Sandia National Laboratories

Energy Storage Policy Workshop

PREPARED FOR THE NEW ENGLAND CONFERENCE OF PUBLIC UTILITY COMMISSIONS

Will McNamara

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Energy storage policy is the focus of this presentation.

- We will be covering the following topics:
  - Historical context of utility-industry policymaking
  - Overview of federal versus state responsibilities
  - Federal activity to date
  - The key energy storage policy issues at the state level
  - State activities to date
  - Considerations for state regulators
  - Q&A session

First, here is a list of acronyms for terms used in this presentation.

ARRA = The American Recovery and Reinvestment Act of 2009

BTM = Behind the Meter

DER = Distributed Energy Resource

DOE = U.S. Department of Energy

E = Economic issue

EPA = Environmental Protection Agency

ES = Energy storage

ESS = Energy storage system

FERC = Federal Energy Regulatory Commission

IRP = Integrated Resource Plan

ISO = Independent System Operator

ITC = Investment Tax Credit

LEG = Legislative action

NEM = Net energy metering

PJM = PJM Interconnection

PUC = Public Utility Commission

PURPA = The Public Utility Regulatory Policies Act (1978)

R = Regulatory issue

REG = Regulatory action

RPS = Renewable Portfolio Standard

RTO = Regional Transmission Organization

T = Technology issue

TOU = Time of Use Rate

U = Utility issue

Historical & Jurisdictional Context

Understanding energy storage policy within a historical context is helpful.

- Policy development has a been a consistent catalyst for reform in the risk-averse, slow-to-change utility industry.

1978 — **PURPA:** Intended to promote energy conser-vation (reduce demand) and greater use of renewables

1999 — **FERC Order 2000:** Creation of Regional Transmission Organizations (RTOs)

2005 — **EPAct** Tax benefits for EE, net metering on request required; empowered FERC to oversee reliability standards for the bulk-power system

2007 — **Energy Independence & Security Act:** Intended to increase production of clean renewable fuels and promote research on GHG

2009 — **ARRA: Authorized** $35.2 billion in DOE funding for smart grid, renewable energy, and energy efficiency

2011-2013 — **FERC Orders 755 & 784:** Established market-based revenue streams for ES and revised utility accounting and reporting requirements to address ES

2018 — **FERC Orders 841 & 845:** 841-Directed RTOs to remove barriers to the participation of electric storage in wholesale markets 845-Revised interconnection rules for ES.

Federal vs. State Responsibilities

FEDERAL

FERC, Congress, potential for federal agencies to act (e.g., EPA)

- Rules governing wholesale markets / RTOs (FERC)
- Rules governing transmission lines (FERC)
- Tax credit for solar + storage (Congress)

STATES

PUCs, state legislatures, executive directives from governors

- Retail markets
- Operations of distribution networks
- Utility rates
- Other enabling policies

Federal Activities

- FERC Order 841
  - Directed RTOs to remove barriers to the participation of electric storage in wholesale markets
  - RTOs must establish rules that open capacity, energy, and ancillary services markets to energy storage
  - Obviously does not apply to Texas or vertically integrated, non-RTO markets
  - Preliminary approval for PJM and SPP plans

- Congressional activity to define a storage ITC
  - The U.S. House passed a $1.4 million spending package that did not expand tax credits for energy storage.
  - Tax credit is available for storage paired with solar.

Development of energy storage policy varies greatly state to state.

According to the Energy Storage Association (ESA), U.S. states generally fall into four categories when assessing the current status of their energy storage policy development.

INVESTIGATING	CLARIFYING	ENERGIZING	PLANNING
States that have demonstrated an interest in storage through general investigations, workshops, or briefings.	States that are clarifying existing rules, through revising interconnection, net metering, fire and building codes, and other state standards as applicable.	States that are encouraging energy storage through procurement targets, pilot / demonstration project funding, or other mandates or incentives	States are that are addressing energy storage through broader long-term resource planning, resource valuation efforts, grid modernization or distribution system planning.

Barriers to energy storage deployment persist.

Current barriers to the deployment of energy storage generally fall into four categories:

- Regulatory issues at the federal and state levels (R)
- Economic issues (E)
- Utility and developer business model issues (U)
- Technology issues (T)

- Policy issues relevant to energy storage will likely correlate with (i.e., be intended to address) one of the four barriers.
- Within each of these categories, regulatory commission barriers may prioritize policy issues based on the level of impact on hindering deployment.

