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ENERGY:
State Approaches to Boosting Resiliency & Onboarding Innovation

Introduction

Our national reckoning with the impacts of a changing climate grows more important by the day. Fortunately, the avenues to address these challenges are increasingly tangible and new technologies continue to expand the options available to policymakers. In the face of evolving threats, lawmakers can build stronger, more prosperous communities by prioritizing common sense solutions that bolster resiliency and capitalize on innovation.

From preparing for natural disasters by modernizing and hardening power grids, to accounting for accelerating trends in transportation and energy generation, state legislators have pursued a range of solutions so far in 2021. To optimally position their states to meet future energy needs and translate ongoing innovation into quantifiable improvements in resiliency and prosperity for constituents, the Millennial Action Project has identified several focuses for lawmakers to explore:

1. **Resiliency**
    a. **Grid Modernization and Hardening**
    b. **Microgrids**
2. **Innovation**
    a. **Energy Storage**
    b. **Future of Transportation**
    c. **Decarbonization**
        i. **Renewables**
        ii. **Nuclear**
        iii. **Carbon Capture**

The Challenge

Our nation's electric grid faces a crisis decades in the making. The grid suffers from protracted underinvestment and increasingly complex demand models while the nature of threats to energy supply and delivery continue to shift. Instances of significant power outages have grown dramatically over the last several decades, and incidents like 2021's Texas power crisis, where extreme weather brought about a loss in electricity generation capacity with severe social and economic consequences, demonstrate the risk of failing to adequately prepare.[1] At the same time, new technologies are emerging that hold the potential to revolutionize energy dynamics while minimizing reliance on carbon-intensive processes. Environmental concerns and market dynamics can catalyze the energy transition by creating new jobs, new forms of transportation, and a new energy horizons for your state.[2] The challenge is for stakeholders—legislators, energy consumers, and energy producers—to collaborate and implement new energy solutions that boost resiliency and capitalize on innovation for the good of all.

Solutions

RESILIENCY

Grid Hardening & Modernization

Broadly speaking, *grid modernization* refers to accommodating technological advancements in energy generation, transmission, and delivery to create a more responsive, resilient, and secure grid through pairing physical infrastructure improvements and the creation of a *smart grid*. The U.S. Department of Energy (DOE) defines the smart grid as "an intelligent electricity grid—one that uses digital communications technology, information systems, and automation to detect and react to local changes in usage, optimize system operating efficiency, and, in turn, reduce operating costs while maintaining high system reliability."[3] A traditional grid only allows a one-way flow of energy and is less suited to handle more dynamic demand, while a smart grid can handle complex energy flows from diverse sources. A smart grid allows utilities to strengthen monitoring capabilities, and gives consumers increased flexibility and reliability to meet their energy needs, notably through net energy metering measures (NEM) which increase viability of distributed energy resources (DER) such as rooftop solar.

Recently, there has been increased focus on the idea of *grid hardening*, or ensuring the resilience and security of the grid from both physical and cyber threats. As these threats change policymakers should consider ways to minimize risk and protect constituents from costly, and often deadly lapses in power supply. Lawmakers can encourage certain types of grid hardening by requiring utilities to underground certain vulnerable transmission lines, for example, by mandating plans to address vulnerabilities, or even by providing new funding avenues for grid hardening costs.[4] Similarly, state legislators can ensure grid cybersecurity by implementing security frameworks and encryption standards for new technologies like DERs, addressing potential vulnerabilities in advance.

CASE STUDY

In 2021 the New Mexico legislature unanimously passed HB245, a grid modernization and utility distribution hardening package. The bill will increase the resiliency and physical and cyber security of the state's grid while advancing connection to regional energy markets—a potential windfall for energy producers in the state—while increasing access to clean and renewable energy resources with special consideration to low-income and underserved users. The bill also aims to reduce pollution and greenhouse emissions on the grid, allows for private capital investment, establishes a goal of creating skilled jobs related to grid modernization, and creates a tariff to fund eligible projects.

On the subject of resiliency, the Texas legislature overwhelmingly passed SB3, largely in response to February 2021's deadly power outages. The package includes a number of provisions that will boost resilience by preparing, preventing, and responding to major power outages, including: a disaster preparedness education program, a power outage alert system, the creation of a power reliability council, identifying existing vulnerabilities on the grid, and more.

