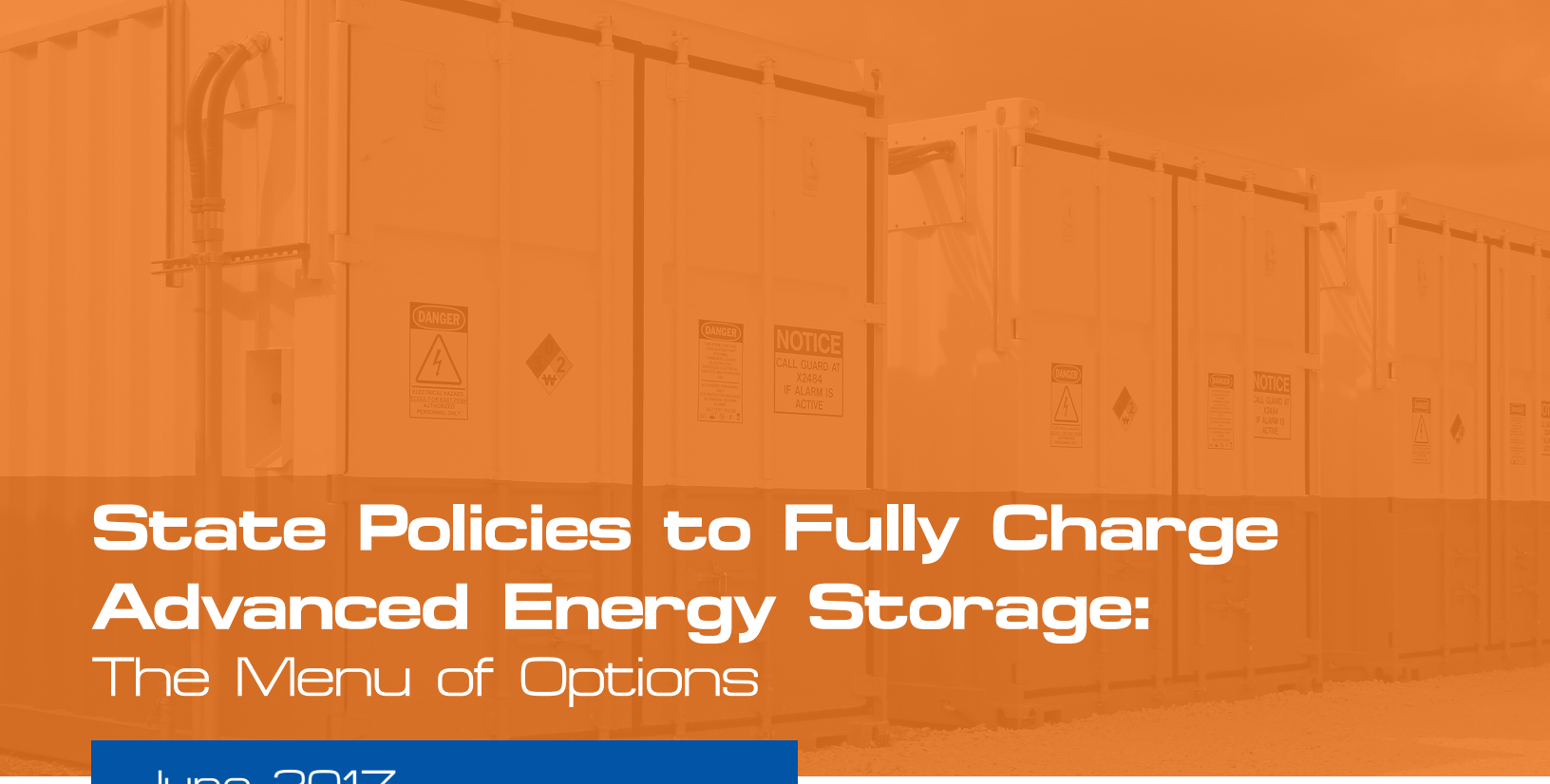


State Policies to Fully Charge Advanced Energy Storage:

The Menu of Options

June 2017

Value. Competition. Access.

State policymakers, utilities, businesses, and households are increasingly looking to advanced energy storage to reduce costs of electric service, enhance electric system reliability, and integrate more renewable resources onto the grid. However, the electric system was designed before cost-effective energy storage was available. Existing state rules and processes inadvertently bias against or exclude energy storage as an investment option, in comparison to conventional investments in generation, transmission, distribution, and demand management.

