



Bio Energy Association of Sri Lanka



The Director General
Public Utilities Commission of Sri Lanka,
Level 06, BOC Merchant Tower,
No. 28, St. Michael's Road,
Colombo 03.

14th March 2017

Dear Sir/Madam,

Long-Term Generation Expansion Planning Code Version 1.0 and Input parameters and assumptions of LCLTGEP 2018-2037

In response to the website notification appearing in the “Public Utilities Commission website: <http://www.pucsl.gov.lk/english/news/12354/>”, on the above mentioned subject, the Bio Energy Association of Sri Lanka, hereby forwards comments on the **Long-Term Generation Expansion Planning Code Version 1.0 and Input parameters and assumptions of LCLTGEP 2018-2037**.

The two submissions have been made as separate documents and cover the areas of greatest concern to the Renewable Energy Sector and The Bio Energy Sector in particular.

If given the opportunity it will be our pleasure to provide more detailed analysis on the points raised by us. We earnestly hope that our comments will be given the careful consideration that they deserve, in order that the future long term generation plans are made in a manner more in the interest of national benefit.

Yours Sincerely
Bio Energy Association of Sri Lanka

Eng Parakrama Jayasinghe
For the BEASL Council

Comments on the Long-Term Generation Expansion Planning Code Version 1.0

It is noted that the CEB is required to follow the guidelines provided by the Long-Term Generation Expansion Planning Code Version 1.0 issued by the PUCSL. This Planning Code has not been revised since its first issue in 2011 and thus cannot be assumed to be applicable at present. Further it presupposes the use of the much hackneyed computer program WASP IV. This computer program has been heavily criticized by stake holders as being inadmissible for Sri Lanka's energy scenario. It is understood that the CEB has already purchased a more appropriate software program. There has been many changes in the national policy outlook of the energy sector as well as very rapid and dramatic changes in all aspects of energy in the recent years. While it may not be feasible to develop an updated Planning Code in the period allowed for the CEB to submit their Long Term Generation Plan for the period 2018 -2037, it is proposed that the following provisions be made as an interim measure.

- Permit more flexibility in the planning process not rigidly adhering to the stipulation of the present Planning Code, particularly based on the use of WASP IV.
- Provide means to include renewable resources as candidate power plants.
- The definition of what is termed “ Least Cost Generation Option” needs to be expressed in a wider perspective than the mere cost to the CEB, but expressed more in terms of the cost to the national economy. Thus the cost of externalities for each type of generation must be included in the derivation of the Cost. Such cost of externalities could be both positive and negative.
- The changes in national policy have to be taken into account as a primary consideration overriding the stipulation of accepting the least cost option as calculated by the CEB. Thus some hitherto accepted options such as coal will have to be ignored and not included as candidate plants as Sri Lanka has ratified both the UN protocol on Sustainable Development Goals as well as the Paris Accord of the UNFCCC. Meeting obligations of the country to meet the stipulations of these two accords require the choice of clean sources of energy and drastic limitations of carbon emissions. Thus there is no possibility of considering any more coal power plants.
- Therefore the present code subject to the above should be considered only as a guide.
- Because of these limitations the LTGP generated should be considered as provisional and be reviewed in terms of a revised Planning Code to be developed within one year.
- The stake holder consultation for a revised planning code should take place soon after the date set for the submission of the LRGP 2018-2037.
- The planning code should provide for adequate stake holder consultation with all relevant Ministries, state institutions such CEB, LECO, SLSEA, Ministry of Plantations, Ministry of Industries , Ministry of Petroleum etc as well as other stake holders from the private sector, such as IPPs, all registered Energy Industry Associations and consumer societies , with room for the environmental groups to express their views.
- Demand forecasting needs to be validated based on verification of past forecasts Vs actuals and adjusted accordingly.
- The definition of “Commercially Mature “should be by world standards and experience and not based on the limited experience and knowledge of the CEB. The many rapid changes occurring in the world needs to be appreciated and accepted for introduction for Sri Lanka to benefit from such advances.

