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BATTERIES AND STATE LAW: A GLIMPSE OF THE FUTURE IN THE LONE STAR STATE

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The mismatch of localized electricity regulations with interstate electricity generation and transmission creates large inefficiencies. It is possible to solve this problem without overturning the entire existing regime by affording federal, state, and local regulatory bodies more power to implement battery technology without traditional regulatory hindrances. Given the limited number of regulatory bodies responsible for oversight, combined with the uniquely deregulated electricity market, the state of Texas is a prime market for the fledging technology. The Lone Star State should accommodate battery implementation by allowing investors to recoup their invested costs in the technology. Applying lessons learned from Texas to nationwide energy markets will help solve many of the inefficiencies plaguing the nation's electricity infrastructure and regulatory framework.

I. INTRODUCTION

In the near future, battery technology will disrupt the utility market. Texas may offer a glance into this future. The state's largest power line company, Oncor Inc. ("Oncor"), revealed its plans to invest billions of dollars by 2018 to install around 25,000 batteries across Texas to discharge electricity when needed.[1] Oncor commissioned a study that found the use of batteries should be

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[1] Jim Malewitz, *State Law Could Short-Circuit Battery Breakthrough*, THE TEXAS TRIBUNE (Dec. 15, 2014), http://www.texastribune.org/2014/12/15/state-law-could-short-circuit-battery-breakthrough.

efficient enough to warrant wide-scale implementation in the near future.[2] Oncor's interest represents one of the first major moves by a large industry player into installing batteries on the electrical grid.[3] The primary hurdle to this progress springs from Texas's regulatory utility market structure, which prevents a company from owning and operating electricity generation and transmission assets, and thus spreads the benefits of battery technology too wide to allow any utility company involved to gain a return on investment.[4] Additionally, difficulties relating to battery implementation will vary when the technology eventually moves to other states, as some states have more accommodating utility structures than others do.[5] Other states have developed energy storage devices, but none have successfully implemented battery technology into the grid on a large scale.

This Recent Development argues that batteries can help alleviate some of the current issues with the mismatch of localized electricity regulation with national electricity generation and transmission, and uses Texas as an example of this possibility. This Recent Development proceeds as follows. Part II identifies the structure of Texas's regulatory-mandated utility market, keeping a strong focus on the effect this format has on the battery's market

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[2] *Id.* This study depends on innovations of leading electric storage companies, such as Tesla, who have started to heavily invest in large-scale battery technology. Brian Fung, *This new Tesla battery will power your home, and maybe the electric grid too*, WASH. POST (Feb. 12, 2015), http://www.washingtonpost.com/blogs/the-switch/wp/2015/02/12/this-new-tesla-battery-will-power-your-home-and-maybe-the-electric-grid-too.

[3] Nicholas Sakelaris, *Oncor Proposes Massive Battery Storage Project on the Grid with Tesla*, DALLAS BUS. J. (Nov. 14, 2014, 10:02 AM), http://www.bizjournals.com/dallas/news/2014/11/13/oncor-proposes-massive-battery-storage-project-on.html.

[4] *See* JUDY CHANG ET. AL., THE BRATTLE GROUP, THE VALUE OF DISTRIBUTED ELECTRICITY STORAGE IN TEXAS PROPOSED POLICY FOR ENABLING GRID-INTEGRATED STORAGE INVESTMENTS 17 (2014), *available at* http://www.brattle.com/system/news/pdfs/000/000/749/original/The_Value_of_Distributed_Electricity_Storage_in_Texas.pdf.

[5] Deregulated markets will better accommodate battery technology, since its implementation will depend on market forces rather than the judgment of a state public utility commission. This argument is developed throughout the paper. For a list of deregulated states *see infra* note 8.

viability. Part III examines how different stakeholders in Texas benefit from the implementation of battery technology. Part IV focuses on what needs to change in the Texas regulatory structure to accommodate battery technology. Parts V and VI extrapolate Texas' problems to other federal and state utility structures to better understand if batteries could be implanted easier in other energy markets. Part VII suggests possible changes at different levels of government to better increase grid efficiency through battery implementation. This Recent Development concludes by discussing how Texas's current electricity market avoids many of the regulatory hurdles present around the country, suggesting that the state is a prime proving ground for the fledging battery technology.

II. THE STRUCTURE OF THE TEXAS REGULATORY UTILITY MARKET

Texas mandates a deregulated utility market: rates charged to customers come from market conditions and are not agency-mandated.[6] The separation of vertically integrated utilities characterizes deregulated markets.[7] A vertically integrated utility is one that owns a monopoly on every part of the electricity market (generation, transmission, and distribution), and is utilized by most states.[8] In 1999, the Texas Legislature passed Senate Bill 7

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[6] *What Approaches to Retail Electric Market Structure have been Tried in Michigan and in other States and Jurisdictions?*, MICHIGAN.GOV, http://www.michigan.gov/energy/0,4580,7-230-68204_54287-293379--,00.html (last visited Jan. 3, 2015). Although, municipalities and electric cooperatives are able to opt out of retail competition. ELECTRIC RELIABILITY COUNCIL OF TEXAS, NODAL MARKET GUIDE 7 (3rd ed. 2010), *available at* http://www.ercot.com/content/services/rq/ERCOT_Nodal_Market_Guide_v3.0.doc (citing S.B. 7, 76th Cong., Reg. Sess. (Tx. 1999)).

[7] Edan Rotenberg, *Energy Efficiency in Regulated and Deregulated Markets*, 24 UCLA J. ENVTL. L. & POL'Y 259, 269 (2006).

[8] THE ELECTRIC ENERGY MARKET COMPETITION TASK FORCE, REPORT TO CONGRESS ON COMPETITION IN WHOLESALE AND RETAIL MARKETS FOR ELECTRIC ENERGY 18 (2006), *available at* http://www.ferc.gov/legal/fed-sta/ene-pol-act/epact-final-rpt.pdf [hereinafter TASK FORCE]. Seventeen states currently utilize deregulated markets: Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Michigan, Montana, New Hampshire, New Jersey, New York,

("SB7"), which required investor-owned utilities ("IOU") to separate their generation, transmission and distribution, and retail functions.[9] Additionally, SB7 mandated free-market competition between different electricity providers, in which customers may choose the lowest-cost option.[10] Providers would still operate their power lines, as it would be inefficient to allow multiple companies to operate overlapping transmission infrastructure.[11] Furthermore, to prevent favoritism by a transmission company to any of its own electricity generation, Section 39.105 of the Texas Utility Code forbids a transmission and distribution utility from buying or selling electric power.[12] The legislature most likely passed this prohibition in response to the Federal Energy Regulatory Commission's ("FERC") push in the late 1990s and early 2000s to ensure adequate competition in energy generation.[13]

Understanding the current Texas utility market is critical to analyzing the possible implementation of batteries onto the grid. Section 39.105 effectively created two competitive markets: a wholesale market between generators and a retail market between

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Ohio, Oregon, Pennsylvania, Rhode Island, Texas, and the District of Columbia. *See Energy Deregulated States in the United States*, QUANTUM GAS & POWER SERVICES, http://www.quantumgas.com/list_of_energy_deregulated_states_in_united_states.html (last visited Jan. 27, 2015).

[9] S.B. 7, 76th Cong., Reg. Sess. (Tx. 1999) ("Not later than January 1, 2002, each electricity utility shall separate its business activities from one another into the following units: (1) a power generation company; (2) a retail provider; and (3) a transmission and distribution utility.") (codified as TEX. UTIL. COD. ANN. § 39.051(b) (1999)).

