

PUBLIC UTILITIES COMMISSION OF SRI LANKA

# STAKEHOLDER SUBMISSIONS

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PUBLIC CONSULTATION ON  
LEAST COST LONG TERM GENERATION  
EXPANSION PLAN 2018-2037

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## Executive Summary

Public Utilities Commission of Sri Lanka, the electricity sector regulator approved the Least Cost Long Term Generation Expansion Plan on the 20th July 2017.

The decision of the approval arrived after hosting written and oral public consultations on the Least Cost Long Term Generation Expansion Plan 2018-37 (LCLTGEP 2018-37) submitted by Ceylon Electricity Board.

Section 43 of the Sri Lanka Electricity Act No. 20 of 2009 as amended by section 13 of Sri Lanka Electricity (amendment) Act No. 31 of 2013, requires the Transmission Licensee to prepare and submit the Least Cost Long Term Generation Expansion Plan (LCLTGEP) for amending and approval of the Public Utilities Commission of Sri Lanka .

Ceylon Electricity Board initially submitted input parameters used in the preparation of the draft plan (LCLTGEP 2018-37) was submitted to the Commission on February 2017 and the draft LCLTGEP 2018-37 was submitted on 5th May 2017.

The Commission held a wider public consultation for both input data parameters and for the draft LCLTGEP 2018-37 under the Section 17(b) of the Public Utilities Commission of Sri Lanka Act, No.35 of 2002.

The Commission's process of approving the LCLTGEP 2018-37 is given below;

Event/ Action	Date / Duration
Communication of timeline for approval process by PUCSL to CEB	November 30, 2016
Submission of input data of LCLTGEP 18-37 to PUCSL by CEB	February 6, 2017
Public Consultation on input data by PUCSL	February 17 - March 22, 2017
Submission of LCLTGEP 18-37 to PUCSL by CEB for approval	May 05, 2017
Public Consultation on the draft LCLTGEP by PUCSL	May 09 - June 15, 2017
Oral stakeholder submission on the draft LCLTGEP to PUCSL through a public consultation	June 15, 2017
PUCSL required clarifications on draft LCLTGEP 28-37 from CEB	June 20, 2017
CEB submitted the clarifications to PUCSL	July 07, 2017 and July 14, 2017
PUCSL Decision on LCLTGEP 18-37	July 19, 2017

Thirty Four stakeholders submitted written observations on the LCLTGEP 2018-37 and 15 Speakers submitted their observation on LCLTGEP 2018-37 at the oral public consultation.

Fourteen written submissions were received for the consultation on input data on LCLTGEP 18-37.

The Commission undertook lengthy studies on the LCLTGEP 2018-37 considering the submissions made by varying stakeholders, Government policy and the other climate agreements that the government endorsed. The Commission announced its decision on 19th July 2017.

This report contains the stakeholder submissions on the LCLTGEP 2018-37 and the responses of the Commission for the submissions.

## Comments on draft LCLTGEP 2018-37

Dear Stakeholder, The Commission value and appreciate your effort in participating the public consultation process of Least Cost Long Term Generation Expansion Plan (LCLTGEP 2018-37). We have strongly considered the comments, proposals and suggestions that you have made and revised the submitted plan accommodating major changes given the limited time phase. However, some comments, proposals and suggestions will be incorporated in developing the next LCLTGEP due to time constraints in approving the LCLTGEP 2018-37 for fast implementation.

Name of the stakeholder	Reference to the submission	Summarized Submission	Response of the Commission
1. Dr. Anil Cabraal	I Methodology		
	1	Generation Planning Code in the Grid Code is no longer appropriate in preparing the Long-Term Generation Expansion Plan 2018-2037 as it bounded by the limitations of WASP.	The Commission agrees. The Commission has already initiated to revise the planning code, so that the next generation plan would be prepared adhering to the new planning code. However, the planning code would not specify any software by name but encourage CEB to use the best practices in the world.
	2	Base Case must include effects of key government policies, including renewable energy commitment, Paris Climate Agreement commitment and other policy commitments, Surya BalaSangramaya, DSM Action Plan etc.	The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.  The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya BalaSangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and

			<p>economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>The Commission noted that the set targets under SooryaBalaSangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.</p> <p>In the approval of the LCLTGEP 2018-39, Commission asked CEB to submit an investment plan with ORE absorption levels to achieve 60% of electricity generation from Renewable energy sources (including Large Hydro plants) by the year 2030 by 30<sup>th</sup> April 2019.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
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	3,4	<p>When CEB has acquired a better planning model, OptGen in 2016, why does CEB continue to use WASP.</p> <p>There is no need to limit Other Renewable Energy to 20 percent, a target set nearly ten years ago.</p>	<p>The Commission agrees that the present planning software has its own limitations on modelling renewable energy and transmission costs.</p> <p>CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in next generation planning. The latest software allows CEB in modelling variable renewable energy as well as transmission costs.</p> <p>The Commission encourages the licensee to adopt and use the best practices in the world to develop the future LCLTGEPs.</p>
	5, 6	<p>Modelling solar based on data at two sites is not adequate. I recommend CEB obtain more site-specific data, for example using SolarGIS1 (available free through the World Bank (knight@worldbank.org), <a href="http://globalsolaratlas.info">http://globalsolaratlas.info</a>. or from NASA <a href="https://eosweb.larc.nasa.gov/project/sse/sse_table">https://eosweb.larc.nasa.gov/project/sse/sse_table</a>). Utility-scale batteries should be considered. A good source of information is IRENA, Battery Storage for Renewables: Market Status and Technology Outlook, <a href="http://www.irena.org/documentdownloads/publications/irena_battery_storage_report_2015.pdf">http://www.irena.org/documentdownloads/publications/irena_battery_storage_report_2015.pdf</a>, and Bloomberg New Energy Finance, Global Energy Storage Forecast 2016-24.</p>	<p>The Commission noted. The Commission will further study the data options you have suggested and will communicate to CEB and SEA to incorporate in the next generation planning as the time constraints in incorporating the same into LCLTGEP 2018-37.</p>
	7	<p>Continued consideration of the nuclear option seems pointless</p>	<p>The Commission noted.</p>

	II Demand forecast		
	8	CEB has overestimated the demand for electricity in the past. If the methodology used in the same as in prior years, the risk of overestimating demand remains.	The Commission noted. At the same time the Commission also have observed that the submitted LCLTGEP 2018-37 has analysed different demand growth rates to mitigate the risk of overestimating the demand. Ex: Scenario for 1 percent increase and 1 percent decrease
	9 (a)	The base case demand forecast is based outdated Central Bank forecast from 2 years ago. Their old forecasts assume real GDP growth rate in 2016 of 5.8-7.6 percent per annum. The real GDP growth rate in 2016 was 4.8 percent. Therefore, CEB needs to recheck the GDP growth rate assumptions to a more realistic value by consulting with credible economists.	The Commission agrees that the real GDP growth varies from the data that has taken into the planning. However, the CEB has used the data which is available in the Central Bank Report 2015, the latest published report during the time of conducting the demand forecasting studies. The Commission will communicate and ensure that the next generation plans would incorporate latest figures.
	9 (b,c)	Verify whether an increase in consumers rather than GDP growth is a more relevant indicator to obtain a better forecast of electricity demand growth (in Industrial and Domestic catagories). The growth in the number of new domestic electricity consumers will be slower than in the past.	The Commission noted that both increase in consumers (no of consumer accounts) and GDP growth are considered as variables for both domestic and industrial sector demand forecasts in the current plan. The Commission also noted that the regression coefficients of the said variables given in Section 3.3.2 indicate that used variables are relevant for the demand forecast. Further, the Commission noted that the

			past electricity demand and DGP growth (Figure 1.1) has shown a direct correlation.
	III Policy adherence		
	10 (a)	Given that this DSM program is carried out by a Presidential Task Force, CEB ignoring its positive impact on demand reduction and thus reducing the investment needed in the power sector is indeed surprising.	<p>Noted</p> <p>The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.</p> <p>The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.</p>
	10 (b)	Sri Lanka's commitment under the Paris Climate Change Agreement, which specifically, proudly noted that Sri Lanka cancelled plans to build 4700 MW of coal-fired power generation. If so, why is coal power generation included in the Base Case	<p>The approved LCLTGE 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.</p> <p>Please note that the Paris Agreement specifies that Sri Lanka has taken initiatives to eliminate introducing coal plants from 2030.</p>

	10 (c)	Did CEB consider the Surya BalaSangramaya Program?	<p>The Commission noted that the set targets under SooryaBalaSangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.</p> <p>Please refer the Commisison's response to comment 2 above, for further details.</p>
	IV Cost Assumptions and Economic Analysis Rigour		
	11	It is not clear if the costs of coal harbor, jetty and coal transport infrastructure are included.	The approved LCLTGEP 2018-37 has considered the costs of coal harbour, jetty and coal transport infrastructure in the decision given.
	12	All costs thant are not sunk costs, including Other Renewable Energy (ORE) must be included	Please note that the costs you have mentioned were considered in the plan.
	13 (a)	The cost included only the Pure Construction Cost of Power Plants and excluded the cost for Feasibility, EIA, Pre-Construction, Detail Design etc, which are not sunk cost	Please note that the costs of feasibility study, EIA, pre-construction & detail design etc. are not considered since those are relatively negligible compared to the overall cost of the project and certain feasibility studies are funded by grants from foreign agencies.

	13(b,c,e)	coal harbour and jetty and local transport infrastructure costs must be included Transmission costs for connecting power plants to the network must be included Does the coal power plant include cost of coal delivery infrastructure?	The approved LCLTGEP 2018-37 has considered the costs of coal harbour, jetty and coal transport in arriving the decision given. The plan has considered the interconnection costs of transmission, but not the cost of transmission lines due to unavailability of data and given the limited time in approving the plan. The Commission will consider the comment in approving future generation plans.
	13 (d,f, h)	90 MW solar plan in 2019 is assumed at USD 943/kW but 100 MW solar plant in 2020 is USD 1300/kW etc. How can costs increase? 50 MW wind plant in 2019 is assumed at \$1084/kW but the 100 MW wind farm in 2020 and 50 MW wind farm in 2022 is higher at USD 1586/kW etc. there is little or no reduction in assumed cost of solar and wind to 2037, even though these costs are steadily and rapidly declining.	Investment cost with interest during construction is assumed to occur at the beginning of The Commissioning year of the plant. Solar and wind power developments in table 8.3: investment plan assumed two year construction period (and S curve cost distribution). The capital cost incurred in 2017 is considered sunk cost, hence, 2019 cost only include the capital disbursements in 2018, where, 2020 cost include total disbursements. Please also refer Commission response to the comment 15 below.
	13(g)	It is unclear why wind and solar developments are taking place in small increments	The Commission noted your comment. The Commission noted that CEB has considered stability, operational and economic constraints of the present system in including wind and solar developments.

	14	I suggest using benchmark cost data that India Central Electricity Regulatory Commission (CERC) has issued and make some adjustments for Sri Lanka (perhaps 20% higher?). The document can be found at <a href="http://www.cercind.gov.in/2016/orders/SO17.pdf">http://www.cercind.gov.in/2016/orders/SO17.pdf</a> .	The Commission value the suggestion that you have made. The Commission will further study the capital cost data from the Central Electricity Regulatory Commission (CERC) and will communicate to CEB to consider and incorporate in the future generation planning.
	15	Information on solar and wind cost reduction trends are important. This can be obtained from IRENA, Power to Change: Solar and Wind Cost Reduction Potential to 2025. <a href="http://www.irena.org/DocumentDownloads/Publications/IRENA_Power_to_Change_2016.pdf">http://www.irena.org/DocumentDownloads/Publications/IRENA_Power_to_Change_2016.pdf</a> .	Approved plan considered capital cost reduction for solar plants only (initial 1400USD/KW gradually reduced to 900USD/KW by 2025).  The Commission will further study the information source (IRENA, Power to Change: Solar and Wind Cost Reduction Potential to 2025 and will communicate to CEB to consider and incorporate in the future generation planning.
	V Environmental considerations		
	1to5	The CEB must be transparent and explicitly state the environmental damage cost per kWh it has assigned to various technologies.	The Commission noted the comment with appreciation and incorporated in the approved plan.  The approved LCLTGEP 2018 -37 considered the externality costs.  Reference for costs of externalities: The Case of RCREEE Member States September 2013.