Energy Storage Policy Issues At The State Level

Key Energy Storage Policy Issues—States

Each of the 50 U.S. states (plus territories) will need to develop policy on many energy storage issues:

1. Utility ownership (U)
2. Multiple use applications (E)
3. Cost / benefit analysis (E)
4. Distribution system modeling (U)
5. Procurement mandates (R/E)
6. Incentives / tax credits (E)
7. Inclusion of storage in utility IRPs (R/T)
8. Changes to net metering policies (E)
9. Changes to RPS programs (R)
10. Changes to interconnection standards (R/T)

Policy Issue #1—*Utility Ownership (U)*

<u>The Issue:</u> Given that storage is typically classified as generation, should utilities be allowed to own storage assets in deregulated markets?

PROS

- Opportunity for long-range, system-wide planning
- Opportunity to optimize the distribution system
- Enhanced flexibility to use cost-effective resources
- Enhanced economies of scale (i.e., prices drop with larger projects)

CONS

- Market power concerns
- Utilities would have an advantage over 3rd parties, creating an unlevel playing field
- Uncertainties about utility cost recovery and equitable rate treatment among customers

Policy Issue #1—*Utility Ownership (U)*

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Point of Reference:

NEW YORK STATE OF OPPORTUNITY. | Public Service Commission

The Reforming the Energy Vision (REV) is the comprehensive energy strategy for the State of New York.

- Utilities operate a DER platform
- Utilities should be neutral about which resources provide grid services
- New York PSC originally prohibited utilities from owning BTM DER, based on concerns about market power
- Subsequently, revisions to REV acknowledge the unique potential for storage, and exceptions for utility ownership can be pursued on a PBR basis (e.g., a demonstrated need to support reliability)

Policy Issue #1—*Utility Ownership (U)*

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Point of Reference:

Texas has been a battleground on the issue of utility ownership. New law allows ownership only among public power entities.

- Texas law defines ESS as generation.
- T/D utilities cannot own generation
- No capacity market or opportunity for frequency reg / arbitrage
- AEP Texas petitioned to own 2 battery storage assets. PUCT punted the issue to Texas Legislature
- New law allows munis and cooperatives to own ESS that sell energy and/or ancillary services

Policy Issue #1—*Utility Ownership (U)*

Other points of reference:

Colorado

[redacted]

Xcel Energy

[redacted]

Xcel Energy's plan is to replace coal-fired generating plants with utility-owned storage.

Oregon

Oregon Public Utility Commission

PacifiCorp

Portland General Electric

Regulatory directive requires consideration of multiple options, including utility ownership.

Policy Issue #1—*Utility Ownership (U)*

Various ownership models for energy storage are emerging:

Utility-Owned	Utility/3rd Party Owned	3rd Party Ownership	Virtual Power Plants
• Utility owns and controls storage project for grid reliability. • Utility operates storage in wholesale markets when it is not needed for distribution reliability.	• Utility owns and controls project for grid reliability. • 3rd Party operates project in wholesale markets.	• Utility contracts with a storage project that is owned by a 3rd party for grid reliability. • 3rd party operates the project for wholesale markets.	• Utility aggregates, or uses a 3rd party aggregator, to receive grid services from multiple DERs projects owned by customers or a 3rd party.

Policy Issue #1—*Utility Ownership (U)*

Key Policy Questions:

- How can state regulators ensure that utilities do not gain the potential for market manipulation and / or stifling competition, growth, and innovation?
- How can state regulators ensure that a level playing field exists for third-party providers?
- Will the rate-basing of energy storage investments drive down market value of services?
- What are the regulatory limitations of rate-based investment process specific to energy storage?

Policy Issue #2—*Multiple Use Applications (E)*

The Issue: The unique characteristics of ES (both load and supply) create flexibility to provide multiple uses or applications, sometimes simultaneously, and therefore layer on more than one revenue stream.

