classifications, FERC Order No. 792 amended the Small Generator Interconnection Agreements and Procedures ("SGIA" and "SGIP") to "specifically include energy storage devices" for SGIA/SGIP eligibility, eliminating both uncertainty and administrative costs for energy storage projects to connect with the grid as generators.[27] Additionally, FERC's inclusion of "energy storage resources" as an "energy constrained resource" in Order No. 764 is further evidence of FERC classifying energy storage as a generation resource.[28] Conversely, FERC has classified storage projects as transmission assets in certain cases, such as the

[23] *Id.* at 732 ("Such reluctance to invest also can stifle innovation.").

[24] Order on Petition For Declaratory Order, 130 FERC ¶ 61,056, at para. 44 (Jan. 21, 2010).

[25] *Id.* ("Under certain circumstances, storage devices can resemble any of these functions or even load.").

[26] Meyer, *supra* note 8, at 525-30.

[27] Small Generator Interconnection Agreements and Procedures, Order No. 792, 145 FERC ¶ 61,159, at paras. 1, 6 (Nov. 22, 2013) (to be codified at 18 C.F.R. pt. 35).

[28] Meyer, *supra* note 8, at 525-26 (quoting Integration of Variable Energy Resources, 139 FERC ¶ 61,246 (June 22, 2012)).

Western Grid Development, LLC order issued on January 21, 2010.[29]

The critical issue with energy storage projects is that they may not fit neatly into FERC's traditional three-category system. Rather, "maximizing the value of a given storage asset within the traditional generation-transmission-distribution framework may require classifying it in more than one asset category."[30] Energy storage's unique ability to perform all three traditional grid functions means that a single energy storage facility could be used as transmission to perform "routine ancillary grid functions" and then also deployed to sell wholesale energy during peak demand.[31] The concern with such an approach is that the storage facility could "over-recover" its costs by combining these different revenue streams. Under the current system, revenue cannot be given on a pro-rata basis for different streams and FERC has thus not allowed multiple revenue stream recoveries. However, FERC has changed course with Order No. 841, which is intended "to remove barriers to the participation of electric storage resources in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations (RTO) and Independent System Operators (ISO)."[32]

II. FERC's Attempts to Resolve the Energy Storage Classification Issue

[29] Order on Petition for Declaratory Order, 130 FERC ¶ 61,056 (Jan. 21, 2010) ("[B]ased on the specific circumstances and characteristics of the Projects, the Projects would be wholesale transmission facilities subject to the Commission's jurisdiction if operated as described by Western Grid.").

[30] Meyer, *supra* note 8, at 532.

[31] *Id.*

[32] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶ 61,127, at i (Feb. 15, 2018) (to be codified at 18 C.F.R. pt. 35).

a. Initial Steps – Increased Cost Transparency

FERC's initial steps to address the energy storage classification problem attempted to increase transparency regarding energy storage's costs and functional flexibility by adding storage-specific expense accounts to the existing classification system.[33] Currently, energy storage facilities have accounts for production, transmission, and distribution.[34] While helpful, these actions did not address the thornier question of how to enable single energy storage resources to "simultaneously . . . recover costs under cost-based and market-based rate mechanisms."[35]

b. Recent Steps – New Precedent Recognizing Energy Storage Services and Order No. 841

In February of 2017, FERC found that a Midcontinent ISO ("MISO") tariff was "unjust, unreasonable, and unduly discriminatory or preferential because it unnecessarily restricts competition by preventing electric storage resources from providing all the services that they are technically capable of providing."[36] FERC's emphasis on allowing energy storage to utilize all of its possible functions creates a hopeful precedent

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[33] *See* Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies, 144 FERC ¶ 61,056, at para. 124 (July 18, 2013) (to be codified at 18 C.F.R. pts. 35, 101, 141) ("[T]here is a need for certainty in the accounting and reporting treatment for energy storage assets and operations, especially in instances where utilities seek to recover costs of energy storage operations in cost-based rates.").

[34] *Id.* at para. 141 (adopting NOPR proposal to create "Account 348, Energy Storage Equipment-Production, Account 351, Energy Storage Equipment-Transmission, and Account 363, Energy Storage Equipment-Distribution . . . .").

