ISO new england

Pathways to the Future Grid

Evaluating clean energy and carbon pricing frameworks as alternative market approaches to advance the region's clean energy transition

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Pathways work will evaluate two potential market approaches to decarbonization

- ISO is working with stakeholders and the Analysis Group to evaluate two market approaches that have been discussed as potential pathways to the future grid
  - Forward clean energy market (FCEM)
  - Net carbon pricing
- ISO plans to study both frameworks simultaneously and issue a final report in the first quarter of 2022 that discusses the market impacts of both approaches

Today's discussion focuses on several key design details

- Continued discussion of the straw FCEM and net carbon pricing frameworks
- These include consideration of key design elements that were discussed in April, including:
  - Integration of an FCEM with existing state policies (e.g., RECs)
  - Treatment of storage resources
- Offer thoughts on whether the modeling efforts should consider a FCEM or an ICCM
  - In addition to slides, refer to accompanying memo posted with materials
- Analysis Group will continue discussion of modeling approach and assumptions it will employ to evaluate the straw FCEM and net carbon pricing frameworks

Appreciate continued stakeholder engagement and feedback

- ISO welcomes feedback and questions associated with each straw framework put forth
  - Comments can be provided during committee discussions or in writing to Steven Otto (sotto@iso-ne.com) and the Chair of the Participants Committee (or designee) for posting
- Written comments received and posted for the NEPOOL meeting since the April meeting
  - Continued consideration of interaction with existing state programs, modeling specifics, model output, treatment of storage resources etc.
  - Today's discussion will consider some of these topics
  - AGI's presentation will also touch on some of these topics, with a greater focus on modeling specifics
  - Discussion of these topics will continue at future meetings

CONTINUED DISCUSSION OF INTERACTION BETWEEN CLEAN ENERGY CERTIFICATES (CECS) AND EXISTING STATE ENVIRONMENTAL PROGRAMS

Model is consistent with a range of approaches for how CECs and existing state programs interact

- In April, ISO discussed a range of potential approaches for how CECs and existing state environmental programs interact
- Consistent with stakeholder feedback, the ISO plans to consider existing programs in its modeling efforts
- The ISO has determined that AGI's modeling framework is consistent with multiple approaches to this interaction
- We do not believe it is necessary to pick between these approaches at this time, given that this stage of the Pathways process is not intended to determine a final, detailed proposal
- However, if the region were to pursue an FCEM/ICCM, further consideration of this interaction would be necessary

ISO's April memo proposed modeling both FCEM and existing environmental programs

- Detailed memo outlined three general approaches to how the FCEM could treat interaction between CECs and other environmental programs, particularly Renewable Portfolio Standards (RPS)
  - Separate certificates for clean energy and renewable energy; "bundled" certificates; discontinued state programs/CECs only
- Included numerical examples illustrating outcomes under various market conditions and approaches
- Memo noted that ISO was leaning towards modeling CECs and existing environmental programs as separate constraints in the pathways study, but explained that various approaches to modeling these constraints may produce similar outcomes

ISO appreciates stakeholder observations and concerns relating to this interaction

- During this discussion, stakeholders raised a number of observations and questions about the ISO's proposed approach, including:
  - Whether it is necessary to model existing state programs at all (even if they are assumed to continue)
  - Importance of accounting for existing statutory requirements in modeling assumptions
  - Whether RECs can or should be modeled as "premium" CECs, where all environmental attributes are bundled

ISO has assessed the modeling approach further in light of these comments

- ISO further considered the potential approaches, while being mindful of the fact that the pathways study seeks to model a straw framework to provide general simulations that may inform decisions on which path to take; not develop a final, detailed proposal for implementation purposes
  - Additional design work would follow if the region chooses to pursue and develop any new approach
  - This assessment has included discussions with AGI to understand the practicalities of their model, and how it relates to the various approaches that have been discussed