[10] *Electric Reliability Council of Texas*, THE TEXAS OFFICE OF PUB. UTIL. COUNSEL, http://www.opuc.texas.gov/ercot.html (last visited Jan. 12, 2015).

[11] Daniel M. Gonzales, *Shockingly Certain: Why Is the Public Utility Commission of Texas Steadfast in Its Resolve to Keep Texas's Energy Market Deregulated Amidst Turmoil?*, 10 TEX. TECH ADMIN. L.J. 497, 503 (2009).

[12] TEX. UTIL. CODE ANN. § 39.105(a) (1999) ("After January 1, 2002, a transmission and distribution utility may not sell electricity or otherwise participate in the market for electricity except for the purpose of buying electricity to serve its own needs.").

[13] TASK FORCE, *supra* note 8, at 30. A further discussion of this trend can be *infra* Part IV.A.

a generator and the final user.[14] An independent organization, the Electric Reliability Council of Texas ("ERCOT"), collects customer's preferences regarding energy providers, manages the flow of energy across the grid to ensure reliability, and dictates the market conditions to ensure nondiscriminatory terms.[15] Texas also utilizes a node structure, which uses over 4,000 points around Texas to calculate the market demand for electricity.[16] These nodes may be an "energy source, sink, or switching station" each with an associated cost of electricity.[17] Basically, nodes are "points of transmission system interconnection."[18] The large number of nodes allows a very transparent market, which increases ERCOT's ability to efficiently dispatch resources to meet demand.[19] This type of distribution allows large and small generators to compete on the same playing field.[20] Congestion, however, still occurs, and large price hikes accompany the use of the transmission infrastructure.[21] ERCOT calculates the related costs of congestion at each node to better understand the related increase in price correlated with the increased demand.[22]

III. THE COSTS AND BENEFITS OF BATTERY TECHNOLOGY IN THE TEXAS UTILITY MARKET

Current market forces in Texas make it attractive to introduce batteries. Texans' demand for electricity is increasing much faster than the demand in other states.[23] Given this ever-growing demand,

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[14] Daniel M. Gonzales, *Shockingly Certain: Why Is the Public Utility Commission of Texas Steadfast in Its Resolve to Keep Texas's Energy Market Deregulated Amidst Turmoil?*, 10 TEX. TECH ADMIN. L.J. 497, 503 (2009).

[15] *Id.* at 503–05.

[16] THE TEXAS OFFICE OF PUB. UTIL. COUNSEL, *supra* note 10.

[17] ELECTRIC RELIABILITY COUNCIL OF TEXAS, *supra* note 6, at 7.

[18] *Id.* at 5.

[19] *Id.*

[20] THE TEXAS OFFICE OF PUB, UTIL. COUNSEL, *supra* note 10.

[21] *Id.*

[22] ELECTRIC RELIABILITY COUNCIL OF TEXAS, *supra* note 6, at 5.

[23] Sakelaris, *supra* note 3. However, these predictions are far from certain. ERCOT and the federal Energy Information Agency ("EIA") differ on the exact level of growth of electricity demand in Texas. The models range from 0.2% to 1.8% increase in annual electricity use. This demand greatly influences the

regulators worry that energy generators will not build generation capacity quickly enough to keep up.[24] Any surplus capacity kept as a buffer could consequently drop to extremely low levels, or, even worse, cause blackouts in certain parts of the grid.[25]

Because energy storage is currently very expensive, generators around the nation must produce energy almost simultaneously to when consumers need it.[26] Low-cost batteries offer a convenient solution by providing the opportunity to buy energy during low-demand periods, and then place it back into the grid when a high-demand for energy exists.[27] Additionally, batteries allow wind power, one of Texas's largest renewable sources of energy, to become more cost efficient.[28] Wind does not always produce a steady stream of energy, and batteries can store the energy produced when it is not needed.[29]

A. *Cost and Benefits to Texas Market Stakeholders*

Investors will only invest in batteries when the benefit outweighs the cost. The cost-benefit analysis differs depending on the stakeholder.[30] Market participants who sell energy on the wholesale or retail market will reap the associated profit from buying energy at low-demand times and reselling at high-peak times to exceed the investment.[31] This group includes generators, transmission and distribution ("TD") providers, and energy

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growth (or decrease) in required generational capacity. *See* Mitchell Schnurman, *Texas Powers Down*, THE DALLAS MORNING NEWS (Aug. 26, 2014, 1:02 AM), http://www.dallasnews.com/business/columnists/mitchell-schnurman/20140825-texas-powers-down.ece.

[24] Sakelaris, *supra* note 3.

[25] *Id.*

[26] THE REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 16 (2011), *available at* http://www.raponline.org/docs/RAP_Lazar_ElectricityRegulationInTheUS_Guide_2011_03.pdf.

[27] Sakelaris, *supra* note 3.

[28] *Id.*

[29] *Id.*

[30] CHANG ET AL., *supra* note 4, at 4.

[31] *Id.*

brokers.[32] Because the Texas market allows many market participants to sell energy through the grid,[33] this group differs from regulated, vertically integrated utilities which operate monopolies in states.[34] The market participants in Texas would benefit from the avoided generation capacity associated with battery implementation. Additionally, batteries could supplement the grid when demand outweighs supply, thus alleviating distribution outages.[35] Businesses could potentially make significant profit during these outage periods, as industrial users lose money when not supplied with electricity to run their operations.[36] For industrial users, the value of lost electricity during these blackout periods average around $20,000/Megawatt-hour ("MWh").[37] Since the average price of one MWh in Texas hovers around $35, energy could hypothetically be sold during a future grid blackout for a large gain.[38]

Policymakers, on the other hand, can judge whether the system-wide benefits outweigh the system-wide costs to the electricity grid.[39] One such policymaker, the Public Utility Commission of Texas ("PUCT"), must include the analysis of "system-wide" benefits in its economic policy.[40] The societal-wide benefits would include: (1) fewer distribution outages; (2) deferred transmission and distribution investments; (3) production cost savings; and

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[32] *See id.* at 4 (stating these market participants include any investors who could profit from installing battery technology on the wholesale market).

[33] *See* THE TEXAS OFFICE OF PUB. UTIL. COUNSEL, *supra* note 10.

[34] *Electric Glossary,* MADISON GAS AND ELEC., http://www.mge.com/about-mge/electricity/elec-glossary.htm (last visited Feb. 19, 2015) ("Utilities are distinguished as being a class of business 'affected with a deep public interest' and therefore subject to regulation. Public utilities are further distinguished in that in most jurisdictions it is considered desirable for them to operate as controlled monopolies.").

[35] CHANG ET AL., *supra* note 4, at 16.

[36] *Id.* at 8–9.

[37] *Id.* at 9.

[38] FED. ENERGY REGULATORY COMM'N, AVERAGE ON-PEAK SPOT ELECTRIC PRICE 2012 (2013), http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-on-pk-elec-pr.pdf.

[39] CHANG ET AL., *supra* note 4, at 5.

[40] *Id.*

(4) cost savings from a decreased need generation investments and demand-side efficiency measures.[41] Customers, the final stakeholder, would benefit from the increased reliability, better power quality (storage can control voltage), and possibly lower electric bills.[42]

The Brattle Group[43] completed a study to quantify the price point necessary to make batteries a worthwhile investment for merchant participants.[44] The study concluded batteries must decrease in price to $350/kilowatt-hour ("kWh") to be attractive to investors.[45] Currently, the price hovers above $500/kWh, but future expected innovation could lower it.[46] By collaborating with Tesla, Oncor has increased its chances of reducing this cost to make wide-scale battery implementation profitable.[47]

The Brattle Group also calculated the installed battery capacity where marginal cost would equal the marginal benefit for market participants.[48] According to the study, this point exists at 15,000 MWh of installed battery capacity in Texas.[49] Above this amount, market participants would not gain from adding additional capacity. As the market includes more batteries, the profits associated with buying and selling during low- and high-demand periods would diminish because there would be more supply during the high-demand periods.[50]

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[41] *See id.*

[42] *Id.*

[43] The Brattle Group is an independent consulting firm advising large clients on complex economic, regulatory, and financial questions.