PROS

- Consideration of multiple uses allow ES to achieve its full economic potential
- Composite forms compensation can combine energy, capacity, environmental, location and temporally specific demand relief value

CONS

- Most energy storage installations today consist of either behind-the-meter or grid-tied applications, but not both
- Some uses may have high priority than others (e.g., reliability), which may create conflicts in the marketplace

Policy Issue #2—*Multiple Use Applications (E)*

While this is an emerging area for policymaking in multiple jurisdictions, there are some trends:

BULK ENERGY SERVICES	ANCILLARY SERVICES	TRANSMISSION INFRASTRUCTURE SERVICES	DISTRIBUTION INFRASTRUCTURE SERVICES	CUSTOMER ENERGY MGT SERVICES
Electric energy time shift (arbitrage)	Regulation	Transmission upgrade deferral	Distribution upgrade deferral	Power quality
Electric supply capacity	Spinning, Non-Spinning & Supplemental Reserves	Transmission congestion relief	Voltage support	Power reliability
	Voltage Support			Retail electric energy time-shift
	Black Start			Demand charge management

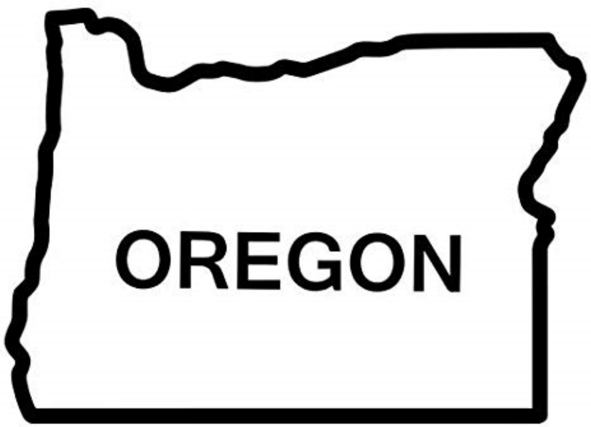
Policy Issue #2—*Multiple Use Applications (E)*

In 2018, California became the first state to issue revenue stacking rules for energy storage projects.

- Developed a set of 11 rules on revenue stacking
- Series of dockets and working groups to address compensation for PUC jurisdictional services, appropriate metering and measurement of Multi-Use Applications, and PUC enforcement of Multi-Use Application rules

Policy Issue #2—*Multiple Use Applications (E)*

Oregon followed California's lead….. With guidelines for revenue stacking within the 5 MWh energy storage mandate.



- Oregon PUC guidelines encourage projects that "stack" revenues by being able to serve multiple applications.
- PGE responded that it is pursuing ES projects that provide:
  - Energy shifting and arbitrage
  - Ancillary services
  - Avoid renewable curtailment
  - System peaking and capacity value
  - Locational value

Policy Issue #2—*Multiple Use Applications (E)*

Key Policy Questions:

- How should multiple use applications be prioritized—for instance, does system reliability have a greater value than other services?
- How will the multiple values of energy storage be tracked? For instance, in CA resources interconnected in the transmission domain are restricted from providing services to distribution domains.
- How can BTM energy storage provide grid services, and how should they be priced?

Policy Issue #3—*Cost/Benefit Analysis (E)*

The Issue: Current market structures and policies lack clear mechanisms to identify and capture the full value of ES.

PROS

- Cost-effectiveness is one of two tests that must be met to establish any energy storage procurement target
- Accurate cost and benefit modeling will help justify utility cost recovery applications
- Market participants need to identify and prioritize customers for whom storage is profitable

CONS

- Currently there is no universal approach toward defining costs and benefits of energy storage
- Assessing the viability of ES is a challenge given that technologies vary in stages of development from traditional to advanced systems
- Wide range of performance create variances in efficiencies & costs

Policy Issue #3—*Cost/Benefit Analysis (E)*

Reference Point

- Legislation in MN directed the state's Department of Commerce to conduct an energy storage C/B analysis, in order to determine the value of adding the resource to the electric grid.
- That analysis is now publicly available: https://mn.gov/commerce/policy-data-reports/energy-data-reports/?id=17-415938

Policy Issue #3—*Cost/Benefit Analysis (E)*

Key Findings From Minnesota's Analysis:

- Solar plus storage is cost-effective today.
- Stand-alone storage could become cost-effective in 2025.
- Over the next 10 years, storage will show increasingly positive cost-benefit ratios for more and more use cases as technology costs decline.
- In MN, 324 MW "peaking capacity" could be "mimicked" by 4-hour duration energy storage.
- MN utilities (and throughout MISO) should include storage in planning studies, resource plans, and procurements for new generation.