		<p>Environmental costs should also include impacts on water (fresh and sea), land and marine environments due to heavy metals emissions, discharge of hot water, solid waste, discharge of coal and coal dust into the sea and land prior to the next cycle, CEB could undertake contingent value analysis or other use approaches to obtain Sri Lanka-specific estimates of damage costs. For a summary discussion of such methods, see Dr. Alberto Longo, The methods to estimate the monetary value of the environment, Department of Economics and International Development University of Bath, A.Longo@bath.ac.uk. <a href="https://www.czp.cuni.cz/czp/images/stories/Vystupy/Seminare/2005%20LS%20Ocenovani%20ZP/longo_methods.pdf">https://www.czp.cuni.cz/czp/images/stories/Vystupy/Seminare/2005%20LS%20Ocenovani%20ZP/longo_methods.pdf</a></p>	<p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p> <p>The Commission will further study the referred study methods that you have mentioned.</p>
	VI Impact of Plant Construction Delays		
	1	The LTGEP considers in its sensitivity analysis, delays in hydro and LNG power plants and that too only by one year, but not coal.	The Commission noted that CEB has conducted the contingency analysis only for the period 2018-2022, where no coal power plants were included in the base case plan proposed by CEB.
	2 to 4	CEB continues to assume unrealistically short duration for building coal-fired power plants of four years. This artificially makes coal fired electricity more economically attractive than it really is. For example, if coal power cost is Rs. 10/kWh and the construction time 5 years beyond the assumed 4 years, then the electricity cost from	The Commission noted the comment.

		the coal plant is effectively nearly Rs. 16/kWh, or 60% higher.	
	VII Integration of Variable Renewable Energy		
	7	The CEB is seeking, Variable Renewable Energy curtailment rights This is a dangerous requirement. Unless there is punitively high cost of CEB for every kWh curtailed, CEB will curtail VRE in favour of coal power.	<p>The Commission noted, these observations.</p> <p>The Commission would like to note that the LNG plants provide the additional flexibility of operating in lower capacity factor and hence, reducing the requirements for renewable curtailments, compared to coal plants.</p> <p>However, when intermittent generation capacity is high, in certain instances it is required to limit the power output of intermittent sources to avoid overloading of the Transmission System. This is an accepted international practice. However, agreements with the power producers and CEB, including terms for procedures and compensation for curtailments will be established prior to exercising any curtailment rights.</p>

	VIII Sensitivity Studies and Scenario Analysis	CEB should distinguish between Investment Strategies and Scenario Analyses	The Commission appreciates the input in this segment. We will address this issue in revising the planning code.
2. Mr. Asela Pathberiya			
	1	If high cost renewables are added instead of low cost power plants, the government should compensate for the additional cost.	In line with the provision of the Sri Lanka Electricity Act, the Government has the power to decide on the compensation if relevant.
	2	I propose calling bids prior to procuring Sojitz Kalanithissa plant, to procure fresh plant if the purchasing Sojitz plant is not viable,	Please note that the Transmission Licensee has the authority to call the bids where the Commission intervene only in the approval process. However, Sojitz Kalanithissa plant was developed on Build, Own, Operate, Transfer (BOOT) basis and has already on a contract with CEB. Hence, the required capacities will be procured without competitive bidding.

3. Mr. Dasun Andarage		<p>1. The 35MW GT proposed shall be increased to 40MW, since the GT manufactures does not manufacture 35MW.</p> <p>2. 300MW LNG CCY plants shall be increased to 400MW as most of the GT manufactures does not manufacture plants with 300MW capacity.</p> <p>3. Instead of 300MW sub critical coal power plant, we suggest to install 350MW super critical coal to reduce the emissions.</p>	<p>The Commission did not consider the comments in the approved plan.</p> <p>The Commission further noted the below.</p> <p>1) Gas turbines are manufactured in capacities vary from 30 MW to 50 MW by different manufacturers.(The capacities are given in ISO conditions and should be adjusted based on the site conditions.)</p> <p>2) Similarly, natural gas fired combined cycle plants are manufactured in capacities vary from 275 MW to 450 MW by different manufacturers.</p>
4. Mr.Hasala Dharmawardene	1	If it is economical for CEB to develop this 100 MW, why does CEB not develop all the wind power (375 MW) ?	The Mannar wind park will be developed by CEB in order to enhance the investor confidence in large scale wind power development and to provide a cost benchmark for future developments in Sri Lanka.
	2	Please provide the cost with its error margin. Or state the confidence interval of the calculated total costs to understand the possible variation of the values	The Commission noted. The generation plan uses scenario analysis based on uncertain variables such as fuel prices, demand growth, etc. as the method to understand possible variations in the Cost of the plan.
	3	Though this planning process uses the border prices, in the actual operation CEB uses CPC prices (which are distorted by different taxes applied for different fuels). By doing so a possibility to deviate from the optimum dispatch is created since the cost calculated at merit order dispatch process is different from the cost calculated in this plan.	<p>The Commission agrees that at present the merit order dispatch is based on the market prices of fuel.</p> <p>The Commission will consider issuing a regulatory tool to ensure that the fuel prices consider in merit order dispatch, do not vary from the border prices of fuel used in preparation of the plan.</p>

	4	What is the basis for having 5% amount of extra spinning capacity (per MW of ORE) ? Why can't it be 10% or 1%?	The Commission noted. Additional spinning capacity for renewable energy considers in this plan, (5%) was determined based on the outcome of frequency stability studies in Renewable energy integration study "Integration of Renewable Base Generation in to SriLankan Grid 2017-2018"
	5	Why are the local environment damage costs not identified and quantified? Why has no action being taken by CEB or THE COMMISSION to do it?	The Commission noted the comment with appreciation and incorporated in the approved plan.  The approved LCLTGEP 2018 -37 considered the externality costs.  Reference for costs of externalities: The Case of RCREEE Member States September 2013.  The Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.
	6	Does the plan consider that the emission of CO2, Sox, NOx and pm2.5 in super critical coal power plant is exactly equal to an LNG plant?	The plan has not considered that the emission of CO2, Sox, NOx and pm2.5 in super critical coal power plant is exactly equal to an LNG plant
	7	Since the issue of Localized pollution from coal is also of high importance, it is best to show how Sox/Nox and particulates emission change with the 4 different cases, rather than only hyping on USD/CO2 ton.	The Commission agrees with your observation. The Commission also noted that Figure 9.12 is important as a graphical representation of cost effectiveness GHG abatement options, given the need of

			attracting carbon finance to achieve 16% conditional GHG reduction target under the Paris Agreement on Climate Change.
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5. Mr. Imran Ansari		Revised base case plan (different GT and Combined cycle plant sizes)	The proposed changes are not considered in the approved plan, as the basis of the changes was not provided.
6. Mr. Ranjith Vithanage- National Movement for Consumer Rights Protection	1	Why government policy 50% from renewables not considered?	<p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028".</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>The Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>

	2	Publish how power plants are funded and interest sources.	The Sri Lanka Electricity Act requires the Transmission Licensee, CEB to select the plant developers based on competitive bidding. Hence, funding is borne by the developer.
	3	Publish year of commissioning of plants	LCLTGEP 2018-37 has identified the Commissioning year of the plant.
	4	Publish what is the change of end user tariff	The change of end user tariff is not indicated in the plan End user tariff calculated considering generation cost, transmission cost and distribution cost. Only the generation cost component is addressed in LCLTGEP. The Commission will take the required measures to include the unit generation cost relevant to each scenario in future generation plans.
	5, 6	Energy World International (EWI) has granted cabinet approval for 300*4 LNG fired power plant.	According to the Electricity Act, any power plant addition can be done (except for certain renewable energy based projects), if only such plant is identified in the LCLTGEP. Since, the new plan has identified requirement for LNG power plants, the mentioned plants can be added, subject to the selection based on competitive bidding and other provisions of the Sri Lanka Electricity Act.
	7	The Commission should order CEB to include this in the plan and remove of 300MW oil plants and 900MW coal plants	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.

	8	With addition of proposed LNG plant by EWI, from Jan 2020, industrial tariff should be reduced by 10% of current prices and domestic tariff by 15%	The Commission noted.
	9, 10, 11	Even though wind and solar energy is environmental friendly, addition of such technologies should not lead to electricity price increase. Also, Coal plants should not be built.	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.

7. Mr. Sampath Thilakarathne		Generation cost in day and peak time are different. Hence it is unjustifiable to compare solar energy generated during day with electricity from grid at peak time and paying for the net surplus. Hence, solar power promotion is based on creating a fair situation artificially.	The Commission noted. The capacity additions under Surya Bala Sangramaya and the respective feed in tariff rates are a policy decision of the Government. The rates are designed to promote roof top solar plants.
8. SC	Fuel Price Assumptions	Same time period should be referred for Coal and LNG prices	<p>The Commission agrees with your observation. The approved LCLTGEP considered average fuel prices of the year 2016 from the sources below;</p> <ul style="list-style-type: none"> <li>-Coal price (81.0 USD/MT); NEWC as published by Globalcoal.com + (shipping+ insurance and lightering costs) as invoiced by Lanka Coal for the respective period</li> <li>-Oil Price(LSFO:46.5USD/bbl, diesel : 53.6USD/bbl); Singapore platts + freight and terminal charges from CPC/CPSTL for the respective period</li> <li>-NG price(8.4 USD/MMBtu); 14% of Petroleum Association of Japan, monthly crude oil import cost for the respective period + USD 2.5/MMBtu terminal costs</li> </ul> <p>Fuel prices will be approved by the Commission at input data consultation prior to prepare future generation plans.</p>

	Transmission Cost	CEB should verify if the coal plants with transmission cost is more economical than NG plants in Colombo	<p>The plan has not considered the cost of transmission lines due to the limitation of the software that used to develop the plan.</p> <p>However, the Commission encourages CEB to adopt best practices in the world to develop the future plans and the issue will be addressed in the future plans.</p>
9. Mr.Amila Wickramasinghe (SLEMA)	Economic cost of fuel	It is understood that the least cost generation expansion plan is prepared using forecast economic costs, but it is likely that when the selected thermal power plants are constructed and are actually operated, they may not be dispatched on the same economic basis, but on actual financial costs to CEB.	<p>We agree that at present the merit order dispatch is based on the market prices of fuel.</p> <p>The Commission will consider issuing a regulatory tool to ensure that the fuel prices consider in merit order dispatch, do not vary from the border prices of fuel used in preparation of the plan.</p>
	Losses	The Network loss recorded for 2016 is 9.64% and the forecast loss for 2042 is 9%. Assumed 9% figure assumed for network losses in the long term, which is not good enough	<p>Noted</p> <p>The Commission has issued loss targets to CEB for next 4 years (7.5% by 2020) but it is noted that it has not been considered.</p> <p>The Commission will strictly consider this in future generation plans.</p>
	LOLP	LOLP is expected to be as high as 1.2% in 2018, suggesting the reliability has been seriously compromised.	<p>Thank you for your observation. The 1.2% LOLP in 2018 is within the LOLP criteria (0.5%-1.5%) specified by THE COMMISSION in the Generation Planning Code.</p> <p>Justify it ?</p>

	Optimistic plant schedule	2019 and 2020 planned power plant additions which seem to be optimistic scheduling. Any back-up plans?	Thank you for the observation. Contingency Analysis given in chapter 11 of the LCLTGEP 2018-37, analyses impacts of plant implementation delays and propose necessary mitigation actions. THE COMMISSION will also monitor the implementation of the proposed power plants.
10. Environmental Foundation Limited	1	Government's stance on coal power generation and Sri Lanka's compliance towards a renewable energy dominant electricity generation plan	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
	2	If CEB is committed to reducing pollution, they can start from one of the existing largest sources of pollution in the possession of the CEB, which is LCPP at Norochcholai.	The Commission together with CEB is in the process of developing ways and means to address this issue. The Commission has already appointed a committee to study the thermal power plants in Sri Lanka and Norochcholei would be studied intensively through that study and immediate actions will be taken with the completion of the study. The Commission also noted that ambient air quality, stack emissions such as Sox ,Nox etc have been monitoring by the power plant. The Commission has already taken initiatives to regulate the environmental monitoring plan of the plant and obtain these data on a regular basis and disclose.

