Competitive Auctions with Subsidized Policy Resources

The ISO’s Proposed Approach to Balancing Wholesale Markets and States’ Policies

Chris Geissler and Matthew White
Summary

• The ISO is offering a conceptual proposal for Forward Capacity Market (FCM) enhancements to:
  – Accommodate subsidized resources into the FCM over time, and
  – Preserve competitive capacity pricing for unsubsidized resources

• This presentation summarizes the objectives, key features, and benefits

• We seek stakeholder feedback, and plan to discuss design details at the NEPOOL Markets Committee beginning in June
ISO Discussion Paper Available

- Summarizes the challenges of integrating state policy resources into the FCM
- Presents the ISO’s conceptual proposal and design principles in greater detail

**Competitive Auctions with Subsidized Policy Resources**

States Are Subsidizing Clean Energy Resource Development to Meet Their Legislative Requirements

- Growing provision of out-of-market revenues through long-term contracts
- Legislative initiatives vary by state

<table>
<thead>
<tr>
<th>States</th>
<th>Recent State Resource Procurement Initiatives</th>
<th>Expected Resources</th>
<th>Target MW (nameplate*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA, CT, RI</td>
<td>2016 Multi-State Clean Energy RFP</td>
<td>Solar, wind</td>
<td>460</td>
</tr>
<tr>
<td>MA</td>
<td>2016 Energy Diversity Act</td>
<td>Clean energy, incl. hydro import</td>
<td>Approx. 1200</td>
</tr>
<tr>
<td>MA</td>
<td>2016 Energy Diversity Act</td>
<td>Off-Shore Wind</td>
<td>Up to 1600</td>
</tr>
</tbody>
</table>

*Note: Nameplate MW may be higher than qualified FCM capacity MW
Concerns over Subsidized Resources

• **Status quo.** Under the Minimum Offer Price Rule (MOPR), resources may be built to meet state policies but cost too much to clear in the FCM
  – Limited MOPR exemption for some new renewables

• **Likely Results are Inefficient.** Region may end up overbuilt for Resource Adequacy needs

• **States concerned** that consumers would bear unnecessarily high costs if state policy resources do not participate as FCM resources:

  \[
  \text{FCM Costs} + \text{Additional retail charges to fund state subsidies}
  \]
Competitively-Based Capacity Pricing Remains Essential

- Subsidized renewables can profitably sell in the capacity market for artificially low prices
- MOPR prevents capacity price suppression, helping to ensure competitive capacity prices
  - Even if unintentional, subsidized entry has a similar effect to buyer-side market power
- Competitive capacity pricing is essential to attract investment in (non-subsidized) new entry cost-effectively when needed
ISO’s Proposed Path Forward

• The ISO is developing a capacity market design solution:
  – Accommodates subsidized resources into the Forward Capacity Market (FCM) over time, and
  – Preserves competitive capacity price signals for unsubsidized resources needed for regional Resource Adequacy

• It builds upon the existing capacity market framework in New England

• It is based on specific design principles and objectives discussed during the 2016 stakeholder-led discussions on Integrating Markets and Public Policy (IMAPP)
Four Design Objectives and Principles

1. **Competitive capacity pricing.** Maintain competitively-based capacity auction prices, by minimizing the price-suppressive effect of out-of-market subsidies on competitive (unsubsidized) resources.

2. **Accommodate entry of subsidized resources into the FCM over time.** Minimize the potential for New England developing too many resources in the power system, an inefficient and costly outcome.

3. **Avoid cost shifts.** To the extent possible, minimize the potential for one state’s consumers to bear the costs of other states’ subsidies.

4. **A sustainable, market-based approach** that minimizes administrative mechanisms and extends, rather than upends, the existing capacity market framework.
Key Concept: Coordinate Entry and Exit

- **Two forms.** Coordinate entry of (subsidized) **new** and:
  1. **Exit** of (unsubsidized) **existing** capacity \( [\text{New} \ vs. \ \text{Existing}] \)
  2. **Entry** of (unsubsidized) **new** capacity \( [\text{New} \ vs. \ \text{New}] \)

- Both forms help prevent the over-build problem *and* capacity price suppression with subsidized new entry

- **When there is no new subsidized supply to coordinate:**
  FCA’s competitive price signals continue to guide entry and exit
Solution Approach: A Substitution Auction

• After the FCA: Existing or new resources awarded capacity supply obligations (CSOs) may transfer their obligations to new, subsidized resources that do not have CSOs

