The Re-MAT Mechanism: A Look at Prices and New Plants

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Abstract

This paper analyzes the proposed Renewable Market Adjusting Tariff or Re-MAT in light of recently enacted legislation on how to determine the market price for the §399.20 Feed-in Tariff program. In part, we use data prepared by Henwood Associates, Inc., from the PG&E Cogen and Small Power Production Semi-Annual Report, January, 2013 on FiT eligible hydroelectric and wind projects. The analysis describes prices under the proposed Re-MAT mechanism and whether or not the prices are likely to be conducive to new entrants in the hydroelectric power market.

1 Background

Recently enacted legislation, Senate Bill 32 and Senate Bill 2 1X, provided new considerations for the California Public Utilities Commission (CPUC) on eligibility for the §399.20 FiT Program. Key changes included raising the program cap from 1.5 MW to 3 MW, more latitude in setting prices,[1] and allocating capacity to three different product types. In response to these amendments, the CUPC issued a decision on May 24, 2012 outlining a

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[1] CPUC D12-05-035 section 2.2

Renewable Market Adjusting Tariff (Re-MAT) mechanism for pricing new renewable energy contracts. In their decision, the CUPC cites the requirements of federal and state law. State law includes the following mandate:

> (2) The commission shall establish a methodology to determine the market price of electricity for terms corresponding to the length of contracts with an electric generation facility, in consideration of the following:
>
> > (A) The long term market price of electricity for fixed price contracts, determined pursuant to an electrical corporation's general procurement activities as authorized by the commission.
> >
> > (B) The long-term ownership, operating, and fixed-price fuel costs associated with fixed-price electricity from new generating facilities.
> >
> > (C) The value of different electricity products including baseload, peaking, and as-available electricity.[2]

where "electric generation facility" means an electric generation facility of renewable energy resources.[3]. In this analysis, we examine whether the pricing mechanism proposed by the CPUC considers the long-term capital costs associated with new small hydro facilities. Based on existing capacity from expiring contracts, we conclude the Re-MAT price is likely to decline below the initial price of $89.23/MWh. The resulting price is substantially lower than the price of any recent small hydro project that has required capital investment.[4]

2 The Re-MAT Methodology

The CPUC issued decision 12-05-035 on May 24, 2012 which describes the details of the Re-MAT technology.

[2] Section 399.20(d)

[3] 399.20(a)(4)

[4] For much of this analysis, we focus on small hydro as representing the sector of non-peaking as-available renewable power with capacity less than 3 MWh. To our knowledge, no new small-capacity wind projects have sought FiT contracts in the past five years.

This tariff permits both new projects and projects coming off legacy Qualifying Facility (QF) contracts that were signed in the early 1980s. Many of these contracts are expiring in time to bid on the new FiT contracts in the Re-MAT mechanism, increasing the participant pool in each round of the mechanism.

2.1 MWs to be offered in PG&E

CPUC D12-05-035 (in May of 2012) set up the Re-MAT auction mechanism and allocated the 750 MW (megawatts) authorized by the legislature to the three investor-owned utilities and public utilities. Pacific Gas and Electric (PG&E) is a regional monopoly, and has a share of 218.8 MW (Section 12.3 on page 78).

In Section 12.1 (p. 77), the decision reads: "We find that all capacity already under contract from the existing §399.20 FiT Program must be subtracted from each utility's total capacity allocation. If a contract is terminated at a future date, then the utility is obligated to re-contract for that capacity."

To determine the remaining capacity to be equally split among the three product types, information made public available by PG&E[5] shows that 108.228 MW have been contracted for. As of 3/7/2013, PG&E will divide the remaining 110.57 MWh among the three product types: baseload, peaking as-available, and non-peaking as-available.[6] This results in 36.84 MW allocated to the "non-peaking as-available" product type[7]. The analysis in this paper focuses on this product type, which includes hydro and wind power.