- In this regard the strictures in the Electricity Act on 2009 and the amendment of 2103 restricting generation projects to those included in the approved LTGP , behooves the PUSCL to be extra careful in approving a LTGP which is short sighted and based on limited knowledge and vision, not keeping open the avenues for the country to benefit from the many advances being made in the energy sector in rest of the world.
- There must be definite provision to ensure that the introduction of new renewable energy options are not blocked by addition of large scale inflexible systems such as coal and gas with massive expenditure on infra structure. The desire and the attempts to protect such investments would lead to concerted efforts to block the introduction of more benign and sustainable resources. This trend is seen worldwide and Sri Lanka is fortunate that such investments are as yet, not substantial. However, there has been clear indication of this desire such as the attempts to limit the introduction of wind and solar to the grid, and to ensure that the Coal power plant can operate at higher plant factor. The argument brought forward is that it is the least cost option, which is a warped argument full of errors not substantiated by independent and accurate analysis.
- It is understood that the CEB has invested in a new planning software called OptGen. Hopefully this is better suited for the Sri Lankan conditions and therefore it should be used for the planning exercise. If there is an issue of training of personnel for its usage, very quick program should be instituted so that it's use can form part of the new Planning Code.
- Most importantly what must prevail throughout the planning process and the development of the LTGP is the Sri Lankan National Perspective and not the narrow view point of the CEB. In this context the wise stake holder consultation is essential and should therefore be mandatory.
- The fact that the CEB enjoys a monopoly buyer status prevents healthy competition as seen in other countries and in other sectors in Sri Lanka. Therefore to counter this undesirable situation, the planning code must provide guidelines to ensure that the national interest is safeguarded.
- There has always been a lack of transparency and a level field of comparison when the cost of generation from different sources of energy are calculated and presented. For example, the many subsidies and state facilitations available for the fossil fuel sector are not taken into consideration when comparing the cost of RE which are being developed by the Private Sector as of now. The Planning Code must give proper guidelines to remove this disadvantage for the RE sector, at least for the purpose of comparison of cost, even though such subsidies are not given to the private sector. There is no reason why the development of the RE should be the purview of the private sector. Let the state sector also compete for a share on equal grounds.

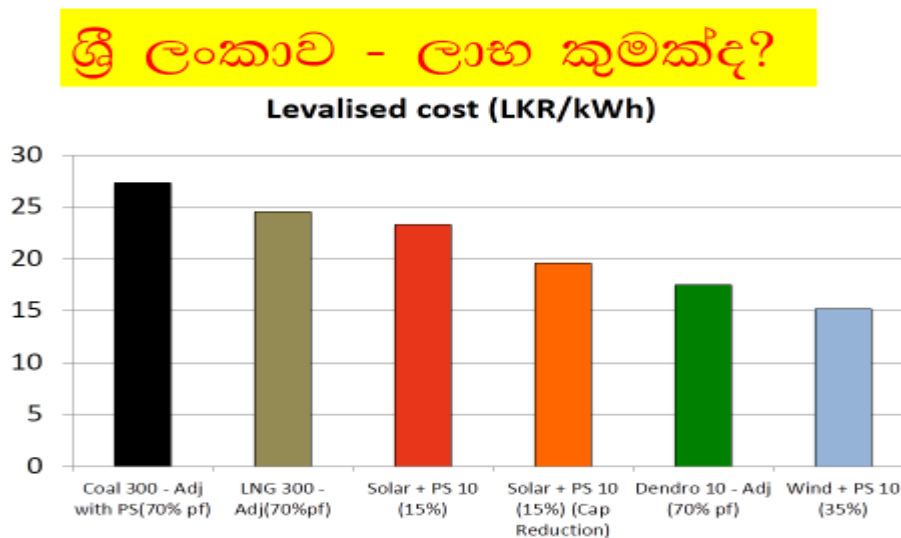
Comments on Input parameters for CEB LTGP Plan 2018-2037

The Public Utilities Commission has called for public comments on the Input Parameters proposed by the Ceylon Electricity Board to be used for the generation of The Long Term Generation Plan for the period 2018 to 2037.