Policy Issue #3—*Cost / Benefit Analysis (E)*

Key Policy Questions:

- Most cost/benefit analyses for energy storage are based solely on the energy benefits of storage, ignoring many non-energy benefits such as job creation, reduced land use, reduced grid outages, and higher property values. What steps can be taken to capture non-energy benefits?
- How can a cost/benefit analysis for ES ensure that multiple applications are included and address the unique configurations of ES based on where the EES facility is located?
- What external resources are available to regulators?

Policy Issue #4—*Dist. System Modeling (U)*

<u>The Issue:</u> Much of new storage is expected to be connected to distribution feeders. Should utilities be required to develop distribution modeling plans and include energy storage in those plans?

PROS

- Effective distribution system modeling supports optimal ESS sizing, placement, and operation
- Distribution modeling provides location power quality improvements, mitigation of voltage deviation, frequency regulation, load shifting, etc.

CONS

- Utilities may opt for least-cost alternatives over maximum benefit solutions.
- Mis-using or mis-locating ESSs in distribution networks can degrade power quality and reduce reliability as well as load control

Policy Issue #4—*Dist. System Modeling (U)*

California and New York lead the way for requiring utilities to include energy storage in advanced distribution system modeling and planning.

- CPUC required 3 IOUs to submit Distribution Resource Plans that find opportunities to site, value and integrate renewable energy.
- The Plans include site specific evaluations for ES

- REV model envisions utilities acting as Distributed System Platform providers
- For the past three years, regulators, utilities and other stakeholders concentrated on filing proposals for the DSIP (Distribution Service Implementation Plans) process and rolling out pilot programs

Policy Issue #4—*Dist. System Modeling (U)*

States are including energy storage (and DERs) into distribution planning in a variety of ways.

- Requirements for utilities to file distribution system or grid modernization plans (CA, HI, IN, MA, MN, NY)
- Directive to file a five-year distribution system plan describing how the utilities will prioritize distribution resources (MD, MI)
- Requirements to conduct hosting capacity analysis (CA, HI, MN, NY)
- Consideration of cost-effective non-wires alternatives (CA, NY, RI)
- Locational net benefits analysis for DERs (CA, NY)
- Investigations into DER procurement strategies (CA, HI, NY)
- Requirements for utilities to report on poor-performing circuits and improvement plans (many states —e.g., FL, IL, OH, PA, RI)
- Investigation into DER markets (HI)

Policy Issue #4—*Dist. System Modeling (U)*

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Key Policy Questions:

- Energy storage will continue to pose challenges for distribution planning: Insufficient resources, inadequate transmission corridors, high uncertainty and volatility of renewable resources. How will these challenges be addressed?
- How can regulators ensure consistency between distribution modeling and other planning requirements (IRPs, grid modernization, and the creation of distribution system platforms)?
- What planning model are best suited to demonstrate distribution functions representing charging and discharging behavior that is unique to ES?

Policy Issue #5—*Procurement Mandates (R/E)*

The Issue: Procurement targets are mandates set by a state that require utilities to acquire a specified quantity of energy storage, intended to provide more opportunities for energy storage.

PROS

- Used to stimulate market development
- Provides cost recovery certainty for utilities
- Storage targets are "in the public's best interest"
- A mandatory approach for storage is compatible with most RPS policies

CONS

- Uncertainties about how to determine appropriate procurement levels & benefits
- Mandates allow the government to pick "winners" rather than the marketplace.
- Current resource planning is sufficient; 100% renewables will drive storage anyway

Policy Issue #5—*Procurement Mandates (R/E)*

Procurement mandates are still rather uncommon. Only six states have mandates, with others are looking at the issue.