	3	Cost of externalities and lessons to be learnt from the Lakvijaya Power Station (LVPS)	<p>The Commission is in the process of studying the environmental performance of LVPS. The additional measures to mitigate environmental damage due to operation of the plant and the costs are also expected to identify in this study.</p> <p>In addition, it is expected to revisit the conditions of the environmental Licence issued to LVPS and Licence will only be extended subject to complying with the conditions. Also, it is expected to conduct the post monitoring required in EIA and implement the Environmental Management Plan.</p> <p>Please note that the cost of externalities were considered in approving the LCLTGEP 2018-37.</p>
	4	Integration of Demand Side Management (DSM) forecasts	<p>The Commission noted.</p> <p>The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.</p> <p>The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.</p>

	5	Concerns regarding renewable energy generation Pollution due to Mini-hydro plants Pollution due to small/mega solar plants	The Commission noted. Therefore, the Commission will study the subject area you mentioned and will assist CEB with the cost of externalities of renewable energy generation in developing future generation plans.
	6	It is questionable why exploration of domestic natural gas reserves is delayed.	Petroleum Resources Development Secretariat (PRDS) has indicated availability of domestic natural gas by 2021-23, subjected to finding an investor by 2018. Therefore, it will be considered in developing future generation plans.
11. Dr. J. Ratnasiri	Planning methodology	No one can say exactly what the fuel prices will be in 10 or 20 years' time, or how the coal plant price will change relative to that of LNG plant price. Hence, the planned schedule of adding coal plants and LNG plants up to 2037 based on just one set of prices determined several years ago, is highly flawed and cannot be accepted.	The Commission noted.  To mitigate the risk of uncertainty of future fuel prices, the Commission will consider checking the robustness of the LCLTGEP in different fuel price scenarios, in approving future LCLTGEPs.
	Proposed Methodology	The selection of a power plant - whether coal or gas - is best made after comparing prevailing prices, specific generation costs and performance against specifications.	The Commission noted the method with appreciation. The Commission will further study the proposed method and sent to CEB for consideration in future LCLTGEPs.

	Least Cost	Economic cost would mean externality costs including damage to health of people, ecology and climate system. As such, the LTGE Plan has no legal validity as it does not conform to the provisions in the Amended Electricity Act, and hence should be rejected outright.	<p>The Commission noted the comment with appreciation.</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>The Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
	Cost of externalities	<p>Damage cost (0.77Ects/kWh)converted to UScts by multiplying by 1.11 and adjusted for population density by multiplying by 3.25, ratio of population densities in Europe (100) and Sri Lanka (325).</p> <p>The external damage cost for supercritical coal plant for Sri Lanka is UScts/kWh 2.8.</p>	<p>The Commission appreciate these observations. Cost of externalities was considered in analyzing the different scenarios. Coal Plants have not qualified as least cost plants in the approved plan.</p> <p>The Commission appreciates if you can further clarify the basis of the adjustment based on population density.</p>

	Levelized cost of Coal and LNG plants	<p>Levelized costs calculated by commenter</p> <p>Super critical coal:10.0 - 11.8 Usctc/kWh</p> <p>NG-fired CCGT: 7.0 Uscts/kWh</p> <p>With no externalities cost included, cost of generation from natural gas is lower than that from coal depending on the relative prices of the two fuels.</p> <p>With the externalities cost included, cost of generation from natural gas is lower than that from coal for all prices of LNG and coal.</p> <p>When least economic cost is taken into consideration, the least cost option is always natural gas power plants rather than even supercritical coal power plants.</p>	<p>The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.</p>
	Proposed changes to UKHP	<p>A reservoir with high capacity could be built below St. Clair's water falls to collect water falling down St. Clair's and Devon waterfalls without displacing any people. Water from this reservoir could be taken to the main shaft of the UKHP to generate electricity during rest of the day which has the potential to add about 500 GWh (according to the CECB proposal submitted during hearings).</p>	<p>The Commission noted .</p> <p>The Commission will further study the comment and require CEB observations on this.</p>
	Uma Oya Plant	<p>It may be noted that Uma Oya project has already caused several adverse social, physical and environmental impacts including damages to many houses, which have not been addressed in the EIA Report.</p>	<p>The Commission noted.</p> <p>Uma Oya is a multipurpose project and developed by the Ministry of Irrigation and Water Management and is not under the direct purview of the Commission.</p> <p>In order to avoid similar situations with power projects to be implemented in the future, the Commission will take the required measures to coordinate with Central Environment Authority to ensure</p>

			adequate EIA studies are carried.
	Nuclear Power	Sri Lanka being a small country with a high population density, a nuclear plant will not be socially acceptable as it involves many risks and with issues relating to disposing of spent fuel, nuclear power has no place in the country's energy mix.	The Commission noted.  Nuclear power is considered only as a potential thermal generation option in the study. However, base case plan or the approved plan does not include any nuclear power plants.
	NDC	Under Paris agreement, Sri Lanka has undertaken 4% unconditional and 16% conditional reduction of GHG emissions by 2030 compared to business-as-usual (reference) scenario. If the no-coal scenario given in Annex 7.6 is adopted, it will be possible to reduce carbon dioxide, the principal GHG, by 22% by 2030	The Commission noted.  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
12. Mr. K C Somaratne	2 (a)	Page 2-6 gives the graph of energy to be tapped from the 3 major systems for different duration values. What does this duration mean? Should not it be changed to probability.	The graph represents 100 possible hydro conditions generated from the stochastic dual dynamic programming (SDDP) forecast model. It shows the percentage duration where, annual hydro energy is equal or higher than plotted value.
	2 (b)	(b) What does this sentence mean: ".....the worst conditions in dry and very dry scenarios were considered in calculating the average and it resulted in a reduction in the weighted average figure " What are the worst conditions in dry & very dry scenarios indicate?	For preparation of the LCLTGEP, said 100 hydro conditions are categorized in to the 5 hydro scenarios, very wet, wet, medium, dry and very dry. For calculation of the weighted average hydro figure, the worst conditions categorized under dry and very dry hydro scenarios were considered.

	2(c)- (f)	<p>LTGP 2006 gives a maximum of 5661GWhrs (without UK) and LTGP 2018 gives a maximum of 4994GWhrs (with UK). Inflow data from 1979 to 2014 should have included that year 2013 when hydro yielded 5994GWh.</p> <p>average of 4050 GWhrs corresponds to only 2984hrs, the minimum to 2386hrs and the maximum to 3680hrs. If you ignore those 6 bad years from 2000 to 2005, these three will have probabilities of 70%, 10%, 20%.</p>	<p>The Commission noted.</p> <p>The Commission appreciates if you provide the basis of the of the assessed probabilities.</p>
	Coal & Hydro Power compatibility	<p>Only real CO2 related parameter for Sri Lanka is how much CO2 we generate per year per unit area and next addition of a 900MW Coal Power Plant will take it to about 450 tons of CO2/km2 which is about 6 times the global average.</p>	<p>In addition, the approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.</p>
	Solar-Hydro Compatibility	<p>We believe we should be able to generate 3800MW of PV solar (or 5700GWhrs of energy) and this will be especially relevant if there is any possibility that we could generate this power without upsetting the environment. This 3800MW solar along with 900MW coal to handle the base load will give us a suitable framework to face the imminent price variations of the future.</p>	<p>The other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>However, future targets will be reviewed in future generation plans,</p>

			with the implementation of major thermal power plants and advancements of ORE technologies.
13. Ms. Neela Marikkar	1 Coal the cheapest?	Coal is not the cheapest option due to (1) Rupee depreciation in long term, (2) high Transmission cost, (3) due to lack of flexibility in following variable loads	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved. However the approved plan has not considered the impact of rupee depreciation and transmission costs. The Commission has already initiated to revise the planning code, so that the next generation plan would be prepared adhering to the new planning code. The Commission will consider the mentioned comment when revising the code.
	2 LNG Ren. Combination	Considering cost of social and environmental externalities of coal outweigh those of LNG, making LNG a more feasible option economically, socially and environmentally. large scale renewable technologies including solar and wind have dramatically reduced in price and are extremely competitive with coal without the negative environmental impact.	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved. The approved plan includes higher capacity additions of wind and solar power plants compared to previous plans. However, the other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.

	3 Norachcholai Coal Plant	Norochcholai Coal Power Plant is a living example of the devastating impacts of coal 1.adverse effect on fishery industry and corral reefs, (2)Coal dust and fly ash, (3) effect on agriculture around te plant	<p>The Commission currently in the process of conducting a study to identify environmental performance of LVPS. The additional measures to mitigate environmental damage due to the operation of the plant and the costs are also expected to identify in this study.</p> <p>The Commission expects to revisit the conditions of the environmental Licence issued to LVPS and Licence will only be extended subject to complying with the conditions.</p>
	4 Proposed Trincomalee Coal plant	Trincomalee coal plant is a human catastrophe in the making for the people in the Eastern province and the people of the North Central province. Hazrdous emmissions impact of which get worsen with monsoon rains leads to acidic gases from Trincomalee during the North-East monsoon will contribute to acid rain across the wind path. The long term impact on our cultural heritage from Sri Maha Bodhi to cultural monuments in Sigiriya, Dambulla etc.	<p>The Commission noted.</p> <p>Cost of externalities (Environmental and Social cost) was considered in analysing the different scenarios. Coal Plants have not qualified as least cost plants in the approved plan.</p>
	5 Alternatives	Renewables and Natural gas	Please refer 2 above

14. Mr. Parakrama Jayasinghe (Bio -Energy Association)	Consultation on input data	While we expected a stakeholder meeting to discuss the submissions made, none has been held and moreover a call is now made for submission of comments on a LTGEP generated by the CEB using the very same obsolete input parameters and guidelines.	<p>The approved LCLTGEP was prepared based on updated fuel prices and considering the costs of externalities.</p> <p>Please note due to the time constraint (deadline imposed on the CEB to submit the LCLTGEP 18-37, before April 30, 2017), the Commission and the CEB agreed that CEB prepares the draft plan based on the same input data, and any changes to the plan based on the Commission decision on input data to be incorporated in the plan as an addendum. The Commission communicated the stakeholders, in the notices calling for public comments on input data, that the comments will be considered in the approval of the LCLTGEP18-37.</p> <p>The Commission intends to approve the input parameters prior to preparation of future generation plans.</p>
	A		
	1	1. Any LTGEP generated using outdated input parameters and planning guidelines would patently be inaccurate and not realistic and therefore a futile exercise.	<p>The Commission noted.</p> <p>Please note that the approved plan was developed using updated fuel prices recommended by The Commission. The Commission has already initiated to revise the planning code, so that the next generation plan would be prepared adhering to the new planning code.</p>