[44] CHANG ET AL., *supra* note 4, at 9.

[45] *Id.* at 2.

[46] *Id* at 7.

[47] Christopher Martin & James Polson, *Texas Utility Plans Battery Fix for Wavering Wind, Solar*, BLOOMBERG BUS. (Nov. 10, 2014, 10:12 AM), http://www.bloomberg.com/news/articles/2014-11-10/oncor-2-billion-texas-batteries-would-smooth-renewables ("Oncor has talked to Tesla Motors Inc. about using its batteries for the grid. . . . Tesla has announced plans to build a 'gigafactory' in Nevada that would produce batteries that can supply power to cars and store electricity for utilities. The company has said it plans to cut the per kilowatt-hour cost of its batteries by more than [thirty] percent.").

[48] CHANG ET AL., *supra* note 4, at 8.

[49] *Id.*

[50] *See id.* at 5–6.

Unfortunately, the benefits of battery technology apply to various utility market players differently. For example, energy generators may invest in batteries to avoid building new generation capacity.[51] Their bottom line, however, would not realize the additional inherent benefit of avoided transmission construction and demand-side efficiency measurements.[52] The mandated separation of generators and TD providers and the prohibition against TD companies selling electricity exacerbate this problem by preventing benefits from spreading through parties in different operations of electricity generation and delivery.[53] The Brattle Group argues policymakers should alter the Texas utility regulatory structure, so that the overall benefits of battery implementation on the Texas grid can be realized by investors.[54]

B. *The Costs and Benefits the Texas Regulatory Structure Poses to Battery Implementation on the Grid*

Texas contains a unique energy market, due to its customers' ability to choose their retail electric provider.[55] Most other states, with monopolistic, vertically integrated companies, set energy rates to cover the utility's reasonable costs for operating its whole business plus a fair return on shareholder investment.[56] Texas, on the other hand, promotes competition between different energy providers, and consequently, generators only receive payments for the energy they produce.[57] Like any market, different middlemen will also add costs, such as a transmission fee or energy-broker markup.[58]

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[51] *Id.* at 11.
[52] *Id.* at 17.
[53] *Id.* at 17–18.
[54] *Id.*
[55] Sakelaris, *supra* note 3. Other states allow customers to choose their retail provider. Texas, however, is the only state to function as a fully competitive energy market where electricity providers compete for the lowest price. *See* MICHIGAN.GOV, *supra* note 6.
[56] TASK FORCE, *supra* note 8, at 18.
[57] Sakelaris, *supra* note 3.
[58] *See* TASK FORCE, *supra* note 8, at 58–59.

Unfortunately, even though Section 39.051 breaks up any vertically integrated company and promotes competition, it also spreads the benefits of battery technology amongst energy generators, TD providers, and customers.[59] In a deregulated market, technology must be cost-competitive against other types of energy generation for a market participant to invest. If no single entity gets all the concentrated benefits, then no one will be incentivized to push for change. In Texas's current system, no individual party can enjoy all the benefits.[60] For example, according to a study completed by the Brattle Group, avoiding the cost of new generation capacity will only significantly benefit energy generators.[61] Thus, only generators would profit, because the method of generation does not affect other market participants' bottom lines.[62] Any savings passed to energy brokers or customers would not be substantial enough to warrant investment on a significant scale.[63] The Brattle study also found the extra benefit given to TD providers (deferred investment and reduced outages) would not be substantial enough to warrant the full utilization of battery technology.[64] To gain the maximum impact from battery technology on all of these parties, the Texas legislature must incorporate it into the wholesale electricity market.[65]

Given the current policy framework in Texas, neither generators nor transmission companies can independently capture sufficient benefits to justify investing in storage.[66] The Brattle Group recommends that the Texas Legislature allow transmission and distribution companies to invest in electricity storage and auction off the capacity to a third-party manager.[67] To maintain a clear delineation, transmission companies should be able to auction

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[59] *See* TEX. UTIL. CODE ANN. § 39.051 (1999).
[60] *See* CHANG ET AL., *supra* note 4.
[61] *Id.* at 17.
[62] *See id.*
[63] *Id.*
[64] *Id.*
[65] *Id.*
[66] *Id.*
[67] *Id.* at 17–18.

off the wholesale market value of distributed storage.[68] These third parties would then be responsible for scheduling the charge/discharge of the storage devices to maximize revenues in the wholesale market.[69] Transmission companies could then use the auction proceeds to decrease the rates customers pay.[70]

IV. OTHER STATES' REGULATORY ACCOMMODATION OF BATTERY TECHNOLOGY

State utility markets differ greatly in their regulatory mandates and actual makeup. Though Texas utilizes a deregulated model, most states utilize a traditional regulated utility market.[71] As discussed in Part III.A, under a regulated model, the vertically integrated utilities own the generation, transmission, and distribution.[72] Rates are based off the utility's reasonable cost, plus a fair return on shareholder investment, divided among all the consumers served.[73] However, a wholesale market slowly developed over time in the unregulated market, consisting of utilities buying large quantities of energy from different utilities to serve their customers.[74] Wholesale markets now mostly serve deregulated models.[75] Despite similar regulatory structures in most states, the actual makeup of each market differs due to states' different responses to market and regulatory pressures in the past.

A. *Brief History of State Utility Market Development*

The regulated, monopolistic state utility market was the norm for many years. Around the 1980s, states began to realize the

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[68] *Id.* at 18.
[69] *Id.*
[70] *Id.*
[71] TASK FORCE, *supra* note 8, at 16.
[72] *Id.* at 18.
[73] *Id.*
[74] *Id.* at 19.
[75] *See* William H. Hogan, Regulation and Electricity Markets, Presentation to the Western Power Trading Forum (Apr. 16, 2009), *available at* http://www.hks.harvard.edu/fs/whogan/Hogan_wptf_041609.pdf.

regulated model did not encourage efficiency within the utility.[76] Most notably, the Public Utilities Regulatory Policies Act ("PURPA") allowed non-utilities to enter the market by gaining access through the transmission infrastructure and thereby competing with traditional utilities providing energy.[77] FERC forced transmission companies to allow any generator to buy access to its infrastructure.[78] Consequently, states began passing measures to deregulate their utility market in similar measures to Texas.[79]

Two types of deregulated markets exist: those based on private contracts between energy brokers and generators and those based on a transparent and published market.[80] Markets based on private contracts suffer from congestion when the transmission infrastructure cannot accommodate all the energy being transported to end-users.[81] This forces transmission companies to hold some of their capacity in "reserve" to accommodate unexpected congestion.[82] On the other hand, transparent markets give clear indications of when more generation and TD infrastructure is needed.[83] However, dramatic price shifts may occur because of the lack of long-term certainty in transmission access.[84] By 2006, sixteen states and D.C. had restructured their retail electric service to include one of these options.[85]

B. *The Modern State Utility Market*

Utilities in many different types of regulated and unregulated markets have begun to divest or transfer their generation assets as a

[76] TASK FORCE, *supra* note 8, at 19.
[77] *Id.* at 20–21.
[78] *Id.* at 22–24.
[79] *Id.* at 42.
[80] *Id.* at 3–4.
[81] *Id.* at 3.
[82] *Id.*
[83] *Id.* at 3–4.
[84] *Id.* at 4.
[85] *Id.* at 6.

part of restructuring plans.[86] Regulators in FERC have launched a major push to stop vertically integrated companies from discriminating against other energy generators using their transmission infrastructure.[87] Federal legislation encourages independent regulating bodies to manage transmission lines[88] and prohibits discrimination regardless of who manages the TD infrastructure.[89] Additionally, the number of vertically integrated companies is falling: by 2010, twenty-four states had replaced, or attempted to replace, their electric utility monopoly system with competing sellers.[90] Consequently, different companies are realizing the profits from separate parts of the market. Investors could have a difficult time making batteries cost-efficient because they cannot realize the benefits across multiple sectors of the utilities market.