With over $2 trillion in utility investments in electric supply and infrastructure expected through 2030, it is critical that the range of investment options include energy storage to ensure affordable and reliable electric service.

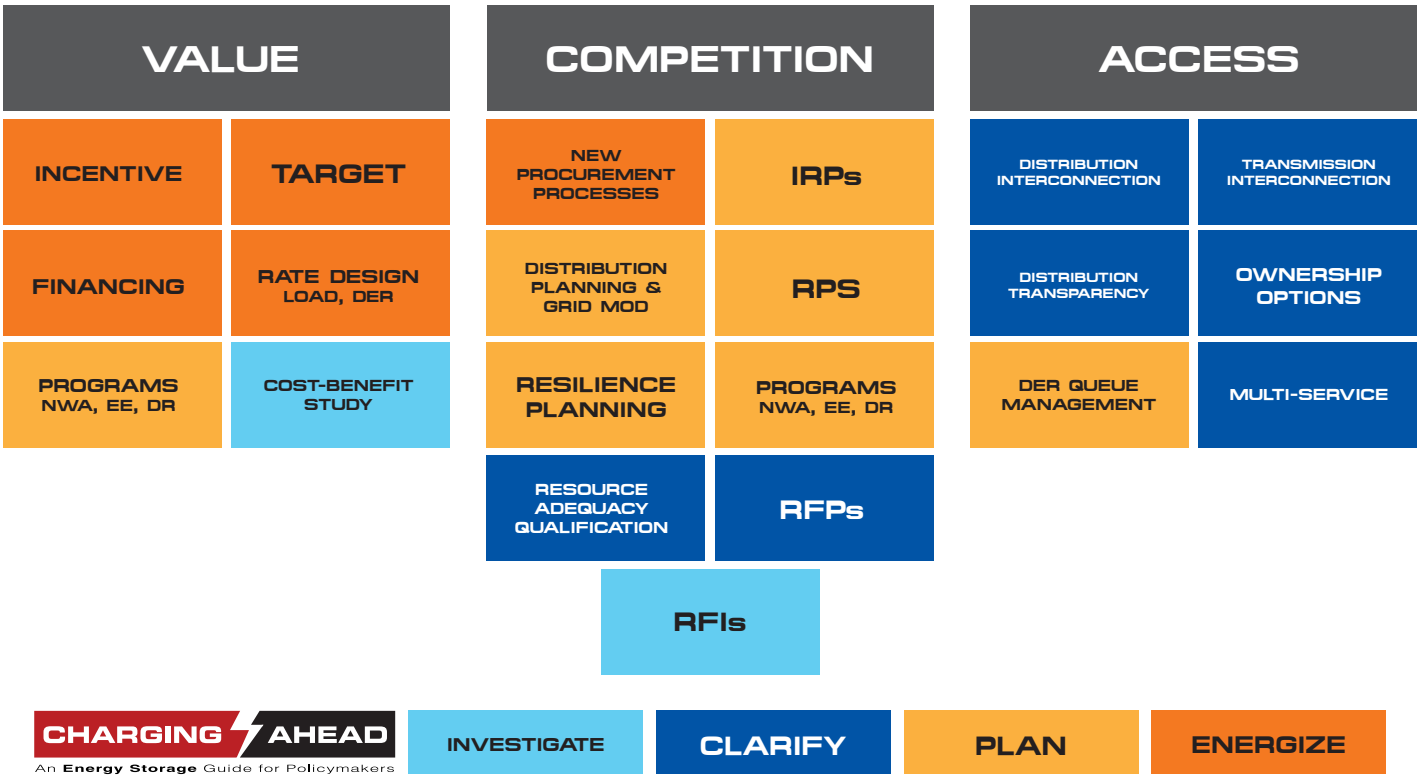
The 2017 report, *Charging Ahead: An Energy Storage Guide for State Policymakers*, includes educational information on energy storage technologies, services, economics, market barriers, and foundational state policy and regulatory considerations for storage. This document builds on *Charging Ahead* by offering a menu of the many actions that state policymakers and regulators can pursue to remove barriers to and accelerate storage deployment.