	2,3	<p>The THE COMMISSION has already approved an interim LTEGP 2017-2034 to the CEB approving the projects earmarked up to 2020 and calling for an updated plan beyond that in compliance with issues ignored by them such as National Policies and Cost of Externalities etc The CEB failed to submit the revised LTGEP by the extended stipulated date 1st Sept 2016 and has now submitted a new LTDEP for the period 2018-2037 , while there is no evidence of any transparent action to comply with the approvals given for projects up to 2020</p>	<p>The Commission approved the revised LCLTGEP 15-34 (submitted by CEB on August 10, 2016), on September 15, 2016 subject to several conditions, including submission of LCLTGEP 18-37 for Commission approval on or before April 30, 2017.</p> <p>The cost of externalities and the National policies were considered strictly in approving the LCLTGEP 18-37.</p> <p>The Commisison has already asked CEB to submit the implementation plan of the proposed power plants and The Commission will monitor the implementation time to time to ensure continuity of electricity supply.</p>
	4	<p>There has been no attempt to facilitate and accelerate DSM activities</p>	<p>The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.</p> <p>The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.</p>
	5	<p>There is a grave danger in adopting and complying with a LTGEP with large centralized power plants based on outdated technologies</p>	<p>Please note, focus on centralized generation cannot be overcome at once due to the limitations in currently available studies and planning tools.</p>

			CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in next generation planning. The latest software allows CEB in modelling and optimizing variable renewable energy as well as transmission costs, thus eliminates the bias in present software towards centralized generation.
	B		
	1. Lack of Coherence with National Policies	CEB has ignored (1) Energy Sector Development Plan for a Knowledge based Economy 2015-2025 which calls for 94 % of the energy to come from renewable resources and elimination of all fossil fuels except 6% from indigenous LNG and no coal, (2)many high level Ministerial and Cabinet decision in respect of the development of renewable energy projects, (3) NDCs	<p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”. As per the study, optimum ORE capacity has been integrated into the</p>

			<p>system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	2. Least cost option	Not considered costs of externalities	The Commission considered Cost of externalities in approving the plan.
	3 Sources for cost of externalities	<p>References for costs of externalities</p> <p>1.<a href="http://webcache.googleusercontent.com/search?q=cache:FD8PutnGU_gj:www.mdpi.com/1996-1073/8/2/1440/pdf+&amp;cd=4&amp;hl=en&amp;ct=clnk&amp;gl=ca">http://webcache.googleusercontent.com/search?q=cache:FD8PutnGU_gj:www.mdpi.com/1996-1073/8/2/1440/pdf+&amp;cd=4&amp;hl=en&amp;ct=clnk&amp;gl=ca</a></p> <p>2.<a href="http://www.atse.org.au/Documents/reports/the-hidden-costs-of-electricity.pdf">http://www.atse.org.au/Documents/reports/the-hidden-costs-of-electricity.pdf</a></p> <p>3.<a href="https://www.uni-stuttgart.de/hkom/presseservice/pressemitteilungen/2013/130405_Deliverable_IER_to_GREENPEACE_DE.pdf">https://www.uni-stuttgart.de/hkom/presseservice/pressemitteilungen/2013/130405_Deliverable_IER_to_GREENPEACE_DE.pdf</a></p>	<p>The Commission studied the references you have suggested during approval of the plan.</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs, from the following source.</p> <p>The Case of RCREEE Member States September 2013.</p>
	4.a	Used US Dollars as the currency basis without provision for depreciation of the SL Rupee	<p>The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.</p> <p>The Commission has already initiated to</p>

			<p>revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>
	4.b	Lack of justification of capital costs which are assumed to remain constant	<p>The approved plan has considered capital cost reduction for solar plants only.(initial 1400USD/KW gradually reduced to 900USD/KW by 2025).</p> <p>The Commission will communicate to CEB to consider cost reduction trends of other renewable technologies also in future generation plans</p>
	4.c	The options of using indigenous equivalent resources such as Dendro power is not taken into consideration in adequate measure	<p>The Commission noted.</p> <p>The Commission noted that the LCLTGEP include 85MW of biomass power plants during the 20 years.</p>
	4.d	The already proven vast resources of Solar and Wind power with the world market trends continually declining is not given	Please refer 4.b
		The implementation of the proposals of the LTGEP with many fossil fuel plants, is not only a move against the National Policy, but will also act as a deterrent and disincentive for the development of the indigenous sources of energy, primarily being developed by the private sector.	<p>The Commission agrees that the plan does not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>The Commission will strictly consider the observation to be incorporated in</p>

			approving future generation plans.
	6 Adequacy of renewable Energy resources 7: World trend	The plan has not complied government policy decisions on future renewable energy share.  In many countries including the USA and India with its vast resources of coal, the cost of solar power has reached grid parity or cheaper than coal based power already. This trend is seen for many aspects including wind power , storage and electric vehicles.	Please refer B 1 above
	8: DSM	This task seems to have been relegated to the Sri Lanka Sustainable Energy Authority with very little direct contact with the electricity consumers. It is the duty of the state monopoly with thousands of skilled engineers to undertake this task whether formidable or not.	The Commission noted. The Commission will communicate to CEB and SEA to take the required actions to expedite the implementation of proposed DSM projects and incorporate the impact of DSM in future generation plans.
	The Role of Bio Mass Energy	The very significant potential to develop Sri Lanka's unique dendro power resource is an advantage to be made use of to provide at least 500 MW of base load power by 2025 and increased further in the later years.	The Commission noted. We appreciate if you could provide us the basis for the proposed dendro power target to consider in future generation plans.

15. Ms. P. Vithanage (Petroleum Resource Development Secretariat)	1	" LNG fired Power Plants" is used in the document at very many places. This need to be corrected as " Natural Gas(NG) powered Power Plants"	Noted. The Commission will communicate CEB to use the correct terminology(use term NG for domestic supplies and R-LNG for regassified NG) in future plans.
	2	FSRU on short term contract would be a better option considering domestic gas production targets by 2021-22.	The Commission noted. CEB has considered land based terminal option in the study and has not assumed the availability of domestic natural gas.
		It is suggested to incorporate the action plan for those near term power plants in the LTGEP with identified key tasks that need to be fulfilled to reach the target time.	The Commission noted.  The Commission has already to CEB to submit implementation plans for the first 10 years of the approved plan, with millstones.  Please note that CEB has already submitted the plans for the base case in the draft plan.  The Commission expects to monitor the progress regularly against the submitted milestones and take remedial actions, if any delays in implementation are observed.
	3	include the cost- benefit analysis for the "energy mix with NG development" as well. In this case consider both scenarios LNG and domestic NG options after 2030.	The Commission noted.  The Commission will communicate to CEB to consider including a scenario capturing availability of domestic natural gas in the future.

			The Commission appreciates continuous assistance and information from PRDS for this.
	4	Section (iii) of page 4-5 in Chapter 4 It is suggested to change the title " imported LNG" instead of LNG	The Commission noted.  However, the requested changes are not critical at this point, therefore it will be considered in the future generation plans.
	5	It is suggested to change the title as "Domestic Natural Gas Resources" and further adding a new para on potential high natural gas reserves and associated indirect benefits	The Commission noted.  However, the requested changes are not critical at this point, therefore it will be considered in the future generation plans.
	6	overall effective price of NG deducting state fiscal gains is roughly 2-3 dollars less than this value depend on the size of the discovery. Therefore the breakeven price for domestic NG can be further increased in this plan.	Noted with appreciation. The Commission will communicate with CEB to consider the economic cost of domestic natural gas in future generation planning studeis.
16. Small Hydro Power Developers Association	Point 1		
	Rupee depreciation	Due to rupee depreciation, cost of coal become higher compared to Renewables	The Commission agrees. The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.  The Commission has already initiated to revise the planning code and will

			<p>consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>
	Increase in fuel oil prices	Cost of thermal power plants are beyond CEB control due to increasing prices and affect the economy	<p>The Commission noted.</p> <p>To mitigate the risk of uncertainty of future fuel prices, the Commission will consider checking the robustness of the LCLTGEP in different fuel price scenarios, in approving future LCLTGEPs.</p>
	Least cost of mini hydro	The first eight year mini hydro tariff (three tier) is high). Also tendering process adds additional administration cost compared to standard agreements. Hence it is doubtful if tendering process gives the least cost.	<p>The Commission agrees that the administration cost in case of competitive bidding may become higher than that for SPPA process.</p> <p>However, it is unlikely that the competitive bidding compromises the least cost principle.</p>

	<p>Point 2: National Policies</p>	<p>The plan has ignored government policies MOPRE plan during 2015-2025 95% from Renewables and 6% from LNG, reduction of carbon footprint by 5%</p>	<p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	<p>Point 3:</p>	<p>Feasibility of 600MW nuclear plant is uncertain</p>	<p>The Commission noted.</p>

	Nuclear Power		Nuclear power is considered as a potential thermal generation option in the study. However, approved plan does not include any Nuclear power plants.
	Point 4: Planning process	Stakeholder consultation meeting was not arranged for input data consultation.  The plan was prepared on same obsolete parameters The planning process should be more consultative and comprehensive	The approved LCLTGEP was prepared based on updated fuel prices and considering the costs of externalities.  Please note due to the time constraint (deadline imposed on the CEB to submit the LCLTGEP 18-37, before April 30, 2017), the Commission and the CEB agreed that CEB prepares the draft plan based on the same input data, and any changes to the plan based on the Commission decision on input data to be incorporated in the plan as an addendum. The Commission communicated the stakeholders, in the notices calling for public comments on input data, that the comments will be considered in the approval of the LCLTGEP18-37.  The Commission intends to approve the input parameters prior to preparation of future generation plans.

<p>17. Solar Industries Association</p>		<p>Ignores the enormous development in solar technology and it's successful integration into the LTGEP</p>	<p>The Commission has noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028".</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>The Commission noted that the set targets under Soorya Bala Sangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
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18. Rain Forrest Protectors	1. Rooftop Solar Power	While the Government's recent attempt to promote rooftop solar power is commendable, the implementation has been slow due to inefficient processes at LECO/CEB. The costs of obtaining NET metering application, the meter, and rewiring to comply with LECO rules are quite high for the average consumer.	Noted with appreciation. The Commission has already issued guidelines pertaining to rooftop solar power and plans are underway to issue further guidelines to support successful implementation of the rooftop solar PV development and achieve government policy targets. These guidelines will be developed consulting and taking into the consideration of public concerns.
	2. Waste to Energy	Waste to Energy- Plasma gasification can be used to convert carbon-containing materials to synthesis gas that can be used to generate power and other useful products, such as transportation fuels. Plasma gasification provides key benefits	Noted with appreciation. The Commission will further study this and recommendations on waste to energy-Plasma gasification will be sent to CEB for consideration in future generation plans.
	3. Wave Energy	Sri Lanka has a large potential to generate energy via untapped ocean waves . Locally, research into wave energy is done at University of Moratuwa with promising results. National Aquatic Resources Agency (NARA) has already identified many sites suitable for wave energy projects.	Noted with appreciation. The Commission appreciate if you share more information on the mentioned local studies on wave energy.
	4. Damage from Wind and Minihydro	Main concern with wind energy is the deadly bird strikes which can devastate populations of bird species if the projects are built within bird migration routes. Require careful planning in selecting sites Construction of mini-hydro projects have resulted in further loss of biodiversity.	Noted.  The Commission will communicate with Central Environmental Authority (CEA) and SEA to ensure required EIA is conducted prior to implementation of other renewable plants and also to ensure post monitoring requirements in the EIA are met during the operation of the plant.

