

Attachment 1: Revised PAV Methodology Description

Portfolio-adjusted Value (“PAV”) is intended to represent the value of a resource or Offer in the context of PG&E’s portfolio. This approach contrasts with Market Value, which is intended to represent the value of a resource or Offer regardless of PG&E’s portfolio. The calculation of PAV thereby makes explicit and systematic PG&E’s preferences for project location, delivery start dates, and contract term lengths (tenor). PAV also makes explicit and systematic the reduction in value to PG&E’s portfolio associated with the uncertainty in the firmness of generation from an offer and the increase in value to PG&E’s portfolio of flexibility in scheduling the generation from an offer. To calculate PAV, adjustments are made to PG&E’s Market Value calculations, components, and/or resulting values.

As PG&E’s portfolio changes, different adjustments may be appropriate. Thus, the description of PAV in this document will apply for PG&E’s 2012 RPS RFO only and is not intended to apply to future RPS solicitations by PG&E or other PG&E solicitations. For the 2012 RPS RFO, PAV adjustments include the following components: Location, RPS Portfolio Need, Energy Firmness, Contract Term Length (Tenor), and Curtailment.

1. Location

PG&E has a preference for projects in its service territory. This preference is influenced by constraints (either in the marketplace or imposed on PG&E by regulatory agencies) that may limit the amount of capacity in SP15 that PG&E can count toward its RA requirement. Capacity located closer to PG&E’s load is likely to deliver energy that has more value for PG&E’s bundled electric portfolio, even when market forward prices indicate that energy delivered farther away has greater Market Value. The long-term need for new resources in PG&E’s service territory is also more likely to be mitigated by a new resource in NP15 than a new resource located in SP15. The calculation of PAV effectuates this by adjusting the value of energy and capacity for offers from resources in SP15.

The PAV Energy Benefit for offers from resources in SP15 is calculated using the minimum of the SP15 energy forward price and the NP15 energy forward price, for each period the value of energy is calculated. This adjustment is not intended to adjust for congestion—that is accounted for in the calculation of Net Market Value in the Locational Marginal Price Aggregation Multipliers. This adjustment is intended to account for the relative value, to PG&E’s portfolio, of energy that may be used to serve PG&E’s bundled customer load. This adjustment is not duplicative of the Energy Value component of Net Market Value. Whereas PG&E’s calculation of Energy Value in Net Market Value represents an offer’s value of energy to any wholesale market participant, including investor-owned utilities in southern California and purely financial traders, the locational adjustment described here is specific to PG&E’s portfolio and would not be made by investor-owned utilities in southern California, financial traders, and wholesale market participants in general (although the locational adjustment described here might be made by other load-serving entities with load heavily concentrated in northern and central California).

The PAV Capacity Benefit for offers from resources in SP15 is calculated using a short-run avoided cost of capacity rather than a long-run avoided cost of capacity, even when the PAV

Capacity Benefit for offers from resources in NP15 is calculated using a long-run avoided cost of capacity. This adjustment is intended to account for the relative value, to PG&E's portfolio, of capacity that may be used to meet future resource adequacy requirements to serve PG&E's bundled electric customers. This adjustment is not duplicative of the Capacity Value component of Net Market Value. Whereas PG&E's calculation of Capacity Value in Net Market Value represents an offer's value of capacity to any wholesale market participant, including investor-owned utilities in southern California and purely financial traders, the locational adjustment described here is specific to PG&E's portfolio and would not be made by investor-owned utilities in southern California, financial traders, and wholesale market participants in general (although the locational adjustment described here might be made by other load-serving entities with load heavily concentrated in northern and central California).

As a consequence of these adjustments to the value of energy and capacity, offers from resources in NP15 will tend to have higher PAV and rank better than equivalent offers from resources in SP15.