• This is arranged using a two-settlement process known as a substitution auction
  – Existing resources must then permanently retire (they have no CSOs)
  – New subsidized entrants may also substitute for unsubsidized new resources (which would then not enter)

• The substitution auction generally does not affect payments to existing (non-retiring) resources awarded CSOs, or to loads
Solution Stage 1 – The Primary FCA

• The ISO would conduct the FCA in two stages: The primary auction and the substitution auction

• **First stage:** ISO runs the FCA
  – Primary FCA determines the total supply to be procured, and resources’ initial CSOs
  – MOPR applies to all new resource offers
  – Uses the current capacity demand curves

• The primary FCA sets the competitively-based capacity clearing price
  – This achieves Design Objective #1...
  – But subsidized new resources are still likely to be priced too high to clear the primary FCA
Solution Stage 2 – The Substitution Auction

• **Second stage:** Substitution auction runs promptly after the FCA
  
  – **Supply:** Subsidized resources are entered on the supply side, *without* a MOPR applied to their supply offer prices
  
  – **Demand:** Retirement bids and new offers awarded initial CSOs in first stage are entered *on demand side*, at same offer prices in primary FCA
  
  – No administrative demand curves are used in the substitution auction

• Through clearing this auction, resources that retained CSOs in the primary FCA **transfer their obligations** to subsidized new resources that did not clear in the FCA (due to the MOPR)
  
  – The subsidized supply is paid the substitution auction’s clearing price
  
  – Subsidized supply that does not clear in either auction can participate as new (subsidized) supply in next year’s auctions
SUBSTITUTION AUCTION: EXAMPLES

How the two-settlement substitution auction works
Next: Two Numerical Examples

• **Example A:** Coordinating subsidized new entry with exit of existing resources

• **Example B:** Coordinating subsidized new entry versus *un*subsidized new entry

• **Both examples will show:**
  1. How prices are set and the two-stage market settles
  2. No price suppression in the FCA for competitive capacity
  3. Accommodates entry of subsidized capacity into the FCM (over time)
  4. No impact on capacity payments by loads (generally)

• **The market clearing process is the same in both examples, but the settlements are different in the two cases**
Example A: The Setting

- Assume the FCA has a range of offers from seven resources

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Offer Type</th>
<th>Offer Price with MOPR ($/kw-mo)</th>
<th>Preferred (Subsidized) Offer Price ($/kw-mo)</th>
<th>Offer Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Existing Supply Offer</td>
<td>$4</td>
<td>-</td>
<td>300</td>
</tr>
<tr>
<td>E2</td>
<td>Existing Supply Offer</td>
<td>$5</td>
<td>-</td>
<td>175</td>
</tr>
<tr>
<td>R1</td>
<td>Retirement Offer</td>
<td>$6</td>
<td>-</td>
<td>50</td>
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<tr>
<td>R2</td>
<td>Retirement Offer</td>
<td>$7</td>
<td>-</td>
<td>100</td>
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<tr>
<td>S1</td>
<td>New Supply Offer</td>
<td>$9</td>
<td>$0</td>
<td>50</td>
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<tr>
<td>S2</td>
<td>New Supply Offer</td>
<td>$10</td>
<td>$2</td>
<td>75</td>
</tr>
<tr>
<td>S3</td>
<td>New Supply Offer</td>
<td>$11</td>
<td>$4</td>
<td>50</td>
</tr>
</tbody>
</table>
Example A. Stage 1 – The Primary FCA

- Existing and retirement offers are awarded capacity obligations

$0$ $2$ $4$ $6$ $8$ $10$ $12$

<table>
<thead>
<tr>
<th>Offer Price</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$8 / kw-mo.$</td>
<td>clearing price</td>
</tr>
<tr>
<td>625 MW total supply</td>
<td></td>
</tr>
</tbody>
</table>

Three new subsidized units **do not clear** (due to the MOPR)

- $8 / kw-mo. clearing price
- 625 MW total supply
Example A. Stage 1: Primary FCA – Full Results

- Total cost to load for the primary FCA: $5M / mo.