Microgrids

Enabled by the same technologies pushing the nation's transition to a smart grid, microgrids are important factors in onboarding new energy generation and boosting resilience. Microgrids integrate distributed generation resources and electrical energy storage (EES) facilities into a localized distribution service area that can be decoupled (often referred to as 'islanded') from the main grid. Microgrids effectively coordinate local distributed generation, improve energy economics for generators and consumers, and provide fine tuned demand response while serving as a reliable backup to the larger grid.[5]

Ultimately, Microgrids help create more resilient and economically dynamic communities that are well-equipped to respond to shifts in energy supply and potential disasters. They are also a bulwark against the threat of a large-scale attack on the nation's electric grid and provide life-saving electricity in times of natural disaster; Puerto Rico, for example, is moving ahead with a plan to divide the island into regional microgrids in response to devastating power outages in the wake of 2017's Hurricane Maria.

CASE STUDY

State lawmakers can facilitate the development and implementation of microgrids through several policy avenues, most notably by removing barriers to microgrid construction and coordinating integration of microgrids. In 2021 the Maine legislature passed LD1053 which authorizes the construction of microgrids in the state. Masschussetts passed a similar bill, H.2194, in 2020 that formally recognized utility customers' rights to establish microgrids and procure local energy sources for the purpose of "energy generation or resiliency." In 2017, Hawaii passed HB2110 instituting a Microgrid Services Tariff. The tariff on utilities will quicken microgrid adoption by financing the integration of microgrids with the main grid as the state seeks to spurn microgrid development. More recently, both New Jersey and New York have introduced legislation to encourage microgrid development through tax credits and grant programs.

INNOVATION

Energy Storage

The increase in distributed power generation and the variability of some renewable resources creates new, and sometimes problematic dynamics of energy transmission and delivery. While the overarching goal of smart grids is to optimize these dynamics, scenarios arise where power demand can not be met by typical sources or, alternatively, there is an excess of power capacity. The ability to "smooth" out these sporadic imbalances in supply or demand can be met with electrical energy storage (EES) with the added bonus of boosting resiliency.

Electrical energy storage systems, sometimes referred to as battery energy storage or utility scale battery energy storage systems, convert and store generated electrical energy that can be reconverted and deployed when needed. These systems aid the adoption of intermittent renewable resources, provide quick responsiveness during demand spikes, add a layer of resilience during generation outages, and improve grid dynamics by reducing instances of curtailment—the suspension of clean renewable power generation when supply on the grid has been met at the moment. Given the potential multiplier of EES to renewable adoption and impact and its importance to boosting resiliency, many states have recently implemented new rules urging the development of new energy storage capabilities. Despite this recent uptick, the US still falls significantly behind many European and Asian counterparts in EES deployment.[6]

CASE STUDY

Lawmakers around the country can choose to prioritize the development of specific EES methods—such as Oregon lawmakers who passed SCR1 in 2019, a resolution declaring legislative support for closed-loop pump energy storage—or they can more broadly seek to incentivize EES development in their states. Most states have pursued the latter route through tax abatements or credits for EES systems or equipment, including Indiana (SB2383) and New York (SB3229) in 2021, while others have established statewide goals for energy storage capacity, such as

Connecticut through 2021's SB952. Other avenues to incentivize energy storage can be seen in examples like Oregon's HB2618 from 2018 which created a rebate system for residents and businesses that set up PV generation paired with on-site energy storage. Many of these efforts have been overwhelmingly bipartisan, indicative of a broad recognition of energy storage's importance to our national energy future and its immediate benefit to consumers through increased resilience.

Future of Transportation

Among a myriad of developments fueling change, perhaps the most visible is the ongoing increase in plug-in electric vehicles (PEVs) and other forms of electrified transportation. The Department of Energy describes the relationship between grid modernization and electric transportation as "complementary," as smart grids will be better equipped to handle the complex modeling, cybersecurity, and increased data management requirements of PEVs. The rapid growth of PEV ownership—according to the Edison Electric Institute, there will be over 18 million PEVs on US roads by 2030, up from 1 million in 2018—amplifies the already urgent need for grid modernization while presenting a few unique hurdles.[7]

More than 30 states have opted to accelerate PEV expansion by offering incentives for low- or zero-emission vehicles. Some states have faced declining gas tax revenues, and begun compensating with new fees on electric, and in some cases hybrid vehicles.[8] While continued PEV adoption will increase consumer flexibility and reduce emissions, states should take care to develop the required infrastructure, keeping in mind the unique distribution and security challenges that electrified transportation brings. On the horizon, some states are beginning to consider the implications of fuel cell technology on transportation electrification (see WASB5000); fuel cells are also being considered as a potential new generation source and are referenced further below.

