



Bidding Requirements for ICAP Spot Market Auctions

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Agenda

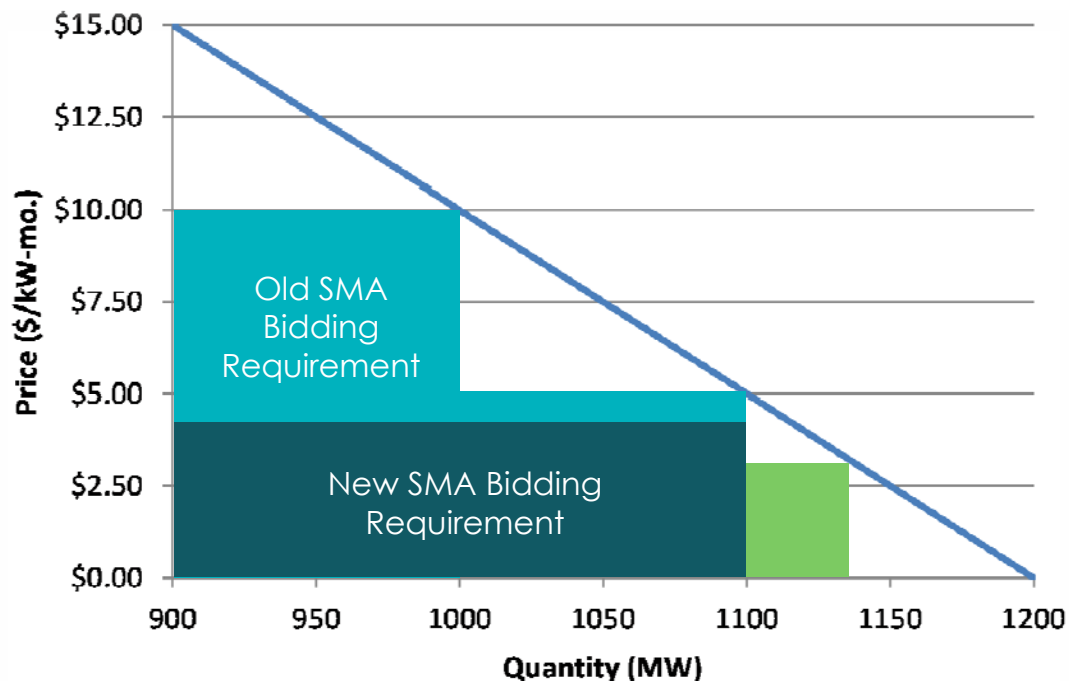
- Rationale for Proposed Changes
- Approach 1
- Approach 2
- Comparing the Approaches



Rationale for Proposed Changes

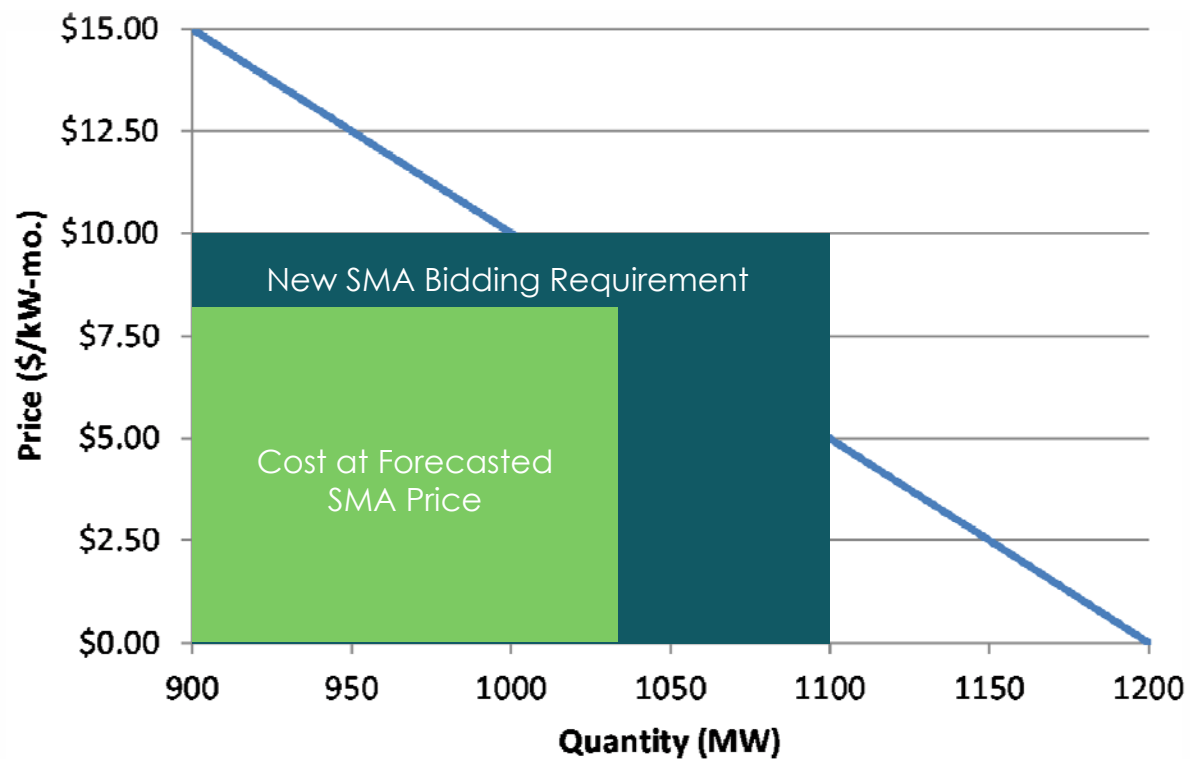
Benefits of New SMA Bidding Requirement

- The ISO will implement new bidding requirements for ICAP spot market auctions (SMAs) this winter.
 - This will yield more reasonable bidding requirements when UCAP prices are low and customers are deficient.



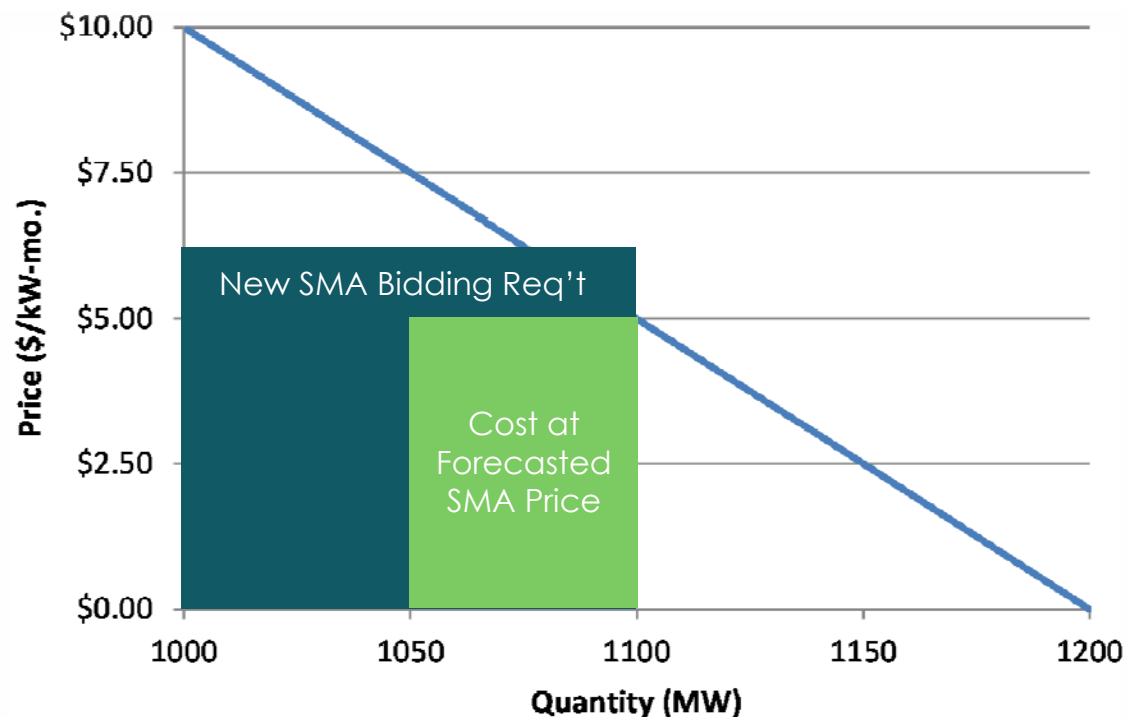
Drawbacks of New SMA Bidding Requirement

- But it may produce unreasonable SMA bidding requirements when UCAP prices are high.



Drawbacks of New SMA Bidding Requirement

- The new SMA bidding requirement may also be unreasonably high for a customer with UCAP in excess of its share of the UCAP requirement.





Principles for SMA Bidding Requirements

- To ensure that the SMA bidding requirement is reasonable for a broad range of market outcomes and market participants:
 - The SMA bidding requirement should be based on forecasts of the amount that customers will actually have to pay in the SMA.
 - Its calculation should explicitly recognize the relationship between:
 - The price in the SMA and
 - The quantity that must be purchased in the SMA.
 - It should account for capacity that a customer certifies (i.e., offers at a price of zero) in excess of its share of the UCAP requirement.



