

You too can be a “Prosumer” of Electricity

The electricity sector is very much in the news these days, with a wide range of opinions being expressed by an equally wide spectrum of people. Unfortunately many simply unviable proposals borne out of lack of proper understanding and inability to appreciate the holistic impact of the electricity sector on the national economy and the society. However, the general principles and the holistic background are not so intricate and should not be the purview of the limited few.

Even though the state owned monopoly is making mega losses year after year and contributing largely to the degradation of the environment, the consumer who with due credit to the CEB, now constitute the entire population, are now becoming aware of this situation.

The consumer, particularly those consuming less than 120 units per month have been lulled in to a state of complacency by the declared consumer tariff rates, which the CEB is quick to point out are highly subsidized. This is pure deception both by the successive governments and the CEB as the mega losses of the utility will have to be borne by all the consumers indirectly.

This situation calls for an entirely new way that the energy industry in general and the electricity sector in particular is viewed. Since the CEB which holds the monopoly status is a state owned institution, entirely owned by the public, it is important to recognize that the consumer, which is the entire public are the main shareholders of this enterprise, to whom the CEB must be made responsible.

The role of the Consumer to make a change

Under these circumstances, the electricity consuming public should recognize that even under the present unacceptable and illogical state of management of the industry, that they too have the right and opportunity to make positive and proactive interventions.

Of course the first obvious option is to reduce the consumption in many ways that are possible, starting with replacement of all bulbs with LED bulbs, which is now being offered at very reasonable prices by the Sri Lanka Sustainable Energy Authority and the CEB. This is not only a saving for the consumer, but a service to the nation, given that Sri Lanka is at present highly dependent (over 73 % in 2019) on important fossil fuels both oil and coal, for the generation of electricity.

The “Prosumer Concept” and Opportunity

However, the phenomenal advances in the power generation technologies that have been developed and commercialized in the recent years, particularly in the Solar PV technology, have opened up an entirely new vista for the electricity industry.

Thus the concept of “Prosumer” which places the electricity consumer in the role of producer of electricity, as well as being a consumer is now entirely feasible. This option can now be exercised by the domestic sector consumers, as well as the larger industrial and commercial level consumers.

Sri Lanka which achieved the enviable status among our neighbors of 100% electrification, has also taken the most progressive step by way of the “Surya Bala Sangraamaya”. This system which progressed from the original net-metering system, whereby the consumer could reduce his monthly bill by generating all or some, of electricity consumption using a roof top solar PV array, has now been expanded by two additional options

- Net Accounting system, whereby any generation over and above the self-consumption is compensated financially by the CEB and:
- Net Plus System, where the entire generation from the roof top Solar PV array is exported to the grid and is paid for by the CEB. The self-consumption is metered separately and charged for at the prevailing consumer tariff

Therefore, the stage is already set and the regulations are in place for the cult of “Prosumers” who can boast of the slogan “ **Every Roof Top a Power Plant**”. While there are a number of consumers who have already embraced this option, perhaps the numbers have not reached the level to make a significant impact to reduce the sorry dependence of the on imported fossil fuels.

The much touted renewable energy projects, such as wind power and solar parks approved by the cabinet and the Board of Directors of the CEB as far back as 2017, have still not even reached the tender stage. The potential impact of these 700 MW of power projects if implemented could have had, is evident from the current cost of generation in the table below recently published by Dr. Thilak Siyambalapitiya .

Electricity produced from	Cost: Rs. per unit sold in 2019				Price: Rs. per unit sold in 2019	Gain or loss: Rs per unit sold in 2019
	Capacity	Energy	T&D	Total		
Larger hydro	3.64	-	4.56	8.20	16.88	8.68
Coal-fired	3.68	10.76	4.56	19.00	16.88	(2.12)
Oil-fired	5.99	26.57	4.56	37.12	16.88	(20.23)
Solar, wind, small hydro	-	20.93	4.56	25.49	16.88	(8.61)
Total	3.87	13.88	4.56	22.30	16.88	(5.42)

It is to be noted that the costs indicted above for the Solar and Wind have now dropped significantly for the new projects, with the 100 MW wind plant in Mannar expected to cost less than Rs 10.00 to the CEB and the current tender for Solar PV parks, have a ceiling price of Rs 15.60 per unit. The PUSCL has published the estimated cost of externalities of oil and coal power which should also be added to the above costs which are borne by the CEB. Further the roof top solar does not have any significant T & D costs being a distributed generation close to the consumers.