V. BATTERY IMPLEMENTATION IN DIFFERENT TYPES OF STATE UTILITY MARKETS

Because utilities recoup investments by set rates, battery implementation could easily occur in a regulated market.[91] In a deregulated market, however, batteries will be good investments once the price point drops, taking into account all of their benefits spread amongst different stakeholders.[92] The smaller number of traditional vertically integrated companies, however, poses the main threat to battery implementation. This divesture is occurring in regulated and deregulated markets alike.[93] Only regulated

[86] *Id.*

[87] *Id.* at 30.

[88] FLOYD L. NORTON ET AL., ENERGY LAW AND TRANSACTIONS § 82.04 (2014).

[89] Order No. 888, Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 61 Fed. Reg. 21,540, 21,541 (Apr. 24, 1996) (codified at 18 C.F.R. § 35 (2015)).

[90] *Status of Electricity Restructuring By State*, U.S. ENERGY INFO. ADMIN. (Sep. 2010), http://www.eia.gov/electricity/policies/restructuring/restructure_elect.html. This divestiture was in response to the greater amount of competitiveness in electricity markets caused by regulatory pressure in the late 1990s. TASK FORCE, *supra* note 8, at 42.

[91] CHANG ET AL., *supra* note 4, at 14.

[92] *Id* at 17.

[93] *See* TASK FORCE, *supra* note 8, at 30–31.

markets, however, allow market players to regain their costs through ratemaking.[94]

Additionally, the rate at which utilities buy wholesale energy, regardless of the type of market in which they operate, has increased over the long term.[95] Due to the large quantities demanded and the high-price at which the energy could be sold, battery-owners would benefit handsomely from an increased wholesale market.[96] Batteries can even help generation companies avoid the costs associated with wholesale markets, by keeping a viable source of energy available as a reserve.[97] Since a wide-scale conversion to deregulated markets is impractical,[98] the problem of increasing the efficiency of the wholesale electricity market then centers on how to allow regulated and deregulated markets to seamlessly coexist.

Inherent factors in the unregulated utility market dissuade adequate investment to increase the amount of generation serving customers. The two main issues are the lack of long-term contracts on the wholesale electricity market and lack of transmission infrastructure to accommodate new generation capability.[99]

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[94] *Id.* at 5–6.

[95] *Id.* at 30. The share of power purchased on the wholesale market by investor-owned utilities increased from 17.8% to 37.3% between 1989 and 2002. Steven J. Eagle, *Securing a Reliable Electricity Grid: A New Era in Transmission Siting Regulation?*, 73 TENN. L. REV. 1, 11 (2005).

[96] CHANG ET AL., *supra* note 4, at 8–9.

[97] *Id.* at 6–7.

[98] A national movement occurred in the 1990s and early 2000s for state deregulation of electricity markets. It failed, however, due to hesitant states erecting "safeguards" to protect against fluctuations new competitive models. In actuality, these safeguards undercut many of the free-market mechanisms of the deregulated markets and led to their eventual collapse. *See* Richard J. Pierce, Jr., *Completing the Process of Restructuring the Electricity Market*, 40 WAKE FOREST L. REV. 451 (2005).

[99] Eagle, *supra* note 95, at 4–5. Certain operators have also created "capacity markets," however, to help alleviate this concern. Capacity markets estimate the peak demand three years ahead, and then allow energy generators to bid on any amount of capacity they want to sell. Then, the operator will sell the energy for a "clearing price," which is the highest amount any generator is paid to meet the total estimated demand. Historically, parties implementing demand efficiency measures can also bid into the market to sell energy. Adam James, *How Capacity*

Batteries can greatly alleviate these two problems. Batteries built close to end-users can alleviate the need to build extra transmission lines from generators.[100] Additionally, they can supplement the delivery of energy to satisfy long-term contracts.[101] Furthermore, batteries can be used as a necessary reserve to avoid harsh, volatile markets or the overload of the transmission grid.[102] The main issue, then, revolves around how to incorporate batteries into unregulated markets.

VI. IMPLEMENTATION OF BATTERIES INTO NATIONAL REGULATORY SCHEMES

Batteries can be included in regulated markets as part of a utility's capital cost. Deregulated markets pose a more difficult problem given the past failings of states to establish an adequate regulatory structure. Batteries, however, actually pose a convenient solution for these past shortcomings, and FERC could mandate their implantation by increasing its own statutorily-granted power over deregulated markets.

A. *History of the Deregulation Movement*

Congress granted FERC the power to manage interstate sales of electricity in the Federal Power Act ("FPA").[103] Congress enacted FPA in 1935 to fill the gap the Supreme Court created when it held that no state could regulate interstate wholesales of electricity.[104] At the time, interstate electricity was an insignificant portion of the electricity market.[105] Today, almost all electricity

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Markets Work, ENERGY COLLECTIVE (June 14, 2013), http://theenergycollective.com/adamjames/237496/energy-nerd-lunch-break-how-capacity-market-works-and-why-it-matters.

[100] CHANG ET AL., *supra* note 4, at 8–9.

[101] *See* TASK FORCE, *supra* note 8, at 4.

[102] *Id* at 6 (discussing how battery investors can buy surplus energy at low-demand periods and then sell it at peak times, thus evening out the any drastic fluctuations in prices).

[103] *See* 16 U.S.C. § 813 (2012) (stating when the states do not control the electricity market "jurisdiction is conferred upon the commission").

[104] Pierce, *supra* note 98, at 466 (citing Fed. Power Comm'n v. So. Cal. Edison Co., 376 U.S. 205, 220 (1964)).

[105] *Id.*

dealings have interstate effects.[106] Three interconnected grids separately serve the east, west, and Texas.[107]

Legislation attempting to level the playing field between established utilities and smaller generators accompanied the deregulation movement in the 1980s. PURPA gave cogeneration plants and small power producers the opportunity to sell to utilities if they met certain qualifying criteria.[108] The Energy Policy Act of 1992 ("EPAct of 1992") expanded transmission access to larger energy generators.[109] The EPAct of 1992 also extended FERC's authority to order TD providers to "provide transmission service for wholesale power sales to any electric utility."[110] FERC enacted these mandates into regulation Order Numbers 888 and 889, which required non-discriminatory open access to transmission service.[111] The Commission believed open access would be a critical first step to establishing competitive markets.[112]

Congress then passed the Energy Policy Act of 2005[113] ("EPAct of 2005"). The EPAct of 2005 required FERC to create incentives for TD providers to improve transmission capabilities.[114] Additionally, the EPAct of 2005 repealed PURPA requirements for electric utilities to buy power from qualifying facilities ("QF").[115]

Finally, Bill Hogan of Harvard's Kennedy School of Government contributed a vital piece of the deregulated utility model utilizing a node structure.[116] The nodal system not only converted the scarcity of electricity into prices, but also includes

