

Technology differentiation in the solar energy markets in India: A study

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Received: September 01, 2018

Accepted: October 12, 2018

ABSTRACT

For all the years that humans have existed, the dire need for energy has also existed. We have basically two forms of energy. They are renewable source of energy which can be renewed over time and they do not get exhaust. The other source of energy is the non renewable source of energy which cannot be renewed over time and it will get exhausted one day because of its limited reserves. The world has concluded that the nations cannot keep on exploiting their natural resources in an arbitrary manner. They need to save their resources for the coming future generations also. Hence, the concept of sustainable development was brought forth. Accordingly, India also has made provisions in its legislations with respect to promoting and maximizing the use of renewable energy.

As far as the renewable energy markets in India are concerned, the State Electricity Regulatory Commissions have specified the Renewable Purchase Obligations for the obligated entities. Owing to the extreme disparity between the states regarding the capacity of generation of electricity and energy, certain states are energy surplus whereas certain states are energy deficient. Hence, the concept of renewable energy certificates was brought in. This mechanism aimed at eradicating this disparity. The obligated entities were given an option either to purchase quota of energy from the renewable sources or to purchase an equivalent of renewable energy certificates from the power exchanges.

But there exists many problems in the renewable energy markets. One of the major problems that inhibit these markets is the failure to differentiate between technologies employed in the generation of renewable sources of energy. This differentiation of technology includes the lack of mechanism to recognize the intra source technology on the basis of the year of commissioning of project. This research paper is an attempt to study this differentiation and how far has Indian Energy Law and Policy provided for the same. Also, in this light, it is important to pose possible solutions to the problem.

Keywords: Technology, Multipliers, Renewable Energy Certificates, Renewable Purchase Obligations, Solar

Importance of Differentiating Technology

In the field of renewable energy, technology plays a pivotal role. Every day, new technological innovations take place. The prime purpose of innovation is to reduce the cost of electricity generation thereby making the generation of electricity cost efficient and effective.

When technology improvises over time, the cost of generation of electricity also reduces. For example, suppose a series of technology where each subsequent version is an improvisation over the previous e.g X Y and Z. Then the rate of generation of electricity is negatively proportional to the improved technology i.e. 100, 75, 50 and so on. It is difficult for X to make an immediate change of technology to Z to achieve the reduced rate of generation of electricity.

Take for example, if X technology and Z technology are mandated to follow the same regulations under which the minimum tradeable price is 55 keeping in mind the Z technology. Then, it does not create a level playing field for X because these regulations completely ignore the "change in technology" factor. In the light of the above discussion, it is essential to create a level playing field for X technology so it does not receive a set back on the grounds of technology.

This issue was much debated and discussed owing to the views and opinions of various stake holders who had commissioned their generation projects much earlier and the new floor price of trading renewable energy certificate was too low with respect to the technologies and hence, they were likely to make huge losses. The stakeholders argued that with time, the low cost technologies enter the market and hence, the previous investors lose out on their investments. With respect to solar plants, this is essentially the case, because in this, all investment is made all together and the operational costs of the project are very low. Hence, it becomes difficult for them to replace their technologies. Hence, the regulations must distinguish between old and new projects.¹ Also, when the floor prices are revised, the commissioned projects face losses in investment and the vintage multipliers save them from future vagaries.²

Changes in the Energy Policy

Various international practices and the demand voiced by the stakeholders, it was felt that it is the time to bring changes to the renewable energy markets keeping in mind the manner in which technology affects the renewable energy markets. Accordingly, the amendments were made to the Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for

Renewable Energy Generation) Regulations, 2010 in the year 2014. This amendment to the regulations added two clauses, (7) and (8) under the regulation 7 and these clauses provided as follows³:

- A distinction was made between the projects commissioned prior to 1st January 2015 and the projects commissioned after 1st January 2015. The projects commissioned prior to 1st January 2015 are termed to be vintage projects.
- The Central Electricity Regulatory Commission will determine the quantum of Renewable Energy Certificates to be issued to these projects per 1 MW hour of electricity generated and injected into the grid.
- Normally, the regulations stipulate that 1 REC will be issued to 1 MW hour of electricity generated and injected in the grid. But the vintage projects will be provided more than 1 certificate for 1 MW hour of electricity injected into the grid to provide level playing field. This denomination of certificate to be done by the CERC is called the Vintage multiplier.
- The formula for the vintage multiplier is as follows:
Vintage Multiplier = Floor Price of Base Year/ Current Year Floor Price
- The base year taken was 2012-13 in which the floor price was determined for a period of 5 years. The vintage multiplier will remain in force for a period of 1st January 2015 to 31st March 2017 and after this, the projects will go back to the normal trading of 1 REC for 1 MW hour of electricity generated and injected into the grid.