CASE STUDY

In 2021 Oklahoma overwhelmingly passed SB600, the Driving on Road Infrastructure with Vehicles of Electricity (DRIVE) Act of 2021 which created a tax of three cents ($0.03) per kilowatt hour or its equivalent on the electric current used to charge or recharge the battery or batteries of an electric vehicle beginning in 2024. The bill aims to reconstitute lost revenue from declining gas taxes which will be used to maintain state infrastructure. Separately, to prepare for growth in electric transportation, Rhode Island recently signed S994 into law which directs the state's department of transportation to develop a plan for electric vehicle charging infrastructure, similar to New Jersey's S606 from 2018 which directed local and municipal units to create vehicle charging resources. Lastly, Indiana approved HB1168 this year which Establishes the Electric Vehicle Product Commission to examine electric vehicle capabilities in the state and identify opportunities for manufacturing and the creation of high-skilled jobs in the industry.

Decarbonization

Not lost on policymakers, many of the innovations discussed here are immediate responses to the need to reduce and minimize carbon consumption in the face of climate change, also known as decarbonization. Every year policymakers are exploring new ways to bolster renewable energy generation, while lawmakers in some states are reexamining nuclear power as a zero-carbon option that reduces carbon outputs. Lastly, the growth of carbon capture technology has spawned a race to uncover applications that create jobs, boost conservation efforts, and help fight climate change.[9]

Renewables

The importance of renewable and clean energy resources in decarbonizing our grid cannot be overstated. While the profile of these technologies has been discussed elsewhere, it is worth highlighting several developments in the policy space that may make onboarding these resources easier and more equitable.

Many states are pursuing innovative approaches to onboard more renewable distributed energy resources, such as community-scale solar installation and other creative approaches that remove barriers to renewable technology for consumers, mitigate cost-shifting, cut emissions and energy prices, and create new jobs.

CASE STUDY

Community solar projects have received significant attention from state legislatures in recent years (see MD HB683, 2019). New Mexico joined the fray this year with SB84, the Community Solar Act, which establishes guidelines around the construction and operation of community solar facilities in the state, including bill credits to subscribers of certain community solar projects. Also this year, New Jersey passed A5434 into law which establishes a dual-use solar project pilot program for unpreserved farmland. The bill allows certain land to be eligible for solar resource construction while still qualifying for farmland assessment under certain conditions.

Fuel Cells

Many states are seeking to incentivize research and development of fuel cell technology. Fuel cells use chemical energy, usually from hydrogen or other abundant fuels, to cleanly and efficiently produce electricity. According to the Department of Energy: "Fuel cells are unique in terms of the variety of their potential applications; they can use a wide range of fuels and feedstocks and can provide power for systems as large as a utility power station and as small as a laptop computer."[10]

CASE STUDY

Connecticut passed HB6524 in 2021 which directs electric distribution companies to solicit proposals to acquire new fuel cell generation projects; the bill was passed with overwhelming bipartisan support. New Jersey chose to probe fuel cell development via a different avenue with A740 which requires state agencies to consider fuel cell electric generation when awarding contracts for purchase of items that require a power source.

Nuclear

Other states are exploring new nuclear power facilities to meet their states energy needs without adding carbon intensive electricity generation. Nuclear is a zero-emission clean energy source according to the Department of Energy, and advancements in nuclear technology are creating the prospect of low-risk, low-waste, and reliable energy generation.

CASE STUDY

This year New Mexico considered legislation to create a Radioactive Waste Task Force, SB82. The legislation ultimately did not pass both chambers. The task force would have explored the implications of federal and privately operated waste disposal sites in the state and made recommendations to the legislature. Also in 2021, Montana pursued several pieces of legislation that aim to clarify and ease the potential development of new nuclear resources in the state: SJ3 provides for a feasibility study of advanced nuclear reactors in the state, and HB273 repeals certain restrictions on new nuclear construction.

Carbon Capture

Finally, carbon capture, utilization, and sequestration (CCUS) is an exciting new technology in the fight against climate change. CCUS captures airborne carbon and "either reuses or stores it so it will not enter the atmosphere."[11] The technology is still in its early days and many states are working to understand the potential benefits to local economies, both through commercial applications of stored carbon and in creating new jobs while also exploring the impacts of conservation on removing carbon in the atmosphere. Carbon capture can also incentivize conservation efforts as researchers and policymakers seek to quantify the sequestration capabilities of natural ecosystems such as wetlands.[12]

CASE STUDY

Several states pursued bipartisan legislation that aims to understand the potential for development and utilizations of carbon capture, including Illinois through HB165 which directs researchers in the state's university system to submit a report on CCUS in the state to the legislature by the end of 2022. Virginia enacted similar legislation through SB1347 which establishes the Carbon Sequestration Task Force which will elaborate a report on increasing carbon sequestration through long-term conservation, establishing sequestration goals, identifying markets and funding mechanisms, and developing a standard methodology to determine carbon levels.

Conclusion

In the face of climate uncertainty and rapidly shifting dynamics in energy generation, transmission, and delivery, state lawmakers should continue to prioritize solutions that improve dependability of the grid, bolster resilience against evolving threats, and take advantage of innovative technologies to strengthen their states and communities. The range of solutions indicate the scope of the challenge and the best approach will vary by state, but the underlying facts remain: there are tangible ways to create a cleaner, more reliable, and more resilient energy future and a failure to prepare will leave constituents behind.