Propose to account for existing state programs as constraints in modeling

- There may be cases where accounting for these programs will not impact the results, especially when demand for clean energy is significantly greater than demand for energy satisfying these programs
  - E.g., Case C from the April memo
- However, incorporating existing state programs in the model will more robustly account for their impacts when they are binding, resulting in a price based on the marginal resource
  - E.g., Case B from the April memo
  - May also be important for certain cases and types of certificates, and in assessment of non-FCEM pathways
- Accounting for existing state programs in the model will provide better understanding of each of the potential pathways, including the status quo, under a broad range of market conditions

Model formulation is consistent with multiple approaches to integrating state policy

- This formulation is consistent with a "separate product approach" that treats RECs and CECs as separate products, where renewable resources are awarded separate certificates for each product
- However, this formulation is also consistent with another approach raised by stakeholders where the existing state policies are integrated into the forward procurement of CECs
  - Under this "premium CEC" approach the FCEM would include constraints to reflect additional value for specific environmental attributes (e.g., renewable)
- Because the model is consistent with both of these approaches, it is not necessary to choose between them at this stage of the pathways study

Both approaches compensate resources for their contributions to environmental objectives

- Consider a resource that produces both renewable and clean energy, where the system's cost to providing the next increment of **clean energy** is $10/MWh, and to providing **renewable energy** (while holding clean energy constant) is $15
  - Recall from the April memo that the introduction of a clean energy constraint may reduce the incremental cost to providing renewable energy, and does not introduce a double payment
- Under the "separate products approach," the renewable resource will be awarded a REC and a CEC for each MWh
  - The price is $10 for the CEC, and $15 for the REC, for total compensation of $25 per MWh
- Under a "premium CEC" approach, it will be awarded a premium CEC for each MWh of energy it produces
  - The price for this premium CEC will be $25 per MWh, equal to the sum of the incremental costs for each environmental attribute
- Thus, compensation is the same under each approach

Both approaches also allow states to meet their environmental objectives

- Under the "separate products" approach, states would separately procure CECs and RECs to ensure that their objectives associated with both clean energy and other environmental attributes are satisfied
  - E.g., if the states desire at least 100 MWh of clean energy, where at least 80 MWh of this clean energy is renewable, will require the procurement of 100 MWh of CECs and 80 MWh of RECs
- Under the "premium CEC" approach, states will specify demand for total CECs, as well as for premium CECs, to ensure that their total environmental attribute demand is satisfied
  - E.g., if the states desire at least 100 MWh of clean energy, where at least 80 MWh of this clean energy is renewable, will require the procurement of 20 MWh of CECs and another 80 MWh of premium CECs
- Model framework is sufficiently general to be consistent with both approaches

Modeling formulation is sensible for the pathways study, but would require further assessment if region pursues a FCEM

- This modeling formulation does not consider many of the accounting and legal questions that would need to be addressed to translate this conceptual framework into a complete design that could be implemented and administered, such as:
  - Will RECs be procured as a premium clean energy product in the forward auction?
  - Would legal definitions of existing environmental certificates need to be updated?
  - What product(s) would states need to procure to meet their environmental mandates?
- If the region opts to pursue a FCEM, stakeholders and the New England states would need to further consider precisely how these questions would be addressed

DESIGN CONSIDERATION OF IMPORTS AND SEAMS QUESTIONS

Model will consider energy imported from outside New England

- In addition to supply and demand conditions in New England, AGI's model will consider supply and demand in New York to inform how electricity may be transferred between regions
- The model will also consider electricity delivered from Quebec
- Accounting for these neighboring regions will help the model accurately simulate future outcomes under each of the potential pathways studied, including the status quo
- AGI can offer more detail on these modeling mechanics and assumptions
- Welcome stakeholder feedback on proposed approach discussed below

Sale of RECs across state lines

- Consistent with current market rules, propose the model will allow RECs generated outside the ISO-NE footprint to be used for compliance in New England, presuming that the certificate supplied is:
  - Consistent with the relevant environmental attributes associated with the state program, and
  - Not used for compliance in another state
- In doing so, model will allow RECs to be traded between New England and New York to the extent permitted by existing sate programs

