RESOURCE CAPACITY ACCREDITATION (RCA) REFORM: ENVIRONMENTAL PERSPECTIVES

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NRDC's Perspective on RCA Reforms

NRDC supports fair and robust accounting for the reliability contributions of both clean and conventional resources

To support the decarbonization transition, ISO-NE's Forward Capacity Market must support:

- **Accurate Resource Adequacy:** Ensure both a reliable grid and avoid retaining unneeded legacy resources
- **Level Playing Field:** Ensure equitable and robust accreditation for all resources
- **Fair Allocation of Benefits:** Fairly compensate state-level value creation from clean resource development
- **Advance State Decarbonization Targets:** Integrate with state-level policy, planning and procurement activities

NRDC has engaged GE Energy Consulting to provide quantitative analysis to inform ISO-NE RCA reform decisions with results expected in September 2022

RCA Reform Priority Policy Questions

- **State Policy:** When states are designing clean energy policies, will they have appropriate incentives to value/internalize reliability benefits?
  - Value of funding hybrid solar + storage
  - Value of funding offshore wind development
  - Ability to retire legacy resources and displace fossil fuels

- **Merchant Development:** Will merchant developers be able to finance clean energy resources based on marginal valuation that undercounts their total (lifetime average) reliability contributions?
  - Impacts solar, storage, onshore and offshore wind

- **Ratepayer Equity:** When state policy funds new resource entry, how will the reliability benefits of that resource be allocated across ISO-NE?
  - Allocated to all ISO-NE ratepayers or allocated to ratepayer group(s) that funded project(s)?

Level Playing Field: Addressing Thermal Limitations

- Equitable and competitively-neutral accreditation has been a strong focus of ISO-NE and NEPOOL stakeholders in redesigning the FCM
- Competitive neutrality requires equivalent focus / scrutiny for thermal resources as proposed for intermittent resources under MRI
- FCM must address:
  - Fuel supply limitations for gas-only resources
  - Weather-driven correlated outages / ambient derates
  - Transmission outages and congestion
- Recent analysis for Advanced Energy Economy (Astrape[1]) and the Massachusetts Attorney General's Office (Brattle[2]) emphasize significance of addressing thermal limitations

[1] Accrediting Resource Adequacy Value to Thermal Generation, Prepared by Astrape for Advanced Energy Economy, p. 6
[2] Capacity Resource Accreditation for New England's Clean Energy Transition, Prepared by Brattle for the Massachusetts Attorney General's Office, p. 18-19

Robust, equitable market design requires addressing known limitations of the thermal fleet.

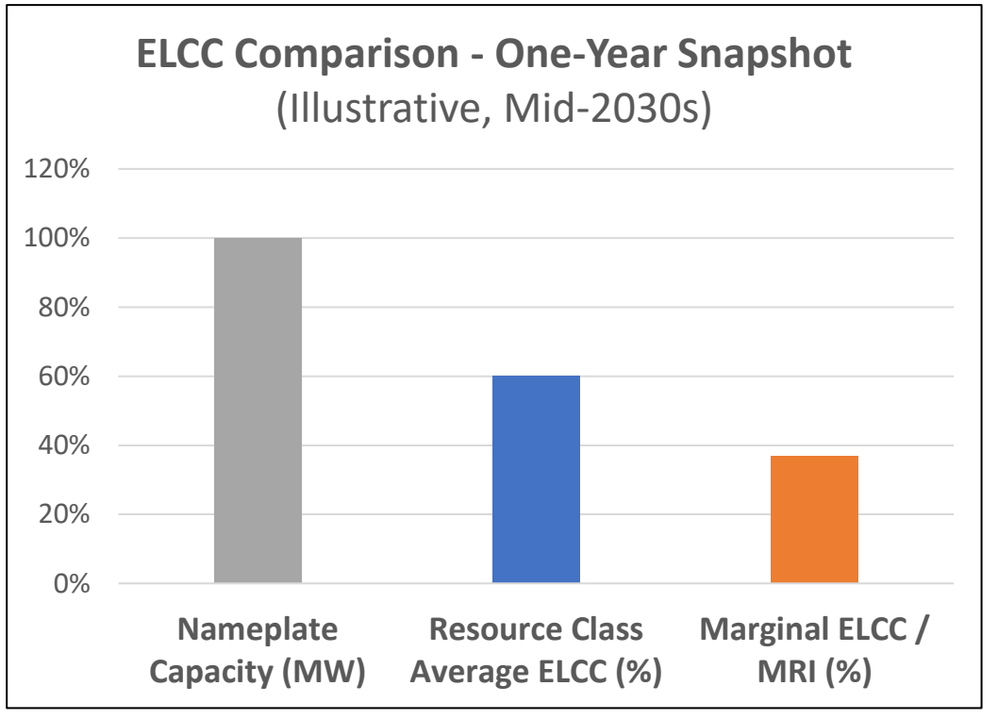
Incentives and Equity: Fairly Valuing Clean Energy