General Approach

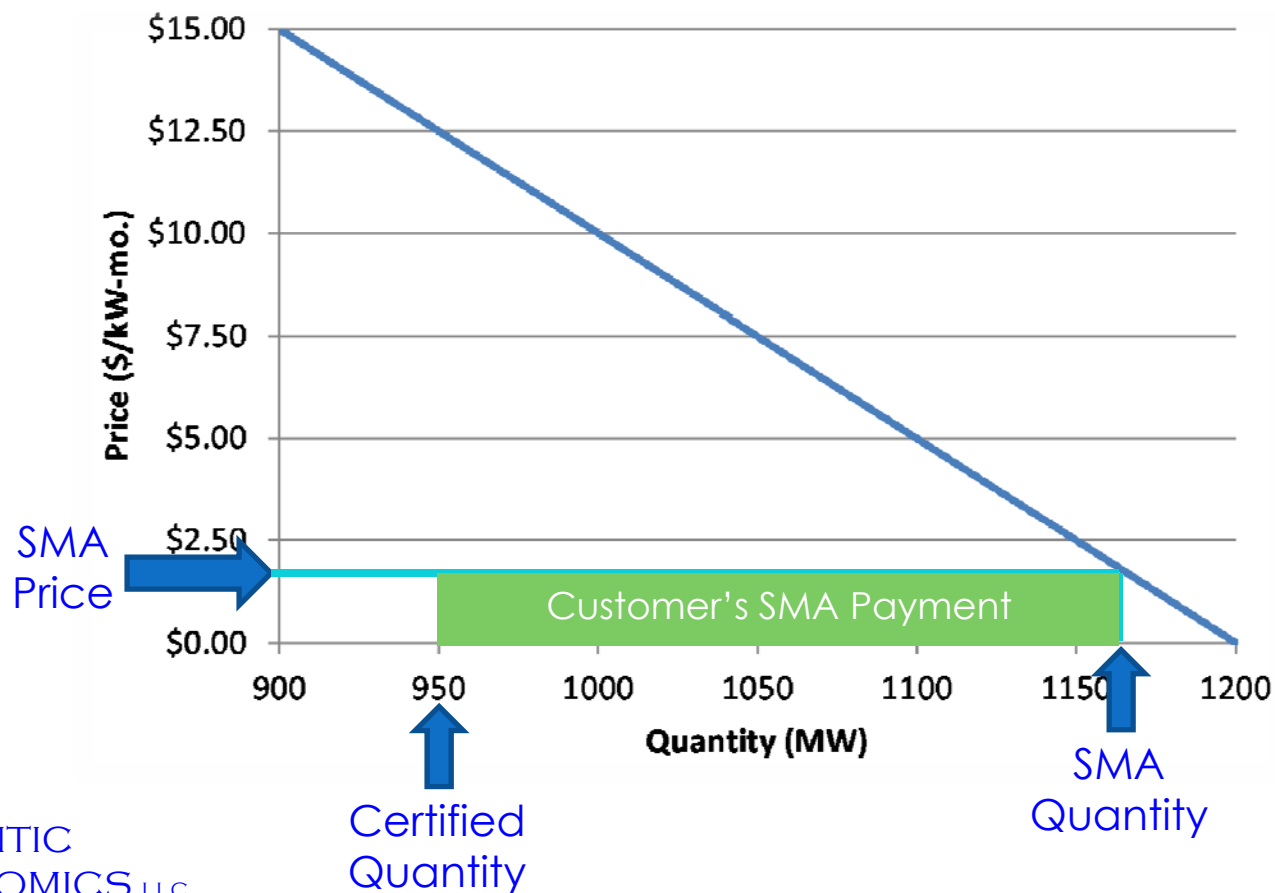
- My July 11 memo describes two approaches for meeting these objectives.
 - Each approach is based on the idea, that, given a value for the SMA price, the ISO can calculate how much each customer would have to pay for purchases in the SMA.
 - Therefore, given the distribution of prices, the ISO can determine the distribution of the amount that each customer would have to pay.
- Initially, I will describe Approach 1.



Approach 1

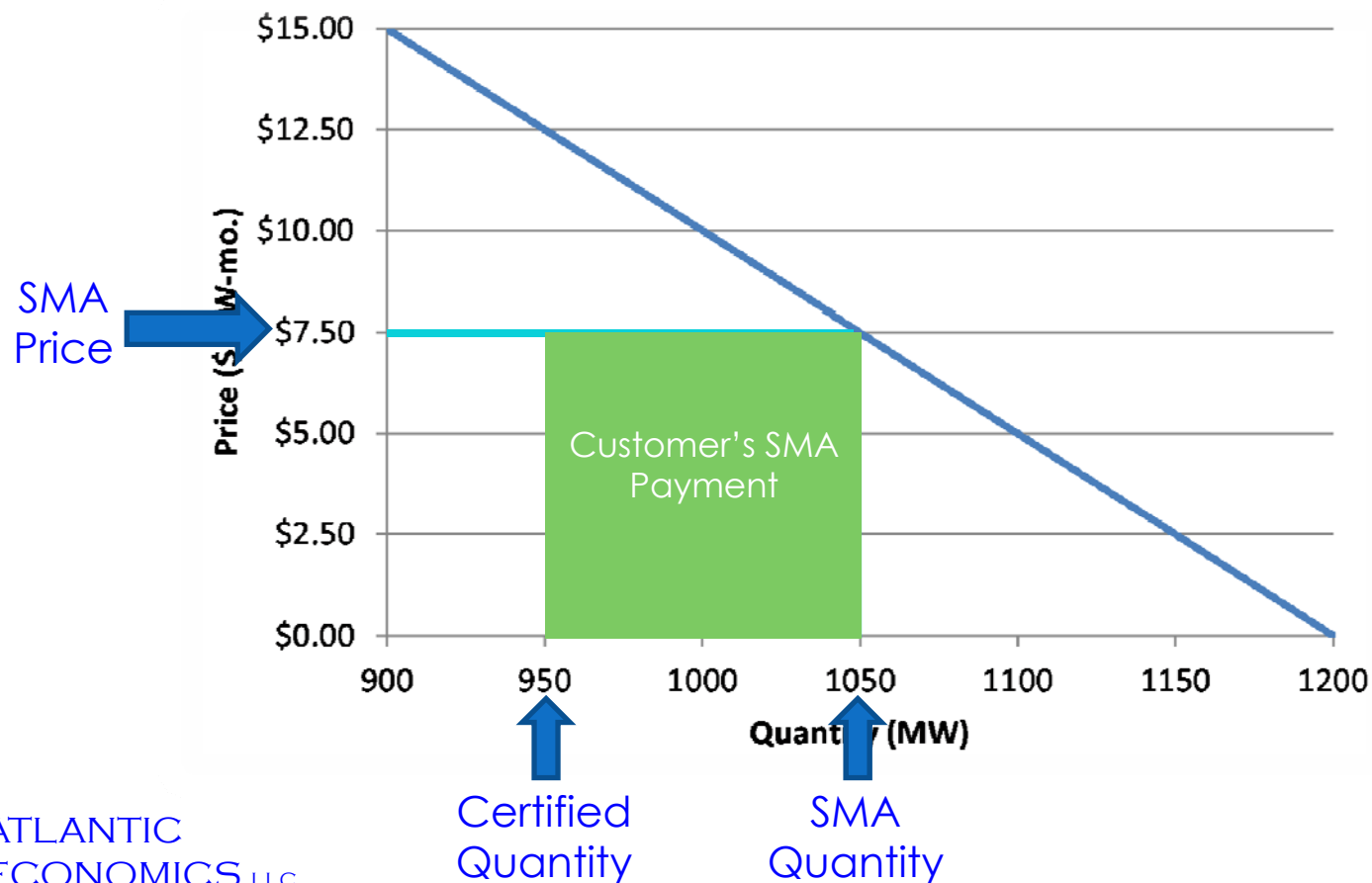
Interrelationship Between Price and Quantity

- If the SMA price is low, the customer will pay a lower price, but for more capacity.



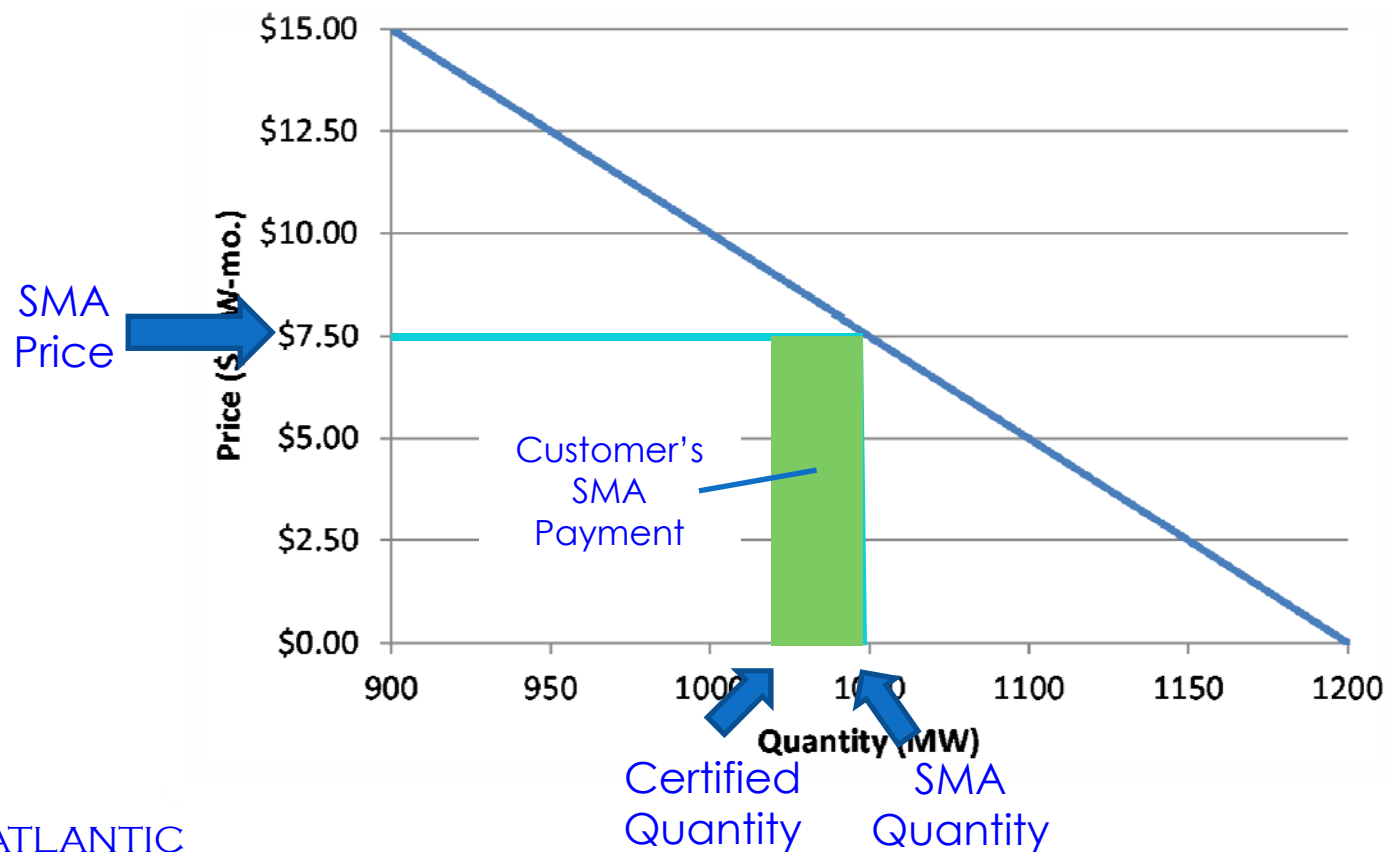
Interrelationship Between Price and Quantity

- If the SMA price is higher, the customer will pay a higher price, but for less capacity.



Impact of Excess UCAP on SMA Payment

- If the customer certifies more than its share of the UCAP requirement, it will pay less.