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Offer Type</th>
<th>Clearing Price ($/kw-mo)</th>
<th>Cleared Capacity (MW)</th>
<th>Resource Payment ($/mo.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Existing Supply Offer</td>
<td>$8</td>
<td>300</td>
<td>$2.4M</td>
</tr>
<tr>
<td>E2</td>
<td>Existing Supply Offer</td>
<td>$8</td>
<td>175</td>
<td>$1.4M</td>
</tr>
<tr>
<td>R1</td>
<td>Retirement Offer</td>
<td>$8</td>
<td>50</td>
<td>$400K</td>
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<tr>
<td>R2</td>
<td>Retirement Offer</td>
<td>$8</td>
<td>100</td>
<td>$800K</td>
</tr>
<tr>
<td>S1</td>
<td>New Supply Offer</td>
<td>$8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S2</td>
<td>New Supply Offer</td>
<td>$8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S3</td>
<td>New Supply Offer</td>
<td>$8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Auction Totals: 625 $5.0 M

Awarded obligations:
- E1
- E2
- R1
- R2

Do not clear primary FCA:
- S1
- S2
- S3
Example A. Stage 2 – The Substitution Auction

- No MOPR for new supply. Retirement bids enter as demand.

### STAGE 2 – SUPPLY OFFERS

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Offer Price without MOPR ($/kw-mo)</th>
<th>Offer Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>$0</td>
<td>50</td>
</tr>
<tr>
<td>S2</td>
<td>$2</td>
<td>75</td>
</tr>
<tr>
<td>S3</td>
<td>$4</td>
<td>50</td>
</tr>
</tbody>
</table>

### STAGE 2 – DEMAND BIDS

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Bid Price ($/kw-mo)</th>
<th>Bid Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>$6</td>
<td>50</td>
</tr>
<tr>
<td>R2</td>
<td>$7</td>
<td>100</td>
</tr>
</tbody>
</table>

- Unit S3 sets price at $4, and partially clears
- S1, S2, clear, and S3 partially, acquiring CSOs
- R1, R2 shed their CSOs
Example A. The “Severance” Payment

- In effect, R1 receives a “severance” payment of $200K/month, in exchange for a final obligation: to retire from the FCM

<table>
<thead>
<tr>
<th>Auction</th>
<th>Cleared (MW)</th>
<th>Price ($/kw-mo.)</th>
<th>Payment ($/mo.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 sells capacity</td>
<td>FCA</td>
<td>50</td>
<td>$8</td>
</tr>
<tr>
<td>R1 “buys out” obligation</td>
<td>S.A.</td>
<td>−50</td>
<td>$4</td>
</tr>
<tr>
<td>Final Outcome (Net)</td>
<td>0 MW CSO</td>
<td></td>
<td>$200K</td>
</tr>
</tbody>
</table>

- **Subsidized units** (S1, S2, S3) are paid the substitution auction price of $4/kw-mo., by the retiring resources “buying out” their CSOs
  - Analogous to the two-settlement process that occurs between the Day-Ahead and Real-Time energy markets
Example A. Total Capacity Payments, All Resources

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>FCA Clearing Price ($/kw-mo.)</th>
<th>FCA Cleared (MW)</th>
<th>FCA Credit ($/mo.)</th>
<th>S.A. Clearing Price ($/kw-mo.)</th>
<th>S.A. Cleared (MW) (deviation from FCA)</th>
<th>S.A. Credit (Charge) ($/mo.)</th>
<th>Final Capacity Obligation (MW)</th>
<th>Final Auctions Payment ($/mo.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>$8</td>
<td>300</td>
<td>$2.4M</td>
<td>$4</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>$2.4M</td>
</tr>
<tr>
<td>E2</td>
<td>$8</td>
<td>175</td>
<td>$1.4M</td>
<td>$4</td>
<td>-</td>
<td>-</td>
<td>175</td>
<td>$1.4M</td>
</tr>
<tr>
<td>R1</td>
<td>$8</td>
<td>50</td>
<td>$400K</td>
<td>$4</td>
<td>−50</td>
<td>($200K)</td>
<td>-</td>
<td>$200K</td>
</tr>
<tr>
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<td>$8</td>
<td>100</td>
<td>$800K</td>
<td>$4</td>
<td>−100</td>
<td>($400K)</td>
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</tr>
<tr>
<td>S1</td>
<td>$8</td>
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<td>-</td>
<td>$4</td>
<td>50</td>
<td>$200K</td>
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</tr>
<tr>
<td>S2</td>
<td>$8</td>
<td>-</td>
<td>-</td>
<td>$4</td>
<td>75</td>
<td>$300K</td>
<td>75</td>
<td>$300K</td>
</tr>
<tr>
<td>S3</td>
<td>$8</td>
<td>-</td>
<td>-</td>
<td>$4</td>
<td>25</td>
<td>$100K</td>
<td>25</td>
<td>$100K</td>
</tr>
<tr>
<td>Auction Totals</td>
<td>625</td>
<td>$5.0 M</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>$0</td>
<td>625</td>
<td>$5.0 M</td>
</tr>
</tbody>
</table>

- Subsidized resources S1, S2, S3 (combined) receive 150 MW of supply obligations, and total capacity payments of $600K/mo.
Payment Logic: Who is Paying What and Why?