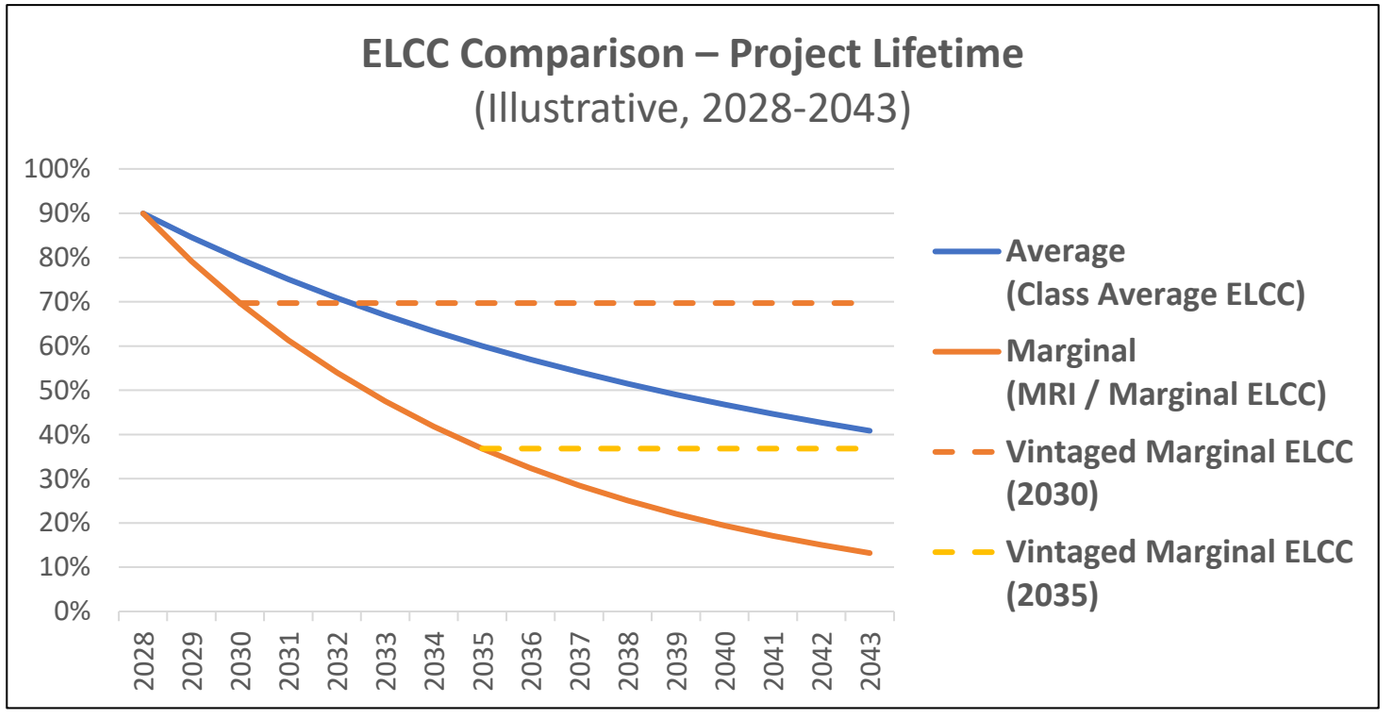
- ISO-NE has proposed marginal accreditation for clean energy resources (solar, wind, storage)
- Marginal accreditation is intended to provide economically efficient signals for resource selection
- When refreshed annually* for existing resources, marginal accreditation omits the ongoing but inframarginal reliability contributions of clean energy resources
  - Much of resources' reliability value represented as reductions in ICR
  - * Current FCM's 3-year-ahead procurement schedule further reduces ICR accuracy with potentially significant implications for resources' compensation under a marginal approach
- Declining marginal value does not imply existing resources no longer needed for reliability, solely that additional resources of similar class provide less marginal benefit[1]
- Marginal accreditation can dilute the policy and market signals to select reliable clean resources:
  - If resource adequacy value is socialized through region-wide ICR reductions, regulators may undervalue reliability in designing policies to meet state clean energy goals
  - Market participants may under-develop clean resources if undercompensated for reliability over the lifetime of the asset

[1] Capacity and Reliability Planning in the Era of Decarbonization, Energy and Environmental Economics, p. 5-6

Marginal accreditation does not compensate a significant share of clean resources' reliability value (total ELCC), reducing the market signal to pursue these resources.