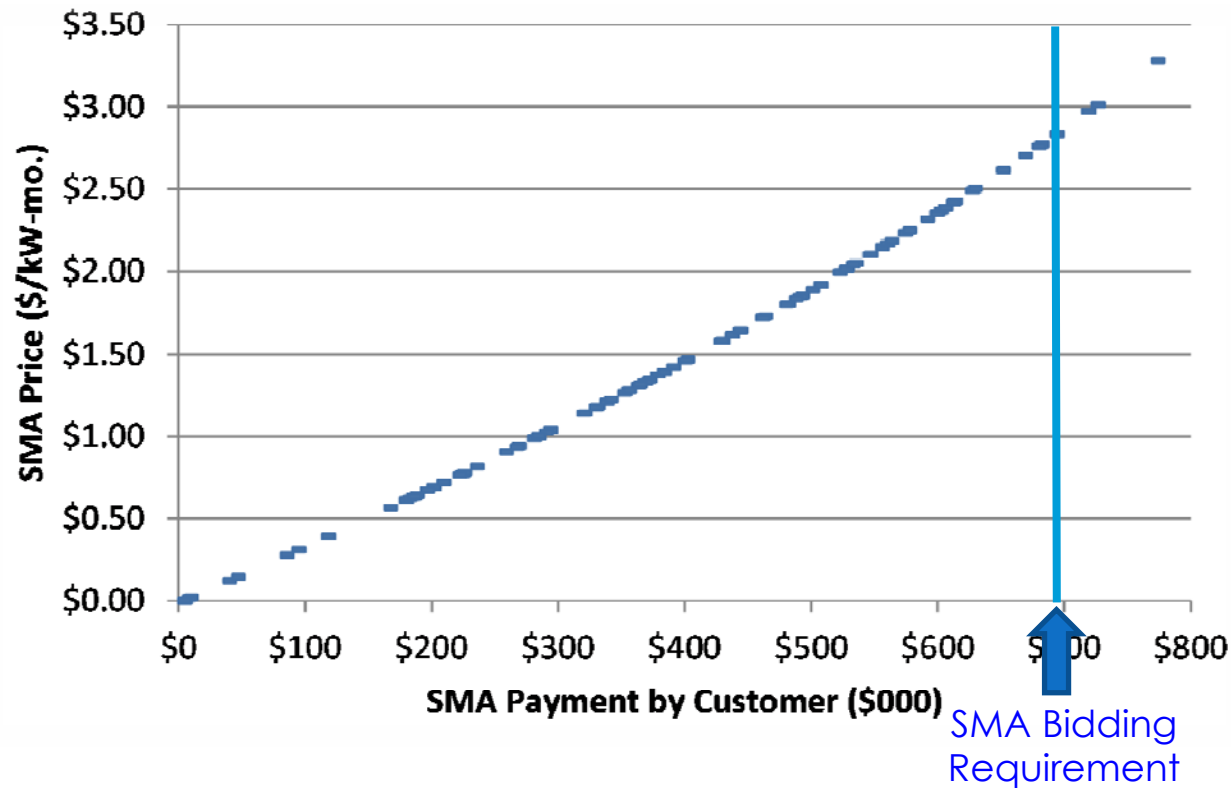


Determining the Distribution of SMA Payments

- If each potential value for the SMA price is drawn from a distribution that reflects the expected value and variability of the spot market price:
 - The ISO can calculate the distribution of the amount that each customer will have to pay.
 - The SMA bidding requirement for each customer can be based on that distribution.

Setting the SMA Bidding Requirement

- This graph shows the SMA bidding requirement that would be calculated for a customer, if it is set at the 97th percentile value of the amount that customer must pay for SMA purchases.



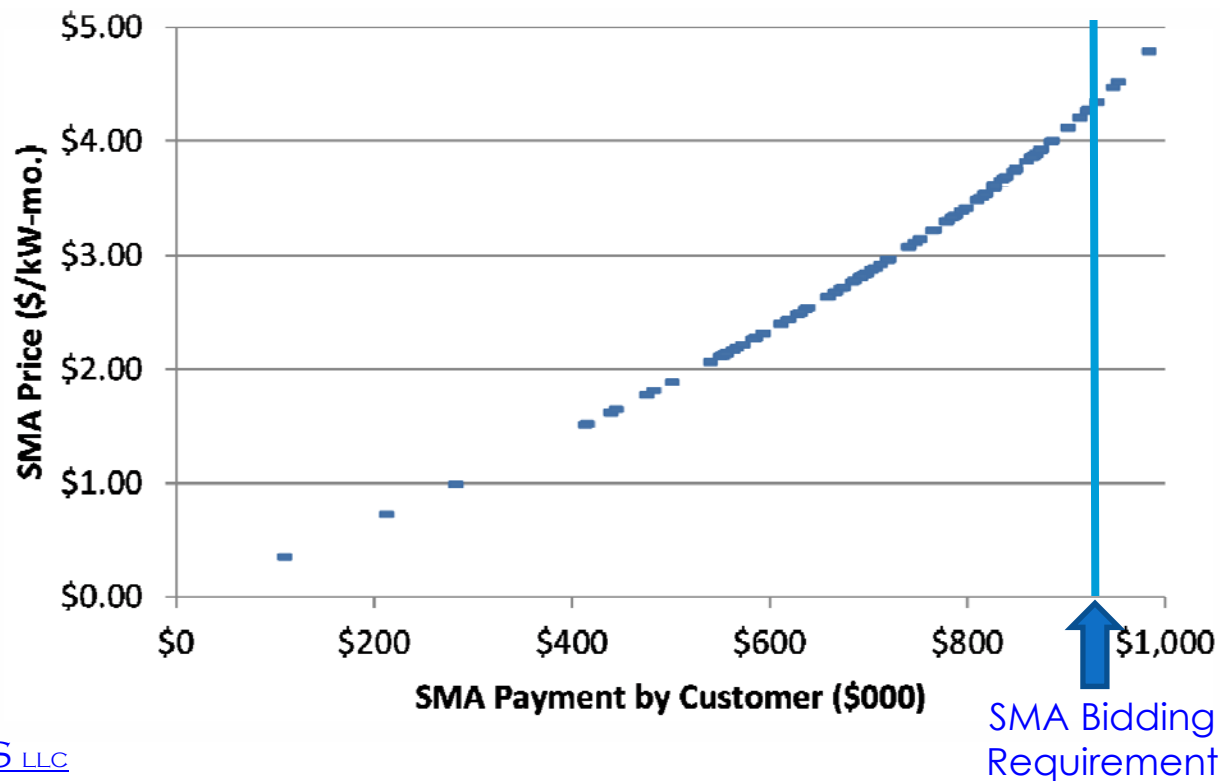


Factors Affecting SMA Bidding Requirement

- The SMA bidding requirement, calculated in this manner, will depend on:
 - Forecasted SMA prices,
 - The variability of SMA prices,
 - And the amount of UCAP that a customer can certify (compared to its share of the UCAP requirement).
- But its dependence on these factors is not simple.

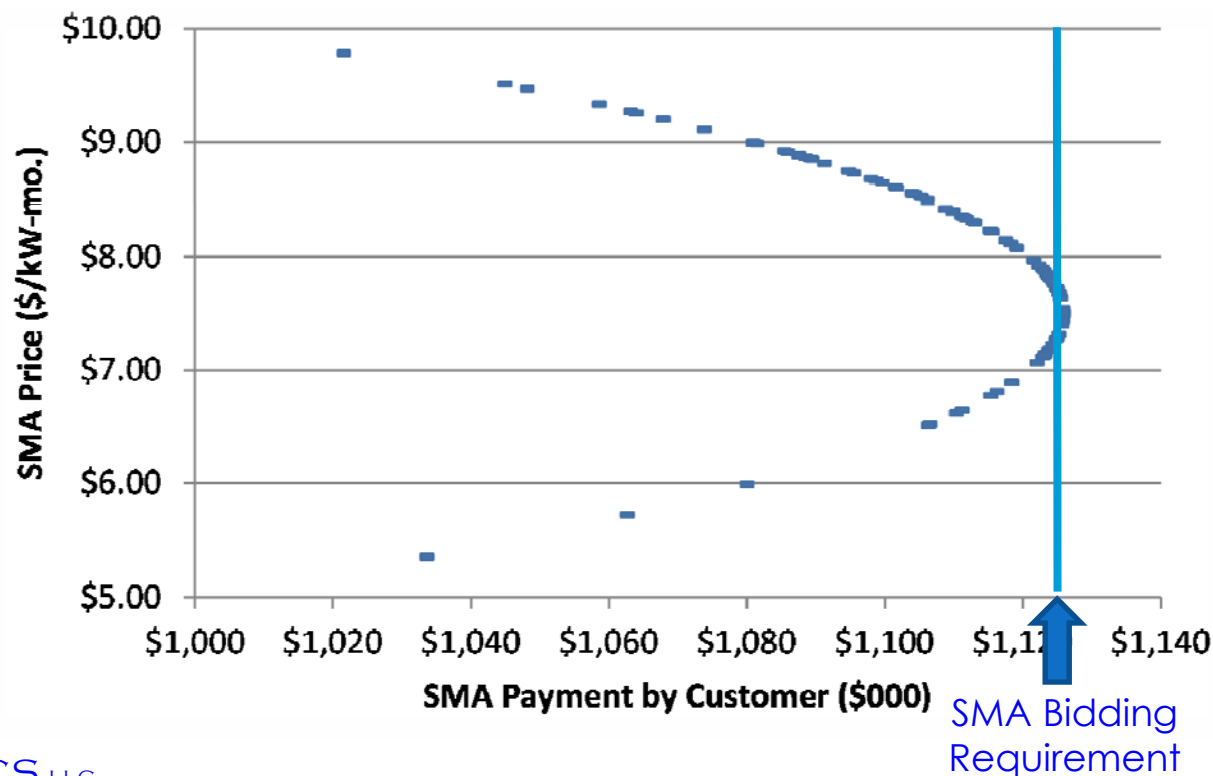
Impact of Forecasted Price on SMA Bidding Requirement

- If forecasted SMA prices are low, increased prices will cause the SMA bidding requirement to rise.
 - Raising the forecasted SMA price from \$1.50/kW-mo. to \$3/kW-mo. causes a 34% increase in the SMA bidding requirement in this example .