[35] Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies, 139 FERC ¶ 61,245, at n.90 (proposed June 22, 2012) (to be codified at 18 C.F.R. pts. 35, 101, 141).

[36] Indianapolis Power & Light Co., 158 F.E.R.C. ¶ 61,107, at para. 69 (2017).

for energy storage developers across the country because "FERC can't ask one ISO to do something without binding the other ISOs."[37] While previous FERC precedent has not allowed cost recovery for multiple uses, this recent FERC MISO tariff order appears to create a new precedent for enabling energy storage to provide all of its possible services which in turn should allow for multiple-use cost recovery as well.[38]

Over the past year, FERC has taken more significant actions toward addressing this issue. On February 15, 2018, FERC issued a final rule on energy storage that requires "each RTO/ISO to revise its tariff to establish a participation model consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, facilitates their participation in the RTO/ISO markets."[39] The Order states that for each RTO/ISO:

> [the] participation model must (1) ensure that a resource using the participation model is eligible to provide all capacity, energy, and ancillary services that the resource is technically capable of providing in the RTO/ISO markets; (2) ensure that a resource using the participation model can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer consistent with existing

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[37] Peter Maloney, FERC Storage/DER Integration Proposal Gets High Marks, But Other Priorities Loom, UTILITY DIVE (Nov. 14, 2017), https://www.utilitydive.com/news/ferc-storageder-integration-proposal-gets-high-marks-but-other-priorities/510659/.

[38] Herman K. Trabish, *A Silver Bullet? Inside FERC's Landmark Energy Storage Rulemaking*, UTILITY DIVE (Jan. 10, 2017), https://www.utilitydive.com/news/a-silver-bullet-inside-fercs-landmark-energy-storage-rulemaking/433559/.

[39] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶ 61,127, at i (Feb. 15, 2018) (to be codified at 18 C.F.R. pt. 35).

> market rules that govern when a resource can set the wholesale price; (3) account for the physical and operational characteristics of electric storage resources through bidding parameters or other means; and (4) establish a minimum size requirement for participation in the RTO/ISO markets that does not exceed 100 kW.[40]

Regarding electricity sales to and from the RTO/ISO markets and energy storage resources, the Order states that "each RTO/ISO must specify that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets must be at the wholesale locational marginal price."[41]

Order No. 841 addresses energy storage's issues with multiple stacked applications and multiple value streams from wholesale markets and distribution retail services.[42] The Order appears to be heavily influenced by the majority of the more than 100 comments submitted to FERC regarding the Notice of Proposed Rulemaking ("NOPR") that preceded the Order. The majority of these comments supported the goal of reducing uncertainty and creating clearer rules for energy storage and DER integration into wholesale markets, especially regarding energy storage.[43] However, the Order did not take any final action on one of the

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[40] *Id.* at i-ii.

[41] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶ 61,127 (Feb. 15, 2018) (to be codified at 18 C.F.R. pt. 35).

[42] *Id.*

[43] *See* Maloney, *supra* note 37 (noting Exelon commented "that . . . 'the time is ripe' for FERC to take up the matter of integrating storage into ISOs and RTOs . . . ." and PJM said, "[s]torage resources should be able to participate as both wholesale sellers of services and wholesale buyers of energy.").

NOPR's critical proposed reforms: removing barriers to DER aggregations. The Order explained that while FERC "continue[s] to believe that removing barriers to distributed energy resource aggregations in the RTO/ISO markets is important, [FERC has] determined that more information is needed with respect to those proposals."[44]

c. Order No. 841 – Next Steps for RTOs/ISOs

Each RTO and ISO must create its participation model by this November.[45] After that time, they then have a year to put the models into action.[46] Once in place, these models "will likely become one of the largest opportunities for energy storage in the country."[47] When creating these participation models, the RTOs/ISOs must ensure that neither cross-subsidization nor over-recovery occurs. The critical aspect is emphasizing the need for increased collaboration and communication between FERC, the states, and ISOs/RTOs regarding energy storage facilities, and utilizing the most advanced technology to record how each storage facility is being used on a second-by-second basis.

In this scenario, the RTOs/ISOs will have to create "a new type of optimization engine or algorithm" to ensure that energy storage facilities do not over-recover costs.[48] This will likely have to be completed in

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[44] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶ 61,127, at ii.