• The states’ subsidies enable high-cost, existing resources to receive a net payment to retire and be replaced by states’ preferred new (e.g., higher-cost clean energy) resources
  – Load entities still pay the same total capacity cost, with or without the substitution auction: $5M/mo., in this example

• In this two-settlement design, the payments’ logic is:
  – Subsidies enable the new units to offer capacity below their true costs
  – That, in turn, provides an opportunity for potentially retiring units to transfer (“buy out”) their obligations at less than their true cost
  – The retiring units transfer their supply obligations to the subsidized units, and transfer part (but not all) of their primary FCA payments
  – The retiring units keep a portion of their primary FCA payment, in consideration for a final obligation to retire
Accommodating Subsidized New Entry Addresses Concerns over Consumers’ Total Costs

- New (subsidized) supply clearing in the substitution auction becomes existing supply in subsequent FCAs
- In subsequent auctions, it would receive the primary FCA clearing price (until it eventually retires…)
- This capacity market revenue stream should be expected to reduce the out-of-market costs incurred by consumers to subsidize the development of state-preferred policy resources
- **Addresses states’ concerns** over consumers’ total costs if the state policy resources were unable to participate in the FCM
Example A: Summary

- Preserves **competitive capacity pricing** in the primary FCA (Design Objective #1)

- Accommodates **entry of subsidized new resources** into the FCM, minimizing potential for inefficient over-build (Design Objective #2)

- Increases financial incentives for existing, high-cost resources to **retire earlier** (relative to current FCM rules)

- Loads continue to **pay only the costs of the primary FCA**, like today
  - Consumers in non-subsidizing states do not bear higher costs because subsidized resources are accommodated (Design Objective #3)

- Transparent, competitive-market approach to balancing wholesale markets and public policies (Design Objective #4)
New Case: Treatment of Unsubsidized New Supply in the Substitution Auction

- Coordinating ‘new v. new’ requires balancing three issues:
  1. Deterring new supply by “fictitious entrants” that only seek to substitute out for a payment, undermining the primary FCA price
  2. Minimizing potential for an inefficient over-build of the system when new entry is not needed
  3. Preserving entry incentives for competitive new entry when needed

- There is a tension (no ‘perfect’ solution) to these three issues
- Proposed treatment for ‘new v. new’ cases is similar to the prior example, with a modified settlement rule (next)
Example B: An *Unsubsidized* New Supply Offer

- Assume competitive new supply N1 offers 100 MW at $7 / kw-mo. (*no retirement bid R2*). All other assumptions are unchanged.

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Offer Type</th>
<th>Offer Price with MOPR ($/kw-mo)</th>
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<td>175</td>
</tr>
<tr>
<td>R1</td>
<td>Retirement Offer</td>
<td>$6</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>N1</td>
<td>New Supply Offer</td>
<td>$7</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>S1</td>
<td>New Supply Offer</td>
<td>$9</td>
<td>$0</td>
<td>50</td>
</tr>
<tr>
<td>S2</td>
<td>New Supply Offer</td>
<td>$10</td>
<td>$2</td>
<td>75</td>
</tr>
<tr>
<td>S3</td>
<td>New Supply Offer</td>
<td>$11</td>
<td>$4</td>
<td>50</td>
</tr>
</tbody>
</table>

- Three new subsidized units have high offer prices due to MOPR.
- Old, high-cost unit that would retire without capacity revenue.
- Competitive new unit that requires capacity revenue to enter the market.
Example B. Stage 1 – Primary FCA

- All existing resources’ bids, and the competitive new resource N1, are awarded initial capacity obligations

FCA Demand Curve

- FCA clearing price = $8
- Cleared MW = 625

Three new subsidized units do not clear (due to the MOPR)

Same pricing as Example A:
- $8 / kw-mo. clearing price
- 625 MW total supply
- $5 M / mo. total payments
Example B. Stage 2 – The Substitution Auction

• Retirement bids and new supply offers (awarded obligations in primary FCA) enter as demand in the substitution auction

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Offer Price without MOPR ($/kw-mo)</th>
<th>Offer Capacity (MW)</th>
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<td>S3</td>
<td>$4</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Bid Price ($/kw-mo)</th>
<th>Bid Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>$6</td>
<td>50</td>
</tr>
<tr>
<td>N1</td>
<td>$7</td>
<td>100</td>
</tr>
</tbody>
</table>

