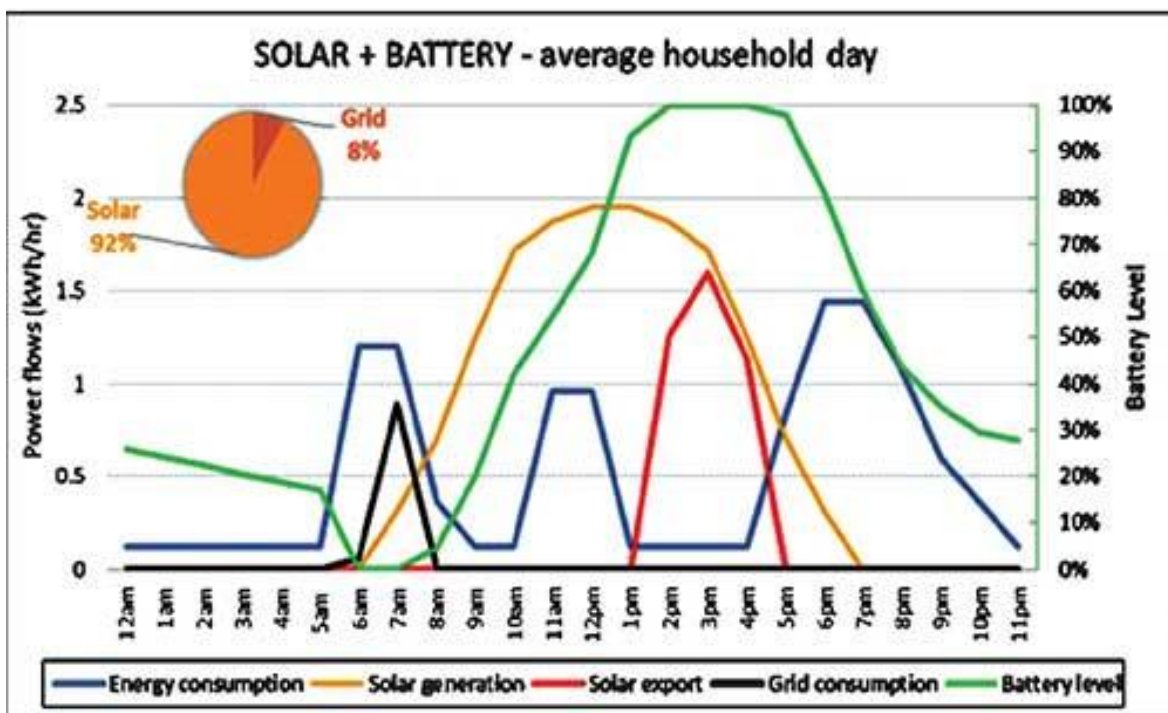
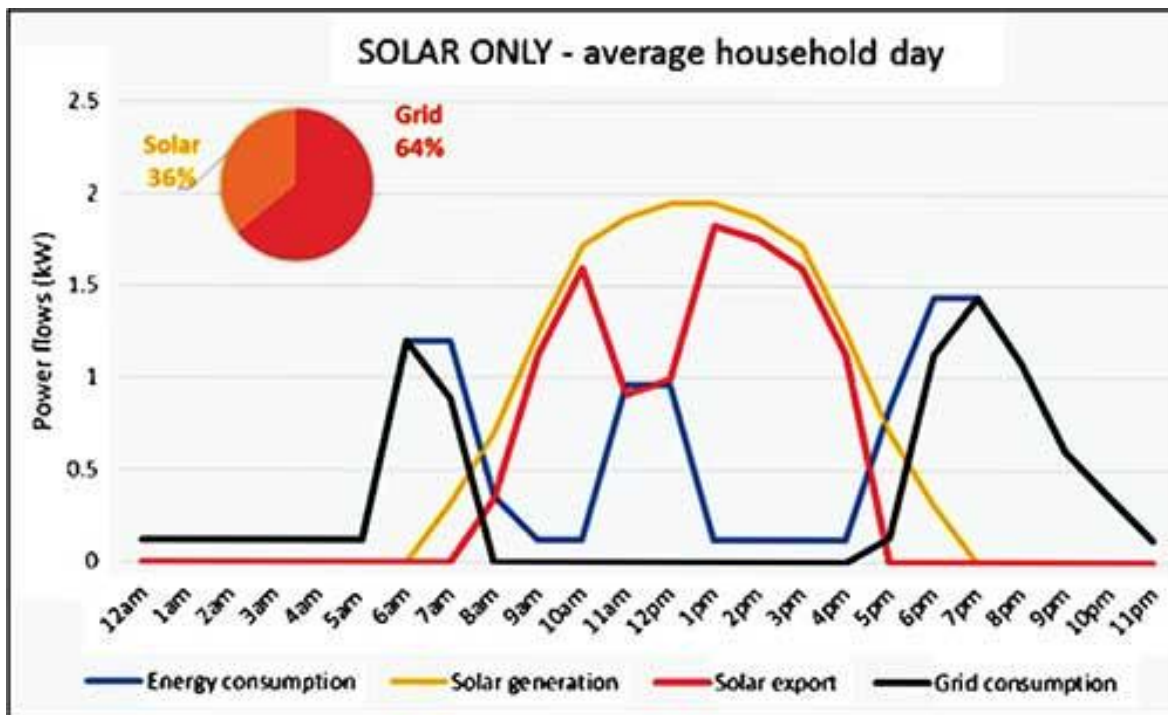