	CA	MA	NJ	NY	OR	VA
	1,825 MW by 2020	200 MW by 2020	2,000 MW by 2030	3,000 MW by 2030; interim goal of 1,500 MW by 2025	5 MWh by 2020	3,100 MW by 2035
Originating Source	**LEGISLATIVE & REGULATORY**	**LEGISLATIVE**	**LEGISLATIVE**	**LEGISLATIVE**	**LEGISLATIVE**	**LEGISLATIVE**

Policy Issue #5—*Procurement Mandates (R/E)*

Key Policy Questions:

- Can procurement mandates be effective if other legal or regulatory hurdles to energy storage remain unaddressed?
- What is the best approach toward determining appropriate and realistic mandates?
- Should the mandates be state-wide or utility-specific?
- Should the mandates apply to IOUs only or munis and cooperatives as well?
- What steps can be taken to ensure that ratepayers do not incur increased costs for arbitrary procurement levels, or face increased costs without associated benefits?

Policy Issue #5—*Procurement Mandates (R/E)* Which state will be next?

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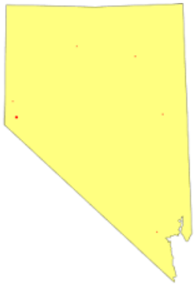

NEVADA

Just last week the PUC established biennial targets (not a mandate) for NV Energy--100 MW by the end of 2020 and increasing to 1,000 MW by the end of 2030. Legislation has directed the PUC to investigate a statewide procurement mandate.

Legislation directs ACC to investigate targets. A regulator on Arizona's Corporation Commission has proposed a 3,000 MW by 2030 target, but it has not yet been approved.

CONNECTICUT

Discussions on the ESA's Energy Storage Monitor Webinar on 3/18 indicated there are discussions within the CT Legislature to set a mandate consistent with neighbors NY & MA.

Policy Issue #6—*Incentives / Tax Credits (E)*

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The Issue: Regulatory frameworks typically prevent utilities & end-use customers from being able to monetize the value of ESS. Incentives can serve as a bridge to jumpstart a market while regulatory policies are finalized.

PROS

- Pay-for-performance metrics that incentivize utilities to improve the utilization of existing assets can be very effective in deferring infrastructure investments
- Customer incentives can be tied to the economic value that is brought to the grid

CONS

- Providing subsidies to ES can quickly become complicated---e.g., determining if the battery is charged by renewable energy or grid electricity
- Undefined parameters create a gap allowing parties to "double dip"

Policy Issue #6—*Incentives / Tax Credits (E)*

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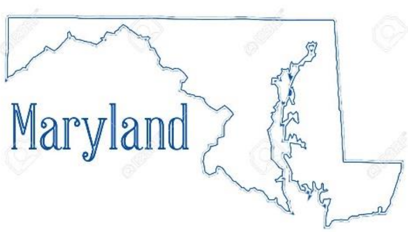
- California, New Jersey, Maryland and Nevada are acting as leaders in this movement
    - CA: Smart Grid Incentive Program; incentives for customers who produce electricity through storage
    - MD: First state to provide an ITC for storage
    - NV: SESIP program; rebates for solar + storage
- Massachusetts, New York and Hawaii seem to be next in line
- So far, California is the only state in which an incentive program for storage has actually be implemented (the SGIP)

Policy Issue #6—*Incentives / Tax Credits (E)*

- While the debate continues whether or not state-level incentives for ES are necessary, some “best practices” are emerging.



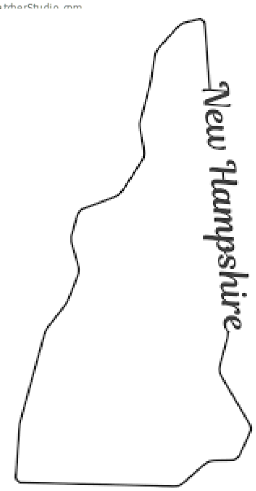
- 1st state to adopt a state-level, 30 percent tax credit for energy storage devices

- 1st state to allow BTM batteries to be eligible for funding support from a large energy efficiency budget

Policy Issue #6—*Incentives / Tax Credits (E)*

- Other notable states that offer a subsidy for energy storage , or are planning to do so, include:

- A taxpayer who holds an interest in a ESS can claim an advanced energy income tax credit in an amount equal to 6%



- Innovative approach in which Liberty Utilities provides residential customers with Tesla Powerwall batteries—Customers get back-up power and TOU rates; the utility gets an alternative to more capital-intensive grid upgrades.

Policy Issue #6—*Incentives / Tax Credits (E)*

Key Policy Questions:

- Should a state develop unique incentive levels for energy storage paired with solar, energy storage intended to help boost behind-the-meter storage, etc.?
- From what funding sources will the incentive be supported?
- If ES is to be subsidized through existing EE budgets, how will that be justified (e.g., cost/benefit analysis)?