Endnotes

[1]https://www.npr.org/2016/08/22/490932307/aging-and-unstable-the-nations-electrical-grid-is-the-weakest-link, https://www.texastribune.org/series/winter-storm-power-outage/

[2]https://ensia.com/features/us-power-grid-renewables-wind-solar/

[3]https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf

[4]https://www.ncsl.org/Portals/1/Documents/energy/HardeningGrid_1_32298.pdf

[5]https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/role-microgrids-helping, https://microgridknowledge.com/microgrids-economic-development/

[6]http://css.umich.edu/factsheets/us-grid-energy-storage-factsheet

[7]https://www.eei.org/resourcesandmedia/newsroom/Pages/Press%20Releases/EEI%20Celebrates%201%20Million%20Electric%20Vehicles%20on%20U-S-%20Roads.aspx

[8]https://www.c2es.org/document/us-state-clean-vehicle-policies-and-incentives/,

[9]https://e360.yale.edu/features/deep-decarbonization-a-realistic-way-forward-on-climate-change

[10]https://www.energy.gov/eere/fuelcells/fuel-cells

[11]https://www.energy.gov/carbon-capture-utilization-storage

[12]https://www.nrdc.org/experts/melanie-sturm/stewardship-wetlands-and-soils-has-climate-benefits

Sample Legislation

All bills included below were introduced with bipartisan co-sponsorship and/or received bipartisan support at some point. Bills are presented in no particular order and inclusion does not reflect a MAP endorsement. Email policy@millennialaction.org for more info or to submit your legislation.

Grid Modernization, Hardening, and Resiliency

- NM HB245 - Utility Distribution System Hardening, passed unanimously
- OR HB2190 - Community energy resilience projects grant program
- TX SB3 - Relating to preparing for, preventing, and responding to weather emergencies and power outages
- NV SB448 - Utility related provisions including soliciting physical transmission infrastructure upgrades and requiring integration into a regional grid
- ND SCR4012 - Concurrent resolution to establish a state policy to support the reliability and resilience of the electric grid

Microgrids and Energy Storage Systems

- ME LD1053 - Defines and authorizes the construction of microgrids in the state
- NH HB376 - Microgrid application committee
- CO SB20 - Technical change to ensure fair valuation of clean energy and energy storage resources for taxation purposes
- CT SB952 - Creates solar energy storage goals, increases the virtual net metering cap, permits ownership of solar power generation facilities by electric distribution companies, and more
- IN SB383 - Provides a sales tax credit for utility scale battery energy storage
- NM HB262 - Energy storage system tax credit
- NY SB3229 - Tax abatement for electric energy storage equipment
- UT HB153 - Energy Storage Tax Credit

Renewable Energy and Decarbonization

- IL HB3446 - Coal to Solar Energy Storage Act, also incentivizes the development of energy storage
- NJ A740 - Requires State agencies in awarding contracts for purchase of items that require power source to consider items powered by fuel cells
- MN HF164 - Energy Conservation and Optimization Act
- MA SB9 - Next-Generation Roadmap for state climate policy
- CO B1253 - Appropriation to local governments to fund grants for renewable and clean energy infrastructure implementation projects
- CT B6571 - Revise the authority of the CT Green Energy Bank and create a commercial sustainable energy program in the state
- CT HB6524 - Electric distribution companies shall solicit proposals to acquire new fuel cell generation projects
- HI SB932 - Repeals the building energy efficiency revolving loan fund. Authorizes moneys in the green infrastructure special fund to be used to finance the option to purchase solar energy systems and other clean energy equipment
- MT HB346 - Revising tax assessment rules for solar energy

- IL HB165 - Carbon Capture Task Force
- NM SB84 - Community Solar Act

Electric Vehicles

- HI HB803 - Related to new development of EV charging facilities, penalties related to EV parking violations, updates equipped parking requirements
- IN HB1168 - Establishes the Electric Vehicle Product Commission
- MD HB44 - Clean Cars Act, increasing funding for EV rebate program
- MN HF1878 - Electric Fuel Tax
- OK SB600 - Tax of three cents ($0.03) per kilowatt hour or its equivalent on the electric current used to charge or recharge the battery or batteries of an electric vehicle
- OR HB2783 - Relating to funding the transition to electric motor vehicles
- OR HB2165 - Tariff to support transportation electrification
- SC S304 - Establish The Joint Committee On The Electrification Of Transportation
- WA SB5000 - Creates a hydrogen fuel cell electric vehicle pilot sales and use tax exemption program