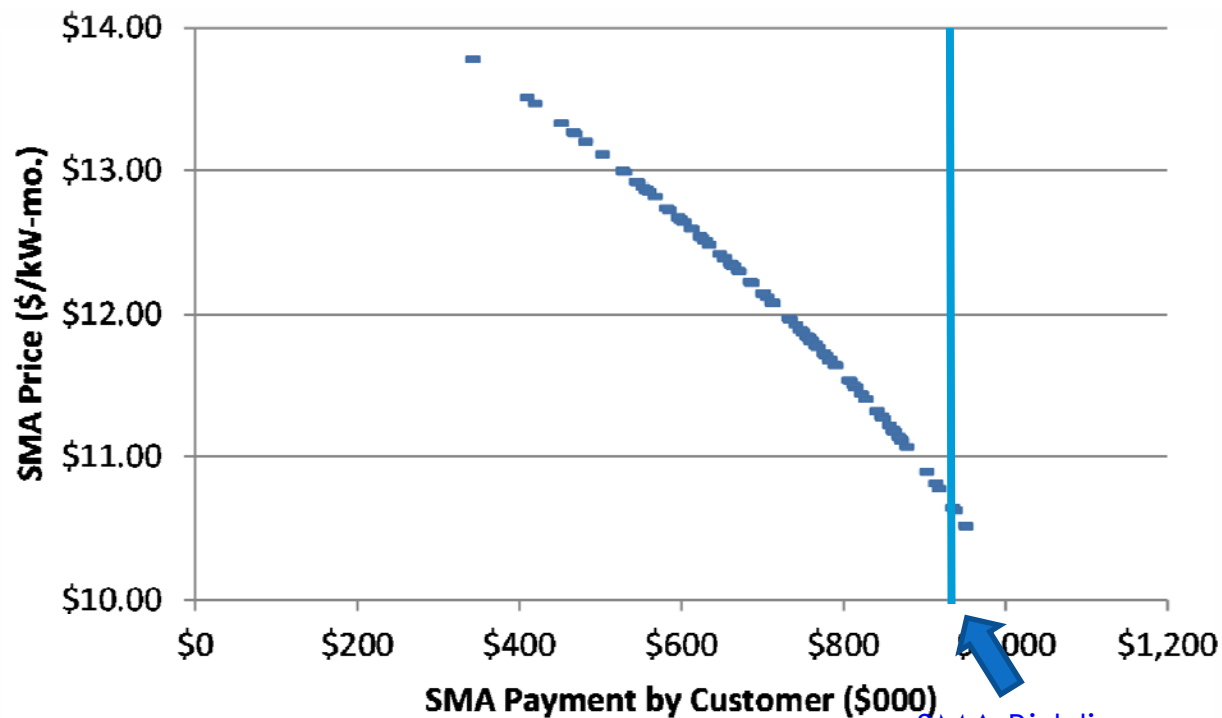
Impact of Forecasted Price on SMA Bidding Requirement

- Increasing the forecasted SMA price further, to \$8/kW-mo., leads to an increase of another 22% in the SMA bidding requirement in this example.
 - The impact of paying a higher price is mostly offset by having to buy less UCAP at that higher price.



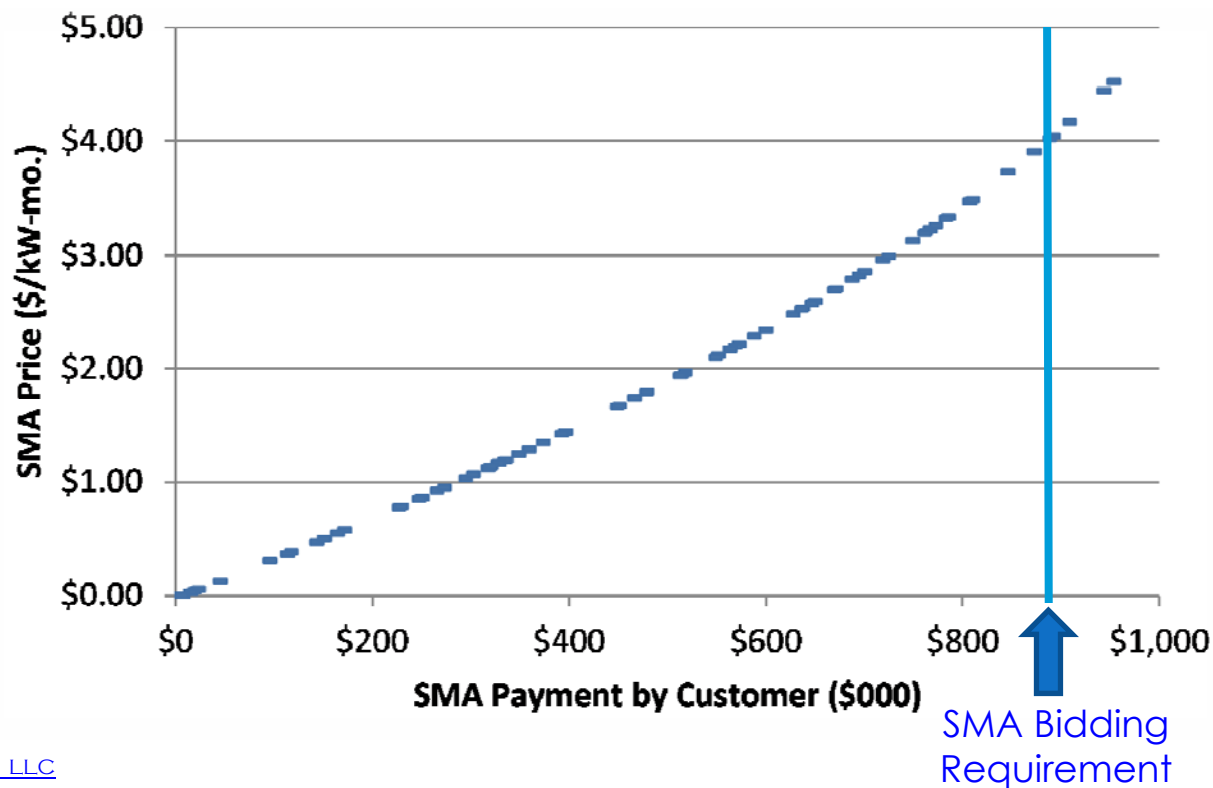
Impact of Forecasted Price on SMA Bidding Requirement

- Even higher forecasted SMA prices reduce the SMA bidding requirement.
 - Raising the forecasted SMA price from \$8/kW-mo. to \$12/kW-mo. in this example causes a 17% decrease in the SMA bidding requirement.



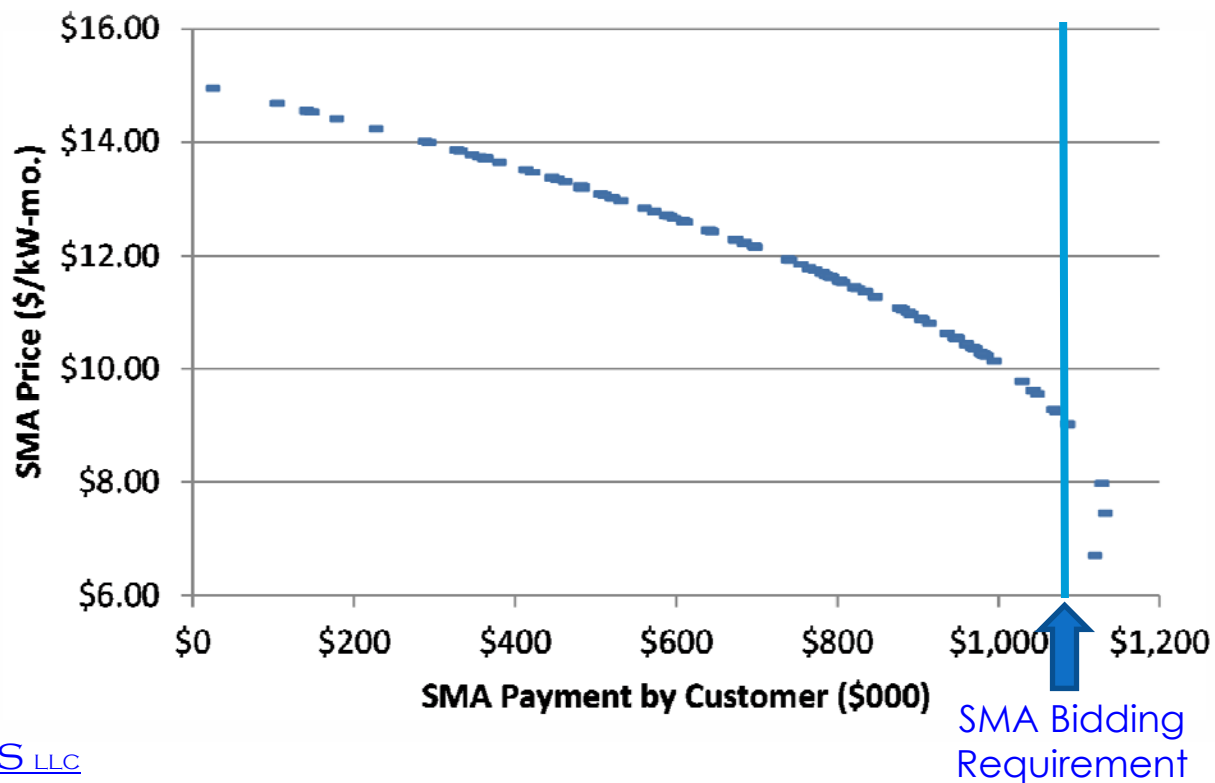
Impact of Price Variability on SMA Bidding Requirement

- If forecasted SMA prices are low, higher SMA price variability will lead to increased SMA bidding requirements.
 - At a forecasted price of \$1.50/kW-mo. in this example, doubling SMA price variability causes the SMA bidding requirement to rise by 31%.



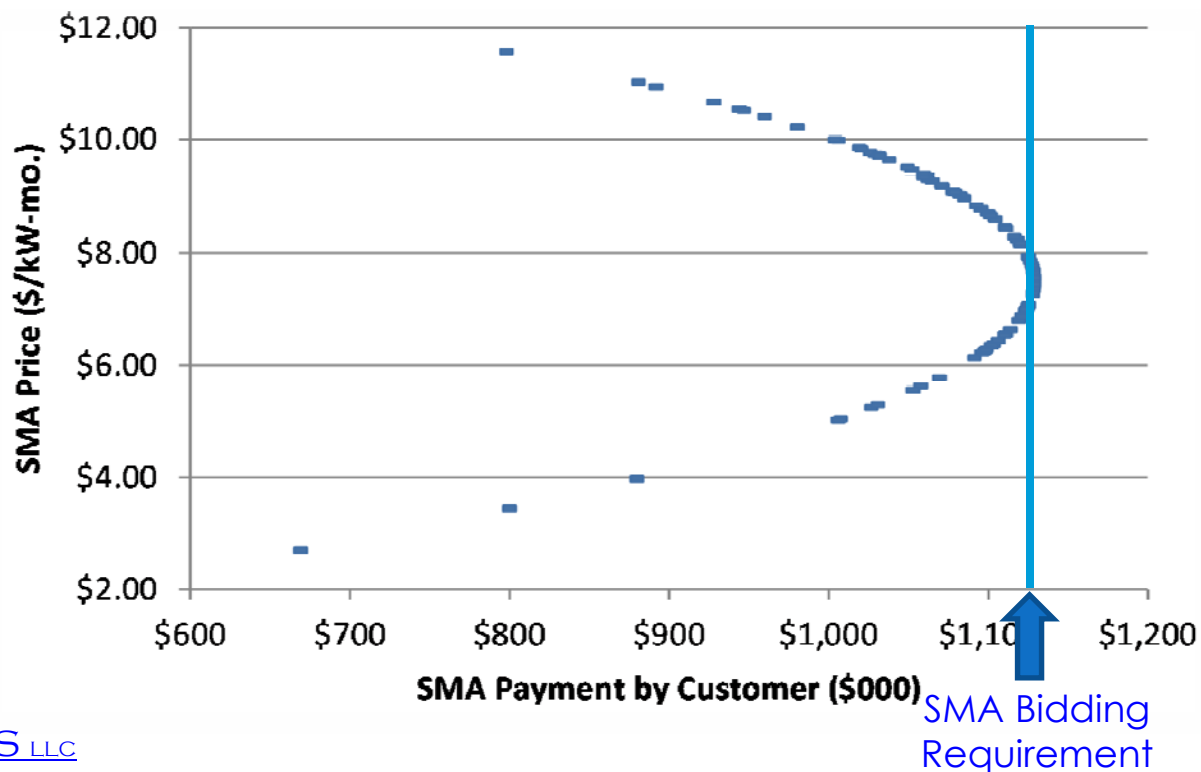
Impact of Price Variability on SMA Bidding Requirement

- Similarly, if forecasted SMA prices are high, higher SMA price variability will lead to increased SMA bidding requirements.
 - At a forecasted price of \$12/kW-mo. in this example, doubling SMA price variability causes the SMA bidding requirement to rise by 14%.