[45] Jeff St. John, *FERC Allows Energy Storage to Play in Nationwide Wholesale Markets*, GREENTECH MEDIA (Feb. 15, 2018), https://www.greentechmedia.com/articles/read/ferc-energy-storage-wholesale-markets#gs.Vi=e6h0.

[46] *Id*.

[47] *Id.*

[48] Trabish, *supra* note 38.

collaboration with FERC, to create a system where each energy storage device registers for the various functions it is willing and able to perform, has its performance monitored, and has the amount of time the device performs each specific function recorded. At the end of each month, or some other agreed upon timeframe, all involved parties will then settle the cost-recovery elements of each specific function performed. This method would ensure that no double-counting occurs while still enabling the storage facility to obtain its maximum deserved revenue. One issue RTOs/ISOs will have to address is possible conflicts in situations where an energy storage facility must choose one of the multiple functions it could perform at any moment. Each participation model will have to create extremely precise rules for how an energy storage facility chooses between operating as a transmission service, generation service, or distribution retail service at any given time.[49]

III. Implications of Order No. 841 and Uncertainty Surrounding DERs

With Order No. 841, FERC has given states, RTOs/ISOs, and project developers greater certainty for investments in energy storage projects. Allowing individual energy storage facilities to recover from multiple value streams while acting in generation, transmission, and distribution capacities will help enable energy storage to reach its full potential and become a foundational aspect of a future low-carbon energy system. With this type of certainty in place for energy storage, the transition to a low-carbon energy system could happen sooner than

[49] *Id.*

previously anticipated.

However, FERC's decision to postpone creating a rule on DER and energy storage aggregation leaves much uncertainty unresolved. While Order No. 841 creates clear signals for large energy storage projects and commercial-scale DER sources that do not need aggregation, many smaller projects that do rely on aggregation are left wondering what will happen. This aggregation issue relates to the "cross-jurisdictional challenges" of the current energy infrastructure between FERC, RTOs/ISOs, and local distribution utility companies because local utility companies control the distribution grid, which happens to be "where the vast majority of DERs are connected."[50] This aggregation issue is complicated for FERC because RTOs/ISOs do not have control over the utility companies' distribution grid, and the utility companies also rely on their local DER and energy storage projects for their own local power infrastructure. It quickly becomes a complex, multi-pronged problem at various levels, dealing with communication and coordination, service contracts, service rates, accounting issues, accurate metering and billing, and above all, grid reliability and safety.[51] FERC must address all of these problems before creating a final rule on the subject, and the proposed rule must resolve them in a way that effectively allows both the RTOs/ISOs and local utility companies to achieve the maximum possible benefits from aggregated DERs and energy storage devices.

Even with the current system's uncertain status regarding energy storage and DER aggregation, solar-plus-storage and wind-plus-storage

[50] John, *supra* note 45.

[51] *See* John, *supra* note 45.

bids are already setting record low prices,[52] and multiple states are committing to deploy increasingly greater amounts of energy storage to meet renewable energy goals.[53] Also of note, the California Public Utilities Commission ("CPUC") recently authorized the local utility company, PG&E, to procure energy storage resources to replace three existing natural gas power plants.[54] The lack of a rule on DER aggregation likely will not stop renewables-plus-storage prices from dropping even further as energy storage facilities at the commercial level are able to recover greater costs and thus offer lower prices that are still fair to the market. These lower prices will enable renewables-plus-storage to beat out future and existing fossil fuel plants (which only operate at a commercial level) at a much faster rate. Energy storage facilities will likely replace a significant number of existing "peaker" plants, similar to the CPUC order with the three PG&E natural gas plants. Peaker plants

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[52] *See* Jason Deign, *Xcel Attracts 'Unprecedented' Low Prices for Solar and Wind Paired With Storage*, GREENTECH MEDIA (Jan. 8, 2018), https://www.greentechmedia.com/articles/read/record-low-solar-plus-storage-price-in-xcel-solicitation#gs.lKPxZJM (reporting a median solar-plus-storage price of $36/MWh, 20 percent lower than previous record, and a median wind-plus-storage price of $21/MWh, which is below Lazard's levelized cost of energy estimates for wind).