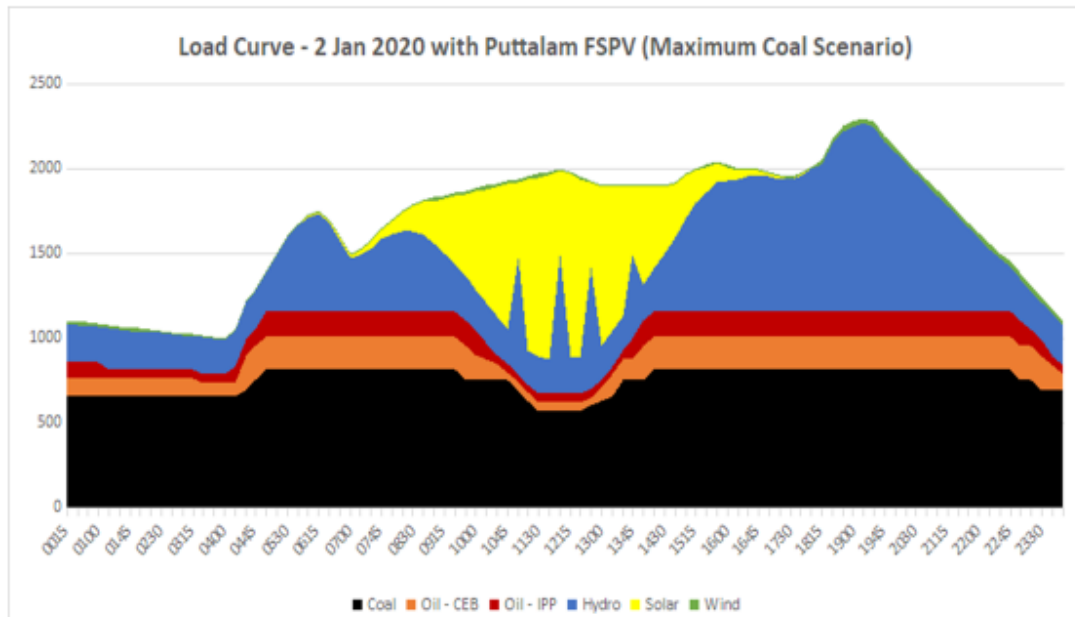
In this back ground where sourcing the funds for such large scale fossil fuel based power plants is becoming increasingly difficult, the roof top solar systems are smaller distributed units entirely funded by the consumers themselves, and requires only a few months to implement. Thereby over 269 MW of Roof Top Solar systems have already been connected to the national grid over the last few years , when no major power plants have been commissioned. The potential growth is over 100 MW annually if there is adequate facilitation by the CEB.

With the best interest of both the consumers and the country, there should be encouragement for all consumers opting to join the Surya Bala Sangraamaya , to opt for the “Net Accounting” system optimizing the capacity of the solar PV system , governed only by the available roof area and the limits imposed by the CEB. The following comments are on domestic consumers for the moment as there are no regulatory impediments for this segment of consumers.

This intervention has the great advantage of pumping significant amount of energy, back to the national grid, albeit during the sun lit hours. However, even without the very desirable battery storage backup to

cater to the peak hour demand, this energy export has the salutary effect of saving the equivalent amount of water in our major hydro reservoirs, as well as limiting the use of very expensive oil based power generation which is the main cause of losses incurred by the CEB, during the sunlit day time hours. With adequate scale of integration of such “Prosumers” it is evident that we may be able to save enough water to cater to the entire peak hour demand too. This is naturally assisted by the already operating Wind Power, which will now be augmented by a further 100 MW in August 2020, and the contribution from the coal power plant, which unfortunately has to run on the 24/7 basis.