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[106] *Id.*
[107] *Id.* at 465.
[108] TASK FORCE, *supra* note 8, at 20.
[109] *Id.* at 23–24; *see* Energy Policy Act of 1992, ch. 134, 106 Stat. 2776 (1992).
[110] TASK FORCE, *supra* note 8, at 24.
[111] *Id.* at 25.
[112] *Id.* at 24.
[113] Energy Policy Act of 2005, Pub. L. No. 109-58 (2005).
[114] 16 U.S.C. § 824s (2012).
[115] 18 C.F.R. § 292.203–04 (2014) (stating the criteria to be a QF: a capacity of 80 megawatts or below and waste, biomass, renewable sources, geothermal resources, or a combination thereof constitute 75% of its energy generation) (repealed in 16 U.S.C. § 1253 (2012)).
[116] Pierce, *supra* note 98, at 468.

the constrained transmission resources.[117] The increased prices clear the market and signal the need for more transmission infrastructure.[118] Understanding the location of constrained transmission resources is critical to successfully benefiting the transmission grid, as "[i]nadequate transmission capacity has played a major explanatory role" in many price spikes and blackouts.[119]

B. *Past Woes of Deregulation at the State Level*

California is the poster child for deregulation gone wrong. The state began its deregulation process in the late 1990s and attempted to create a "California market," when in reality the state received much of its power from surrounding states not adhering to the same deregulation.[120] The most destructive mistake was the state's price cap on the retail market, which effectively created inelastic demand for the wholesale market.[121] This meant that the wholesale market had essentially infinite demand.[122] Given the limited supply of generation, prices skyrocketed.[123] These weaknesses in the system created ripe opportunities for companies like Enron to greatly profit by manipulating the system.[124] California consumers suffered as energy-brokers withheld energy to increase prices and profit.[125]

A better example of deregulation is the Pennsylvania-New Jersey-Maryland Interconnection ("PJM") region in the Northeast. The PJM region stretches across parts of thirteen states and the

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[117] *Id.*
[118] *Id.*
[119] *Id.* at 483.
[120] *Id.* at 471. California differentiated its electricity market from those of the surrounding states. It did not take into account the differences between its own rates and out-of-state prices for energy. Enron, and other energy brokers, took advantage of this discrepancy through aggressive market manipulation, which greatly hampered the state's energy market and contributed to its eventual downfall. *Id.* at 471–77.
[121] *Id.* at 472.
[122] *Id.*
[123] *Id.*
[124] *See id.* at 472–76.
[125] *Id.* at 475–76.

District of Columbia.[126] The participants utilize node pricing, an independent organization operates the transmission system, and many vertically integrated companies spin off their generation, transmission and distribution capabilities.[127] Consequently, PJM saves about $3.2 billion per year and generators have increased the efficiency of their plants' capacity to energy delivered from 5–20%.[128]

PJM still contains many structural problems. The states in PJM interact with regulated markets in surrounding states, which skews the economics of operating a purely competitive utility market.[129] These states can also stymie the construction of transmission projects through any of their jurisdictions, as many states and agencies retain veto powers to block such construction.[130] Additionally, PJM and the surrounding eastern grid created artificial barriers between accessing each other's transmission infrastructure.[131] These barriers do not encourage market players to invest in transmission and distribution capabilities because they cannot build large economies of scale.[132] This lack of investment causes the largest threat to a deregulated market: lack of transmission infrastructure.[133] Commentators have doomed any effort to restructure utility markets, no matter how the market is organized, unless transmission capabilities improve.[134]

C. *Inadequate State Siting Procedures for Transmission and Generation*

Between 1986 and 2002, peak demand and electric generating capacity grew twenty-six percent and twenty-two percent, respectively, while transmission capacity barely grew above the

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[126] *Maps*, PJM INTERCONNECTION, http://pjm.com/documents/maps.aspx (last visited Jan. 27, 2015).
[127] Pierce, *supra* note 98, at 469.
[128] *Id.*
[129] *Id.*
[130] *Id.*
[131] *Id.* at 470.
[132] *Id.*
[133] *Id.*
[134] *Id.*

interconnection of new plants.[135] Several states imposed moratoria on installing new generation capacity for fear that local transmission grids would be overwhelmed.[136] Studies have found this stagnation to cost the United States billions of dollars a year due to the lack of adequate economies of scale.[137] Increased transmission capacity benefits the grid as a whole by allowing the freer flow of electricity.[138] Consequently, increased reliability in one state enhances the reliability in the whole grid spanning many surrounding states.[139] The differences in deregulated and regulated markets allow transmission infrastructure to develop at different paces.[140] While a deregulated market uses market forces to determine new capacity needs, regulated markets' new transmission capabilities are determined by a public utility commission.[141] Transmission siting authorities only account for localized, intrastate considerations, rather than judging the costs and benefits increased transmission capacity has on the interstate utility market.

States have exclusive jurisdiction over transmission siting.[142] State legislatures establish the meaning of "public interest" and "general welfare" for their respective state public utility commissions ("PUCs"), which are necessary findings to permit all new transmission capacity.[143] Examples of factors which prove that a project is within the public interest include feasibility, demand for electrical service, and practical alternatives.[144] PUCs then use these factors to

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[135] Eagle, *supra* note 95, at 12.

[136] *Id.* at 11.

[137] Pierce, *supra* note 98, at 453–55 (reviewing briefly studies completed in the 1970s and 1980s which analyzed the inefficiencies of the electricity market).

[138] *See* Eagle, *supra* note 95, at 14.

[139] *See id.*

[140] Jim Rossi, *Realizing the Promise of Electricity Deregulation: Moving Public Law Out of the Deference Trap in Regulated Industries*, 40 WAKE FOREST L. REV. 617, 675 (2005).

[141] *Id.*

[142] Eagle, *supra* note 95, at 13.

[143] *Id.* at 21. "The United States Supreme Court has long ago affirmed the states' right to regulate private firms, such as utilities, that are 'affected with a public interest.'" *Id.* at 20.

[144] *Id.*

grant permits.[145] Some PUCs consider the impact on a whole region, rather than just a state.[146] With this mindset, transmission capacity can adequately accommodate interstate energy markets, which comprise a vast majority of the American grid.[147] Other states' PUCs, however, are not authorized to consider interstate benefits.[148] In 2005, twenty-two states allowed localities to block interstate transmission expansion projects.[149] Not-In-My-Backyard ("NIMBY") attitudes thus prevent transmission capacity from keeping up with new generation capacity.[150] This hurts not only the state in which the decision was made, but also the entire surrounding region using the same grid.

To gain a permit, a utility must also prove it is satisfying a public use, and thus addressing a public need.[151] The definition of a public need requires, at a minimum, that the solution have substantial intrastate benefits.[152] States across the nation have interpreted adequate in-state benefits to range from "requiring that the project's primary beneficiaries be in-state citizens, to merely requiring the accrual of

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[145] *Id.* at 19–20.

[146] *Id.* at 23 (citing In re New England Electric Transmission Corp., 48 P.U.R.4th 477 (N.H.P.U.C. 1932)).

[147] Pierce, *supra* note 98, at 465 (noting that Texas is the only state with its own, self-contained electricity grid).

[148] Eagle, *supra* note 95, at 23.

[149] Rossi, *supra* note 140, at 647. Commentators estimate these localized interests account for approximately $1 billion due to the associated cost of litigation, regulatory compliance, and research. Lisa M. Bogardus, *Recovery and Allocation of Electromagnetic Field Mitigation Costs in Electric Utility Rates*, 62 FORDHAM L. REV. 1705, 1724–25 (1994).