ESA Energy Storage Association

Menu of State Policy Options to Fully Charge Energy Storage

To enable the use of energy storage and realize its greatest benefits to ratepayers, state policymakers should focus on three core efforts:

- **Capture the full VALUE of energy storage.** Ensure that the unique and myriad benefits of energy storage are realized via accurate market signals that monetize economic value, operational efficiency, and societal benefits.
- **Enable energy storage COMPETITION in all grid and resource planning and procurements.** Energy storage can serve as a cost-saving and higher-performing resource at the meter, distribution, and transmission levels, but only when fully considered in all planning processes.
- **Ensure fair and equal ACCESS for storage to the grid and markets.** Numerous barriers to market and grid access exist, dramatically limiting the ability for energy storage systems to interconnect and offer their full range of potential services -- especially multiple services from a single asset.



While many of these topics are regularly the subject of state regulatory bodies, state legislators and governor's offices play an important role in establishing programs and authorizing regulators to make progress. Fundamentally, these three policy areas work together in concert to ensure that states make optimal decisions about future electric system investments.

Current market structures and policies lack clear mechanisms to identify and capture the full value of energy storage systems. System benefits and cost savings to ratepayers can best be assured by setting accurate market compensation for the services that energy storage systems provide. While there is no single solution, various efforts can quantify the values and realize the benefits as markets and policies catch up.

Procurement targets: Setting a cost-effective, "no regrets" procurement target for storage jump-starts longer term market creation, drives valuation of system benefits for energy storage, and allows all stakeholders to "learn by doing"—all of which can provide immediate and/or long-term benefit to ratepayers. California, Oregon, New York, and Massachusetts have developed "no regrets" targets, and other states like Nevada have passed legislation seeking to establish targets. California is already exceeding target procurement levels as utilities rapidly learn the operational benefits and experience the cost savings of storage, and the regulatory framework catches up to the technology.

Time-varying rate design: New innovative grid tools, like energy storage systems, smart inverters, and distributed generation, require modernized rates to ensure these new tools best serve customers and the grid, particularly during periods of peak demands. Dynamic and time-varying rates can signal to custormers the value of leveraging storage, while better aligning customer costs with system costs.

DER compensation: Distributed Energy Resource (DER) valuation proceedings have the ability to embed the locational and time value of a distributed resource into a tariff form that can provide accurate market signals for peak shaving and load modifying resources like energy storage. The VDER proceeding in New York and Next Generation Incentive Program in Massachusetts are in the process of developing such tariffs and a value of service approach to distributed energy resources can ensure compensation of storage for its particular attributes.

Storage investigations and cost-benefit studies: Storage investigations and proceedings can identify state-specific policy and market barriers that limit realization of storage value. Additionally, cost-benefit studies of scenarios of wide-scale storage deployment can provide guidance to state policymakers on the magnitude and type of ratepayer benefits that further policy activities can realize.

Demand-side programs: Demand-side programs, such as payments for peak load reduction, can provide a signal of value for storage. Similarly, as one rationale of energy efficiency programs is to defer or avoid system capacity, funds intended for such efforts could also meet their goals if offered to storage.

Incentives: Incentives in the form of rebates, grants, or various tax incentives, can provide a bridge to scalable deployment for energy storage to accomplish broader efficiency, resilience, and renewable energy goals as system costs continue to decline and policies and markets evolve. Incentives should be designed to decline over time until storage values are more easily monetized in market rules.

Financing support: Programs that lower the risks or cost of financing to storage, such as through state financing authorities, can similarly provide a signal of value. A number of states have set up economic development authorities and/or green banks, both of which can avail revolving loan funds and novel deal structures to lower project risk and drive more private financing.

Storage is often not on the menu of options considered in planning and procurement; when it is included, it is often with outdated assumptions. Additionally, legacy modeling does not adequately reflect the operational parameters or value proposition of energy storage. While supply and infrastructure are historically mutually exclusive platforms in planning, a single energy storage system can cross asset classes. Definitions, eligibility standards, operational standards, modeling processes, rules, metrics, and other aspects of planning and procurement processes must update to enable a modern grid; without them, ratepayers bear the risks of shouldering otherwise avoidable costs.

Integrated Resource Planning: Used in some form in over 25 states, IRPs should take a proactive approach to include storage in resource planning. Best practices for inclusion of storage are: ensuring storage is included as an eligible technology; using latest cost and performance data; matching resource need with resource selection; using sub hourly modeling; ensuring net cost of capacity (stacked benefits) are considered; and incorporating load-sited storage options as a potential resource.

Distribution system planning: Storage can serve as a flexible and cost effective alternative to many traditional distribution assets, such as substation upgrades. Grid planners must take a proactive approach to comparing storage to conventional distribution investments, as well as include values beyond simple asset substitution, such as increasing circuit hosting capacity. Additionally, increased transparency and competition is required in planning so that storage may be offered as a non-wires alternative. Grid modernization or distribution planning proceedings, such as are underway in New York, Minnesota, Maryland, and California, can ensure that some of these processes are put in place.