Background: Average and Marginal ELCC / MRI





- **Average ELCC*:** Average reliability contribution of the resource class, including inframarginal reliability benefits
- **Marginal ELCC:** Marginal reliability benefit of the next megawatt, excluding inframarginal reliability benefits
- **Vintaged Marginal ELCC:** Marginal reliability benefit of the resource *when installed*

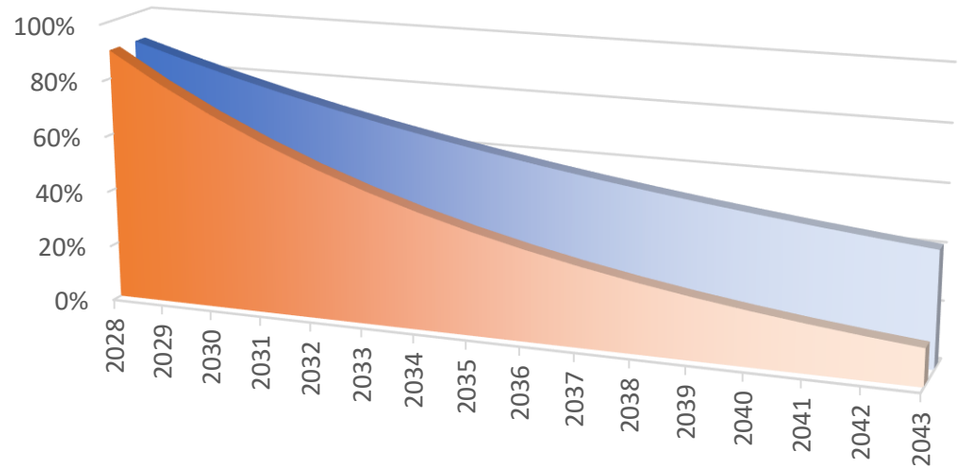
Marginal Reliability Impact (MRI), proposed by ISO-NE, approximates Marginal ELCC

* ELCC – Effective Load Carrying Capability

Marginal vs. Average: Battery Example

- In this illustrative example, a battery resource with declining MRI is developed in 2028 with an initial MRI of 90%
- Over the 15-year PPA:
  - The battery class average declines from 90% to 41%
  - The marginal battery unit value drops from 90% to 13%
- Marginal accreditation omits ~1/3 of the resource's total lifetime reliability contributions from a capacity awards standpoint
- **How does this omission impact policymaker and market participant incentives for clean energy investment?**

MRI v. Average Project Value Stream
(Illustrative, 15-Year Project Lifetime)



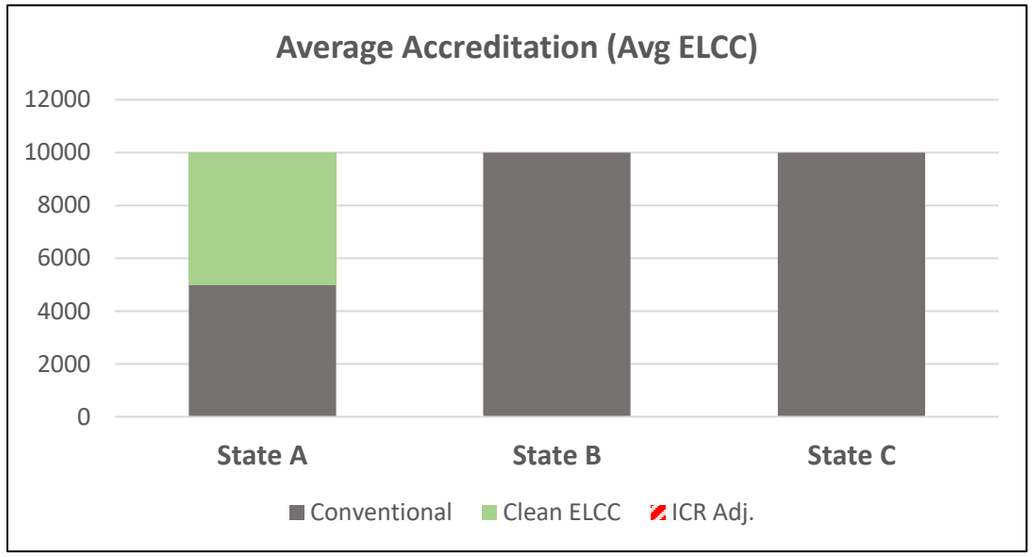
	Average	Marginal / MRI
Lifetime Capacity Awards per MW	9.8 MW-Years over 15 Years	6.5 MW-Years over 15 years
Average Lifetime Accreditation (%)	61%	41%