[150] Eagle, *supra* note 95, at 25.

[151] *Id.* at 14. Another issue utilities must address is eminent domain, in which there is limited uniformity among the states. A majority of states grant eminent domain with the legal status as a utility. The minority of states grant eminent domain once the transmission project obtains approval by the applicable state PUC. Ashley Brown, Systems in Transition Conference, Transmission Markets and Institutional Arrangements: A Perfect Mismatch (Feb. 6, 2002), *available at* http://www.ksg.harvard.edu/hepg/brown_papers/a.brown_hepg_transmission.markets.and.institutional.arrangements.a.perfect.mismatch.pdf.

[152] Eagle, *supra* note 95, at 16.

a substantial benefit to in-state citizens."[153] Additionally, commentators have noted that even if regional transmission organizations do eventually control interstate electricity transmission siting authority, they could still be hindered by not having the power of eminent domain.[154]

D. *State Discrimination Against Non-Utility Market Players*

Additionally, discrimination against non-utilities[155] by states attempting to block outside competition occurs somewhat regularly and creates inefficiencies in the market by stymieing competition. Florida provides an example, as the state supreme court forbade independent generators from accessing the transmission infrastructure.[156] The Florida PUC initially granted a third party a permit to generate and sell energy on the wholesale market.[157] The Florida Supreme Court, however, held that a permit to generate and sell electricity must correspond to a *specific* need for electricity.[158] Consequently, non-utility generators serving the wholesale market would not be permitted to operate in the state, because there was no corresponding specific need for their

[153] *Id.* at 16. *Compare* Mississippi Power and Light Co. v. Conerly, 460 So. 2d 107 (Miss. 1984) (dismissing out-of-state benefits as a possible basis for the use of eminent domain and holding that Mississippi citizens must be the primary beneficiaries of such use) *with* Stone v. Pennsylvania Pub. Util. Comm'n, 162 A.2d 18 (Pa. Super. Ct. 1960) (ruling regional integration to constitute a direct intrastate benefit).

[154] Eagle, *supra* note 95, at 42.

[155] Non-utility means generation or transmission providers who are not controlled by a state's public utility commission.

[156] Tampa Elec. Co. v. Garcia, 767 So. 2d 428, 434 (Fla. 2000) ("The Commission determined that because non-utility generators are not included in this definition, Nassau is not a proper applicant under section 403.519. The Commission reasoned that a need determination proceeding is designed to examine the need resulting from an electric utility's duty to serve customers. Non-utility generators, such as Nassau, have no similar need because they are not required to serve customers.").

[157] *Id.* at 431–32.

[158] *Id.* at 434 ("A determination of need is presently available only to an applicant that has demonstrated that a utility or utilities serving retail customers has specific committed need for all of the electrical power to be generated at a proposed plant.").

provided generational capacity.[159] The court circumvented any dormant Commerce Clause concerns by arguing the Congressional intent of the EPAct of 1992 explicitly left power plant siting and need determinations to the states.[160]

Furthermore, other states make it extremely difficult to build new generational capacity through many different means. Very similar to the problems inherent with siting new transmission capacity, new merchant generation units are often opposed by strong local concerns.[161] These localized interest groups argue that: (1) new generation does not necessarily serve in-state residents (Wisconsin); (2) state siting procedures are inadequate (Indiana); or (3) new capacity is simply not needed (Vermont).[162] Consequently, utilities controlling transmission can easily discriminate by granting their own generation capabilities a discount on transmission access.

VI. SUGGESTED REGULATORY CHANGE

One of the primary worries about deregulated markets—price fluctuations—could be mitigated through battery installation. Batteries can solve price fluctuations by storing energy when it is in great supply and small demand, and then discharging while it is in small supply and great demand.[163] State or market actors could place batteries near nodes to facilitate the variable market demands of an unregulated market. Additionally, this would sidestep the extreme difficulties posed to siting transmission facilities. Consequently, the main problem confronting electricity markets—which could be partly remediated by battery implementation—is a mismatch of national-sized grids and state regulations. National, regional, and state actors should take measures to insure adequate

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[159] *Id.*

[160] *Id.* at 436 ("We find no merit in the constitutional arguments advanced by New Smyrna. As to any alleged preemption or interference with interstate commerce, we find that power-plant siting and need determination are areas that Congress has expressly left to the states.").

[161] *See* Chris Deisinger, *The Backlash Against Merchant Plants and the Need for a New Regulatory Model*, 13 ELEC. J. 51 (2000).

[162] *Id.*

[163] CHANG ET AL., *supra* note 4, at 6.

regulations promote generation and transmission investment in these grids, while also not entirely upturning the status quo.

A. *Possible National Implementations*

Congress enacted the FPA to "fill the gap in state regulatory authority that the Supreme Court had created by holding that no state could regulate interstate wholesale of electricity."[164] This FPA is largely antiquated, as Congress passed it when most of the nation's energy was generated and consumed in the same state.[165] Replacing the FPA would cause massive disruption in the electricity market and the economy; consequently, replacement is most likely not feasible. Through the FPA, however, FERC has jurisdiction over activities solely affecting the wholesale market.[166] FERC has the ability to fill in this gap and supplement wholesale activity with battery implementation. Given the ability for batteries to simply replace transmission infrastructure, other barriers, such as a finding of public need and state veto power for transmission construction, could be circumvented by the Commission.

FERC has already attempted to level the playing field by promulgating Order 888 in 1996, which requires non-discriminatory access to the electricity grids for generators.[167] The Order requires public utilities that "own, control, or operate electric transmission facilities to provide nondiscriminatory service to all participants in the transmission market."[168] The Commission requires public utilities to use open-access, non-discriminatory transmission tariffs.[169] The

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[164] Pierce, *supra* note 98, at 466; *See also* 16 U.S.C. § 824(b)(1) (2012) ("The provisions of this Part . . . shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce.").

[165] Eagle, *supra* note 95, at 10 (citing Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 61 Fed. Reg. 21,540 (May 10, 1996) [hereinafter Order 888]).

[166] 16 U.S.C. § 824(b)(1) (2012).

[167] Eagle, *supra* note 95, at 6.

[168] Patricia Paredes, *Recent Decisions of the United States Court of Appeals for the District of Columbia Circuit: Energy Law*, 73 GEO. WASH. L. REV. 827, 830 (2005) (citing Order 888).

[169] *Id.* at 830.

Order was an attempt by the agency to promote wholesale competition.[170]

An odd dichotomy exists in that FERC controls the regulation of transmission facilities, but lacks decision-making ability for siting considerations.[171] The EPAct of 2005 allows FERC to implement batteries in "national interest electric transmission corridor[s]."[172] The Court of Appeals for the Fourth Circuit drastically minimized this provision in *Piedmont Environmental Council v. FERC*.[173] The court ruled that in promulgating the EPAct of 2005, Congress only intended to "make[] sure that there is a utility commission available . . . to make a timely and straightforward decision on every permit application in a national interest corridor."[174] Consequently, given the five circumstances outlined in the EPAct of 2005, FERC only has jurisdiction when a state commission either is "unable to act or acts inappropriately by including project-killing conditions in an approved permit."[175]

Specifically, the *Piedmont* court completely rejected FERC's interpretation of the EPAct of 2005, which gave the Commission

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[170] Order No. 888, 61 Fed. Reg. at 21540. ("The Commission's goal is to remove impediments to competition in the wholesale bulk power marketplace and to bring more efficient, lower cost power to the Nation's electricity consumers.").