The Bio Energy Association of Sri Lanka, which is championing the large scale integration of sustainably grown fuel wood based power generation to the national grid would like to make the following comments on the relevant sections of the above proposed input parameters.

1. Historically there has been an attempt to portray a picture that power generated using biomass is more expensive than coal based power. This incorrect picture is created due to the application of different parameters for the two options, in making the comparison. For example the following issues exist and appear to be repeated in the present exercise.
 - a. There is an assumption that the renewable energy development and dendro energy in particular is the purview of the private sector. This need not be so. Therefore the analysis of viability and comparison of cost of generation should be done with same input parameters, including unit capacities, special concessions enjoyed by the state institutions in case of large fossil fuel based power generation facilities developed by the state. For example the coal imports are duty free and no other taxes apply for the fuel supply, whereas all inputs for a dendro power plant would be subject to many direct and indirect taxes and levies. Therefore for the purpose of comparison of costs of generation, the same duties and levies have to be added to coal or gas power generation project undertaken by the state.
 - b. The state ventures enjoy many advantages such as low cost funding from state sponsored loans etc which are not available for the private sector. Thus the data on cost of funds must be on a more equitable basis for the comparison.
 - c. The comparison is made on widely differing unit sizes which make the specific cost of the Dendro Plants unreasonably high. Without making a pre judgment of the viable size of Dendro power plant, presumably based on the premise that generation of adequate fuel wood supplies is questionable, the comparison should be made on the basis of a plant size where the specific capital cost would be comparable.
 - i. A minimum size of 50 MW is proposed for this reason. It is not up to the CEB to make the decision that the required biomass cannot be sourced. The supply of coal or oil for their fossil fuel based power plants is arranged by other state institutions. Same should apply in case of Dendro power. More over when sources several kilometers underground in foreign countries are assumed as readily available, the resource of undoubted potential clearly visible in Sri Lanka should not be deemed unviable or unavailable. This is not the forum to discuss this issue and it is a matter of national policy which is now well documented.
 - ii. The use of too low a generation unit size impacts both the specific capital cost as well as the operating efficiency. The efficiency value of 15.1% is unacceptable. Efficiencies over 25% are possible using higher operating pressures and super heat temperatures for the larger sized plants
 - iii. Biomass energy is the only renewable energy source with economically viable storage mechanism which is essential in meeting Sri Lanka's energy needs. The extent of land available for biomass cultivation as an integrated energy/ agro crop has been reinforced by the recent findings of the undp/fao/slsea study. Moreover there is no inventory cost as in case of coal or oil where large quantities will need to be kept in store.

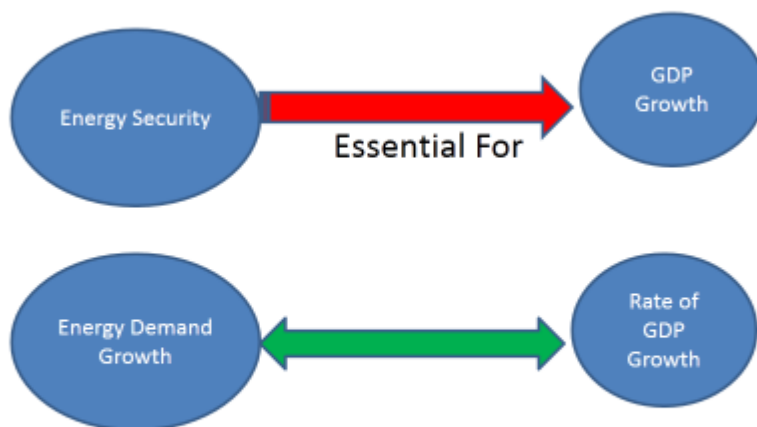
- d. The true comparison of generation costs, factoring in the issues listed above but without factoring in the cost of externalities both positive and negative is illustrated below.