Accordingly, various vintage multipliers were derived of which we look at the Solar REC that were as follows⁴:

Solar REC	New Price	Old Price
Floor Price	3500	9300
Forbearance Price	5800	13400

Accordingly, the vintage multiplier was $9300/3500 = 2.657$ (2.66). That means, the vintage solar projects commissioned prior to 1st January 2015 were issued 2.66 certificates for 1 MW hour of electricity generated and injected into the grid.

The New Practice

In the year 2017, the practice of vintage multiplier was discontinued. The new proposed scheme of providing for a level playing field that was introduced was the determination of floor price and forbearance price which was technology specific. In this, the two factors that are taken into consideration are Average Power Purchase Cost and the tariff rates as determined by the respective SERCs. Owing to this, the new determined floor and forbearance prices are given below:

Prices	Non Solar REC (Rs/MWh)	Solar REC (Rs/MWh)
Forbearance Price	2900	2500
Floor Price	1000	1000

In contrast to this, the below given are the old floor and forbearance prices:

Prices	Non Solar REC (Rs/MWh)	Solar REC (Rs/MWh)
Forbearance Price	3300	5800
Floor Price	1500	3500

The discontinuation of the vintage multipliers is a big decision by the commission especially in the light of Solar RECs. We see that there has been a decrease of Rs. 3300 in the Forbearance price whereas there has been a decrease of Rs. 2500 in the Floor price. The pattern of Solar Power generation is that it incurs one time installation cost and the operational costs are minimal. So it is important for all the developers of the project to get beneficial trading returns to the moment that their installation costs are fully recovered. This step is essential to incentivize the solar power generation.

Further, we see that here the forbearance and floor prices are determined on the basis of competitive bidding tariff rates in states with a presupposition that bidding reflects the efficient costing. Due to this, major chunk of Old projects have been ignored. It could have been better if the

Current Market Scenario

There are two power exchanges in India where the renewable energy certificates are being traded. They are Indian Energy Exchange and the Power Exchange India Limited. The current market trends reveal that there

has always been more supply of solar RECs as compared to its demand. The latest trend of sale of RECs at the 2 power exchanges in the month of August and September 2018 reveal that⁵:

- The Solar RECs are mostly traded at the floor prices only.
- The supply of Non-Solar RECs is more than the Solar RECs
- The clearing ratio of Solar RECs is less than the Non-Solar RECs.

In the light of the given conclusions, it is felt that there is a need of strong intervention in the area of Solar RECs. The policy ideas can be taken from following lacunas:

- The current policy on the RECs completely ignores the difference of technology within the same source of energy.
- The current policy ignores the fact that over certain duration, the technology changes and few projects start functioning at the point of economies of scale whereas some undergo a completely cost effective change in technology.

The above discussed approach in the policy has been inhibiting the growth of the renewable energy markets. Hence, we must now look at the possible policy interventions.

Reintroduction of Vintage Multipliers with a Sun Set Clause and duration fixing on the Basis of Debt Repayment Period

We talked about the difference in the technology which is based on different sources. Now we must also look at the difference in the technology in the same source. India recognized the difference between the new technologies and the old technologies in the same source of energy specifically solar and hence, it introduced the “Vintage Multiplier.” But when 2.66 RECs were allotted to 1 MW of electricity injected in the grid, and then it raised the supply of the RECs. These vintage multipliers have been abolished with effect from 2017. The said order of the commission was challenged before the Appellate Tribunal for Electricity but it has been upheld. The reasons given by the Commission are as follows:

“In view of the growing competition and induction of latest technologies, more and more generators are participating in the auctions/bids with considerable reduced cost of generation. Thus, the Central Commission in specifying REC prices, has shifted to bid discovered prices in place of earlier generic tariff fixed by it when the RE sector specially solar was in infancy stage. Similar is the case of Vintage Multiplier which was specified based on its necessity under the discretionary powers of the Central Commission. The Central Commission has adequately dealt with these matters in the impugned order with cogent reasoning and we do not find any infirmity or otherwise, unjustness in specifying the floor and forbearance prices of REC and discontinuation of the Vintage Multiplier.”⁶