A closer look at Sampur coal power plant (Part 1)

08th June 2015, www.island.lk, By Eng. Parakrama Jayasinghe

It is encouraging that my article questioning the need for the proposed Sampur coal power plant, which appeared in the Island newspaper on the 27th May 2015, has evoked considerable interest and discussion. It is also interesting that a letter to the editor from Eng Jayantha Ranatunga also appeared in the letters to the editor column of the Island on the



same date under the heading " Solar roof top systems - another view". While Eng Ranatunga would not have had any inkling of my article and the my proposal coincidentally based on the use of roof top solar PV systems as the alternative to the proposed Sampur Coal power plant, there has been much email traffic on both topics. This debate was also fueled by the very well presented case for Roof top solar as a viable source of energy, titled "Business Plans To Encourage Solar Electricity" published by Prof Kumar David, based on the scenario in California, which appeared in the Colombo Telegraph of 24th May 2015.

Eng Ranatunga responded to this article claiming that the use of roof top solar systems supported by the current net metering system is a pro rich exercise and also detrimental to the CEB's cash flow. While agreeing in principle to his claim, one should look at the present status in context. For instance only about 9 MW of roof top installations have been erected so far attracted by the provisions in the net metering system. As such the loss of revenue to the CEB to date has not been significant as claimed by Eng Rantunga. Perhaps due to the email correspondence which brought out many responses contesting the claims made by him, Eng Ranatuga has published a further article in the Island of 4th May 2015 titled " Why We Need the Sampur Coal Power Plant". While I am most grateful to him for the complimentary comments made by him, let me recommend that he consults the SEA to find out the degree of investments already made and the projects in the pipe line on Dendro Power. I feel that in the national interest, a more in-depth study is required, which will demonstrate that his claims of unproven , untested and futuristic nature of the options proposed by me are not factually correct, in that the world has moved forward much faster than he has given credit for. In fact the future is already with us and coal has no role to play in that future.

On the other hand the solar PV installations fuelled by the provisions of the net metering system has had the most salutary effect of creating widespread awareness of the financial and technical viability of the roof top solar systems and the confidence generated in the minds of the consumers of the role of Solar energy in the future, even though the energy authorities are still adopting a frog in the well attitude. In addition the demand for such systems continue to grow in spite of the reduction in the consumer tariff some months ago. This demand growth is also supported by the local vendors passing on some of the benefits of the world market price decline of solar PV systems in recent years. One more common objection to solar PV is that it is a drain on foreign exchange for the country. While the coal power plant will constitute a continuous drain for the import of coal over the years in addition to the initial capital cost of the power plant, the current Sri Lankan financial authorities do not consider this as a major issue, when one looks at the tremendous increase in the import of private vehicles, or the fact that we continue to import major food items all of which can be grown locally. As such this is hardly a tenable argument. The proposed scale of the roof top Solar PV will be achieved over many years. The financial regulators should be more concerned of the fact that the state will have to finance the Coal power plants even as loan capital repayable with interest, the capital for the solar systems will be generated by the individual consumers with no burden on the treasury or the public.

A major growth of this demand would of course be a matter of concern to the CEB, in time to come, and hence my proposals, to promote the same roof top systems with limited storage, which will be a win win solution not only to the consumers and CEB but to the

Hotel Sector	Unit	Minimum	Maximum	Average
Source of Energy				
Electricity	kWh/Yr/M ²	59.65	226	120.97
Electricity	kW/Room	2.2	8.31	5.15

country at large. The storage option is already proven and more and more top level companies are entering the market with improved and cheaper storage options, many of which are already in the market. The recent launching of the "Power Wall" system by Tesla motors has been a high point in this sector. I am told by engineers at the Sustainable Energy Authority that the storage option is viable in Sri Lanka even at the present quoted price of US\$ 3500 for a 10 kWh system, where as Tesla has predicted that the price could come down by 50% when their Giga factory of 10 million square feet is in operation later this year in the west coast of USA. Obviously Mr Elon Musk does not consider the concept of Solar PV as unproven or futuristic. Nor does our nearest neighbour India which has called for offers for 3000 MW of solar installations and the Karnataka state has already embarked on a 2000 MW solar park. In Australia the utilities are recognizing the optimal role that can be played by Solar energy and have contracted with Panasonic to install large battery storage systems at their Grid Substations to enable a large scale integration to the national grid. The storage requirements for a Sri Lankan households are much less than the 10 kWh storage capacity of the Tesla Power Wall. A careful review of the current world market would reveal many other products at even lesser prices.