Our earliest estimated available date for the tariff to be effective through the Re-MAT mechanism, as described as of 3/20/2013 in CPUC D12-05-035, is October 1, 2013 (1 month to proposed decision, 1 month of comment, 1 month revisions, 1 month appeals, and 2 months time for utilities to file the contract). A few months variation in the available date of the tariff does not qualitatively affect our analysis. Power producers are required to come online within 24 months of signing a FiT contract, though this period can be extended up to six months for certain regulatory delays.

[5] http://www.pge.com/b2b/energysupply/wholesaleelectricsuppliersolicitation/standardcontractsforpurchase/

[6] For a description of product types, see CPUC D12-05-035.

[7] Non-peaking as-available is defined as hydro and wind in CPUC D12-05-035, page 43.

2.2 Description of Re-MAT

The Re-MAT mechanism is described in detail Section 6 of D12-05-035. The pricing methodology can be succinctly described as follows. There will be 12 offerings of equal-sized blocks, spaced apart every two months, with an estimated start date of October 1st, 2013. Each block will offer 3.07 MW. For the first block, for each of the three FiT product types, the Re-MAT starting price is based on the weighted average of each of the three public utilities' highest executed contract resulting from the RAM auction held in November 2011. This starting price has been determined to be $89.23/MWh. If subscription in the two-month block equals 100% or more of the capacity allocated for that product type, then the price will decrease for the next block, with price decreases occurring at an increasing rate for consecutive over subscription. If that two-month block is under-subscribed, then the price will increase in a similar fashion as described in the over-subscription case. D12-05-035 describes the price decreases and increases in detail with illustrated examples.

3 Analysis of Re-MAT

This analysis will focus on the "non-peaking as-available" product type, i.e. solar and hydro. We use data prepared by Henwood Associates, Inc., from the PG&E Cogen and Small Power Production Semi-Annual Report, January, 2013 on FiT-eligible hydroelectric and wind projects. The data consist of FiT-eligible hydro and wind power producers whose contracts projects coming off "legacy QF" contracts that were signed in 1980. The data include information on the legacy QF contract, the capacity of the project, and when the project will be 24-month FiT eligible. We use this as a representation of the pool of legacy bidders for the FiT program through the Re-MAT methodology. Our analysis likely is a conservative estimate of the pool of bidders, as the FiT program also allows for new projects to bid on tariffs.

We proceed with the analysis in two stages. First, we describe why it is likely that the proposed Re-MAT methodology will likely result in substantially decreased prices for FiT contracts relative to the starting price. Second, we examine whether or not the price is likely to be at a level to incentivize the construction of new projects.

3.1 Prices under the Re-MAT Methodology

Fit contracts are attractive compared to selling on the spot market. We use historic data on PG&E Short-Run Avoided Cost as a proxy for the spot market.[8] For the past four years, SRAC has been close $40/MWh. The starting price for the fit contract is set to be $89.23/MWh, which is more than double the SRAC. For a hydro producer to not get a FiT contract would mean subjecting the producer to the volatility and uncertainty of the spot market, which is currently at a substantially lower price. It is not unreasonable to assume that all eligible legacy producers would prefer a flat tariff of $89.23/MWh for 10, 15, or 20 years rather than looking to sell on the spot market, given the current spot market prices.