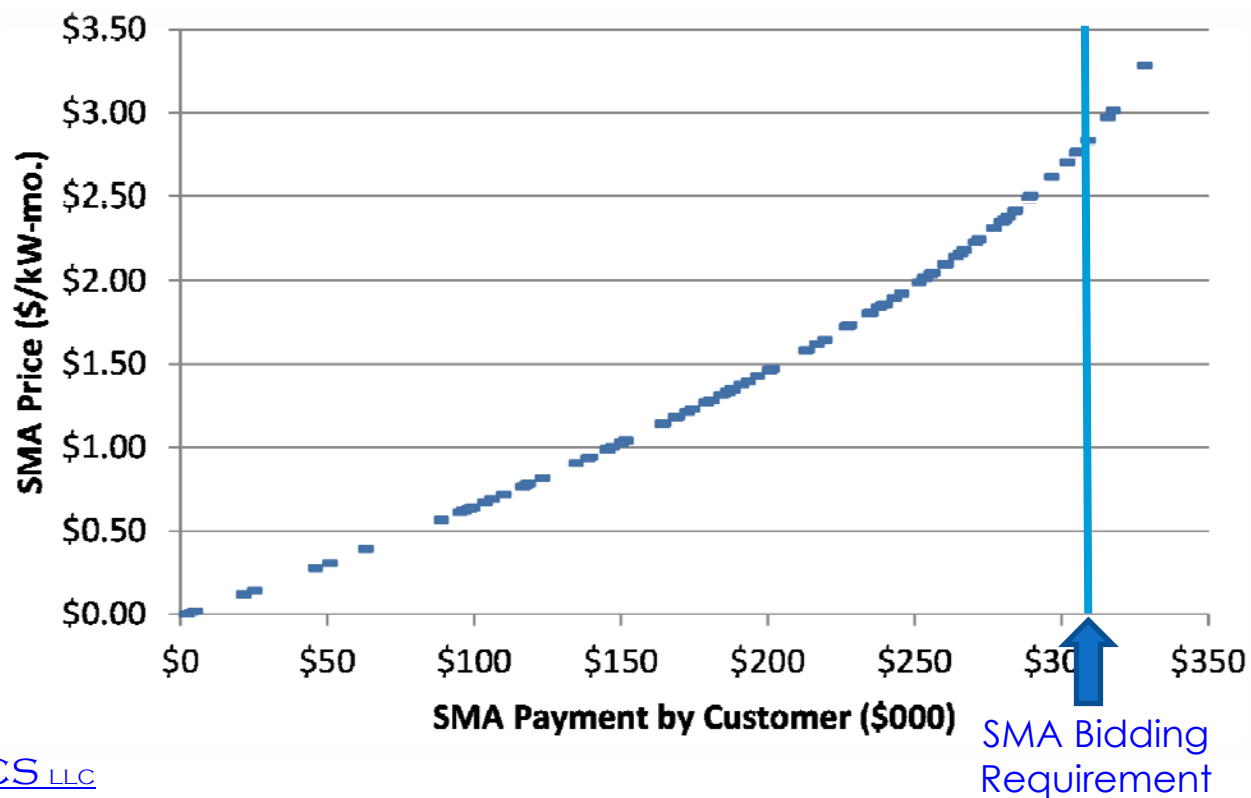
Impact of Price Variability on SMA Bidding Requirement

- But at intermediate values for forecasted SMA prices, higher SMA price variability may not significantly affect SMA bidding requirements.
 - At a forecasted price of \$8/kW-mo. in this example, doubling SMA price variability has no impact on the SMA bidding requirement.



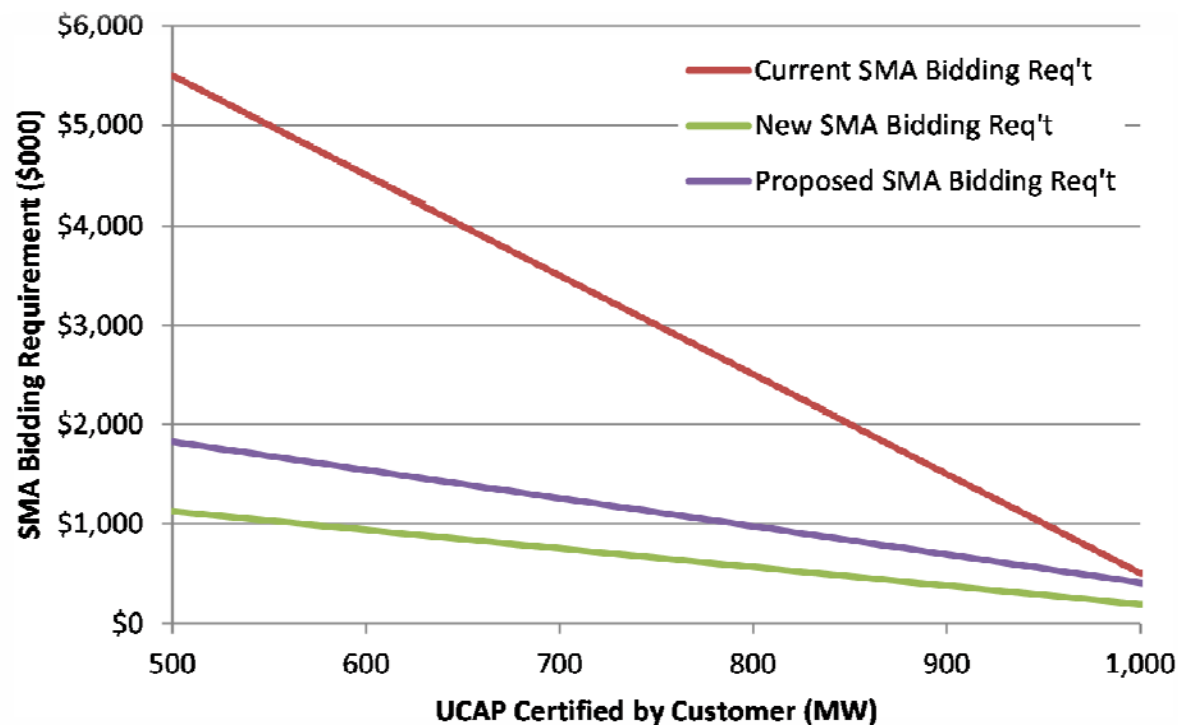
Impact of Quantity Certified on SMA Bidding Requirement

- Increasing the amount of UCAP certified by a customer lowers its SMA bidding requirement.
- At a price of \$1.50/kW-mo. in this example, if the customer certifies 103.5% of its share of the UCAP requirement (instead of 90%), its SMA bidding requirement falls by 55%.



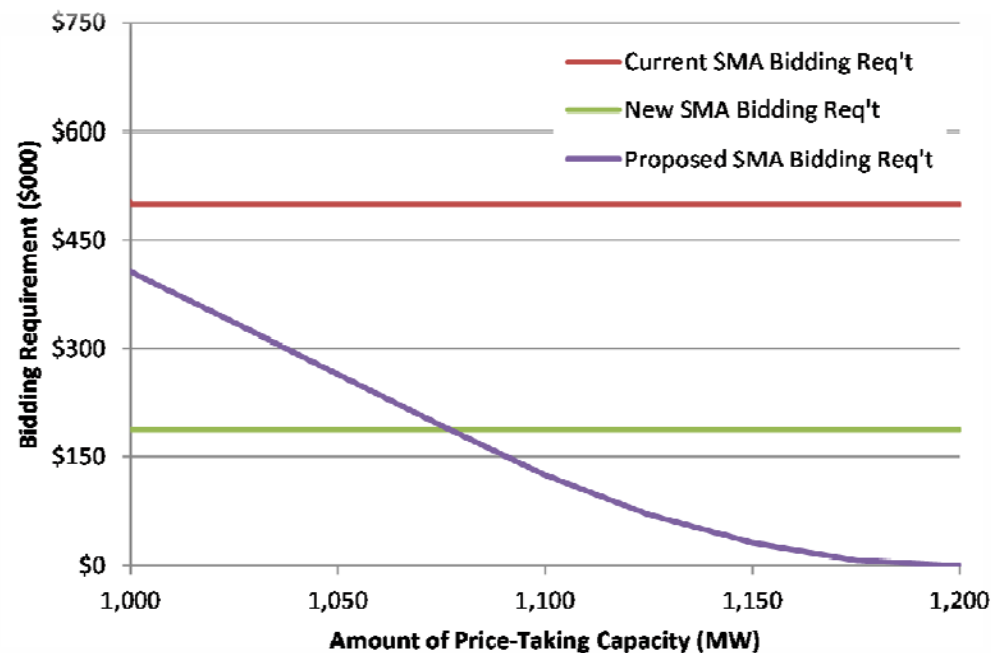
SMA Bidding Requirement When Prices Are Low

- When UCAP prices are low, the SMA bidding requirement for customers with deficiencies may be:
 - Well below the current SMA bidding requirement.
 - Slightly above the new SMA bidding requirement.