The commission mentions that competitive bidding pricing is the new method in discovering the tariffs to be considered while determining the floor and the forbearance price. It has made a presumption that even the older projects will bid with the prices of latest technology. It is agreed that the projects established earlier experience the economies of scale phase but it is too arbitrary to let two unequal projects participate through competitive bidding. Moreover, what is latest today will be outdated tomorrow. Hence, it is argued that the system of vintage multiplier must be relooked at and reintroduced.

The problem that the vintage multipliers pose is the decision as to when these vintage multipliers should lapse because if they are perpetual in nature, then they will make windfall gains. Owing to this, there can be the following possible consideration to be made when deciding on this point:

1. There should be a proper analysis of the costing of the project. It must be looked at as to when will the project start experiencing the phase of economies of scale. Also, the viability of the project must be looked at in the light of the latest technologies. Primarily a sunset clause must be fixed. This sunset clause essentially mentions as to the decreasing rate of multiplier over time and the exact time when the multiplier will become extinct. Once the multiplier becomes extinct, the old projects will be treated at par with the latest technologies and same number of RECs will be issued to both projects for 1 MW of power.
2. The sunset clause usually and ideally should be set as regards the duration for the debt repayment. This refers to the debt that the project owner has taken for the purpose of financing the project. The current market trends must be looked at as to how do the market offers to finance renewable energy projects and the product designing in loans and debts. Based on this, we can conclude that if a project loan is to be repaid in 12 years, then for the 12 years, we must make the project viable for him and that we do by providing the multiplier. Once his loan is repaid, due to the sunset clause, the multiplier gets extinct. Hence, he can reap benefits of the project even at the basic prices because his phase of economies of scale is on and his expenditure has also become extinct.

Conclusion

Technology has a very important role to play in the markets of renewable energy. Over time, certain technology depreciates and new technology takes over the market. In such times, we need to differentiate between the regulations that regulate both the projects. The market trends reveal that the solar market has not yet been so developed. We need to design the market through inter source technology segmentation as well. India started the practice of technology differentiation in the year 2015 for the projects commissioned prior to 2015. This practice became extinct in the year 2017. Later on, new practice started off in the year 2017 of determination of floor price and forbearance price on the basis of competitive bidding tariff rates in states with a presupposition that bidding reflects the efficient costing. But the current market trends reveal that there is a need to incentivize the solar market by lending financial support to the developers on the basis of contemporary technologies and phase of their projects. Accordingly, we conclude that there is a scope of policy intervention by reintroducing the vintage multipliers with a sunset clause.

¹Petition No. SM/016/2014 (Suo Motu), Central Electricity Regulatory Commission 'IN THE MATTER OF Determination of Forbearance and Floor Price for the Solar REC' (2014) <http://www.cercind.gov.in/2014/draft_reg/ord.pdf> accessed 23 October 2018

²Devesh Singh, 'REC Trading, Issues, Challenges & Way Forward' (Ministry of New and Renewable Energy) (2013) <<https://mnre.gov.in/file-manager/UserFiles/presentations-23052013/IEX.pdf>> accessed 23 October 2018

³Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) (Third Amendment) Regulations, (2014) L- 1/12/201013

⁴Akhil Awasthy, 'REC markets in India: issues and Prospects' (Indian Energy Exchange, 2015) <https://www.iitk.ac.in/ime/anoops/for15/ppts/Day-1%20IITK/IEX_REC%20Issues%20%20Prsp%20%20-%20Mr.%20Akhilesh%20Awasthy.pdf> accessed 23 October 2018

⁵REC Trade Results August 2018 (Open Access, Blog by ReConnect) (2018) <<http://reconnectenergy.com/blog/2018/08/>> accessed 23 October 2018

⁶Green Energy Association v. Central Electricity Regulatory Commission APTEL 95/2017) <<http://aptel.gov.in/judgements/A.No.%2095%20of%202017%20%20%20105%20of%202017%20%20A.No.%20173%20of%202017.pdf>> accessed 23 October 2018