[171] Eagle, *supra* note 95, at 35.

[172] 16 U.S.C. § 824p (2005) (stating the Commission may preempt a state and issue a permit for the construction of electric transmission facilities in a national interest corridor when: (1) a state where the transmission facilities are to be constructed or modified does not have authority to approve the siting of the facilities; (2) the state does not have the authority to consider the interstate benefits expected to be achieved by the proposed construction or modification of transmission facilities in the State; (3) a permit applicant is a transmitting utility under the FPA, but does not qualify for a permit in a particular state because it does not serve end-users in that state; (4) a state commission has withheld approval for over one year; or (5) the state commission has conditioned its approval to make the project not economically feasible or will not significantly reduce transmission congestion in interstate commerce).

[173] 558 F.3d 304 (4th Cir. 2009).

[174] *Id.* at 314.

[175] *Id.*

permitting authority if a state denied a permit.[176] Based on the plain meaning of the words in the statute and the inclusion of numerous limiting conditions, the majority concluded that Congress meant to grant very limited permitting backstop authority to FERC.[177] However, much evidence exists to make the Congressional intent less clear. First, as the *Piedmont* dissent notes, a study completed by the Department of Energy for the EPAct of 2005 specifically noted "FERC should act if state and regional bodies are unsuccessful in siting and permitting national interest transmission lines."[178]

Additionally, a House Report on its version of the bill, which contained identical language as the Act eventually passed, granted the authority to FERC if "after one year, a state, or other approval authority is unable or refuses to site the line."[179] Even the dissenting views in the House recognized the Act's authority to "eliminate[] . . . deference to the States in decisions about the siting of transmission lines. . . ."[180] Finally, a Senate Report recognized the Bill to authorize FERC permitting power over transmission facilities if a state withholds a permit "inappropriately."[181] These pieces of legislative history could easily signify Congress's intent to grant FERC transmission permitting power if a state PUC denies a permit. If not, these statements at

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[176] *Id.* at 313 (citing 16 U.S.C. § 216(b)(1)(C)(i) (2006) (focusing the statutory meaning of the language granting permitting authority to FERC after a state PUC "withheld approval for more than 1 year after the filing of [a permit] application").

[177] *Id.* at 313–15 (analyzing the meaning of "withheld" and the four instances in the statute where Congress gives FERC power to control transmission siting).

[178] *Id.* at 321 (quoting U.S. DEPT. OF ENERGY, NATIONAL TRANSMISSION GRID STUDY 58–59 (May 2002), *available at* http://www.ferc.gove/industries/electric/gen-info/transmission-grid.pdf).

[179] *Id.* at 325 (citing H.R. REP. NO. 109-215(I), at 261 (2005)).

[180] *Id.* (citing 151 CONG. REC. H2193 (daily ed. Apr. 20, 2005) (statement of Rep. Dingel)).

[181] *Id.* (citing S. REP. NO. 109-78, at 5 (2005)).

least signify enough Congressional ambiguity to grant FERC *Chevron* deference.[182]

Congress could help alleviate this uncertainty by passing another statute explicitly stating its intent to give FERC such power. If this new statute included similar language to the EPAct of 2005, federal preemption could exist in regards to state determinations of need, because the statute grants transmission siting authorization if the Commission determines it is "consistent with the public interest."[183] This power could greatly replace the localized power over transmission siting, and instead allow a national commission to consider the benefits to the interconnected grid spanning many states. This type of permitting would almost eliminate NIMBY concerns by allowing the Commission to balance localized effects of the transmission infrastructure with increased capacity of electricity transportation. However, increased national transmission permitting would not solve the problems inherent in *Tampa Elec. Co. v. Garcia*,[184] where a state political branch disallowed extra generation capacity.[185] Wholesale electricity generation, which technically could flow through the grid into other states, would be a further stretch for nationalized control, and may be seen as encroaching too far into traditional state power.

FERC could also use a dormant Commerce Clause argument, which was quickly disregarded in *Tampa Bay*,[186] to prove federal

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[182] Chevron v. Natural Resources Defense Council, 467 U.S. 837, 843 n.9 (1984) (stating a court should use "traditional tools of statutory construction," which includes legislative history, to judge the intent of Congress and, if the intent of Congress is ambiguous, then deference should be afforded to the applicable agency as long as their interpretation of the statute is permissible, which is a low bar).

[183] 16 U.S.C. § 824p(b)(1)(B) (2006).

[184] 767 So. 2d 428 (Fla. 2000).

[185] *Id.*

[186] Tampa Elec. Co. v. Garcia, 767 So. 2d 428, 436 (Fla. 2000) ("We find no merit in the constitutional arguments advanced by New Smyrna. As to any alleged preemption or interference with interstate commerce, we find that power-plant siting and need determination are areas that Congress has expressly left to the states.").

jurisdiction over wholesale energy generation. The Supreme Court has interpreted the Commerce Clause of the U.S. Constitution[187] to restrict states from engaging in economic protectionist behavior that discriminates against or burdens interstate commerce.[188] A state law is discriminatory if it is "facially discriminatory, has a discriminatory purpose, or is discriminatory in effect."[189] If a court determines no discriminatory component exists, then it will apply a flexible balancing approach, called the "*Pike* Balancing Test," that weighs whether the burdens on interstate commerce are "clearly excessive" compared to local benefits.[190]

A state denial of extra transmission or generation capacity could be seen to conflict with the dormant Commerce Clause. A denial of generation and transmission capacity growth affects both the denying state and the surrounding states on the grid, so it is unlikely that would be found to be discriminatory. In applying the *Pike* balancing test, however, a court could find a lack of transmission and generation capacity in interstate electricity markets to clearly exceed the local benefits. This is especially true in regards to transmission siting, as a lack of transmission capabilities has been viewed[191] to plague the nation's electricity market. A lack of transmission infrastructure could be seen as providing a large burden to interstate electricity commerce. Given the lack of serious negative effects from transmission siting,[192] a court could conclude a state decision to not grant a permit for

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[187] U.S. CONST. art. I, § 8, cl. 3.

[188] Baldwin v. G.A.F. Seelig, Inc., 294 U.S. 511, 522 (1935).

[189] Alexandra Klass & Elizabeth Healey, *Energy Policy, Extraterritoriality, and the Dormant Commerce Clause*, 5 SAN DIEGO J. CLIMATE & ENERGY L. 127, 131 (2014) (citing Daniel K. Lee & Timothy P. Duane, *Putting the Dormant Commerce Clause Back to Sleep: Adapting the Doctrine to Support State Renewable Portfolio Standards*, 43 ENVTL. L. 295, 300–02 (2013)); *See* SDDS, Inc. v. South Dakota, 47 F.3d 263, 267 (8th Cir. 1995).

[190] Klass, *supra* note 189, at 131 (citing Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970)).

[191] Pierce, *supra* note 98, at 469.

[192] *Environmental Impacts of Transmission Lines*, PUB. UTIL. COMM'N OF WISC. (2013), *available at* http://psc.wi.gov/thelibrary/publications/electric/electric10.pdf (explaining how many of the feared effects from nearby transmission infrastructure do not exist or, if they do exist, can be greatly mitigated).

transmission siting violates the dormant Commerce Clause. A denial of increased generational capacity would be a different story given the serious localized concerns accompanying generation facilities such as pollution and possible health effects. Any damage to interstate commerce by avoided generational capacity would most likely not outweigh the serious localized concerns in increasing generational capacity.[193]

A distinction would also have to be made between the facial language of a statute and how that language is applied. Both are judged the same way as to whether they manifest as an undue burden on interstate commerce. A state's criteria for determining a public need are not discriminatory, as they only focus on in-state benefits from a proposed project. A state's PUC or judiciary's judgment of the criteria to a specific permitting action, however, could put an excessive burden on interstate commerce. This could occur when a state denies extra transmission capacity to avoid a relatively small localized inconvenience, and completely disregards the interstate need to alleviate transmission congestion.