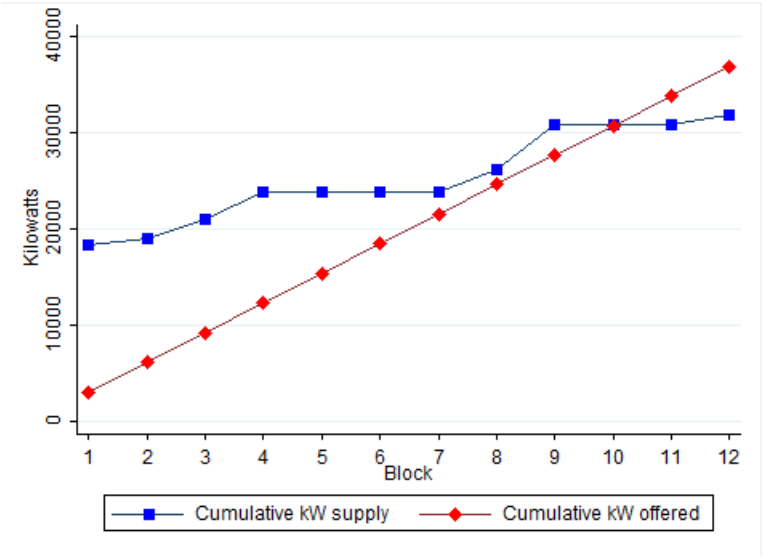
The relevant supply of non-peaking as-available providers includes the legacy QF contracts that are FiT eligible in the 24-month time frame for each block offered under Re-MAT. Using the capacity on the legacy contracts, we estimate the total supply of existing power that would likely be available for each block of the RE-MAT mechanism . Figure 1 plots this over time, as well as the cumulative availability of Re-MAT contracts, which is simply 3.07 MW for each additional block.

From Figure 1 it is easy to see that there is excess supply of power over the amount of power contractible for the first half of blocks under the Re-MAT mechanism. In the first block, there will be 18.3 MW of power eligible for a FiT contract, which is about six times the amount that will be offered. Due to this stock of producers who would potentially want a FiT contract, this oversupply persists through time. Not every hydro and wind eligible producer need bid in the FiT program in order to result in an excess of bids, though it is likely that every existing plant will bid at the initial price of $89.23. As long as a FiT contract is more attractive than selling on the spot market, each block will be oversubscribed by existing plants, as the total demand for contracts (i.e. existing capacity) exceeds the supply of contracts for the first nine blocks offered.

The illustrated price decrease example from D12-05-035 section 6.4.2 shows that, for each block the Re-MAT is oversubscribed, the price decreases. The price decreases start at $4, then $12, $24, $40, and $60 from the starting price of $89.23. This results in a price path of $89.23, $85.23, $77.23, $65.23, $49.23, and $29.23. There is enough excess capacity of power

[8] http://www.pge.com/b2b/energysupply/qualifyingfacilities/prices/index.shtml

Figure 1: Cumulative kW Supply vs. kW Available for Contract



Cumulative kilowatt supply plotted against cumulative Kilowatt offered under Re-MAT by block. Cumulative kilowatt supply is calculated using data by Henwood Associates, Inc., calculated from the PG&E Cogen and Small Power Production Semi-Annual report on FiT eligible hydroelectric and wind projects whose contracts are coming off "legacy QF" contracts.

to fully subscribe the first 9 blocks. When the spot price market becomes an attractive alternative to the FiT program, producers of power will instead choose to not bid in Re-MAT and either risk selling on the spot market or shut down. The spot market is price is about $40 and subject to future monthly volatility. Even if hydro and wind producers give the spot market a 25% premium over the FiT, we would still expect to see the price of a FiT contract decline, to perhaps as low as $49.23. This price decline would occur if first four blocks of Re-MAT are over subscribed, which, given the available capacity shown in this section, has a reasonable chance of occurring. A price drop from $89.23 to $49.23 yields 61.3% of the original starting price.

Our analysis of the differential between available capacity and available contracts indicates that the that the Re-MAT mechanism will likely result in substantial price decreases.

3.2 New Projects

From 2009 through 2012 there was little capital investment in small hydro feed-in tariff plants that sell to PG&E.[9] Out of the 17 contracts that were signed in the four-year period, only one new plant was opened, one plant was repowered after some time of disuse, and one was retrofitted to existing pipelines. The price received by the new project, opened by Sierra Green Energy. LLC, was $113.90/MWh. This price is 28% higher than the initial offering price under the proposed Re-MAT mechanism, and 22% higher than the average price of contracts given to the 14 existing plants during that time frame.