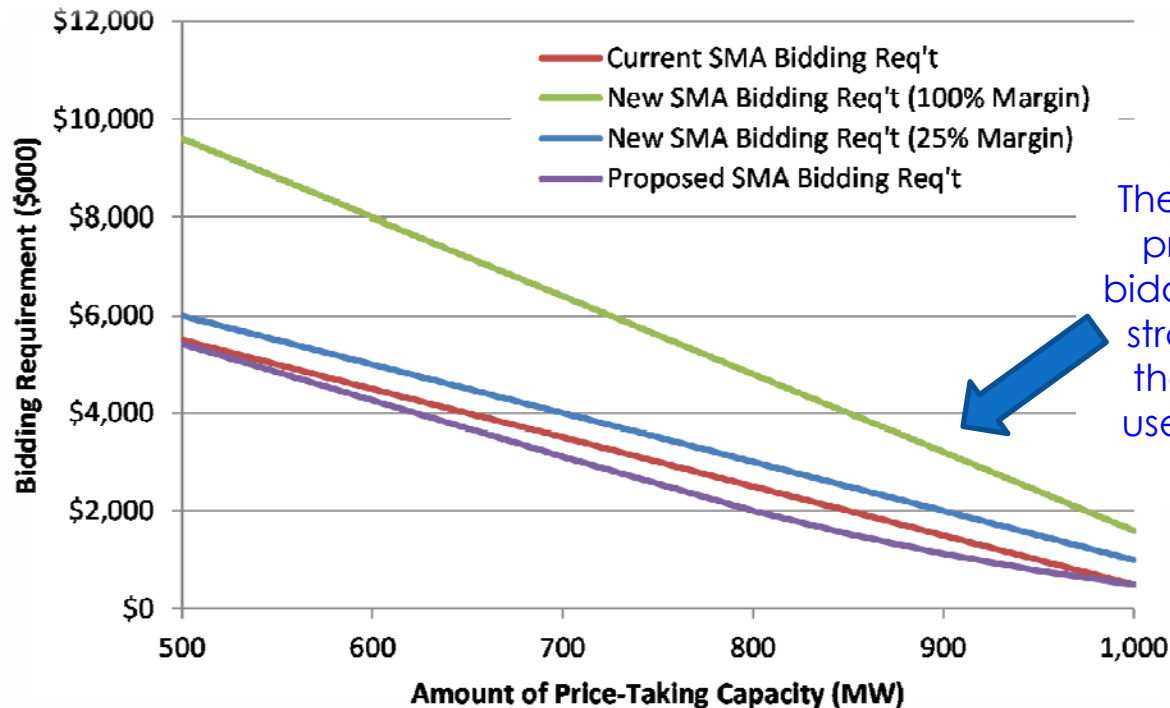
SMA Bidding Requirement When Prices Are Low

- When UCAP prices are low, the SMA bidding requirement for customers with excess UCAP may be:
 - Well below the current SMA bidding requirement for customers with large amounts of excess UCAP.
 - Above the new SMA bidding requirement for customers with small amounts of excess UCAP, and below it for customers with lots of excess.



SMA Bidding Requirement When Prices Are High

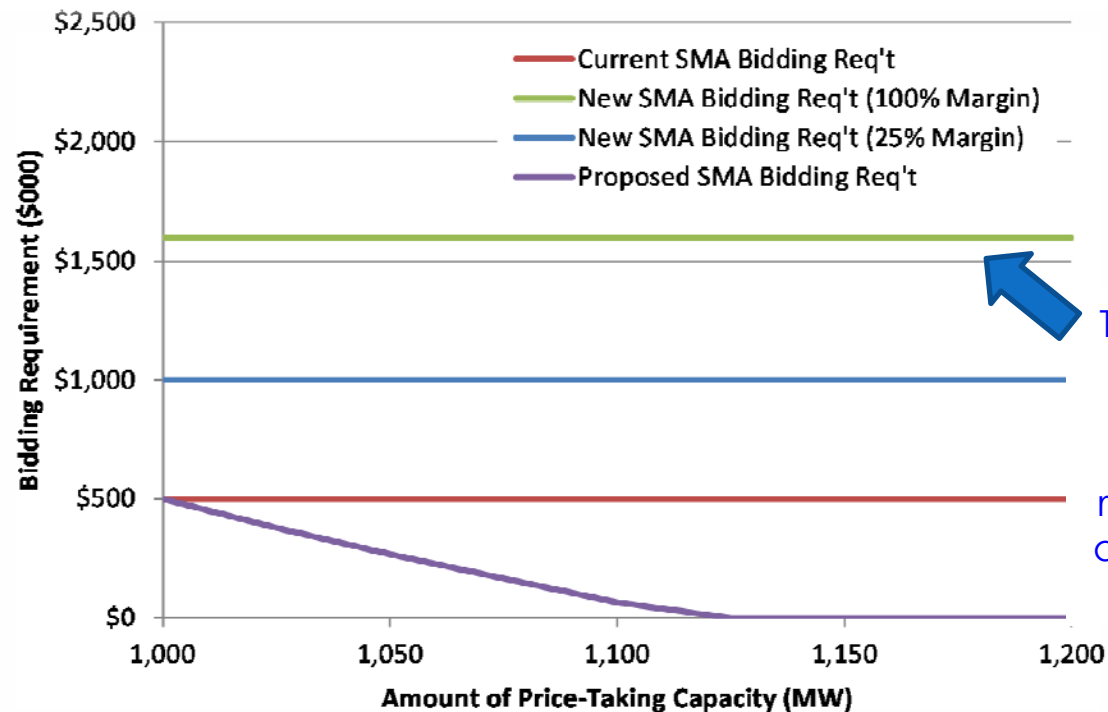
- When UCAP prices are high, the SMA bidding requirement for customers with deficiencies may be below both the current and the new SMA bidding requirements.



The impact of higher prices on the SMA bidding requirement is stronger for NYC, as the new approach uses a larger margin there.

SMA Bidding Requirement When Prices Are High

- When UCAP prices are high, the SMA bidding requirement for customers with excess UCAP may be:
 - Well below the current SMA bidding requirement for customers with large amounts of excess UCAP.
 - Well below the new SMA bidding requirement.



The impact of higher prices on the SMA bidding requirement is again stronger for NYC.



Approach 2

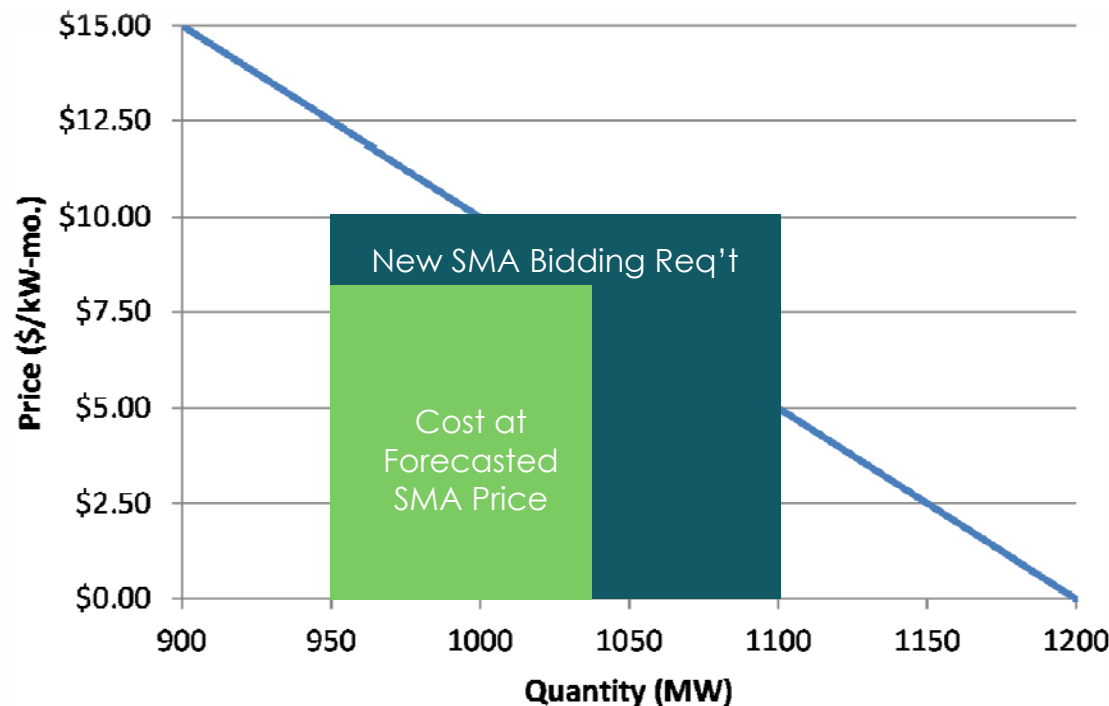


Drawbacks of Approach 1

- One shortcoming of Approach 1 is that it only considers UCAP offered at a price of zero when calculating the SMA bidding requirement.
 - If forecasted UCAP prices are higher than the price at which it has offered that UCAP, the customer probably will not have to purchase that UCAP.
 - The customer's SMA bidding requirement should be reduced accordingly.

Approach 1 for a Customer Certifying UCAP

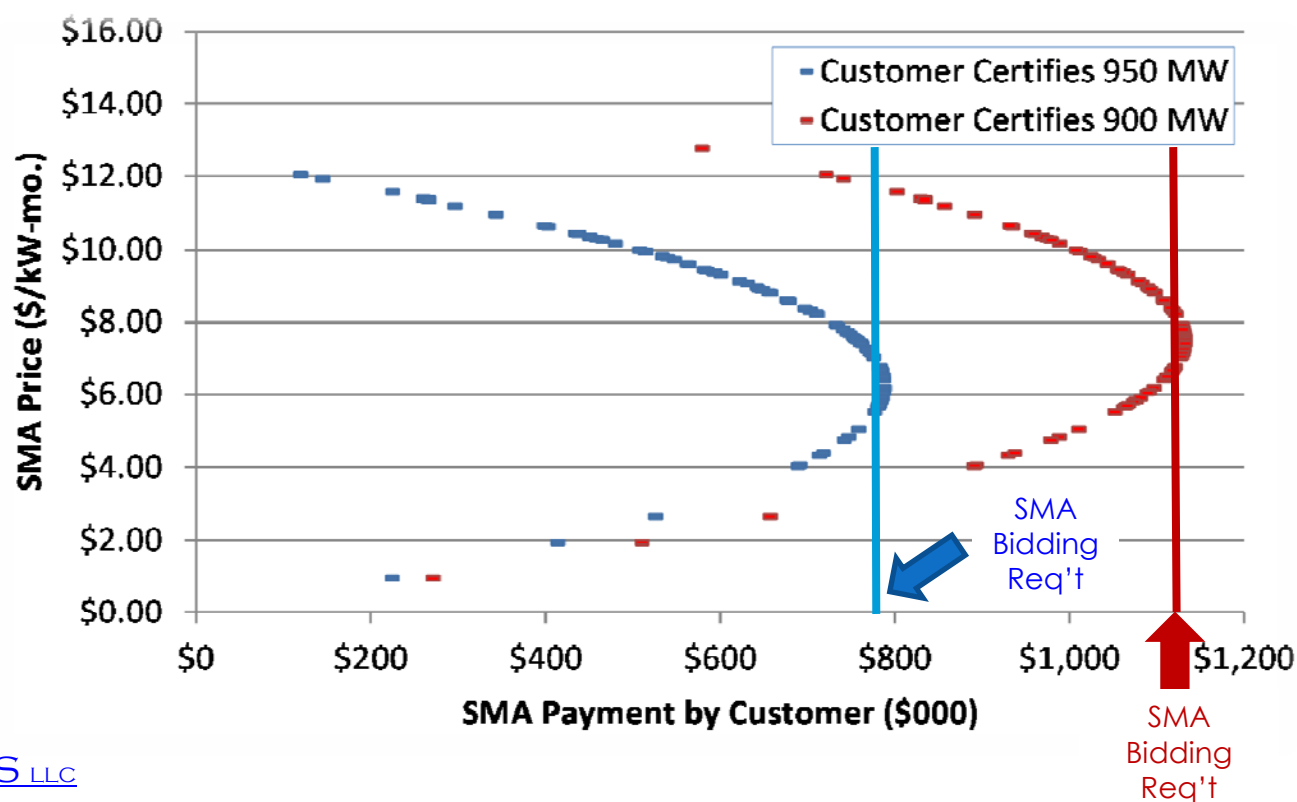
- Suppose this customer certifies 950 MW of its 1000 MW share of the UCAP requirement, and the forecasted SMA price is \$8/kW-mo.
 - Approach 1 would set its SMA bidding requirement at \$781,000.
 - This is slightly above the cost it would incur at the forecasted SMA price, but well below the new SMA bidding requirement.