2. RPS Portfolio Need

PG&E has a preference for offers with deliveries beginning in 2019-2020.^{1/} PG&E will consider how an offer contributes to PG&E's overall portfolio need for RPS energy. For each delivery year in which PG&E's portfolio (augmented by the offer) is projected to be short RPS-eligible energy, the Energy Benefit of that offer's RPS-eligible energy will be increased using PG&E's forward price curve for Renewable Energy Credits (RECs). However, for each delivery year in which PG&E's portfolio (augmented by the offer) is projected to be long RPS-eligible energy, no additional value will be attributed to the offer's RPS-eligible energy; in other words, that RPS-eligible energy will be valued using an energy price curve for non-renewable energy. This RPS portfolio need adjustment is not duplicative of the Energy Value component of Net Market Value. Whereas PG&E's Net Market Value calculation reflects the value of generic energy in the marketplace, the RPS portfolio need adjustment described here reflects the incremental value of RPS-eligible energy to PG&E's portfolio in those years, and only those years, when the energy actually is projected to be needed to meet the portfolio's RPS requirement.

Thus, offers that deliver RPS energy only in periods when PG&E's portfolio needs RPS energy will have higher PAV and rank better than equivalent offers that deliver RPS energy in periods when PG&E's portfolio does not need RPS energy.

3. Energy Firmness

PG&E's Net Market Value calculation of Energy Value uses energy forward price curves that are associated with firm energy. Offers in the RPS RFO are typically not for firm energy. To value the energy benefit for an offer from a resource that has uncertainty in the minute-by-minute production of energy, a risk-adjusted multiplier is used in calculating PAV. PAV is calculated as the product of an offer's Energy Benefit (as calculated in the Energy Value component of Net Market Value and then adjusted by the locational adjustment and RPS

^{1/} PG&E Draft 2012 RPS Plan – May 2012 Draft, Appendix 6 (2012 Solicitation Protocol), at 12.

portfolio need adjustment described above) and the PAV risk-adjusted multiplier for that offer. The PAV risk-adjusted multiplier takes on values between 0.8 and 1.0. A multiplier of 1.0 represents an offer's Energy Benefit is the same as if the offer were to provide firm energy. A multiplier of 0.8 represents substantial reduction in an offer's Energy Benefit because of the offer's significant uncertainty in energy production from its resource. The multiplier for an offer from a solar thermal resource will typically be higher than the multiplier for an offer from a wind resource or a solar PV resource. An offer for a solar thermal resource with storage will typically have a higher multiplier than a solar thermal resource without storage. The particular PAV risk-adjusted multiplier applied to an offer will be a function of the relative firmness of the offer's energy and not simply a function of the renewable technology being offered.

The energy firmness adjustment itself will not result in any PAV increase or better ranking for offers providing dispatchability. For offers providing dispatchability, PG&E will either: (1) use option-based approaches to calculate the Energy Value component of Net Market Value, and/or (2) calculate PAV using the curtailment adjustment described below. Nonetheless, offers providing dispatchability will have higher PAV and rank better than equivalent offers that do not provide dispatchability.

The energy firmness adjustment is not duplicative of the Energy Value component of Net Market Value. Whereas PG&E's Net Market Value calculation reflects the value of firm energy in the marketplace, the energy firmness adjustment described here reflects PG&E's assessment of the reduction in offer value that results from measuring and managing a position with uncertainty in energy production. For the same particular offer, other wholesale market participants might assess lower or higher reductions in offer value, resulting from each wholesale market participant's different portfolio positions and different capabilities, opportunities, and constraints for wholesale market activities.

The energy firmness adjustment is also not duplicative of any integration cost adder that might be used in PG&E's 2012 RPS RFO. The energy firmness adjustment is strictly in the context of PG&E's portfolio. In contrast, an integration cost adder is in the context of the system: "[T]he function of this [integration cost] adder would be to estimate the cost to ratepayers for the real time balancing of the transmission system from instability caused by unexpected fluctuations in generation or load caused by the [offer's] project."^{2/} The PG&E portfolio perspective and the physical transmission system perspective are two distinct and separate perspectives.

Thus, offers that deliver RPS energy with greater firmness will have higher PAV and rank better than equivalent offers that deliver RPS energy with less firmness.

4. Contract Term Length (Tenor)

PG&E prefers long-term transactions to match the portfolio's long-term RPS need, and so is seeking contracts with delivery periods 10 years or greater.^{3/} A countervailing consideration is

^{2/} Proposed Decision at 26.