19. Dr. Tilak Siyambalapitiya	1	Power plant additions in the near term are already badly behind schedule; some have not been started at all. The golden rules in utility planning to be followed by THE COMMISSION and CEB are: Decisions for longer-term solutions: First Decisions for shorter-term solutions: Second Energy efficiency, demand response: Third Emergency power: Last	<p>The Commission noted.</p> <p>The Commission has observed delays in implementation of the LCLTGEP as the major reason for emergency power procurement and short term solutions. The Commission has already requested CEB to identify major milestones of the implementation schedule of the plants expected in first 10 years of the approved plan.</p> <p>(CEB has already submitted the same, according the base case of the draft plan).</p> <p>The Commission will monitor the progress of the implementation plan and will take necessary action to ensure continuous supply of electricity in Sri Lanka.</p>
	2	Transmission and distribution loss targets (page 3-7) indicate no basis and are incompatible with the Commisison's loss targets	<p>The Commission noted.</p> <p>The CEB informed The Commission that the loss targets were not considered in this plan, as the investment required achieving the proposed targets are currently being identified. The Commission will strictly consider this in future generation plans.</p>
	3	Forecasts need to indicate whether they exclude embedded/distributed generation at customer premises	<p>The Commission noted that the set targets under Soorya Bala Sangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.</p>

			Therefore the Commission will strictly consider the comment and incorporate in developing next generation plan.
	4	The time is right to give-up the arbitrarily real discount rate of 10%, and use a more realistic discount rate	Agrees with the Comment. The Commission is considering conducting an independent study to identify more accurate discount rate.
	5	The stability criteria used in assessing the ORE absorption capacity is not stated. Additionally, frequency stability and voltage stability criteria used and test results should be published (Annex 5.4)	The Commission will consider the comment when approving the Long Term Transmission Expansion Plan of the CEB, which will be prepared by CEB based on the approved LCLTGEP 18-37.
	6	Spinning reserve of 5% allowed to account for intermittency is unclear.	The Commission noted.  Additional spinning capacity for renewable energy considered in this plan, (5%) was determined based on the outcome of frequency stability studies in Renewable energy integration study "Integration of Renewable Base Generation in to Sri Lankan Grid 2017-2018"
	7	The LOLP figures in the near term indicate serious reliability problems until 2024.	The Commission noted.  The Commission noted that the LOLP is within the criteria specified in the Planning Code.
	9	Fuel price forecast used for sensitivity analysis are on the high side. World Bank Commodity price forecast predicts lower prices	The Commission noted.  The Commission will consider the comment in approval of future

			generation plans.										
	10	Cost parameters for renewables are not given	<p>The Commission noted.</p> <p>CEB will communicate CEB to indicate the data in future generation plans.</p> <p>Please refer the below table for the cost parameters on renewable.</p> <table> <thead> <tr> <th>Capital cost</th> <th>O&amp;M cost (cost)</th> </tr> </thead> <tbody> <tr> <td>Solar 1400USD/kW- reduce to 900USD/kW by 2025</td> <td>3</td> </tr> <tr> <td>Wind 1525USD/kW</td> <td>1.5</td> </tr> <tr> <td>Bio mass 2067 USD/kW</td> <td>0.7</td> </tr> <tr> <td>Mini hydro 1529 USD/kW</td> <td>4</td> </tr> </tbody> </table>	Capital cost	O&M cost (cost)	Solar 1400USD/kW- reduce to 900USD/kW by 2025	3	Wind 1525USD/kW	1.5	Bio mass 2067 USD/kW	0.7	Mini hydro 1529 USD/kW	4
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	12	It is unclear how information in table 6.1 was used for this study	CEB has used the information in Table 6.1 to depict that the Fuel Diversity and Security targets given under National Energy Policy and strategies-2008 for 2015 were achieved.										

	13	If (policy) scenarios and sensitivity studies were separated out, the comparisons would have been more meaningful.	The Commission noted.  The Commission is in the process of revising the planning code. The Commission has already identified the need to separately indicate policy analysis and sensitivity studies and presentation in matrix form as new additions to the guideline.
	14	It is unclear whether ORE capital costs were added to the NPV derived from the modelling studies	Yes. PV cost of Other Renewable integration (USD million 2004.6 -without externality cost) is included in the plan.
	17	Table 7.14 can be expanded or a new table to be added to specifically show the status and plans of: nearby states in India, India as a whole, Pakistan and Bangladesh.	The Commission noted.  The suggestion will be communicated to CEB to be incorporated in future generation plans.
	18-20	Professional reports are written in the past tense, third person, and passive voice. Terms such as “huge”, “up gradation”, should be avoided in professional reports Power plant types are generally stated as coal-fired, oil-fired, etc	The Commission noted.  The suggestion will be communicated to CEB to be incorporated in future generation plans.

20. Mr. Vidhura Ralapanawa	1	The methodology, assumptions, tools and the approach used in the LTGEP has an explicit bias towards, a. Generation planning with a focus on 'baseload' power, b. favours fossil fuel to the expense of renewable energy, c. Centralised generation and transmission vs distributed generation/storage, d. ignores and externalises environmental concerns, e. ignores the innovation, development and disruption in thesector	<p>The Commission noted.</p> <p>Please note, focus on centralized generation cannot be overcome at once due to the limitations in currently available studies and planning tools.</p> <p>CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in next generation planning. The latest software allows CEB in modelling and optimizing variable renewable energy as well as transmission costs, thus eliminates the bias in present software towards centralized generation.</p>
	3 Base Load Power	Tried to obtain flat demand curve, promoting more coal, with pump storage to support and has ignored increasing renewables with pump storage. Newer approaches look at how one can load in the renewables first, and curtail fossil fuel based power such as coal. This is increasingly happening in countries in Europe (including Germany) and also in India. WASP software is designed to work with baseload power plants	Please refer 1 above.

	4. a	Sri Lanka does not have fossil fuels but has more than sufficient renewable generation it does not make sense to focus on fossil fuel based generation, especially based on their impact on the rupee depreciation	<p>The Commission noted.</p> <p>The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.</p> <p>The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>
	4.b	The plan underestimates the expected cost reductions in renewable technology such as solar and battery storage	<p>The Commission noted.</p> <p>The approved plan has considered capital cost reduction for solar plants only.(initial 1400USD/KW gradually reduced to 900USD/KW by 2025).</p> <p>The Commission will communicate to CEB to consider cost reduction trends of other renewables technologies also in future generation plans</p>
	4. c	It is noted that the renewables are not considered as candidate plants – candidate plants are all fossil fuel based.	<p>The Commission noted.</p> <p>Renewable technologies such as dendro and mini hydro are considered as candidate plants. The software that CEB currently uses to develop LCLTGEP does allow modelling variable renewable sources. Solar and wind are modelled as</p>

			<p>negative demands instead.</p> <p>These issues will be addressed in future generation plans will adaptation of new planning software.</p>
	4.d	State initiatives such as floating solar plants have not made into the generation plan	<p>The Commission noted.</p> <p>The plan identifies solar capacity additions 410 MW by 2020, 685 MW by 2025, 1009 MW by 2030 and 1442 MW by 2037. This includes capacity additions under rooftop solar as well as scattered and utility scale solar developments. It is possible to implement the proposed initiative under these capacity requirements.</p>
	5. a	The model overtly supports centralized generation and transmission. This leads to scenarios such as coal power being generated in three ends of the country , whilst the pumped storage is located at Nuwara Eliya area.	<p>Noted with appreciation.</p> <p>Please refer the Commission's response to item 1 above.</p>
	5. b	The separation of transmission and generation also does not show the true cost	<p>The plan has not considered the cost of transmission lines due to the limitation of the software that used to develop the plan.</p> <p>However, the Commission encourages CEB to adopt best practices in the world to develop the future plans and the issue will be addressed in the future plans.</p>

	5.c	There is no exploration on how total cost can be reduced via a deployment of autonomous loosely coupled mini-grids for example, run on solar plus storage.	<p>The Commission noted.</p> <p>The mentioned technologies have not been considered in the present plan other than pump storage hydro power plants.</p> <p>The Commission takes the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p>
	5 d	It is not clear why storage cannot exist next to the generation plant nor closer to the load center, which would reduce the transmission costs and losses.	Noted. Please note only pump hydro storage option is considered in the plan. The Locations of the plants were selected based on the pre feasibility studies that are available.
	6.a, c	the plan claims that social/environmental costs cannot be determined, hence not used. The plan also does not recognise any impact beyond SO <sub>x</sub> , NO <sub>x</sub> and PM.	<p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka</p>

			to be incorporated in future LCLTGEPs.																											
	6.b	The authors appear to be unclear on emission standards, confusing units.	<p>The Commission noted.</p> <p>Emission standards in mg/Nm<sup>3</sup> is given below.</p> <p style="text-align: center;"><i>Table 9 – Stack Emissions of Technologies</i></p> <table border="1"> <thead> <tr> <th rowspan="2">Technology</th> <th colspan="3">Stack Emissions (mg/Nm<sup>3</sup>)</th> </tr> <tr> <th>SOx</th> <th>NOx</th> <th>PM</th> </tr> </thead> <tbody> <tr> <td>35 MW Gas Turbine (Diesel/NG)</td> <td>49.1/0.0</td> <td>174.0/108.6</td> <td>16.2/0.0</td> </tr> <tr> <td>150 MW LNG Combined Cycle</td> <td>0.0</td> <td>108.6</td> <td>0.0</td> </tr> <tr> <td>300 MW LNG Combined Cycle</td> <td>0.0</td> <td>108.6</td> <td>0.0</td> </tr> <tr> <td>300 MW High Efficient Coal Plant</td> <td>100.0</td> <td>400.0 (without SCR)</td> <td>20.0</td> </tr> <tr> <td>600 MW Super Critical Coal Plant</td> <td>100.0</td> <td>100.0</td> <td>20.0</td> </tr> </tbody> </table>	Technology	Stack Emissions (mg/Nm <sup>3</sup> )			SOx	NOx	PM	35 MW Gas Turbine (Diesel/NG)	49.1/0.0	174.0/108.6	16.2/0.0	150 MW LNG Combined Cycle	0.0	108.6	0.0	300 MW LNG Combined Cycle	0.0	108.6	0.0	300 MW High Efficient Coal Plant	100.0	400.0 (without SCR)	20.0	600 MW Super Critical Coal Plant	100.0	100.0	20.0
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	7	The plan does not address newer approaches of solar integration(Grid integration and defection), smart grids etc.	Please refer 5.c.																											
	8, 9	costs of coal is under-represented in the plan.	<p>The Commission noted.</p> <p>The approved plan considered the average coal price for the year 2016 80.90 USD/MT).</p> <p>Source: Coal price; NEWC as published by Globalcoal.com + (shipping+ insurance and lightering costs) as invoiced by Lanka Coal for the respective period.</p>																											

	10	both global coal demand and production is falling. It is unlikely that low prices will remain in a market that is diminishing both on demand and supply side	The Commission noted.
	11	some of the concerns raised, assumptions released before hand, have been sufficiently addressed, many are left as is.	Due to limitation of time, relevant studies and other resources, only limited number of stakeholder comments on input data were considered in the approved plan.
	12	Although this was requested from previous instances, generation plan does not have a demand curve in 2038.	The Commission noted. The Commission will communicate with CEB to incorporate the comment in future generation plans.
	13	the off-peak generation would be approx 3300MW. This means that coal power plants will have to run at approx 55% of the capacity during the off-peak hours. It is not clear why such a scenario is desirable or needed	The Commission noted.
	14-23	Contrary to the decision by HE the President to not pursue coal power, CEB still has included coal power in the generation plan.	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
	24	Recommendation on renewable planning based on high renewables	The Commission noted. Please provide further details and references for the suggested planning methodology which will be useful for future generation plans.
	25	Battery storage prices are rapidly declining	The Commission will consider incorporating the observation made in future generation plans.