Policy Issue #7—*Inclusion in Utility IRPs (R)*

The Issue: Because traditional IRP models do not consider many of the services that energy storage can provide, the technology does not fit neatly into IRP planning processes.

PROS

- Thermal & electrochemical ES are competitive with natural-gas peaker plants in some cases, and should be considered as an alternative
- Long-term consideration of ES addresses other policy requirements (e.g., for renewables or clean energy)
- Provides certainty around the role that ES will play going forward

CONS

- Lack of reliable cost data and "best practices"
- Lack of tools or protocols for analyzing storage
- Would only apply to vertically integrated utilities that are still responsible for generation resource plans (not restructured markets)
- Does not address local values and flexibility of storage

Policy Issue #7—*Inclusion in Utility IRPs (R)*

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Only a handful of states have thus far explicitly required the inclusion of ES in IRPs (as opposed to voluntary inclusion).

Colorado

New Mexico

Indiana

North Carolina

Policy Issue #7—*Inclusion in Utility IRPs (R)*

Key Policy Questions:

- Ensure that storage is included as a eligible technology for IRPs (majority of states do not)
- How can utilities and regulators ensure that they have access to energy storage data on cost and performance of energy storage systems?
- How can utilities and regulators make sure that they are choosing a resource planning model that can fully represent the benefits of storage and how the technology functions?
    - Does the method allow for sub-hourly and stacked benefits modeling?

Policy Issue #8—*Changes To Net Metering (R)*

The Issue: Pairing solar-plus-storage with NEM has received minimal policy attention to-date due to low level deployments. However, the issue is emerging as pairing energy storage with solar energy systems becomes more economical.

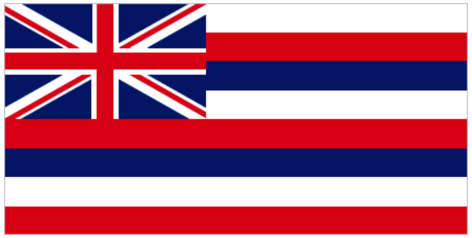
PROS

- A strong market signal would be achieved if certifiably solar-powered batteries could get paid through NEM.
- Addresses the issue of states (e.g., California) reducing the value of traditional solar through TOU rates.
- Adding storage may be a prerequisite for a residential solar project to pencil out.

CONS

- Utilities don’t want to pay net metering (retail) rates to batteries charged by grid power
- Adding energy storage to a solar project adds a layer of complexity

Policy Issue #8—*Changes To Net Metering (R)*



CALIFORNIA:
December 2017:
NEM successor tariff modified virtual net metering to facilitate pairing eligible generation with energy storage.

COLORADO:
1st state to adopt a consumer right to energy storage, which is prompting revision of NEM policy, among other policies.

HAWAII:
Successor tariffs to NEM allow customers to choose a "smart export" option for solar + storage systems (among other non-exporting tariffs)

Policy Issue #8—*Changes To Net Metering (R)*

Key Policy Questions:

- Ensure that the credit given to storage is renewable energy produced and not energy purchased and resold from the grid.
- It is important to keep the bill credit separate from the rate itself.
- Are net metering programs obsolete? Instead of revising NEM, should NEM be replaced with successor tariffs?
- How can utilities and regulators address prices for energy storage that are based on location?

Policy Issue #9—*Changes To RPS Mandates (R)*

The Issue: Should an RPS require energy storage, or should objectives for ES be addressed separately?

PROS

- Integrate intermittent renewable energy
- Help shift renewable generation to more closely match peak loads
- Provide generation and load balancing services
- Reduce the need for peaking and backup generators on the grid
- Reduce customer demand charges

CONS

- Uncertain if regulators need to encourage storage specifically—encouraging renewables may be enough to stimulate storage
- Once an RPS is reopened, opponents of renewable energy could take the opportunity to revise, weaken or revoke the state's obligations

Policy Issue #9—*Changes To RPS Mandates (R)*

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Six states have each adopted an RPS of 50% or more; four of these states also have separate procurement targets for storage.