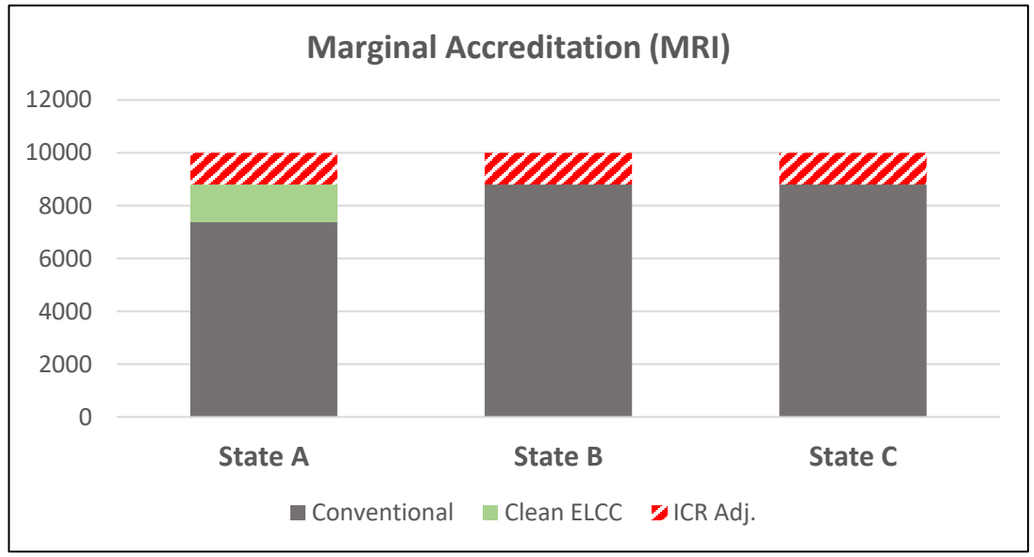
MRI may dilute incentives for states and market participants to value reliability in clean energy policies and investments.

MRI vs. Average ELCC: State Equity Example

- In this illustrative example, the ISO comprises three states with equal load (10,000 MW)
- **State A** develops a clean resource portfolio with a 5,000 MW average ELCC (PCAP) but only 1,400 MW marginal value in 2030
  - **Average:** Using average ELCC accreditation, State A can meet half of its reliability need with its clean resource portfolio
  - **Marginal:** Using MRI, State A's 5,000 MW portfolio is split into 1,400 MW of MRI and 3,600 MW of ICR adjustment for all customers
- Under MRI, where does the 3,600 MW of non-market reliability value end up?
  - 1,200 MW of reduction allocated to each state
  - State A receives total of 2,600 MW of return on 5,000 MW of PCAP investment
    - 1,400 MW as Capacity Awards (MRI)
    - 1,200 MW as ICR reduction
  - States B and C each free ride on 1,200 MW ICR adjustment due to State A's investment

Equity Impacts of State A's Clean Energy Investments





MRI socializes significant reliability value, diluting incentives and encouraging free-ridership.

Long-Term and Regional Planning

- New England can't arrive at a clean, decarbonized grid without a shared view of where it needs to go:
  - What resources are needed, in what quantities, by when?
  - Who will be responsible for procuring those resources? What role will/should the FCM play in driving resource decisions?
  - What transmission will be needed to support those resources?
  - How will synergistic / antagonistic effects between resources feed into planning and procurement?
- If clean energy resources' reliability values are undercompensated, ISO-NE likely to see the development of sub-optimal resource mix (over-investment/under-investment in a different resource classes)
- Short-term market signals from the FCM can support state-level planning, but will need to be augmented with long-term, regional planning across jurisdictions

MRI alone would not produce a strong market signal for states and policymakers to focus on developing a synergistic, diverse, reliable clean energy portfolio.

NRDC RELIABILITY MODELING (GE ENERGY CONSULTING)

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- NRDC has retained GE Energy Consulting to perform quantitative analysis of the ISO-NE system for clean resource portfolios in 2028 and 2040
- This modeling is intended to explore:
  - **Thermal:** Accreditation and reliability impacts from incorporating fossil resource operational limitations (fuel supply, ambient derates)
  - **Clean Resources:** ELCC/MRI design implications for clean energy resources and storage
  - **Seasonal Accreditation:** Accreditation and policy implications of differentiating reliability needs by Summer / Winter
  - **Portfolio Effects:** Results from interaction of resource types and implications for market design
- NRDC's modeling effort is also intended to provide a benchmark for future results from ISO-NE
- NRDC intends to share results of the study at the September 2022 NEPOOL Markets Committee meeting

RCA Reforms: Key Takeaways

NRDC

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- **Level Playing Field:** Assess all resources with similar levels of robustness and scrutiny, including the thermal fleet
- **Fair Allocation of Benefits:** Consider alternatives / augmentations to MRI to address equity issues created by marginal accreditation
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