	26	A clear articulation of environmental impact of power plant choices should be used to get to the economic costs of generation.	<p>The Commission noted and incorporated in the approved plan.</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
	28	Accurate landed costs are important to validate and use	<p>The Commission agrees with your observation. The approved LCLTGEP considered average fuel prices of the year 2016 from the sources below;</p> <p>-Coal price (81.0 USD/MT); NEWC as published by Globalcoal.com + (shipping+ insurance and lightering costs) as invoiced by Lanka Coal for the respective period</p> <p>-Oil Price(LSFO:46.5USD/bbl, diesel :</p>

			<p>53.6USD/bbl); Singapore platts + freight and terminal charges from CPC/CPSTL for the respective period</p> <p>-NG price(8.4 USD/MMBtu); 14% of Petroleum Association of Japan, monthly crude oil import cost for the respective period + USD 2.5/MMBtu terminal costs</p> <p>Fuel prices will be approved by the Commission at input data consultation prior to prepare future generation plans.</p>
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21. Mr. Anusha De Silva		Requested referring <a href="https://www.youtube.com/watch?v=OW5K9BTAWTI&amp;feature=youtu.be">https://www.youtube.com/watch?v=OW5K9BTAWTI&amp;feature=youtu.be</a> (solar power based innovative technology)	<p>The Commission noted.</p> <p>The mentioned technologies have not been considered in the present plan other than pump storage hydro power plants.</p> <p>The Commission take the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p>
22. Mr. Dhammika Kulathilaka	1	Solar panel installation would generate energy in day hours. This will reduce the demand to the system in day hours. But it will add up to the peak hours and creating a sharp peak which is very bad from the system perspective Solar installations are useful if they have a battery backup	<p>The Commission noted.</p> <p>Please note that the day peak demand of the system is increasing at a higher rate than the night peak demand according to the proposed plan. It is expected that the day peak will exceed the night peak in the year 2030.</p> <p>Hence, having more solar plants will provide a larger portion of daily energy requirements, whereas hydro plants can be used for night peak.</p> <p>The battery storage option can also be considered as a solution for sharp night peak resulted by solar generation, in future plans with decreasing costs.</p>
	2	Many solar producers are importing panels to the country. No one is looking after the quality of these panels.	Sri Lanka Standards Institute has already issued quality standards on solar panels and controlling the quality of solar panels imported to Sri Lanka.

	3	I propose THE COMMISSION should take more energetic actions to implement the Generation expansion plan.	<p>The Commission noted.</p> <p>The Commission has already to CEB to submit implementation plans for the first 10 years of the approved plan, with millstones.</p> <p>Please note that CEB has already submitted the plans for the base case in the draft plan.</p> <p>The commission expects to monitor the progress regularly against the submitted milestones and take remedial actions if any delays in implementation are observed.</p>
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<p>23. Prof. Praveen Aberatne/ Ms. Kanchana Weerakoon</p>	<p>1, 3</p>	<p>Inadequate planning and reliance for sustainable energy. Not considered solar, wind, OTEC and solar thermal</p>	<p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028". As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	<p>2</p>	<p>There are options such as Ocean Thermal Energy Conversion (OTEC), Trincomalee Koddia bay is identified as a prime location</p>	<p>The Commission noted. The Commission appreciate if you provide further information on Ocean</p>

			Thermal Energy Conversion (OTEC) studies conducted in Sri Lankan context with references which can be incorporated in future generation plans.
	4	Ignored environmental and social damage cost.	<p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>

24. Dr. Lilantha Samaranayeke	1	Given that Sri Lanka is only 65610 sq. km in the extent, we need to consider the scarcity of land especially in the urban areas	<p>The Commission noted.</p> <p>The Commission will consider conducting an independent study in future, regarding land allocation for power projects in long term.</p>
	1 a,b	<p>(a)Using the existing reservoirs of hydro power stations with large surface areas which receive high light intensity during day time</p> <p>(b) Many of the existing reservoirs of hydro power stations have been located in valleys. As a result one can experience very high wind speeds towards the dams of those reservoirs</p>	<p>The Commission noted.</p> <p>The plan identifies addition of 1442MW solar capacity by 2037. The respective methodology in which the solar capacity identified in the plan is developed through a combination of rooftop solar power, scattered solar developments or utility scale solar parks which will be decided by joint collaboration of MOPRE, SEA and CEB.</p> <p>(b)We appreciate if you would provide further information on suggestion (b) with references.</p>
	2	In the Plan, the Nuclear power option has been delayed until 2030. I do not see a valid logic behind this decision.	<p>The Commission noted.</p> <p>Nuclear power is considered only as a potential thermal generation option in the study. However, base case plan or the approved plan does not include any nuclear power plants.</p> <p>The decision to proceed with nuclear power plants, will depend on the government policy on Nuclear based generation.</p>

	3. a	Proper disposal mechanisms and destinations for thrown out solar panels will have to be planned now	<p>The Commission noted.</p> <p>The plan has not considered the disposal Requirements of solar plants.</p> <p>The Commission will communicate with SEA and CEA to further study the requirement of a disposal mechanism for solar plants</p>
	3.b	<p>Rooftop PVs and other grid connected power producing options directly contribute to instability of the grid. Two options to mitigate this problem:</p> <p>Locate large capacity power plants such as coal or nuclear in the North and East and maintain stability</p> <p>Add proper communication networks between all power producing stations and create a Smart Grid</p>	<p>The Commission noted.</p> <p>The approved plan includes large scale power plants that improves grid stability.</p> <p>Smart Grid technology was not considered in the present plan. The Commission take the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p>

<p>25. Mr. Mayura Botheju</p>	<p>1</p>	<p>a) imported fuel undermines energy security; b) exposes the nation to effects of fuel price and currency risk; and, c) is harmful to the environment.</p>	<p>The Commission noted.</p> <p>The impact of fuel price variations and currency risk is not considered in the approved plan. The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p> <p>The approved plan considered the cost of damage to the environment. Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p>
	<p>2,5,7,8</p>	<p>Renewable energy resources strongly favored due to the factors such as energy security and environmental and social concerns and the fact that these RE plants attract badly needed private sector investments and create skilled employment opportunities throughout the land</p>	<p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of</p>

			<p>“Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	3,4,6	<p>changes to the electrical power industry are taking place as a result of technological advances with advanced forecasting, smart networks, battery storage systems and dispatch capability that are leading to development of utility scale hybrid power generation, distributed generation and micro grids.</p>	<p>The Commission noted.</p> <p>The mentioned technologies have not been considered in the present plan other than pump storage hydro power plants.</p> <p>The Commission takes the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p>
	9	<p>The curtailment is planned to accommodate the coal power dispatch. This reflects flawed thinking. Nowhere in the world a wind power plant curtailed to accommodate the output from a fossil fueled plant!</p>	<p>The Commission appreciates these observations.</p> <p>Approved plan will include only least cost plants. LNG plants will provide additional flexibility of operating in lower capacity factor and hence, will reduce the requirements for renewable curtailments, compared to coal plants.</p>

			However, when intermittent generation capacity is high, in certain instances it is required to limit the power output of intermittent sources to avoid overloading of the Transmission System. This is an accepted international practice. However, agreements with the power producers and CEB, including terms for procedures and compensation for curtailments will be established prior to exercising any curtailment rights.
	10,11	GOSL must reach out the international agencies and advanced nations to highlight the ambitious green power agenda for Sri Lanka. “Unbundling” the CEB (generation, transmission and distribution) will be essential to facilitate the rapid evolution of a modern and “green” power system in Sri Lanka	The Commission noted.
26. SLYCAN Trust	1	The term Intended Nationally Determined Contributions (INDCs) need to be changed to Nationally Determined Contributions (NDCs)	The Commission noted.  The plan has used both terms INDCs and NDCs to describe the development of INDCs to NDCs after ratification.
	2,3,4, 5, 8	The LTGEP needs to align with the NDC commitments The LTGEP needs to be in line with the National Energy Policy developed by the Ministry of Power Coal power plant development mentioned in the LTGEP contradicts several national commitments and the targets mentioned in the national policy Sri Lanka has committed in international for a as going to zero emissions by 2050, as indicated by	The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.  The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya),

		<p>the government policies, presidential manifesto among others. Renewable energy development needs to be implemented in a timely manner,</p>	<p>as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	6	<p>Only focuses on the economic costs of energy development and ignores non-economic factors such as the environmental and social impacts.</p>	<p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission is of the view that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this</p>

			<p>point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
	7	<p>Price of energy sources are measured using USD and does not account for the declining value of the Sri Lankan rupee</p>	<p>The Commission noted.</p> <p>The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.</p> <p>The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>

27. Atomic Energy Board		Present progress of nuclear power development in Sri Lanka and future millstones	The Commission noted.
28. Mr. Bandula Unamboowa		Solar Panels should be import, government to government basis. Due to this reason , panels can be given to the consumers very reasonable cost. Half of the cost of panels should be recovered from the consumers through the long term installment scheme. Introduce this Panels with extra capacity, there for the consumers get extra income out of this	The Commission noted.  Please note that the CEB and LECO have been already in the process of providing concessionary loans for rooftop solar installation. The Commission has issued a directive to CEB, to provide grid connections to rooftop solar in 2 weeks and also the exempted solar rooftop consumers from requiring licensees for selling electricity.
29. Mr. gayan Heenatiyana	Request I	To refrain entertaining the lucrative enforce of the businessmen specially the renewable power developers who have dealt with The Commission to higher their tariff	The Commission noted.  The LCLTGEP required to adhere to the government policy and the planning code. The Commission is authorized to approve or disapprove the LCLTGEP after considering the adherence to the government policy and planning code.
	Request II	I appeal from The Commission that do not try to stop the ongoing projects whether it is Coal or LNG.	The Commission noted.  The Commission has not or will not interfere in stopping any ongoing project but is encouraging the licensee for fast implementation.
	Request III	The combination of Coal and LNG is found to be much practical in the report and I request to explore the Natural Gas resource in Mannar and establish Gas terminal at Colombo.	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost

			principals were approved.  The Commission will encourage CEB to consider availability of domestic natural gas for future generation plans.
	Request IV	Increase the Coal Power plants more and put extra LNG power plant to Colombo	The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
30. Mr. W A D R Jayawardene	1	Stop the ongoing massive scale LNG projects and remain Coal contribution at least 35% from total production until 2037 by increasing the Coal plants, -considering low cost and reliability of coal. Balance between ecology and economic can be obtained with better technology. -LNG is highly combustible, mishandling can lead to bad explosions -lifetime effect of gas mining to the final use, it may well be a lot more harmful to Mother Nature than oil	The Commission noted.  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
	2	The main disadvantages of Solar and wind are uncertainty, low power quality, low reliability and high investment	LCLTGEP required to adhere to the government policy, as well as commitments under Paris agreement on climate Change.  CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028", which has considered the mentioned technical limitations. As per

			the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.
31. Mr. K.Gnanalingam	Coal plant capital cost	If someone works the actual cost to the country its capital cost of Coal cannot be anything less than \$3500/kW of installed power which will just result in this to be the costliest plant	The Commission noted.  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
	Training for new coal plant staff	If the new plant is to come, our staff get a proper training if not we will end up with the sarow experience with the Norochcholai plant taking place.	The Commission noted. Training and development is conducted by the licensee which the Commission also encourages .
	Renewables	Wind Solar Biomass and Wave energy which now seems to be systematically rejected by CEB and they seem to delay grid connection of such projects against the government policy being unable to find solutions to the problem of intermittency of the renewables.	The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.  The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.