Sale of CECs across state lines

- Propose that model allows allow sale of CECs into New England from resources outside the region if the resource provides both clean energy, as defined in the FCEM/ICCM, and RECs to the New England region
- Model will therefore not allow a resource to sell CECs into New England and RECs into New York for the same MWh
  - Limitation seeks to address a concern raised by stakeholders that a resource's environmental attributes are counted towards reducing carbon emissions in both New England and New York
  - Because New York does not have a CEC requirement, double-counting of clean energy could occur without this restriction
- If the region pursues a FCEM approach, further consideration of how to most sensibly account for clean energy originating outside New England is necessary

Application of a net carbon price to imports

- We expect that the model will "adjust" the cost of energy flowing into and out of New England based on the estimated emissions rate of the marginal resource importing energy across the intertie
- This approach seeks to put energy produced outside of New England on similar footing to that in New England
  - This will help produce efficient outcomes that account for both resource production costs and carbon emissions
- Still assessing precisely how this will be done in the model
- If the region pursues a net carbon pricing approach, further consideration of how the emissions rate of the marginal resource will be estimated or calculated would be necessary

PROPOSED TREATMENT OF STORAGE IN FCEM

ISO proposes not to award CECs to storage resources in straw FCEM framework

- ISO published a storage memo in April explaining why awarding CECs to storage resources does not align with sound market design
  - Storage is compensated for its contributions to clean energy production via increased energy market revenues
- Stakeholders noted that the market conditions under which storage is compensated for these contributions via increased energy market revenues may be limited
  - For example, may exclude conditions where storage reduces carbon emissions but does not increase clean energy production
  - This observation is correct, and highlights a key difference between the FCEM and net carbon pricing approaches

Treatment of storage in FCEM, cont.

- Co-located resources will qualify for CECs, based on the non-storage portion of the resource qualifying for clean energy
  - E.g., solar plus storage will receive CECs for any energy produced by its solar capability
- ISO and AGI will consider ways to explore the role of and compensation for storage further via qualitative analysis and/or sensitivities and welcome further stakeholder feedback

MODELING EQUIVALENCE OF FCEM AND ICCM

Background

- In March, the ISO presented a memo titled "Developing a Straw FCEM Framework" that detailed some of the outstanding design questions that need to be answered before Analysis Group can begin their modeling efforts
- Whether AGI would model a FCEM or an ICCM was one such design question
- After further consideration, the ISO now believes that it is not necessary for stakeholders to choose between a FCEM and an ICCM at this time, as AGI's modeling approach is consistent with both
- For additional detail, please see the posted "Modeling Equivalence of the FCEM and the ICCM" memo

Section overview

- Memo considers a pair of numerical examples
  - Each example includes the same set of resources and parameters
- Numerical examples are also available in Appendix slides
- First example considers awards, prices, and compensation when clean energy and capacity are procured simultaneously in an ICCM
- Second example considers awards, prices, and compensation when we procure clean energy first with a FCEM and subsequently procure capacity in a FCM
- Memo compares outcomes between the two examples
- Given assumptions consistent with AGI's modeling approach, the FCEM and the ICCM will yield identical awards and compensation to all resources

Assumptions

- Assumption 1: Resources submit offers for capacity and clean energy based on their missing money, where their missing money is defined as revenue they would need to receive, in addition to that from the energy and ancillary service markets, to recover their costs
- Assumption 2: The markets for RECs and CECs are competitive, so that the marginal resource recovers its missing money but no more
- Assumption 3: Resources offer to sell the entirety of their clean energy and capacity capability forward
- Assumption 4: Resources submit fully rationable (i.e., non-lumpy) offers for capacity

Assumptions, cont.

- Assumption 5: Resources have perfect foresight, so that they can exactly predict the capacity clearing price, their capacity award, their real-time energy profits, their clean energy production, etc.
- Assumption 5 is a particularly key assumption, but one that reflects AGI's broad, market-based modeling approach
- If Assumption 5 does not hold, we might observe divergent outcomes between the ICCM and the FCEM, particularly when the resources have different beliefs about capacity prices
- Consideration of how these beliefs may vary across resources, and how these might inform market design decisions, is outside the scope of this modeling exercise

Key takeaways

- Given Assumptions 1-5, the ICCM and the FCEM will have identical awards, prices, and compensation to resources
- Under a FCEM, resources incorporate their future capacity revenue when determining how much missing money they must recover by selling clean energy forward. When these capacity revenue predictions are accurate, as we assume in the above examples, we get equivalent results under a FCEM or an ICCM