Renewable and clean energy standards: Planning for significant increases in renewable penetration should also include planning for storage requirements to meet such needs and reduce emissions. Studies have shown that significant levels of storage will be required in states with RPS of 50% and above. States like Nevada have passed legislation including storage as an eligible resource for meeting its RPS.

Grid resilience and emergency management planning: Critical infrastructure and resilience planning should always include energy storage. Energy storage is already providing resilience benefits, from backup power in schools and hospitals to the rapid storage deployment to mitigate Aliso Canyon gas shortage in California.

Peak demand reduction and energy efficiency programs: Programs for peak demand reductions (or other demand response) and non-wire alternatives should include energy storage as eligible. Energy efficiency programs with a goal of avoiding new infrastructure costs should include storage as well.

Resource adequacy requirements: Updating requirements for resource adequacy to include flexible assets like storage can ensure the grid operates efficiently without overbuilding and subjecting ratepayers to unnecessary rate increases. Especially as system peaks change, planning and procurements should define performance needs in a technology-neutral manner.

RFPs: Storage should be included as an eligible technology for all requests for proposals when considering new system capacity additions and/or local network capacity needs. Additionally, storage should be considered eligible in clean energy procurements, as it has in Connecticut.

RFIs: Regulators and utilities should use confidential requests for information from storage vendors to gain more up-to-date information on unit performance and pricing.

New procurement processes: Utilities in some states, such as New York and California, have pioneered reverse auctions for non-wires alternatives and peak load reductions. These programs should admit energy storage as an eligible resource.

ACCESS

- DISTRIBUTION INTERCONNECTION
- TRANSMISSION INTERCONNECTION
- DISTRIBUTION TRANSPARENCY
- OWNERSHIP OPTIONS
- DER QUEUE MANAGEMENT
- MULTI-SERVICE

Inadvertent regulatory barriers prohibit storage from interconnecting and participating in the markets effectively. Existing interconnection processes can inappropriately study storage twice, once as generator and once as load, and generally do not take account of the precisely dispatchable nature of storage. At the transmission level, rules do not allow for efficient utilization of existing network capacity, resulting in unnecessary and costly network upgrades that inhibit grid access. At the distribution level, behind-the-meter storage that is purely load-modifying may be subject to unnecessary study, increasing interconnection costs and inhibiting grid access. Existing frameworks also create uncertainty for multiple-use storage to access the grid. Updated interconnection rules and processes should reflect the technical ability and actual utilization of storage assets.

Updating transmission interconnection: Energy storage interconnection requires clear rules, processes, and jurisdictional boundaries. They should allow storage to co-locate at existing points of interconnection under expedited review if no increase in injections desired. Transmission studies should examine storage as a highly-controllable asset, not as an unpredictable load or imprecise generator.

Modernizing distribution interconnection rules and standards: Metering and telemetry should be appropriate to the asset and not overly burdensome. Purely load-modifying storage should not be required to undertake burdensome interconnect study. Regulators could also expedite interconnection review for systems that are located on congested feeders or intended to discharge during peak demand hours. An arbitration process can help solve interconnection disputes while rules are iteratively reformed.

Distribution system transparency: Provide distribution system data, including the location of existing and projected network constraints, so that developers can optimally site storage.

Improve queue management for DERs: Interconnection queues can become bloated quickly because of arbitrary selection processes. Settling these issues proactively can ensure the smoothest and most appropriate resource selection.

Enable multi-service provision: Allow customer-sited storage to provide service to the retail grid as well. In states in wholesale markets, enable storage to provide both retail and wholesale services by devising metering, telemetry, and accounting measures that avoid “double-counting.”

Clarifying ownership options: Enable all ownership models for storage. Allow customers and third-parties to own and provide storage to utilities as a service. In restructured states, allow utilities to own and provide storage as a part of their infrastructure.

Get Engaged

If you are interested in finding out more about any of the state policies on energy storage described in this document, the Energy Storage Association invites you to contact us for assistance and more information. **Please contact Jason Burwen, ESA’s National Policy Director, at j.burwen@energystorage.org or 202-580-6285.**

For a copy of IREC’s 2017 report, *Charging Ahead: An Energy Storage Guide for State Policymakers*, please visit **http://energystorage.org/charging-ahead-energy-storage-guide-state-policymakers**.