[53] *See* Julian Spector, *The Best News Yet For Energy Storage in New York*, GREENTECH MEDIA (Jan. 10, 2018), https://www.greentechmedia.com/articles/read/new-york-storage-industry-cash-target#gs.BNwkDEA (stating that New York pledged 1,500 MW of energy storage by 2025, California has a 1,300 MW energy storage mandate, and Massachusetts pledged 200 MW); *see also* Julian Spector, *Arizona Regulator Proposes Biggest Storage and Clean Energy Target Yet*, GREENTECH MEDIA (Jan. 30, 2018), https://www.greentechmedia.com/articles/read/arizona-regulator-proposes-sweeping-clean-energy-plan?utm_source=SolarWakeup&utm_campaign=3e6315ff52-SolarWakeup_2_182_16_2013&utm_medium=email&utm_term=0_5eaa0aab62-3e6315ff52-44240353&mc_cid=3e6315ff52&mc_eid=5cece66daf#gs.c5CfO34 (noting that Arizona recently proposed a 3,000 MW energy storage target for 2030).

[54] Julian Spector, *PG&E Must Solicit Energy Storage and DERs to Replace 3 Existing Gas Plants*, GREENTECH MEDIA (Jan. 15, 2018), https://www.greentechmedia.com/articles/read/pge-must-solicit-energy-storage-ders-to-replace-three-existing-gas-plants#gs.ZoWykk4.

are those "which turn on only to meet high demand," and peak capacity is similarly the energy needed for the times of highest energy demand throughout the year.[55]

Moreover, with a greater amount of certainty, energy storage facilities will be increasingly utilized for ancillary grid services and reliability. As energy storage technology develops and the various regulators and actors grow more comfortable fully utilizing a facility's capabilities, a single storage facility will be able to perform all of the services described above. The U.S. must add 20 gigawatts of peaking capacity to the grid over the next 10 years.[56] With Order No. 841, energy storage could provide a substantial majority of that capacity through the type of state actions described in this section. However, allowing DER and energy storage aggregation would greatly increase the penetration of renewables-plus-storage and create the potential for an even more dramatic shift away from our centralized energy infrastructure toward one that is more localized, responsive, safe, and inclusive of communities marginalized by our current system. If FERC creates an effective rule regarding DER and energy storage aggregation, it could significantly decrease the amount of peaking capacity required over the next 10 years, in addition to being the catalyst that sparks a full transition away from our current energy infrastructure.

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[55] Liam Denning, *Unlike Peak Oil, Peaker Gas Has a Future*, BLOOMBERG: OPINION (June 20, 2018, 11:03 AM), https://www.bloomberg.com/view/articles/2018-06-20/natural-gas-power-forecasts-are-rosy-for-peaker-plants.

[56] Jeff St. John, *Gas Under Threat? California Regulators Target PG&E Natural Gas Plants With Energy Storage*, GREENTECH MEDIA (Dec. 20, 2017), https://www.greentechmedia.com/articles/read/natural-gas-under-threat-california-pge-gas-plants-energy-storage#gs.uL22uDw.

IV. Conclusion

Although creating a low-carbon energy system and limiting global warming to two degrees Celsius are both long-term goals, the decisions made in the next few years will have a significant impact on society's ability to meet those goals because "power plants built today can continue to operate for decades to come."[57] While some states are adopting renewable-centered energy plans, the level of low-carbon penetration necessary to significantly mitigate climate change also requires federal regulatory action. Energy storage's untapped potential to perform numerous grid functions, especially its ability to pair with renewable energy sources to create a reliable, dispatchable, and increasingly cost-effective low-carbon energy supply, makes unlocking that potential an essential near-term goal.

FERC's Order No. 841 will eliminate much uncertainty around energy storage and help unleash that full potential by allowing energy storage facilities to perform all possible grid functions and receive compensation from multiple value streams. However, this can only be achieved successfully with intense collaboration between FERC, state governments, and ISOs/RTOs to ensure that no cross-subsidization or over-recovery occurs. FERC's upcoming decision on DER and energy storage aggregation will be a critical ruling that can bring even greater certainty to storage-plus-renewables development if decided properly, enabling increased investment and the possibility for a future low-carbon energy system built around a foundation of distributed energy storage

[57] Nuccitelli, *supra* note 5.

technologies. The sooner such decisions are made, the earlier a low-carbon energy future can become a reality.