- S1, S2, clear, and S3 partially, acquiring CSOs
- R1, N1 shed their CSOs

Unit S3 sets price at $4

S.A. clearing price
Example B. Total Capacity Payments

- **Modified settlement rule.** Resource N1 does not receive a CSO, and incurs no credit or charge:

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>FCA Clearing Price ($/kw-mo.)</th>
<th>FCA Cleared (MW)</th>
<th>FCA Credit ($/mo.)</th>
<th>S.A. Clearing Price ($/kw-mo.)</th>
<th>S.A. Cleared (MW) (deviation from FCA)</th>
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</thead>
<tbody>
<tr>
<td>E1</td>
<td>$8</td>
<td>300</td>
<td>$2.4 M</td>
<td>$4</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>$2.4 M</td>
</tr>
<tr>
<td>E2</td>
<td>$8</td>
<td>175</td>
<td>$1.4 M</td>
<td>$4</td>
<td>-</td>
<td>-</td>
<td>175</td>
<td>$1.4 M</td>
</tr>
<tr>
<td>R1</td>
<td>$8</td>
<td>50</td>
<td>$400K</td>
<td>$4</td>
<td>-50</td>
<td>($200K)</td>
<td>-</td>
<td>$200K</td>
</tr>
<tr>
<td>N1</td>
<td>$8</td>
<td>100</td>
<td>$0</td>
<td>$4</td>
<td>-100</td>
<td>$0</td>
<td>-</td>
<td>$0</td>
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<tr>
<td>S1</td>
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<td>-</td>
<td>-</td>
<td>$4</td>
<td>50</td>
<td>$200K</td>
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<td>S2</td>
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<td>25</td>
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<td>25</td>
<td>$100K</td>
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<tr>
<td>Auction Totals</td>
<td>625</td>
<td>$4.2 M</td>
<td>0</td>
<td>$400K</td>
<td>625</td>
<td>$4.6 M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Note:** Reduces total payments from $5.0 M to $4.6 M: resource N1 is replaced by lower-cost subsidized supply that is paid the lower S.A. price
Proposed Treatment Balances the Three Issues

1. **The zero net payment** to “substituted out” competitive new supply **solves Issue 1**
   - “Fictitious entry” is unprofitable, preserving primary FCA pricing

2. **Substituting-out** competitive new for subsidized new **solves Issue 2**
   - Minimizes inefficient over-build when new entry is *not* needed

3. **Primary FCA clearing price** is paid to competitive new supply if not substituted out (e.g., if no subsidized supply)
   - Provides incentive for competitive new entry when there is no subsidized new supply (thus no substitution auction)
Examining Key Insights

- The substitution auction does not change the total MW with capacity supply obligations
  - Avoids both excess supply and FCM price deterioration over time
  - Maintains same total cost to load as primary FCA (generally)
- Provides **entry incentives** if there is no subsidized supply
- Sound design framework that can accommodate **entry and exit across constrained capacity zones** in the substitution auction (see ISO Discussion Paper appendix)
Notable Properties of the Substitution Auction

• It is likely to help New England states **achieve their GHG policy goals** (e.g., older, high-emitting units will retire sooner)

• The substitution auction accommodates new subsidized supply resources in a **technology-neutral** way
  – Accommodates future state subsidies to non-renewable resources (e.g., storage, fuel cells, large-scale hydro, and so on)

• It provides a mechanism to replace the (200 MW annual) existing MOPR renewables exemption by:
  – Accommodating greater amounts of subsidized capacity into the FCM over time, and
  – Replacing an administrative rule with a sustainable, market-based solution
Risks, Limitations, and Caveats

• **No perfect solution.** Some design objectives are in fundamental tension, and there is no truly perfect solution

• **No guarantees regarding retirements’ pace.** If no new offers or retirement bids are submitted, subsidized resources must await following year to seek obligations
  — Seeking to *coordinate* entry and exit over time

• **Some retirements may impact winter fuel security.** This is a complex issue to be addressed in a separate process

• **MOPR does not apply to existing resources in New England,** and we are not proposing to extend it
Next Steps

• The ISO seeks stakeholder input, and will discuss this proposal in the NEPOOL technical committee process beginning in June

• **Anticipated timeline** for 2017:
  
  • May 17: IMAPP Meeting
  • June – November: Discussions at NEPOOL Markets Committee
  • December/January: Participants Committee Vote and FERC Filing

• **Implementation**:
  
  • Targeting FCA 13, to be conducted in February 2019
  • Retirement bids are due March 2018
Questions