The two charts below from Australian sources amply illustrate the benefit from the roof top solar and the impact on the peak hour demand. A similar situation prevails in Sri Lanka.

We have the well proven example of the savings made both in the generation capacity requirements as well as the energy saved by the use of CFLs. According to the SEA records some 300 MW of capacity and 440 MWh of energy were saved by this exercise. The conservation measures launched by the Ministry of Power and Energy and spear headed by the SEA enabled the CEB to avoid the impending power crisis in 2012, created by the reduced hydro power generation and the constant failures of the Coal power plant. I hope that the SEA is continuing in their efforts to increase the penetration of CFL or better still the conversion to LEDs for lighting in all sectors, which would generate further savings and thereby contribute to further trimming of the peak load demand. Such energy saving measures and the conscious option to get off the grid during the peak hours is the better approach for the future.

Information is available with the SEA on many sectors highlighting the potential for savings of which only on sector is illustrated below.

There are many incentives and facilitation that the CEB and the other state agencies can provide to ensure that more and more consumers, adopt this option which will ensure that the proposal to trim the peak hour demand becomes a reality. Of these the following can be implemented immediately.

1. Implement the current proposal to allow time of day metering system presently limited to the industrial and hotel sector consumers, to the house hold sector as well. It is understood

that this proposal is being actively promoted by the CEB, not for the purpose of enhancing the contribution by roof top solar, but to enable them to run the Norochcholai coal power plant at a better plant factor, particularly in the early morning hours. Whatever is the underlying intent, this facility will encourage the consumers to go off the grid during the peak hours, thus trimming the peak demand.

2. Mandate the Sustainable Energy Authority or other suitable state agency to monitor and publish world market prices of solar PV panels and other components and the storage systems required for roof top systems, in order that the vendors are compelled to pass on the advantage of the reducing world market prices to the consumers. This will make the systems more viable with lower pay back periods.

3. Persuade more banks to come in with low interest loans for Solar PV systems, on the same principle as low interest agricultural loans, considering the substantial national benefit of avoiding any more coal power plants. The reasons why the solar option is nationally beneficial in comparison to the coal power plants is explained later. The detractors of solar system maintain the opposite view, which can be shot down even by the simplest calculation as shown later on.

What About Coal Power ?

While the foregoing has been presented to support my earlier proposal for expansion of the roof top solar PV systems with limited storage, the main purpose of this article is to highlight the hidden facets and dangers of the untrammled and short sighted dependence on coal power for Sri Lanka with particular emphasis on the Sampur Power plant, which appears to be pursued in great haste.

Is Coal as cheap as touted?

The cost of power generated should cover the following items of cost

1. Cost of Capital for power plant and transmission lines
2. Cost of Fuel
3. Maintenance costs
4. Operational costs
5. Interest on capital
6. Cost of externalities

The first five items of cost are usually taken in to account in the calculation of the levelized cost of generation over the expected lifetime of the power plant, usually 20 years. This takes into account future costs such as escalation of fuel prices, changes in parity rates etc.

I have made use of an excellent spread sheet provided by Dr Anil Cabraal, retired energy expert of the World Bank, by inserting the current known parameters. While the full spread sheet is too elaborate to be presented here, I will be happy to share the same with Dr Cabraal's permission.

The predicted coal consumption for the Sampur Power Plant is 0.42 kg/kWh. This is higher than the predicted consumption of 0.39 for the Norochcholai plant (Actual in 2013 was 0.46 kg/kWh –CEB Statistics). This will rise further if the plant is run at less than the optimal capacity which will be inevitable.

The reported cost of the 300 MW Norochcholai power plant is US\$ 455 Million or US\$ 1500 /kW. It is not known if this includes the cost of the land, preliminaries and other feasibility study costs etc. However, for a proper comparison at least the cost of the transmission line up to Habarana GSS has to be included in case of the Sampur Plant, as this is part and parcel of the project to deliver energy to the centers of demand.

In addition, the transmission and distribution loss of 11% has to be accounted for as the comparisons is with roof top solar which is a distributed generation at the very point of consumption.

The average cost of coal delivered to Norochcholai in 2013 has been Rs 16,500 per ton (\$ 127/ton) (CEB Statistics 2013) and as high as \$ 150 per ton for some shipments. What this will be in the future is anybody's guess. Let us assume a cost of \$ 125 per ton with an annual escalation of only 2%.

Using the above data the levelized cost of power at point of generation delivered to the consumer will work out to be Rs 20.37per kWh . Since we are considering the comparison of the alternative, which is the roof top solar, which generates at the point of consumption, the comparable cost must allow for the transmission and distribution loss @ 11%. Thus the cost of coal power at the point of consumption is Rs. 22.40 per kWh.

There will be howls of protest on this price prediction, with all manner of calculations. However unless and until the Freedom of Access to Information is passed in to law, we will never learn the whole truth. Till then I for one, will refuse to accept the ridiculously low estimates of the cost of coal power which are quoted in the public media.

parajayasinghe@gmail.com

(To be continued tomorrow)