As such Dendro power of adequate capacity should be included as a candidate option even if the WASP IV program is used. This exercise had been done by The Ministry of Power and Energy in the past and has generated the expected output to show that Bio Energy is the cheapest option for firm electrical energy.

2. A major consideration which has been ignored or downplayed in the past is the cost of externalities. The definition and relevant parameters to be included in the evaluation of this cost is well known and need not be elaborated here. Suffice it to say that all Social, health and environmental impacts of a particular resource or technology would entail must be taken into account, both as positive and negative. The proposed input parameters in the document dismiss this by a mere statement “Damage costs would be determined using a break-even analysis with comparison to latest available studies”. This assessment has to be done with adequate stakeholder consultation and must provide for the inclusion of the stringent protection measures for mitigation of emissions, a major cause of environmental damage and health impacts. The acceptable levels of such emissions should at least be comparable with those adopted in developed countries. The current emission standards issued by the CEA as a draft are not acceptable as being incomplete with many significant and harmful components being omitted as well as lacking transparency in the process of determination. The value of Sri Lankan lives and right for a healthy environment, cannot be any less than what is considered applicable in any other country.
3. The many spin off benefits for the country by adopting Dendro Power should be assessed as a positive impact, and given adequate weightage in the selection process from the candidate options. If the WASP IV program does not have provisions for same, this needs to be done manually prior to adoption of the outputs from the WASP program.
4. Dendro energy is the best form of indigenous energy, which in addition to being renewable and carbon neutral, provides the means of directing more than 65% of the expenditure of generation to the local economy, particularly to the rural economy. This is in addition to the many other spin off benefits in sectors such as agriculture, health environmental enhancement, social equity to name a few. This opens the way to realize the important paradigm shift illustrated below.

The Common Wisdom



3/12/2017

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A New Paradigm needed



**The Potential Target contribution
US \$ Six Billion**

3/12/2017

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- It is noted that the list of Candidate Plants does not include any Wind or Solar. Presumably this is on the basis that these are non-firm resources. However, many studies have proven that Wind and Solar could meet all the stipulations of grid stability etc, deemed possible only from coal and gas power plants
http://reneweconomy.com.au/australian-wind-farms-to-compete-with-gas-to-provide-grid-stability-62697/?utm_source=RE+Daily+Newsletter&utm_campaign=663ae8f96b-EMAIL_CAMPAIGN_2017_02_20&utm_medium=email&utm_term=0_46a1943223-663ae8f96b-40335633,
reneweconomy.com.au/csiro-says-australia-can-get-100-per-cent-renewable-energy-86624/