Analysis Group's modeling efforts

- AGI's modeling approach will make assumptions that are generally consistent with those employed in the above examples
- Their model will assume that:
  - The markets for RECs and CECs are competitive
  - Resources submit offers to sell clean energy based on their clean energy production in the delivery year
  - Resources submit fully rationable offers for capacity and clean energy
  - Resources have perfect foresight about future prices and awards in all markets (including capacity) when making entry/exit decisions

Analysis Group's modeling efforts, cont.

- AGI's modeling approach does not distinguish between a sequential FCEM and a simultaneous ICCM
- More specifically, AGI's capacity expansion model will conduct a single, global optimization to determine the resource mix for each framework
- Their model will include constraints corresponding with capacity demand, renewable energy demand, and demand for clean energy or carbon emissions abatement
- **Key Takeaway:** This modeling approach is consistent with either a FCEM where resources correctly internalize the actual capacity price when formulating their clean energy offer price, or an ICCM where clean energy and capacity are procured jointly

The ISO does not believe it is necessary to decide between an FCEM and ICCM at this time

- AGI's modeling approach is broadly consistent with both, and the results can therefore be treated as reflecting potential market outcomes under either a FCEM or an ICCM
- In practice, there are likely to be differences between these approaches, but such differences are not accounted for in AGI's model
- If the region chooses to pursue such an approach, further consideration of the tradeoffs between an FCEM and ICCM will be necessary to determine which to pursue
- The ISO welcomes stakeholder feedback

ISO looks forward to working with stakeholders to evaluate pathways to the future grid

- With the help of stakeholders and the Analysis Group, ISO will evaluate market outcomes under the forward clean energy market and net carbon pricing frameworks
- Welcome stakeholder feedback today on these efforts, including the two frameworks to be studied and modeling assumptions discussed next by AGI
  - Seeking any written, follow up feedback by May 21 to best allow for consideration ahead of posting date for the June 11 meeting
- Share final report on modeled market outcomes with stakeholders in the first quarter of 2022

APPENDIX: FCEM/ICCM MODELING EQUIVALENCE NUMERICAL EXAMPLES

Parameter summary

- The table below includes the key parameter values for the following examples

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	Missing Money Per MW	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Max Capacity Award	1,000 MW	300 MW	300 MW	300 MW
[3]	E[Clean Energy]	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[4]	CSO Demand	1,200 MW			
[5]	Clean Energy Demand	3,000,000 MWh			

Parameter summary, cont.

- Both examples consider the same four resources with the same parameter values
- Missing Money Per MW is the amount of revenue from capacity and clean energy these resources would require to be economical
- Max Capacity Award is each resource's capacity capability
- E[Clean Energy] provides each resource's expected clean energy production during the delivery year
  - E.g., if Clean 1 provides its entire 300 MW of capacity, it expects to produce 1,800,000 MWh of clean energy
- CSO Demand and Clean Energy Demand are both vertical demand curves, for simplicity

ICCM preview

- Next few slides consider awards and compensation in an ICCM
- Begin with a review of the proposed ICCM mechanics
- For more information on the ICCM, see the "Evaluation of an Integrated Forward Clean Energy Market" memo the ISO posted in March
- Awards, prices, and total revenue to resources in the ICCM will later be compared with comparable output from the FCEM

ICCM offer structure

Slide 29, March Working Session

- Participants would submit a capacity offer, as in the FCM today, that includes both a maximum quantity and a price reflecting the minimum payment rate they would accept to sell capacity
- The ICCM would introduce a new clean energy parameter to their offer that indicates how many MWh of forward clean energy it would sell per unit of CSO
  - E.g., a clean resource may specify that for each MW of capacity sold, it would also sell 100 MWh of clean energy forward
- A participant's offer price would then represent the minimum payment the participant would accept to take on a CSO *and* sell the associated bundled clean energy forward