^{3/} PG&E Draft 2012 RPS Plan – May 2012 Draft, Appendix 6 (2012 Solicitation Protocol), at 12.

that longer-term transactions may pose greater project risk because of uncertainty in market conditions. PG&E has therefore expressed a preference for offers with delivery periods of 10 to 15 years rather than delivery periods lasting 20 years or more.^{4/}

In calculating PAV, the value of an offer is adjusted for the length of the delivery period being offered (i.e., the “contract term length” or “tenor”) using an adder. The adder takes on values between -10 and +10 dollars per MWh. Provided that an offer has contract term length at least 10 years, the shorter is the contract term length, the higher is the value of the adder, and consequently the higher is the PAV of the offer and the better is the ranking of the offer.

The contract term length adjustment is not duplicative of the Net Market Value calculation. PG&E’s Net Market Value calculation is not directly affected by contract term length. Net Market Value is determined by the year-by-year differences between an offer’s contract price (including the time-of-delivery factors) and the forward curves for energy and capacity. The present value of these year-by-year differences matter, but contract term length itself does not matter. PG&E’s Net Market Value calculation is an expected value calculation. In contrast, the PAV calculation quantifies, in the context of PG&E’s portfolio, how contract term length affects the riskiness of an offer.

Thus, offers with shorter contract term lengths (but contract term length at least 10 years) will have higher PAV and rank better than equivalent offers with longer contract term lengths.

5. Curtailment

PG&E prefers offers that provide PG&E flexibility in scheduling a resource’s generation. PG&E values the flexibility associated with Buyer Curtailment. The draft 2012 Form RPS PPA requires a Seller to offer at least 250 hours of Buyer Curtailment, for which the Seller will be compensated. The PPA also allows a Seller to offer more hours of curtailment, and to specify the price the Seller would be paid for energy deemed delivered in those hours.^{5/}

For offers providing additional hours of Buyer Curtailment beyond the 250 required hours, PG&E’s Net Market Value calculation of Energy Value will include, for the additional hours of Buyer Curtailment, the expected value of the difference between the (presumably negative) wholesale market spot price avoided when Buyer Curtailment occurs and the contractual payments to the Seller when Buyer Curtailment occurs. This expected value is anticipated to be realized by any wholesale market participant and is not specific to the particular composition or positions of PG&E’s portfolio or PG&E’s particular capabilities, opportunities, and constraints for wholesale market activities.

However, additional hours of Buyer Curtailment provide incremental value to PG&E’s portfolio, above and beyond the expected value included in Net Market Value. Such incremental value may include reducing the portfolio’s costs for imbalance energy charges from the CAISO,

^{4/} PG&E Draft 2012 RPS Plan – May 2012 Draft, at 64.

^{5/} PG&E Draft 2012 RPS Plan – May 2012 Draft, at 63.

avoiding involuntary curtailment orders issued by the CAISO to PG&E, avoiding extreme volatility in spot market prices for ancillary services, and similar benefits associated with managing the portfolio. The PAV curtailment adjustment is the estimated value of these incremental benefits to PG&E's portfolio, minus the estimated value of contractual payments to the Seller for any incremental curtailment situations not already included in the Net Market Value calculation. Defined in this way, the PAV curtailment adjustment is therefore not duplicative of PG&E's calculation of Net Market Value.

The PAV curtailment adjustment is also not duplicative of any integration cost adder that might be used in PG&E's 2012 RPS RFO. The curtailment adjustment is strictly in the context of PG&E's portfolio. In contrast, an integration cost adder is in the context of the system. The PG&E portfolio perspective and the physical transmission system perspective are two distinct and separate perspectives.

The PAV curtailment adjustment is also not duplicative of the PAV energy firmness adjustment. The curtailment adjustment reflects a flexibility or dispatchability (emanating from hours of Buyer Curtailment) that is a quality superior to must-take firm energy, whereas the energy firmness adjustment reflects uncertain generation that is typically inferior to must-take firm energy and at best is the same quality as must-take firm energy.

Thus, offers that provide greater amounts of additional hours of Buyer Curtailment with lower contractual payments to the Seller will have higher PAV and rank better than equivalent offers that provide lesser amounts of additional hours of Buyer Curtailment with higher contractual payments to the Seller.