Finally, Congress should reinstate the part of PURPA dealing with QFs and allow them to start selling energy to utilities again. QFs were created to accommodate moderately sized renewable energy sources. Batteries supplement these modes of generation by allowing their energy production to be dictated by non-natural factors. Furthermore, under the repealed PURPA language, batteries would qualify as a QF if the respective generation facilities do not have a capacity over 80 MW.[194]

B. *Possible Regional Implementations*

Critics of the status quo have noted the ability of regional transmission organizations ("RTOs") to manage access to electricity grids could reduce the opportunities for undue discrimination.[195] In fact, that was FERC's primary objective in

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[193] C.L. Comar & L.A. Sagan, *Health Effects of Energy Production and Conversion*, 1 ANN. REV. OF ENERGY 581 (1976).

[194] *See* 16 C.F.R. § 292.203–04 (2010).

[195] NORTON, *supra* note 88.

Order 2000: requiring all transmission-owning entities to voluntarily place their transmission facilities under the control of such organizations.[196] The Commission noted that functional unbundling had not solved undue discrimination by TD owners.[197] Even though the Commission thought RTOs were "necessary to remedy impediments to competitive markets," they still decided not to make them mandatory for transmission markets across the nation.[198]

Given the past issues with states such as California and Florida, the FERC should alter Order 2000 to force states to form RTOs. These organizations would be able to ensure equal access to all different types of generators. Though they would not have real power over transmission siting, they could still ensure a clear market to help identify constrained transmission resources. Additionally, given this lack of siting authority, batteries could supplement the constrained transmission resources especially in regions with many substations available to upload and download energy. Batteries could simply be placed near a bottleneck in the grid to help alleviate the pressure.[199]

The great benefits of batteries to RTOs would be in the utilization of renewable energy. Given the fluctuations in power that sources like solar and wind provide, batteries can help harness all of the energy provided from these sources. Energy output from these sources greatly depends on the time of day, and historically these sources have not been able to reach their full potential due to

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[196] *Id.*

[197] *Id.* (noting that unbundling was not the answer due to: (1) administrative difficulty; (2) increase in the number and frequency of allegations regarding discriminatory treatment; and (3) difficult in monitoring the applicable requirement standards).

[198] *Id.*

[199] It should be noted that batteries distributed across the grid could not totally replace transmission infrastructure development in the foreseeable future. In fact, the amount of power they can provide are orders of magnitude different. Batteries can provide about 2 MWh when charged, while a normal transmission line can provide about 2,000 MWh all the time. Telephone Interview with Charlie Mathys, Business Development Manager, Landis + Gyr (Feb. 6, 2015) (on file with author).

the mismatch of their energy production to peak demand.[200] With battery implementation, a large amount of renewable capacity would suddenly become available and help alleviate many generation capacity concerns. Of course, the presence of an RTO is not required for batteries to be implemented. An RTO, however, would help ensure the integrity of access to a transmission grid, and thus would not discriminate against smaller, renewable energy operations attempting to become connected.

C. *Possible Local Implementations*

Given the statutory framework outlined above, states control a large amount of generation and transmission siting capability. Through the FPA, EPAct of 1992, and *Piedmont* Court's interpretation of the EPAct of 2005, states seem to control everything but interstate wholesale markets. Even the federal government's control over the wholesale market even seems limited, given that FERC only has decision-making ability when a state PUC does not make a decision.[201]

If an adequate RTO cannot be developed, then it falls to the states to start considering benefits outside of localized considerations. Transmission siting, even if it only marginally increases the amount of transmission capacity in one state, still benefits the entire grid by decreasing bottlenecks in the flow of energy.[202] One imaginative way the federal government could encourage a decrease transmission congestion is to start enforcing the dormant Commerce Clause against states refusing to allow increased transmission capacity on a grid in which they are connected.

Additionally, state courts should start using a looser standard of state benefit to establish a finding of public need. In fact, many

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[200] Charles Vartanian, *Grid Stability Systems for Renewable Energy Success*, A123 SYSTEMS, http://www.neces.com/assets/Grid-Stability-Battery-Systems-for-Renewable-Energy-Success1.pdf (last visited Mar. 17, 2015).

[201] 16 U.S.C. § 216(b)(1)(C)(i) (2006); *see* Piedmont Envtl. Council v. FERC, 558 F.3d 304 (4th Cir. 2009).

[202] Eagle, *supra* note 95, at 12 ("Because electricity moves along all available paths once introduced into the power grid, every flow of electricity affects the entire distribution network.").

western states' courts have found indirect benefits, such as increased grid reliability, to constitute a constitutionally valid public use.[203] This looser standard would be more difficult to expand to other states given the traditional localized interests in halting such projects.

These national, regional, and local options, however, could come to fruition. Given the past deference to state and localized concerns, courts could strike down any constitutional challenge or policy argument against the status quo. Also, to protect localized concerns, states and localities could continue their stagnation in changing the norm. If the status quo prevails, batteries can help alleviate the issue of bottleneck in transmission capacity and interstate benefits. Batteries can help benefit local operations by providing energy to specific sources and also avoiding the cost of extra transmission capacity. A finding of public need for permitting will be easier, because these type of battery benefits are local. Many of the NIMBY concerns over new transmission infrastructure would diminish since batteries would reduce the need for large transmission lines running through people's lands.

VII. CONCLUSION

Texas's electricity structure avoids many of the problems inherent in many other markets across the country. Most importantly, the entire Texas transmission grid is located in the state.[204] Therefore, the federal government cannot make any dormant Commerce Clause claim or federal preemption argument about the interstate wholesale market. Also, because any infrastructure would wholly serve the state, any new facility would satisfy the qualifications of "need" for generation and transmission siting established by the legislature. Texas is the most deregulated

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[203] *Id.* at 17.

[204] *Electricity Primer—The Basics of Power and Competitive Markets,* ELEC. POWER SUPPLY ASS'N, https://www.epsa.org/industry/primer/?fa=wholesaleMarket (last visited Feb. 19, 2015).

state in the country regarding energy.[205] Consumers only pay for the energy delivered, which does not include any charge for additional capacity.[206] Furthermore, an RTO oversees equal and transparent access to the transmission grid.[207] Its oversight ensures any different type of generation has access to selling their energy. Batteries can help bring the large amount of renewables online, as Texas already has exceeded its renewable goal of 10,000 MW of renewable energy capacity by 2025.[208]

The Texas utility regulatory structure effectively allows all the costs and benefits to flow to those making the decisions, and thus avoids all the complications listed above associated with a mismatch between the electric regulatory structure and the electricity market. The utility market stakeholders in Texas can fully measure any investment they make into the grid. Texas could prove a prime market for the fledging battery technology.

[205] Telephone Interview with Anthony Hawkins, Group Product Manager, Landis + Gyr (Feb. 17, 2015) (on file with author). Other deregulated markets allow a premium to be attached relating to the extra capacity held in reserve.

[206] *Id.*

[207] *Services*, ERCOT, http://www.ercot.com/services (last visited Mar. 17, 2015).

[208] *The Texas Renewable Energy Industry*, TEXAS WIDE OPEN FOR BUSINESS, 5 (2014), *available at* https://texaswideopenforbusiness.com/sites/default/files/02/24/15/renewable_energy.pdf.