Integrated auction clearing

Slide 30, March Working Session

- The ICCM would award capacity and clean energy positions to resources based on their offers and their contributions to meeting capacity and clean energy demand
- Much like with today's FCM, resources that offer these products at lower cost are more likely to be awarded positions than those that offer at higher prices
- However, the auction may award positions to a resource that submits a higher priced offer if this offer also includes clean energy
- Awards would be determined to maximize social surplus, where the social surplus considers the benefits of both products, as determined by the demand curves

ICCM numerical example

- The following tables provide key results form the ICCM numerical example

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM Offers	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Clean Energy Parameter	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW

- Consistent with Assumption 1, the example assumes that resources submit ICCM offers at their missing money
  - Note that Row [1] contains the same values as the Missing Money row from the previous table

ICCM numerical example: CSO awards and prices

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM Offers	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Clean Energy Parameter	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[3]	CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[4]	CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW

- In these examples, prices are set by the marginal resources
- Price for capacity is $60,000/MW, where Non-Clean 1 is the marginal resource with respect to capacity
  - $60,000 is the incremental cost associated with a 1 MW increase in capacity demand

ICCM numerical example: clean energy awards and prices

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM Offers	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Clean Energy Parameter	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[3]	CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[4]	CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[5]	Clean Energy Award	-	1,800,000 MWh	0 MWh	1,200,000 MWh
[6]	Clean Energy Price	-	$20/MWh	$20/MWh	$20/MWh

- Price for clean energy is $20/MWh, where Clean 3 is the marginal resource with respect to clean energy
  - $20 is the incremental cost associated with a 1 MWh increase in clean energy demand
  - This cost results form a modest increase in Clean 3's capacity award, and a corresponding decrease in Non-Clean 1's capacity award, so that the total clean energy sold increases and capacity is unchanged

ICCM numerical example: clean energy awards and prices, cont.

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM Offers	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Clean Energy Parameter	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[3]	CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[4]	CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[5]	Clean Energy Award	-	1,800,000 MWh	0 MWh	1,200,000 MWh
[6]	Clean Energy Price	-	$20/MWh	$20/MWh	$20/MWh

- Clean 2 does not clear for clean energy or capacity despite the fact that their ICCM offer is lower than Clean 3's offer
  - While Clean 2 submits a lower offer, their clean energy parameter is less than half of Clean 3's so Clean 3 contributes more to system demand; Clean 3 provides capacity *and* their bundled clean energy at less cost than Clean 2

ICCM numerical example: total revenue

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM Offers	$60,000/MW	$160,000/MW	$150,000/MW	$200,000/MW
[2]	Clean Energy Parameter	-	6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[3]	CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[4]	CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[5]	Clean Energy Award	-	1,800,000 MWh	0 MWh	1,200,000 MWh
[6]	Clean Energy Price	-	$20/MWh	$20/MWh	$20/MWh
[7]	Total Revenue	$43,714,800	$54,000,000	$0	$34,285,200

- Total revenue to each resource is the combination of their capacity revenue and clean energy revenue: Row [3] times Row [4] plus Row [5] times Row [6]

FCEM preview

- Second example considers a FCEM framework, where clean energy is first procured in a FCEM and then capacity is procured in a subsequent FCM
- The example walks through this process in multiple steps:
  - First we consider FCEM offers, awards, and compensation
  - Then consider FCM offers, awards, and compensation

FCEM numerical example: offers in FCEM

- The table below describes how the clean resources would determine their FCEM offers

			Clean 1	Clean 2	Clean 3
[1]	Missing Money		$160,000/MW	$150,000/MW	$200,000/MW
[2]	E[Capacity Price]		$60,000/MW	$60,000/MW	$60,000/MW
[3]	E[Clean Energy]		6,000 MWh/MW	3,000 MWh/MW	7,000 MWh/MW
[4]	FCEM Offer	=([1]-[2])/[3]	$16.67/MWh	$30.00/MWh	$20.00/MWh

- Missing Money in Row [1] is the same as in previous tables
  - Non-Clean 1 does not appear; they are not eligible to sell CECs
- Forecasted FCM capacity price is $60,000/MW
- Each resource's forward clean energy offer is their per MWh missing money they need to recover, after accounting for their forecasted capacity revenue