	CA	HI	NJ	NY	OR	VT
RPS Mandate	60% by 2030	100% by 2045	50% by 2030	70% by 2030	50% by 2040	75% by 2032
Storage Mandate	1,825 MW by 2020		2,000 MW by 2030	3,000 MW by 2030	5 MW by 2020	

Policy Issues #9—*Changes To RPS Mandates (R)*

Key Policy Questions:

- If energy storage is to be included in RPS mandates, which ES technologies should be covered? Just batteries…or CAES, flywheels, pumped hydro….others?
- Should eligibility for energy storage be based on performance characteristics, such as:
  - Minimum or maximum capacity?
  - Minimum duration the technology can hold a charge?
  - Whether or not the storage installation can be remotely controlled for dispatchability?
- Must energy storage be co-located or integrated with specific generation, or can it stand alone on the grid?

Policy Issue #10—*Interconnection (R/U)*

<u>The Issue:</u> Interconnection standards that preceded renewables and ES technologies are likely in need of revision.

PROS

- Interconnection is a critical step for any resource that operates while connected to a utility's grid
- Interconnection standards can be integrated with other policies covering net metering, distribution planning, integrated resource planning, and energy efficiency to support a comprehensive clean energy plan

CONS

- ES technology is so nascent that interconnection standards can still not envision the full potential of services and benefits that storage can bring to the grid
- Integration of large amounts of DERs can negatively affect the reliability and operational stability of power system

Policy Issue #10—*Interconnection (R/U)*

A Tale Of Two States….

- The ACC has recognized that its legacy standards need to be revised to address the unique interconnection requirements of DERs and storage
- Draft rules were published in June 2015 but by late 2019 final statewide rules have not been adopted
- Utilities in Arizona have developed their own rules, but this has caused inconsistent requirements

- Interconnection rules have not been revised since 2004.
- New revisions include energy storage systems in the definition of eligible projects
- Modeled off of 2014 FERC SGIP
- Fast-track approval allowed for some ES projects

Policy Issue #10—*Interconnection (R/U)*

<u>Key Policy Questions:</u>

- Does the state utilize the foundation provided by IEEE Standard 1547-2018 to support common design and component use?
- Do the Interconnection Standards ensure applicability to multiple services for storage (at minimum addressing storage as a generation source and load source)?
- Do the Standards provide rules for exporting, non-exporting, and limited exporting storage technologies?

State Activities—The Current Status

- Approximately 15 U.S. states have developed substantive energy storage policy as 1Q 2020.
- At this time, these states represent "best practices" for state-level energy storage policies.

PM	I/TC	IRPs	NEM	RPS	C/B A	DSM	IC
CA MA NJ NY OR VA	MD	CO IN NJ NM	CA CO HI	CA HI NJ NY OR VT	MN	CA NY	AZ

A Regulatory Roadmap

Regulatory Roadmap

- While it is difficult (and dangerous) to generalize across the 50 states, there are some common steps in the development of a regulatory roadmap for ES:
  - Develop an ES Roadmap that identifies policy, technology and process changes to address challenges faced by the storage sector.
  - Determine what specific policies make the most sense in a specific state.
  - Ensure collaboration with all stakeholders.

Regulatory Roadmap

- The ESA recommends the following approaches:
  - Capture the full value of energy storage technologies:
    - *Policy initiatives:* Incentives, procurement targets, cost/benefit analyses, and new rate design
  - Enable competition in all grid planning and procurements:
    - *Policy initiatives:* Inclusion of storage in IRPs, RPS, resilience planning, resource adequacy and distribution planning
  - Ensure fair and equal access for storage to the grid and markets:
    - *Policy initiatives:* innovative ownership options, revised interconnection standards, multi-use applications

Regulatory Roadmap—Considerations

- How can energy storage support broader clean energy goals adopted by the state?
- Do the current regulatory structures allow energy storage to compete on a level playing field?
- Are the right state agencies and stakeholders working together to address existing barriers for energy storage?

The energy storage policy landscape continues to evolve.

Sandia National Labs monitors and analyzes activity at the federal and state levels and publishes information in the Global Energy Storage Database, available at this link:

https://www.sandia.gov/ess-ssl/global-energy-storage-database/

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Q&A Session

Thank you!

Contact Information:

Will McNamara

Email: jwmcnam@sandia.gov

Cell Phone: 505-206-7156