What Solar can do without batteries



Of course the CEB engineers express concerns of the impact on stability of the grid due to large scale infusion of variable solar power to the grid. But the fact remains that it will be many years before we reach such scale as there are studies by ADB and other agencies which indicate that even with the present state of the national grid, such issues will surface only on reaching 20% penetration, where as we are barely at **0.4 % solar penetration** now. While there may be issues of over concentration of systems in some isolated locations, we expect that the CEB engineers are experienced and clever enough to overcome such problems as they occur. They have the greater responsibility and the challenge to improve the national grid over the coming years to be able to absorb a much larger proportion of renewable energy, including the solar and wind as has already been demonstrated in many countries already. We hope they would take this as a challenge to prove their competence in the field, rather than concentrating on the purely technical problems which can be overcome. This would pave the way to reach the target of reaching 80% RE contribution by year 2030, which has been declared as the firm national policy by His Excellency the President and is now enshrined in the government’s policy document. The contribution of Solar PV including the Roof Top system could be as high as 5000 MW by this date with 2000 MW coming from the roof top systems.

This is not a fanciful target as there are over 5 million domestic consumers. Even 20% of them can provide over 3000 MW. At present over 25,000 of them have installed roof top systems with a combined

capacity of 269 MW. Although only about 10,600 consumers are on the net accounting system and contribute 165 MW, even those on the net metering system do make a contribution by generating even part of their consumption during the day, and thus save the valuable hydro resource as illustrated above.

Encouraging the Net Accounting system and thereby the true “Prosumers” is the way forward to gain the maximum advantage. The country is grateful to the CEB engineers who have actively facilitated the systems in place and hope for even more support and facilitation from them in the future.

The simple calculation given below would illustrate the great benefit to the CEB and the country by the expansion of this contribution, at no cost to the CEB or the treasury. In this regard the tariff system for the Surya Bala Sangraamaya have been arrived at in 2016 by consensus among the stake holders in a most transparent manner. Even though the impact of the depreciating rupee has had a negative impact on the financial viability to the potential “Prosumer” they have been more conscious of the positive impact on the economy and the country in general. Thus the interest continues unabated and the signal of willing and increased facilitation by the CEB will be a most welcome.

The Impact of Net Accounting			
		Current Status	Forecast
No of Consumers	Nos	10,663	250,000
Installed capacity kW	kW	165,311	3,875,809
Average generation per month /kW	kWh/month	110	110
Payment for Roof Top Solar PV	Rs/kWh	22	22
Cost to CEB @ Rs 22.00 per year	Rs	4,800,631,440	112,553,489,637
Equivalent Cost of Oil Based power	Rs/kWh	37.12	37.12
Savings per month by avoided oil based generation	Rs.	3,299,343,062	77,354,943,787
Loss of Income to CEB due to self-generation			
Average Consumption per consumer	Kwh/month	400	400
Estimated monthly bill /Consumer	Rs	13,964	13,964
Income lost per year		1,786,713,606	41,890,500,000
Therefore the net savings		1,512,629,456	35,464,443,787

Number of consumers > 180 units per month - 582,086

The CEB will incur a loss of income as most of the consumers currently enjoying the net accounting benefits are those charged the high rates of tariff even as high as Rs. 45.00 per unit . Thus the net savings to the CEB in spite of such loss of income is presently estimated as Rs. 1,512.6 Million annually, which is a significant amount, without which the estimated loss would have increased further.

The number of consumers with monthly consumption over 180 units is about 582,000. If 250,000 of them join the Net Accounting system generating the same level of surplus, then the picture changes dramatically as shown above.

Referring back to the current cost of generation quoted earlier, it is important to recognize that the tariff payable by CEB would drop to Rs 15.50 after the first 7 years and remain static over the next 20 years, whereas the cost of any fuel based generation would continue to rise.

We often hear the lamentation of the CEB and the ministry of power and energy that the low end consumers are provided with very high subsidies contributing to their loss. The means by which even the low end consumers can become prosumers and thus remove this perceived cause of loss to the CEB will be addressed in a future article in the interest of reducing the length of this more urgent message.

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