Assumptions: Customer's share of UCAP requirement is 1000 MW; zero-crossing point is 120% of UCAP requirement; monthly reference point is \$10/kW-mo.; $E(P) = \$8.00/\text{kW-mo.}$; $\sigma(P) = \$2.00/\text{kW-mo.}$; new bidding req't uses 25% margin.

Approach 1 for a Customer Offering UCAP at a Low Price

- Alternatively, if this customer certified only 900 MW, and offered 50 MW at a price of \$4/kW-mo., Approach 1 would calculate an SMA bidding requirement for this customer of \$1,125,000.

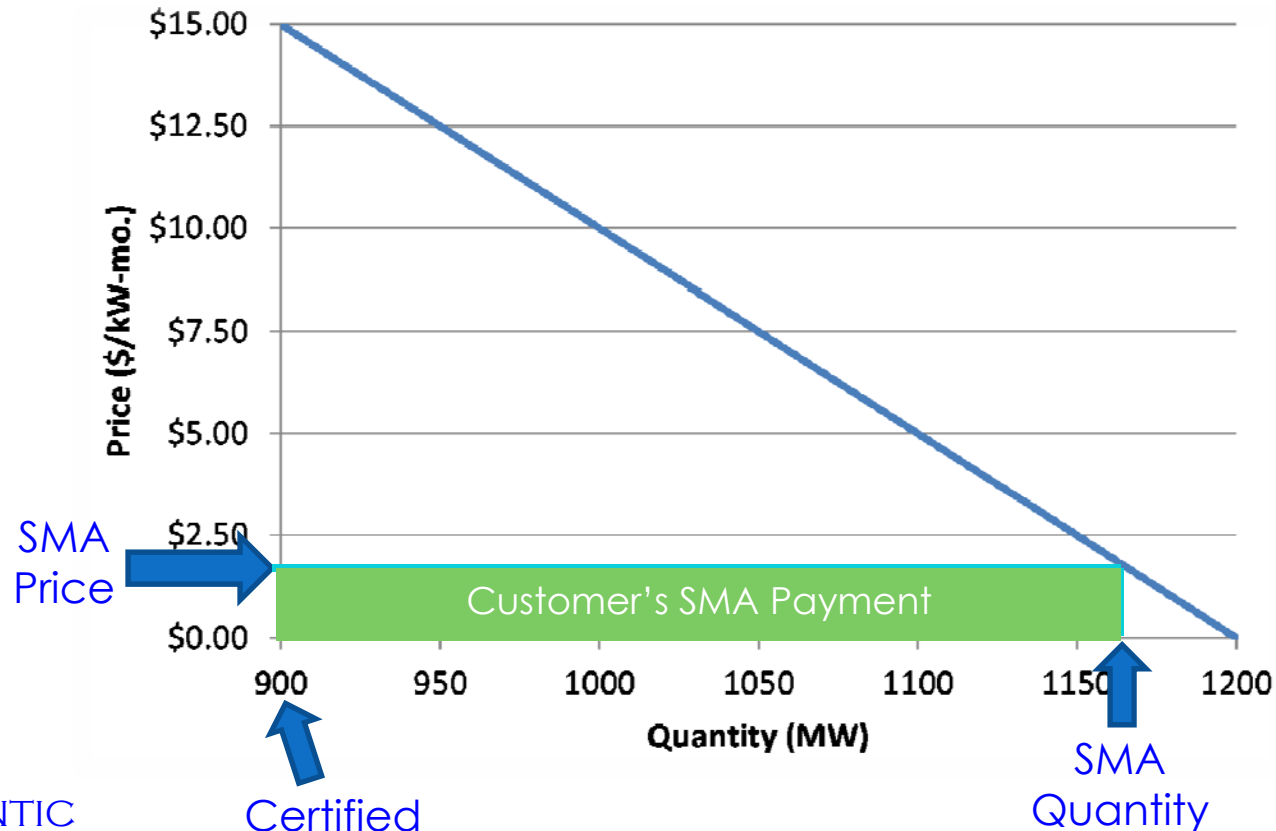


General Approach

- It is very unlikely the SMA price will fall below \$4/kW-mo. in this example.
 - Therefore, the SMA bidding requirement should be much closer to \$781,000 than \$1,125,000.
- To produce an SMA bidding requirement that is consistent with the amount of UCAP a supplier is likely to sell:
 - The ISO would continue to draw potential values for the SMA price from a distribution that reflects the expected value and variability of the SMA price.
 - Given each such value, the ISO would calculate the net amounts owed by each customer, which would be:
 - How much each customer would have to pay for SMA purchases
 - Minus how much each customer would receive for SMA sales.
 - The SMA bidding requirement would be based on the resulting distribution of the *net* amount that each customer would have to pay.

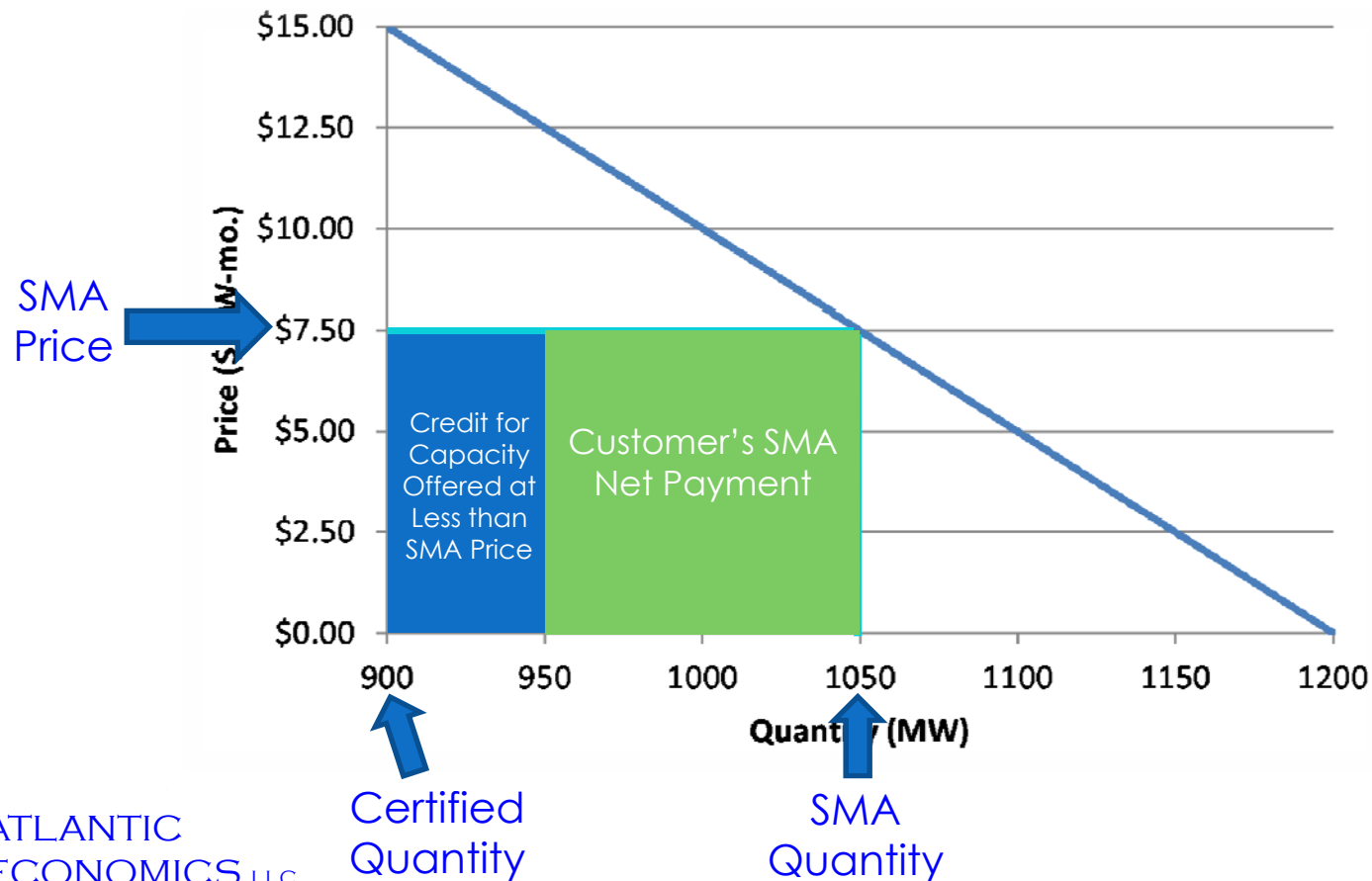
Net Payment When Offered UCAP Is Not Sold

- Suppose this customer certifies 900 MW and offers another 50 MW at \$4/kW-mo.
 - When the SMA price is below \$4/kW-mo., the net amount this customer will pay will not include a credit for this 50 MW of UCAP.