Figure 2: Prices for Small Hydro Plant FiT Contracts: 2009-2012

Project	**Type**	**Price ($/MWh)**	**Premium above Re-MAT**
Sierra Green Energy, LLC	New	113.90	28%
Twin Valley Hydro	Repowered	117.30	31%
San Jose Water Company	Retrofit	100.98	13%

Figure 2 displays the price on the fixed-price contracts for the small hydro projects selling to PG&E. The table reports a premium above the proposed initial Re-MAT price, which is $89.23/MWh. The capital investment plants received a price over 13% higher than initial Re-MAT price.

All three capital investment projects contracted for 20-year terms, which was the maximum length available. From 2009 to 2012, FiT contracts with longer term lengths received higher fixed prices. Shorter contracts (of 10 or 15 years) were signed by existing plants from 2009 to

[9] In 2008, two contracts were executed: the Buckeye Hydroelectric Project and the Tunnel Hill Hydroelectric Project. Both projects were repowers, which involved capital investment, and were signed to 20-year terms. We omit them from our analysis as the macroeconomic conditions were substantially different in the first half of 2008, when these contracts were executed. No other small hydro FiT contracts were executed during that year.

2011. In 2012, several existing plants signed 20-year contracts, when the FiT price had fallen. Thus, the average price of contracts for existing plants over the entire four-year window was $93.18. The data suggest that a price that incentivizes entry into the market is substantially higher than a price that an existing plant is willing to accept. Capital costs for small hydro plants are large and motivate a substantial premium to encourage entry. Moreover, the price seems to be a driving factor, rather than availability of natural resources. A 2006 California Energy Commission study found that approximately 255 MW of small hydro potential could further be developed.[10]

The initial Re-MAT price of $89.23/MWh was determined by a Renewable Auction Mechanism in November 2011 (RAM). This price does not reflect the price needed for new small hydro plants to enter the market, as the price was determined by bidders that differ in size and technology from small-capacity hydro plants. Participants in the RAM auction included renewable projects up to 20 MW. The market segment covered by §399.20 only includes renewable projects up to 3 MW in capacity. Participation by the sector relevant to this analysis in the PG&E RAM auction was small: out of 122 bids, only two bids were submitted by non-peaking as-available projects with capacity less than 3 MW. Hydroelectric technology was not part of any winning bid, and all winning bids were for projects greater than 5 MW.[11] Capital costs for small hydro plants and wind plants of capacity less than 3 MW are likely to differ from the winning RAM bidders. Therefore, the initial Re-MAT price is unlikely to accurately reflect the capital costs needed to induce entry the entry of non-peaking as-available small-capacity plants.

The initial offering price of the Re-MAT mechanism of $89.23 is $4.47 lower than the average price of contracts offered to existing plants from 2009 to 2012. Recent prices received by plants requiring capital investment exceeded the proposed initial price by over 13%. In a market with substantial capital costs, the price to incentivize entry is greater than the price that an existing firm would be willing to accept. All three capital investment contracts are for a twenty-year period, and are therefore comparable to the maximum contracts being offered under Re-MAT. Our analysis in Section 3.1 indicates that the price of a new contract under the Re-MAT mechanism is likely to fall over time. The data suggest that the Re-MAT

[10]"Statewide Small Hydropower Resource Assessment," CEC 500-2006-065. Prepared for the California Energy Commission by Navigant Consulting, Inc.

[11]Advice 4020-E: Appendix A, *Pacific Gas and Electric Company,* March 30, 2012.

mechanism will not provide a price that is high enough to encourage entry into the market by small hydro.

4 Conclusion

PG&E will be offering 12 blocks of approximately 3.07 MHh fixed-price contracts to non-peaking as-available renewable energy providers. Given the expiring contracts from existing plants, there will be an excess supply of capacity for the first 9 blocks offered under the ReMAT mechanism. This excess supply will likely drive down prices below the initial offering of $89.23/MWh. Given the observed prices for recent capital investment projects, the data suggest that the price needed to incentivize entry is greater than the initial price and the lower future prices we expect under the mechanism.