FCEM numerical example: awards, prices, and revenue

- The table below describes awards, prices, and compensation in the FCEM

			Clean 1	Clean 2	Clean 3
[1]	FCEM Offer		$16.67/MWh	$30/MWh	$20/MWh
[2]	Clean Energy Award		1,800,000 MWh	0 MWh	1,200,000 MWh
[3]	Max Clean Energy Award		1,800,000 MWh	900,000 MWh	2,100,000 MWh
[4]	Clean Energy Price		$20/MWh	$20/MWh	$20/MWh
[5]	FCEM Revenue	=[2]*[4]	$36,000,000	$0	$24,000,000

- Clean 1 is inframarginal for forward clean energy
- Clean 3 is marginal and so sets the price at their offer: $20/MWh
- Note that the clean energy price and awards are the same here as in the ICCM example

FCEM numerical example: CSO offers after the FCEM

- The table below demonstrates how Clean 3 would formulate its CSO offer for the FCM
  - Note that we have omitted the other resources for brevity

			Clean 3
[1]	Missing Money		$200,000/MW
[2]	E[Capacity Award]		171.4 MW
[3]	Maximum Capacity Award		171.4 MW
[4]	FCEM Revenue		$24,000,000
[5]	FCEM Revenue Per E[MW of CSO]	=[4]/[2]	$140,000/MW
[6]	Missing Money Less FCEM Revenue	=[1]-[5]	$60,000/MW
[7]	CSO Offer	=[6]	$60,000/MW

FCEM numerical example: CSO offers cont.

- Consider how Clean 3 would develop its offer for the portion of tis capacity capability that sold clean energy in FCEM
- Clean 3 sold 57% of its clean energy capability in the FCEM, so we assume that it seeks to sell 57% of its capacity capability, 171.4 MW
- For this portion of its capability, Clean 3's per MW offer is their missing money minus FCEM revenue per forecast MW of CSO they will be awarded: $200,000/MW - $140,000/MW = $60,000/MW

FCEM numerical example: FCM after FCEM

- The following table provides awards, prices, and compensation to the resources from the FCM, as well as total compensation across the FCEM and the FCM

			Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	CSO Offer		$60,000/MW	$40,000/MW	$150,000/MW	$60,000/MW
[2]	CSO Award		728.6 MW	300 MW	0 MW	171.4 MW
[3]	CSO Price		$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[4]	FCM Revenue	=[2]*[3]	$43,714,800	$18,000,000	$0	$10,285,200
[5]	FCEM Revenue		-	$36,000,000	$0	$24,000,000
[6]	Total Revenue	=[4]+[5]	$43,714,800	$54,000,000	$0	$34,285,200

FCEM numerical example: FCM after FCEM cont.

- Non-Clean 1 is again marginal for capacity and sets the CSO price at $60,000/MW
- Clean 3 is willing to accept Non-Clean 1's offer as the clearing price, so we assume they submit an offer just below Non-Clean 1's offer of $60,000/MW
- Each resource's total revenue across the FCM and FCEM is the product of the capacity price, $60,000/MW, and their capacity award, plus their FCEM revenue

ICCM/FCEM comparison: identical awards, prices, and compensation

		Non-Clean 1	Clean 1	Clean 2	Clean 3
[1]	ICCM CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[2]	FCEM CSO Award	728.6 MW	300 MW	0 MW	171.4 MW
[3]	ICCM CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[4]	FCEM CSO Price	$60,000/MW	$60,000/MW	$60,000/MW	$60,000/MW
[5]	ICCM Clean Energy Award	-	1,800,000 MWh	0 MWh	1,200,000 MWh
[6]	FCEM Clean Energy Award	-	1,800,000 MWh	0 MWh	1,200,000 MWh
[7]	ICCM Clean Energy Price	$20/MWh	$20/MWh	$20/MWh	$20/MWh
[8]	FCEM Clean Energy Price	$20/MWh	$20/MWh	$20/MWh	$20/MWh
[9]	ICCM Total Revenue	$43,714,800	$54,000,000	$0	$34,285,200
[10]	FCEM Total Revenue	$43,714,800	$54,000,000	$0	$34,285,200