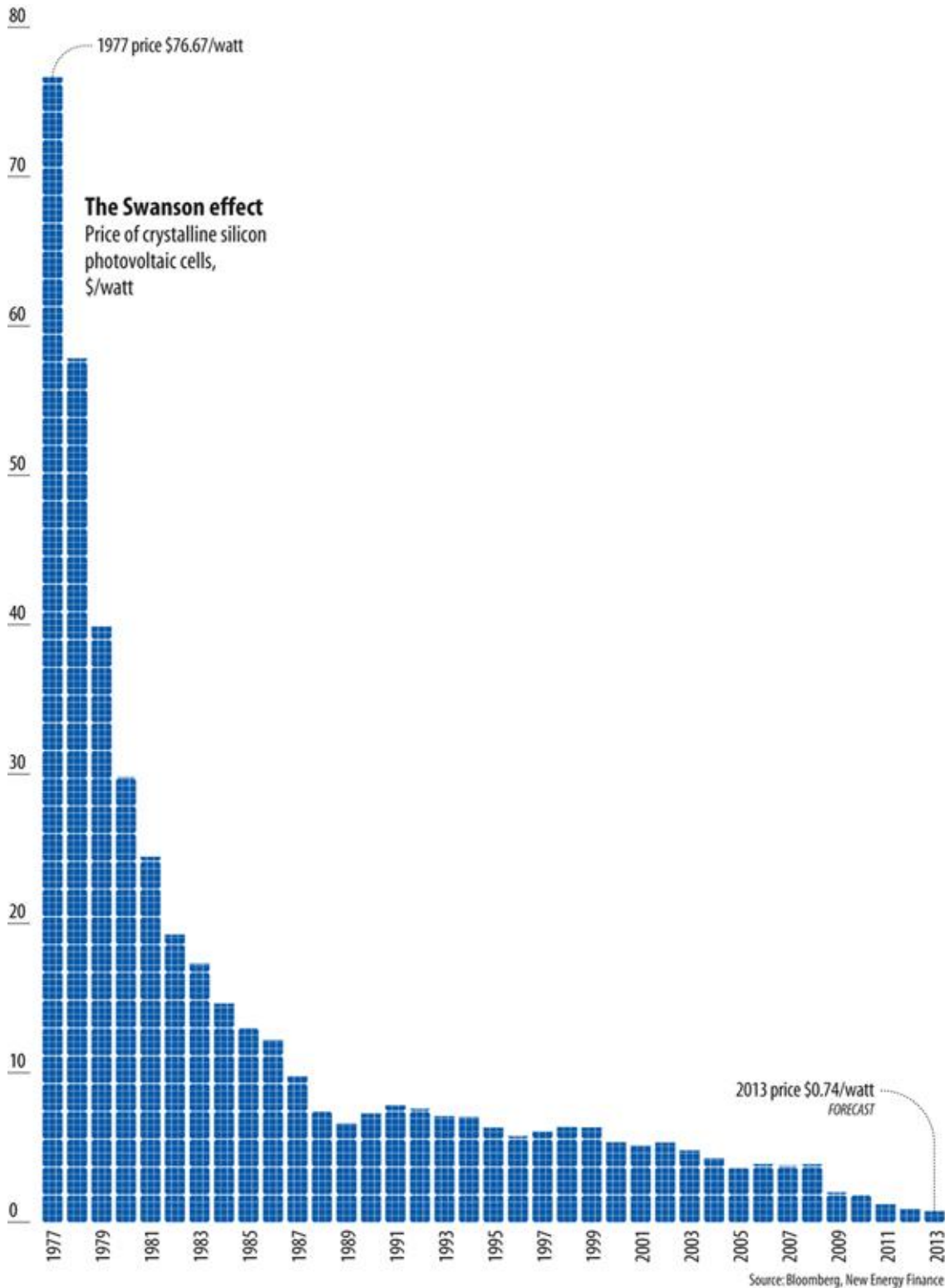
Sri Lanka needs to learn from these technologies already practiced in other countries and thus provide room for much larger integration of such indigenous and renewable resources.

- An overarching consideration which has to be applied is the compliance with National Policies. As Sri Lanka has ratified both the Sustainable Development Goals and the Paris Accord, there is no room to consider any more

coal power plants. As such the list of candidate plants cannot include Coal, even with the so called Clean Coal option, which is a myth.