			<p>CEB has projected Other Renewable Energy (ORE) according to the study of “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”.</p> <p>As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p>
	Storage technologies	With Battery costs falling fast down the plan must have a good policy to promote behind the meter storage as well as grid storage at different levels	<p>The Commission noted.</p> <p>The approved plan has only considered the pump storage technology. The Commission takes the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p>
	Studies on Smart Grid	There must be full-time staff studying the implementation of a SMART grid that is suitable to our conditions and leaves the renewable projects for private investment if CEB is unable to generate enough funds for such projects.	<p>The Commission noted.</p> <p>Smart Grid technology has not been considered in the present plan other than pump storage hydro power plants.</p> <p>The Commission takes the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future</p>

			generation plans.
32. S Karunadasa		Proposal for a new technology to extract wind power	The Commission appreciate your submission. The proposed technology is not considered in the approved plan, as sufficient information regarding the technology is not available.
33. Brightstar		Proposal to supply LNG	The Commission noted.  The proposal is not considered in the approved plan, as this has no direct relevance to the approval process of the plan.
34. SEMA		this plan proposes to increase coal contribution while reducing ORE contribution, this is totally against the national policies, cabinet decisions, etc	The Commission noted.  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
		economic costs shall include externalities and other benefits, CEB has not included any of them.	The approved LCLTGEP 2018 -37 considered the externality costs.  Reference for costs of externalities: The Case of RCREEE Member States September 2013.  The Commission will discuss with the CEB to develop studies to identify values

			that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.
		does not identify the policy cost , if any	The Commission noted.  The observation will be considered in approving the planning code. Future generation plans will be prepared based on the revised planning code.
		WASP is not suitable to analyse new ORE and hence outdated	The Commission agrees that the present planning software has its own limitations on modelling renewable energy and transmission costs.  CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in next generation planning. The latest software allows CEB in modelling variable renewable energy as well as transmission costs.  The Commission encourages the licensee to adopt and use the best practices in the world to develop the future LCLTGEPs.
		CEB is not the ideal entity to make the plan	The Commission noted.  Please note, according to Section 43 of the Sri Lanka Electricity Act, LCLTGEP is required to be prepared by the Transmission Licensee, Ceylon Electricity Board.

35. Mr. Chula De Silva	1: DSM	It is important to develop clear policy guideline on Demand Side Management programme and ensuring implementation through the appointed Presidential Task Force by Sustainable Energy Authority with the active participation of CEB and other relevant institutions.	<p>The Commission noted.</p> <p>The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.</p> <p>The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.</p>
	2: ORE cost	Plan has considered increased renewables share. The additional Present Value cost 153 USD million ( LKR Million 24,000 in today's terms) for ORE integration is an incremental cost to the economy. The question remains who shall pay this additional cost?	In line with the provision of the Sri Lanka Electricity Act, the Government has the power to decide on the compensation if relevant.
	3: Solar PV	It is important to carry out a comprehensive analysis on the technical limitations which restricts Solar PV additions to the system and identify possible solutions such as energy storage systems using our existing hydro reservoirs.	<p>The Commission noted.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028".</p> <p>In the integration study for the next planning cycle, the future targets would be reviewed considering the implementation of major thermal power plants and with advancements of technologies</p>

	4: LNG Plants	Action plan is required to to develop LNG infrastructure and a LNG procurement process for the timely implementation of the proposed power plants.	<p>The Commission noted.</p> <p>The government has appointed a committee under the Ministry of Petroleum Resources Development for development of LNG infrastructure. The action plan is currently being prepared.</p>
	5:Environmental Considerations of the Plan	Recommended to develop a proper mechanism to monitor and mitigate the environmental implications from all the power plants. Also recommends CEB publishing the environmental parameters on a periodic basis	<p>The Commission noted.</p> <p>The Commission has already developed a mechanism to monitor environmental implication from thermal power plants has already issued templates to obtain emission data from Thermal plants on regular basis. These information will be disclosed to the general public.</p>
	6: Scenrios	The IESL would like to draw attention to the importance of determining the optimum energy mix for the country for the planning horizon giving due consideration to the world trends and not burdening the economy and the consumer with high electricity prices.	<p>The Commission noted.</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.</p>
	7: Plant implementation	The CEB, SEA, Ministry of Power and Energy should collectively ensure the timely implementation of the proposed power plants with the backing of firm government decisions	<p>The Commission noted.</p> <p>The Commission will communicate to CEB to submit implementation plans for the first 10 years of the approved plan, with millstones.</p> <p>Please note that CEB has already submitted the plans for the base case in the draft plan.</p>

			The commission expects to monitor the progress regularly against the submitted milestones and take remedial actions if any delays in implementation are observed.
36. Mr. E M Piyasena		When number of coal plants increases the outage of these plant will also increases for statutory maintenance etc. and couple of plant may be remained shut down always. Have you considered this situation?	Noted with appreciation. Scheduled annual maintenance and forced outage rates of plants are considered in the plan. Please refer data sheets given in Annex 4.1
		Alternatives such as charging vehicle batteries could be considered instead of pump storage plant	Noted with appreciation. Such technologies are not considered in the present plan. The Commission take the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.
		World market prices of LPG also competitive with LNG presently. Should be taken attention in this respect as well.	Noted. Approved plan has not considered LPG as a fuel option. The Commission will further study the comment and based on this take the required action to consider this in future generation plans.
		Energy conservation and demand side management	The Commission noted.  The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.

			The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.
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## Comments on Input Data

Commenter	Comment Reference	Summarized Comment	Response of the Commission
1. Dr. Tilak Siyambalapitiya	2. Base demand forecast	Clear indication of column headings is required, such as: Sales, loss (as a % of net generation), Net generation, Peak demand (net generation). A schematic diagram would be useful to show the boundaries, and to improve understanding, especially in a situation where power plant auxiliary power as a % of gross generation is increasing	Noted. The suggestion will be forwarded to CEB to be considered in preparing future generation plans.
		Loss (as a % of net generation) does not match with the loss targets issued by THE COMMISSION. CEB has not given any justification for losses to be held in the range of 9% to 10% throughout the planning window.	Noted. The suggestion will be forwarded to CEB to be considered in preparing future generation plans
		Is the increasing load factor 2015: 65% (actual), 2017: 67% (forecast), 2042: 72% (forecast), supported by the underlying sales growth to each customer category?	Yes. The commiison noted that the increasing load factor is supported by projections of night peak, day peak and offpeak for all customer demand, analysed based on past trends.
	3,4,5. Existing, committed and candidate thermal power	Clear identification on whether the figures given are gross or net, is required.	Noted with appreciation. The suggestion will be forwarded to CEB to be considered in preparing future generation plans

	plants, Annex 1 and 2		
	6. Fuel prices	"delivered at power plant" is exorbitantly high, for base case. Suggest use border prices, as reflected in the international prices.	Noted the comment. The approved plan considered the 'delivered at power plant' cost of fuel. Since, the plan should be based on economic costs, the Commission is of the view that it is required to consider 'delivered at power plant cost', in order to identify total economic cost.
		On all matters related to fuel and efficiency, heat rate, the basis "net or gross", and the basis of heat rate, heat content, etc. "LHV or HHV" should be stated. Fuel costs to be used for nuclear power is not stated.	Noted with appreciation. The suggestion will be forwarded to CEB to be considered in preparing future generation plans
		Terminal fee for R-LNG: is it assumed or calculated	The terminal cost is based on the study 'Energy Diversification Enhancement Project Phase IIA Feasibility Study for Introducing LNG to Sri Lanka'.
2. Mr. Gayan Heenatiyana		Please revert with your side to the fact that, is this the Least Cost Plan or just the Generation Expansion plan?	The plan is based on the least economic cost. In addition the plan has to comply with government policies and the planning code.
		Grid code require revising	Noted  The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.  The future generation plans would be prepared adhering to the new planning code.

		Your ideas in LNG development in the country	With the world trends it is important to consider NG fired power plants as candidate plant. Further, it is important as Sri Lanka has potential NG resources, as this provides energy security and less currency risk compared to foreign fuel fired plants. Further, with latest fuel prices and comparatively lower damage to the environment and society, LNG fired power plants have become price competitive with other conventional technologies.
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<p>3. Mr. Gamini S</p>		<p>In the newspaper "Hindu" that India had signed up for the delivery of electricity with a Chinese company and/or the Chinese Government amounting to the equivalent of a plant capacity of 200 000 MW.          -THE COMMISSION to contact the relevant authorities and the Hindu newspaper and find out whether SL could also get some of this electricity at a reasonable price          -It is also interesting to know that ABB in Sweden had got a order for some 2500 Km of special undersea cable of 1,000 000 volts DC capacity which should be delivered soon.</p>	<p>Noted.</p> <p>The Governments of India and Sri Lanka signed a Memorandum of Understanding (MOU) in 2010 to conduct a feasibility study on inter-connection of the electricity grids of the two countries.</p> <p>This feasibility study was carried by CEB jointly with Power Grid Corporation Indian Limited (POWERGRID) with the main objective to provide the necessary recommendations for implementation of the 1000MW HVDC interconnection project.</p> <p>However, this scenario was not considered in the present generation plan as the change in power systems are yet to study.</p> <p>This scenario can be incorporated into future plans, once the feasibility of such option is identified in the updated studies.</p>
<p>4. Mr. Clifford Regis</p>		<p>more attention should be given to the renewable energy sources          -if it is possible to mass produce solar panals domestically and distribute among all household units at a affordable price          -Also, banning low efficient electronic devised would also help in the energy saving side</p>	<p>Noted.</p> <p>CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028". As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy share) and continued throughout the planning horizon.</p> <p>Sustainable Energy Authority is already conducting programmes, such as energy star programme to promote energy efficient devices</p>

5. Dr.U.Pethiyagoda	i,iii, iv	Employ the net-metering system to enable small and medium generators to feed Into the national grid. -Support rooftop solar panel installations. -Considering the present prohibitive costs for (iii) above, launch a generous Subsidy Scheme.	Net metering scheme is already available in Sri Lanka and was promoted with the recent Surya Bala Sangramaya programme, which introduced additional two schemes, Net-Plus and Net-Accounting. Please note that the CEB and LECO have been already in the process of providing concessionary loans for rooftop solar installation. The Commission has issued a directive to CEB, to provide grid connections to rooftop solar in 2 weeks and also the exempted solar rooftop consumers from requiring licensees for selling electricity.
	ii	Encourage medium level operators to engage in biofuel, mini-hydro, wind and solar.	Noted. The Commission, MoPRE, SEA and CEB has already taken a number of actions encourage medium level private sector participation in developing NCRE.
6. Dr. Anil Cabraal	1.4.3	Plan does not account for cost of over building based on overly optimistic electricity demand growth.	Noted. Plan includes scenario analysis for different demand growth rates (scenarios for 1% increase and 1% decrease od demand growth)
	1.4.5	Consideration of environmental damage costs -Benefit transfer method not suitable	The Commission has noted the comment and has responded, under your comments for the draft plan, indicated at the beginning of this document.

		<p>-damage costs due to pollutant other than gases</p> <p>-Compliance with Paris Agreement on Climate Change</p> <p>-Location specific costs (Recommended reference: <a href="https://www.czp.cuni.cz/czp/images/stories/Vystupy/Seminare/2005%20LS%20Ocenovani%20ZP/longo_methods.pdf">https://www.czp.cuni.cz/czp/images/stories/Vystupy/Seminare/2005%20LS%20Ocenovani%20ZP/longo_methods.pdf</a>)</p>	
		Economic costs, DSM investments, Other renewable energy, coal jetty costs etc. are required to consider	Noted and responded above.
	2 Demand Forecast		
	1	Overestimated demand in past	Noted and responded above.
	2	Central Bank advice on demand forecast	Noted and responded above.
		Verify whether increase in consumers rather than GDP growth is a more relevant indicator to obtain a better forecast of electricity demand growth.	Noted and responded above.