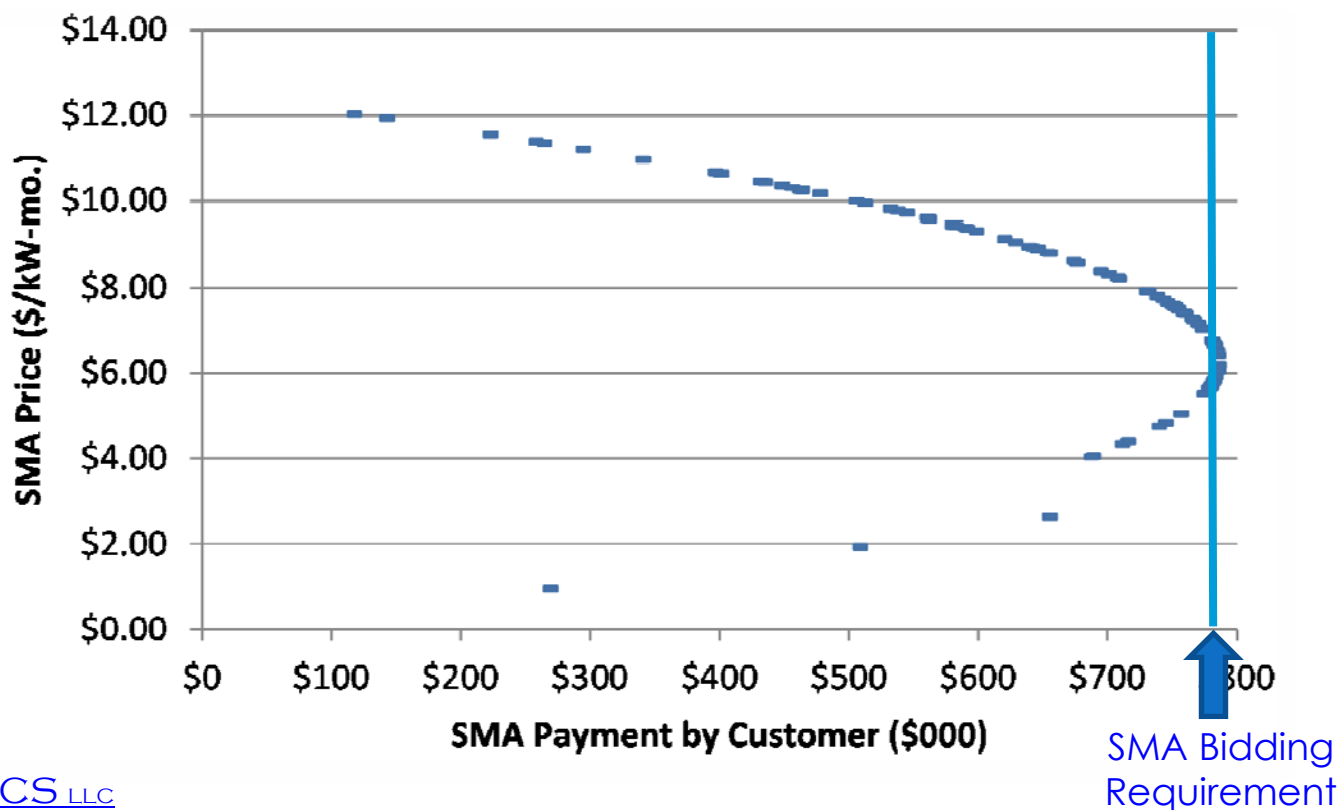
Net Payment When Offered UCAP Is Sold

- When the SMA price is above \$4/kW-mo., the net amount this customer pays will reflect a credit for this 50 MW of UCAP.



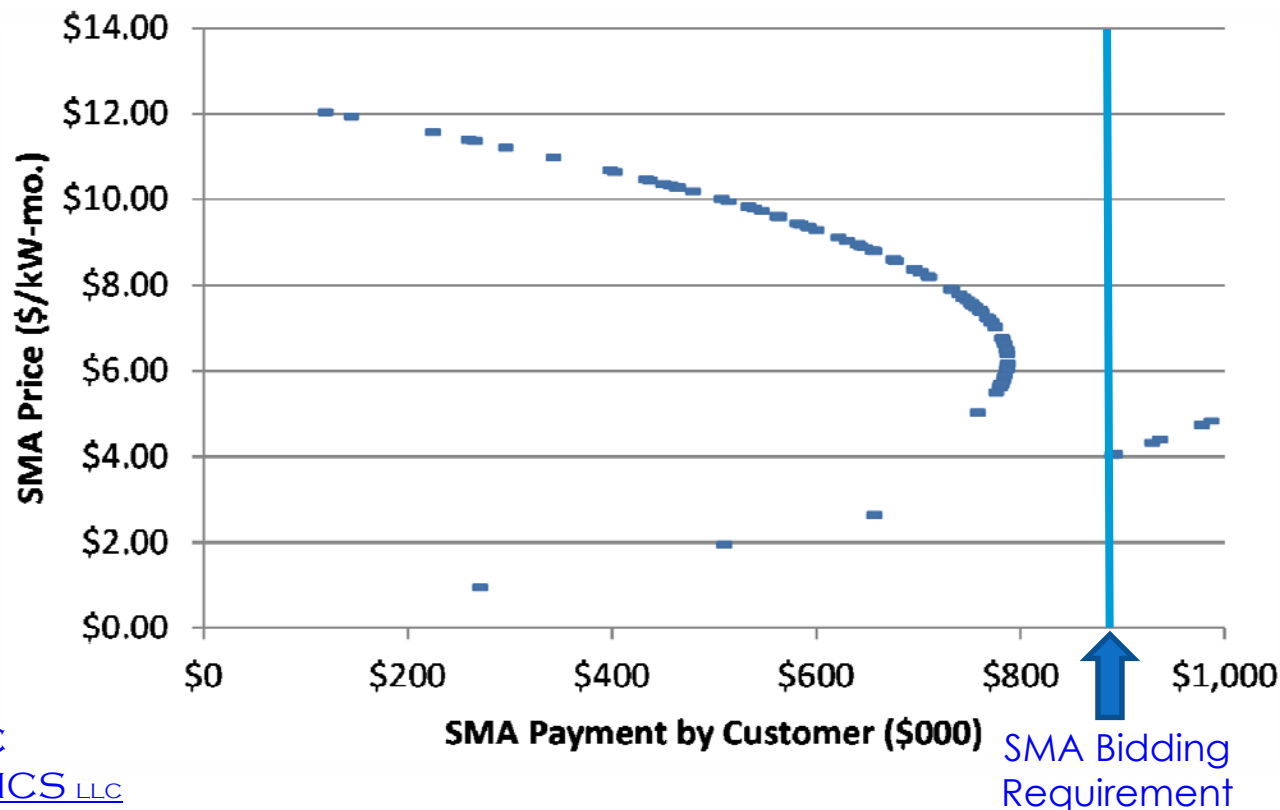
SMA Bidding Requirement When UCAP is Offered at a Very Low Price

- Given the assumptions used in this example, an SMA price below \$4/kW-mo. is unlikely, and when there is such a price, this customer's net payment is low.
 - Therefore, the SMA bidding requirement remains \$781,000.



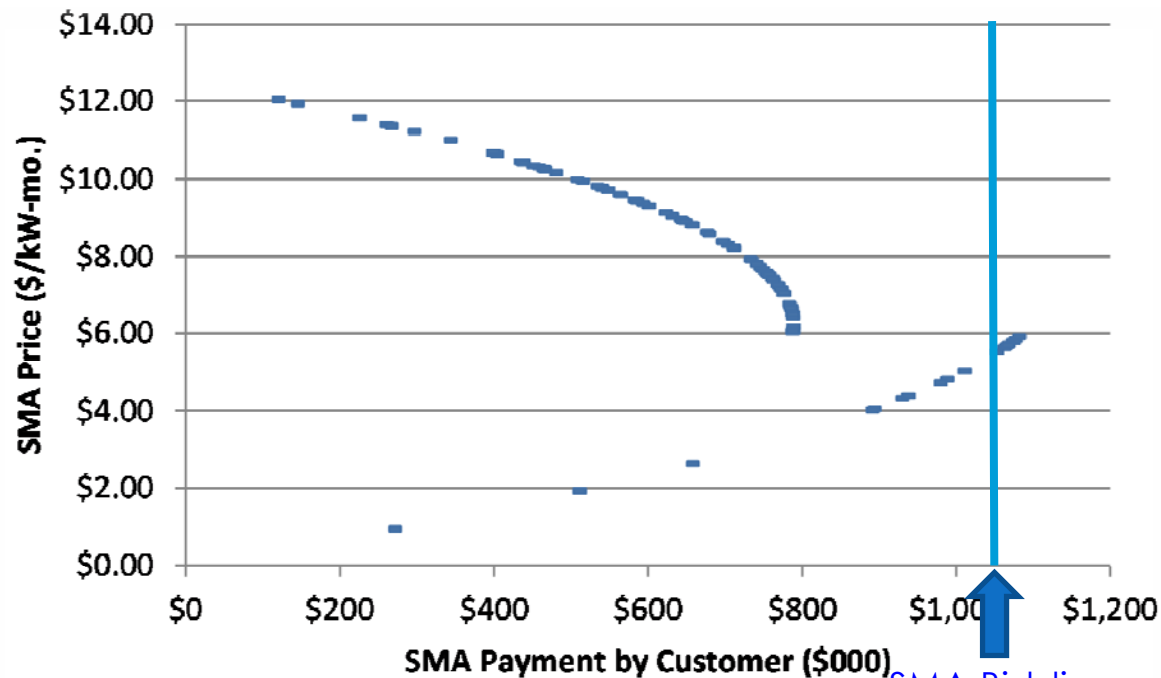
SMA Bidding Requirement When UCAP is Offered at a Slightly Higher Price

- If these 50 MW are offered in the SMA at a slightly higher price (\$5/kW-mo.), the net amount this customer owes when the price is slightly below \$5/kW-mo. exceeds the net amount it owes at higher prices.
 - Therefore, its SMA bidding requirement rises to \$884,000.



SMA Bidding Requirement When UCAP is Offered at an Even Higher Price

- If these 50 MW are offered in the SMA at \$6/kW-mo., this customer's SMA bidding requirement rises to \$1,059,000.
 - These 50 MW probably will be sold in the SMA, since the expected price in the SMA is \$8/kW-mo.
 - But there is a good chance that they will not be sold. As a result, the SMA bidding requirement is close to the value that would be calculated under Approach 1 (\$1,125,000).





Comparing the Approaches



Comparing the Approaches

- Both approaches resolve the problems with the newly revised method for calculating SMA bidding requirements.
 - Approach 2 does a better job of resolving these problems.
 - It accounts for UCAP offered at non-zero prices.
 - But Approach 2 may also be harder to implement.
- To implement Approach 2, it would be necessary to account for the SMA offer curve, which will differ from customer to customer.
 - This may complicate the development of equations to codify this approach in the tariff.



Changes to SMA Timeline

- In addition, either approach would require changes to the current SMA timeline.
 - Under Approach 1, a customer would need to be able to include UCAP in excess of its share of the UCAP requirement in the capacity it certifies.
 - The certification deadline may also need to be pushed up, so that the ISO will have this information in time to calculate the SMA bidding requirement.
 - Under Approach 2, the auction window would need to open earlier, to permit customers to pre-commit to offering UCAP at a given price.
 - Then the ISO could take those offers into account when calculating the SMA bidding requirement.
 - Market participants who wish to continue with the current timelines should be permitted to do so.
 - Their SMA bidding requirements would be calculated using the current procedures.