7. There is no reference given as to how the different capital costs for different technologies have been picked up. The valuable data available from India with necessary adjustment for Sri Lanka, say the enhancement by 10% is recommended. India Central Electricity Regulatory Commission (CERC) has issued such estimates. The document can be found at <http://www.cercind.gov.in/2016/orders/SO17.pdf>.
8. The contribution that can be made by an aggressive DSM process is ignored. This leads to unacceptable estimates of demand growth. An evaluation of the past records to ascertain the reliability of past demand forecasting methodologies must be undertaken first and adjustments made after which the impact of DSM process must be factored in to the final demand forecast. Sri Lanka having reached near 100 % electrification would not have the level of demand increase evident in the past due to the expansion of the grid. The demand growth would therefore be driven by the development projects. However, as evident worldwide and also seen by the records of SEA, the energy intensity is on a decreasing trend. Thus the direct linkage of demand growth to GDP growth is no longer valid. Therefore the forecasting methodology needs revision. Please refer to: <http://sustainability.sjp.ac.lk/publications/>
9. The rapid growth of the Roof Top Solar PV generation, fueled by the “Surya Bala Sangraamaya” with considerable state patronage appears to be ignored in the demand forecasting . The rate of growth is distinctly accelerating and very substantial amount of energy can be expected from this source even in the short term. The CEB cannot ignore the programs of the Ministry of Power and Renewable Energy, under whose authority the CEB exists such as the One Million Roof Top Solar PV Program promoted by the Ministry. The extent of the growth can be ascertained by reference to the SEA and the number of Solar Energy service providers who order books are full. A minimum of 200 MW of such installations can be expected in the short term and will continue to grow.
10. Even without any battery storage the contribution by Wind and Solar during the day time hours is considerable with the changing nature of the daily load curve. Any energy provided by such sources is a direct saving of the coal and oil based power generation used during such hours. Moreover the saving in the water in the hydro reservoirs has to be considered as a mean of serving the daily night peak demand without the addition of any more power plants.
11. The value of pumped storage facilities to enable storage of non-firm energy from wind and solar has been under discussion for some time, and this option appears to be included in the long term generation planning exercise. However, the present plan appears to be to construct dedicated reservoir and generation facilities for this purpose. This is totally uneconomical and unnecessary for Sri Lanka with wide network of major hydro reservoirs. The priority should be to study the feasibility of using existing systems to be adopted for this purpose. This is the recommended approach by international experts. *“For instance Canada has opportunities for storage capacity at almost zero cost. Why? They can connect existing lakes with different elevations and do pumped storage, so the storage is already there in the reservoirs with natural inflows” Krueger recommends that once a utility decides it needs LDS it should first look to its neighbors to determine if any hydro storage exists or could exist at minimal cost. If neighboring states or countries have significant storage capacity, then building interconnectors is the best course of action in terms of costs and revenues. Ref “A Longer Look at Long-duration Energy Storage” Renewable Energy World March/April 2017 .* CEB and Mahaweli Authority has adequate data to test out this option very easily, particularly in respect of the Victoria- Rangenigala system.

12. The value of distributed generation and the wider utilization of renewable resources for electricity generation is a reality which cannot be ignored. The many innovative solutions to handle issues such as variability and seasonality have already been solved in many countries including India. The dramatic reduction of cost of Solar PV as illustrated below, as well as the similar trends in storage has to be recognized in the long term generation planning exercise. This needs to be done now as the reductions are already being realized in commercial scale.



13. Thus Sri Lanka which has been granted this bounty in abundance by mother nature should not take precipitate actions which would effectively block such large scale adoption. This is inevitable if large fossil fuel based power plants with a life span up to 30 years are embarked on at this point of time. Well before such time scale, the RE resources will become financially and technically viable even in Sri Lanka. Thus this issue has to be resolved with much deeper consideration going well beyond the “easy solutions” so to speak, based on the current knowledge and the inclinations of the CEB.

The following extract is from a report published by the Rocky Mountain Institute of USA which has studied this situation in great detail.

“Though many utilities rightly see the impending arrival of solar-plus-battery grid parity as a threat, they could also see such systems as an opportunity to add value to the grid and their business models. The important next question is how utilities might adjust their existing business models or adopt new business models—either within existing regulatory frameworks or under an evolved regulatory landscape—to tap into and maximize new sources of value that build the best electricity system of the future at lowest cost to serve customers and society”.



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