		Targets under Surya Bala Sangramaya	Noted and responded above.
		Did CEB account for the reduction in day time peak load due to Surya Bala Sangramaya (roof-top plus 60x1 MW solar) plus larger solar parks including the several 10 MW parks and the proposed 100 MW solar park	Yes. Day peak reduction due to planned solar additions is considered in the plan. Demand forecast in Table 3.3 is without considering Other renewable energy as negative demand. Final demand forecast for WASP software modelling is derived by deducting projected solar and wind profiles (refer annexes 5.5 and 5.6) from the projected demand curves (30 mins).
		Off peak demand growth assumptions	CEB has assumed current off peak demand (45%) is estimated to grow to 55% by 2037
	5: candidate Plants		
	1	no information provided on pumped storage	Given in Section 5.4 of the plan
	2	NCRE plants	Given in Section 5.5 of the plan
	3	Cost of NCRE development required to be considered in the plan	Cost of development of Other Renewables is considered in the plan
	6	Fuel Prices 6.1: LNG fuel price data needs to be verified. 6.2: LNG price assumptions should be reviewed and the price appropriate to a government-to-government	The Commission agrees with your observation. The approved LCLTGE considered average LNG prices of the year 2016 from the source below; -NG price(8.4 USD/MMBtu); 14% of Petroleum Association of Japan, monthly crude oil import cost for the respective period + USD 2.5/MMBtu terminal costs

		agreement should be used.	Fuel prices will be approved by the Commission at input data consultation prior to prepare future generation plans.
	6.3	Variability of fossil fuel prices is a major risk factor. Uncertainty of fuel prices	The Commission noted.  The plan conducts scenario analysis based on different fuel price forecasts and price variations to mitigate the uncertainty.
	8: Renewable Integration		
	1	Modelling solar based on data at two sites is not adequate. I recommend CEB obtain more site-specific data, for example using SolarGIS1 (available free through the World Bank)	Noted and responded above.
	2	using benchmark cost data that India Central Electricity Regulatory Commission (CERC) has issued and make some adjustments for Sri Lanka (perhaps 20% higher?). The document can be found at <a href="http://www.cercind.gov.in/2016/orders/SO17.pdf">http://www.cercind.gov.in/2016/orders/SO17.pdf</a> .  For data on capital, O&M, economic life, performance parameter, fuel costs, heat rates etc. <a href="http://cercind.gov.in/2016/orders/sm_3.pdf">http://cercind.gov.in/2016/orders/sm_3.pdf</a> .	Noted and responded above.

	3	Information on solar and wind cost reduction trends are important. This can be obtained from IRENA, Power to Change: Solar and Wind Cost Reduction Potential to 2025. See: <a href="http://www.irena.org/DocumentDownloads/Publications/IRENA_Power_to_Change_2016.pdf">http://www.irena.org/DocumentDownloads/Publications/IRENA_Power_to_Change_2016.pdf</a> .	Noted and responded above.
	4	Utility-scale batteries should be considered. A good source of information is IRENA, Battery Storage for Renewables: Market Status and Technology Outlook, <a href="http://www.irena.org/documentdownloads/publications/irena_battery_storage_report_2015.pdf">http://www.irena.org/documentdownloads/publications/irena_battery_storage_report_2015.pdf</a> , and Bloomberg New Energy Finance, Global Energy Storage Forecast 2016-24.	Noted and responded above.
	5	There is no information on biomass fuel costs.	Please refer Fuel Requirement and Expenditure on Fuel given in Annex 7.5
	6	Capacity credit should be given to renewables. -Sugget approach proposed by Peter Meier in his review of the LCLTGEP 2015-34	The Commission Noted. The Commission will further study the method proposed in A Review of the CEB 2015-2034 Long Term Generation Expansion Plan by Peter Meier and communicate with CEB to incorporate the method in next generation plan.

	9. Renewable Energy Integration	the Base Case must include effects of key government policies including renewable energy commitment, the CEB expectation that NCRE generation will reach 17% of total generation by 2019, Paris Climate Agreement commitment, and approved initiatives such as Surya Bala Sangramaya, DSM Action Plan, CEB program for catalyzing LED lighting, and the solar farms and wind parks.	Noted and responded above.
	10. Sensitivity Studies and Scenario Analysis	CEB should distinguish between Investment Strategies and Scenario Analyses	Noted and responded above

7. Environmental Foundation Limited	1	<p>Complete disregard of environmental damage cost from Input Parameters under Economic Aspects</p> <p>1.1 – Environmental pollution</p> <p>1.2 – Site selection and land use cost</p> <p>1.3 – Further research and studies/EIAs</p> <p>1.4 – Post monitoring as specified in EIAs</p> <p>2: Lack of an explanation for 'social damage cost</p> <p>3:General inadequacy of a wider scope and holistic approach in defining social and environmental implications</p>	<p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
8. Renewable Energy Developers Association (REDA)	1	Identify how much of solar, wind& dendro plants of “1 to 5 Megawatts” or “1 to 10 Megawatts”, that will be spread out throughout the country can be added to the existing Grid.	<p>Noted.</p> <p>Other renewable energy share is projected based on the study “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”. As per this study optimum ORE capacity is integrated in to the system up to 2028.</p>
	1.1	Mini Hydro Power is here to stay and should be expanded and encouraged so long as it is regulated.	Minihydro expansion is limited by the availability of potential sites. However, plan has identified 200MW new minihydro plants additions during the planing period

	1.3	<p>We do not support the concept of Large Scale Solar Parks of 100 Megawatts</p> <ul style="list-style-type: none"> <li>-damage to vegetations, plants and animals</li> <li>-Cost on land acquisition</li> </ul>	<p>Noted.</p> <p>The Commission will communicate with Central Environmental Authority (CEA) and SEA to ensure required EIA is conducted prior to implementation of other renewable plants and also to ensure post monitoring requirements in the EIA are met during the operation of the plant.</p>
	1.2	<p>Our concept is to focus on our present Grid. How much of</p> <ul style="list-style-type: none"> <li>I) Solar Power</li> <li>II) Wind Power</li> <li>III) Dendro Power</li> </ul> <p>Once the mix of the power, our Grid can absorb is determined, the expansion plans will be made easier and more cost effective.</p> <p>The Renewable Energy Developers Association proposes that an in-depth Independent Study be undertaken every two years focused on the Island wide Grid absorption of Renewable Energy.</p> <p>A comprehensive study with the focus on the absorption of Renewable Energy to our Grid Island wide has never been undertaken. Without this study our future plans will be sans new technology and will not be in keeping with our National goals in renewable Energy.</p>	<p>Noted.</p> <p>The CEB has conducted the study “Integration of Renewable Based generation into Sri Lankan Grid 2017-2028”, to identify grid absorption capacities of Non conventional Renewable Energy. The Commission will inform if any requirement for further studies are identified.</p>

9. Mr. Nimal Liyanage		THE COMMISSION need to provide other financial parameter such as inflation, electricity price escalation, and the exchange rate projection	<p>The Commission agrees. The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.</p> <p>The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>
		high risk options as nuclear power should not become part of the agenda.	<p>Noted.</p> <p>Nuclear power is considered only as a potential thermal generation option in the study. However, base case plan or the approved plan does not include any nuclear power plants.</p>
		<p>The existing electricity generation plan for the future is based on absolute uncertainties. In contrast, in the case of renewable technologies there is much certainties in the first cost and in the operations.</p> <ul style="list-style-type: none"> <li>• New electricity generation should be done to a significant extent using renewable technologies solar, dendro, and wind.</li> <li>• consider Li-ion or other deep cycle battery storage firstly for peak shaving</li> <li>• Storage losses will need to be considered in all cases as in pump storage</li> </ul>	<p>Noted.</p> <p>The Commission has noted that the total renewable energy share of approved plan (including large hydro) is expected to be within 35 percent to 50 percent (depending on hydro condition) during the planning period of 2018-2037.</p> <p>The Commission has also noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational and economic constraints.</p> <p>Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.</p> <p>Other storage technologies have not been considered in the present plan other than pump</p>

			<p>storage hydro power plants. The Commission take the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.</p> <p>The Commision agrees with your comment regarding storage losses.</p>
		<p>Environmental damage to flora, fauna, land degradation, addiction to cheap fossil fuel based electricity, damage to other income earning established industry such as tourism and the resultant societal damage</p>	<p>Noted</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>The Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>

		<ul style="list-style-type: none"> <li>• A public consultation briefing needs provide references to the latest official policy position papers of government including the Soorya Bala-Sangraamya and other renewables initiatives.</li> <li>• The Policy Guidelines issued by THE COMMISSION in 2009 are seven years old, and needs to be validated with new data and current information prior to a consultation process.</li> <li>• The scenarios selected for analysis will need to be expanded from the current total technical outlook. It needs to take account of societal dynamics and macroeconomics, and the geopolitical issues in the region.</li> </ul>	<p>The Commiison will consider issuing a briefing outlining latest policies, prior to future public consultations.</p> <p>National Energy Policy is currently being revised. The Commission will revise the Policy Guidelines issued by the Commission according to the revised National Policy.</p> <p>Noted the comment on scenario analysis. The Commisison will further study how the mentioned aspects such as societal dynamics and macroeconomics, and the geopolitical issues in the region to be incorporated in scenario analysis and communicate with the CEB.</p>
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10. SC	1	Imported CIF price as at reference date (January 1, 2017) should be set as 93.73 USD/MT and 88.41 USD/MT for Coal 6,3000 kCal/kg and 5,900 kCal/kg respectively	<p>The Commission agrees with your observation. The approved LCLTGEP considered average fuel prices of the year 2016 from the sources below;</p> <ul style="list-style-type: none"> <li>-Coal price (81.0 USD/MT); NEWC as published by Globalcoal.com + (shipping+ insurance and lightering costs) as invoiced by Lanka Coal for the respective period</li> <li>-Oil Price(LSFO:46.5USD/bbl, diesel : 53.6USD/bbl); Singapore platts + freight and terminal charges from CPC/CPSTL for the respective period</li> <li>-NG price(8.4 USD/MMBtu); 14% of Petroleum Association of Japan, monthly crude oil import cost for the respective period + USD 2.5/MMBtu terminal costs</li> </ul> <p>Fuel prices will be approved by the Commission at input data consultation prior to prepare future generation plans.</p>
	2	LNG CIF price should be set as 6.53 USD/MMBtu (14% of USD 46.67)	Please refer response to the previos comment.

11. Mr. Vidura Ralapanawa		The planning methodology seems to be structured around centralized fossil fuel generation. It is urged that THE COMMISSION plan a process which looks at the longterm objectives of the grid including energy security, energy self-sufficiency, environmental protection and public acceptability etc.	<p>Please note, focus on centralized generation cannot be overcome at once due to the limitations in currently available studies and planning tools.</p> <p>CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in the next generation planning. The latest software allows CEB in modelling and optimizing variable renewable energy as well as transmission costs, thus eliminates the bias in present software towards centralized generation</p>
	Exchange Rate		
	1 to 4	Using constant exchange rate makes the study findings unreliable and artificially biased against renewables	<p>The Commission agrees. The approved plan has not considered the impact of rupee depreciation due to limitation of time as it requires lengthy studies.</p> <p>The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code.</p> <p>The future generation plans would be prepared adhering to the new planning code.</p>
	Social Damage Costs		

	5to 10	<p>CEB should be declaring the specific figures they are planning to use, the rationale of the same, the underpinning studies, for estimating social damage cost -calculations should be location specific for major power plants</p> <p>-The numbers used by CEB LCLTGEP15-34 are full of methodological issues such as</p> <p>(a) ignoring damages to water withdrawal, thermal pollution of ocean, heavy metal pollution, Mercury pollution of both water and air, ash disposal, coal spillage etc</p> <p>(b) Failure to include all impacts even on identified pollutants.</p> <p>(c) No real assessment of damages outside the limited morbidity/mortality costs</p> <p>(d) Pollution in Norachcholai that is not identified in previous studies</p> <p>-Benefit transfer method is not suitable</p>	<p>Noted the comments.</p> <p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
	Base Demand Forecast		
	11	The assumptions underlying the demand growth has not been declared	Given in Chapter 3 of the plan

	12	It is important to see not just total demand and peak, but also the daytime and offpeak. The generation options (and storage) should be decided based not only the peak demand and total consumption, but the full load pattern	The Commission agrees. Off peak at present (45% of the peak) expected to grow to 55% of the peak in 2037.
	13	The table says that day peak will exceed night peak from 2030, but the basis of this is not given	Noted. This is based on the analysis of past trends of night peak, day peak and off peak, each, where all three show increasing trends and the rate of increase in day peak is higher than the others.
	DSM initiatives	Initiative for 1 million LED lamps Efficient HVDC systems in new buildings	The Commission noted that this initiative has not been considered. The Commission noted that the demand reduction targets based on such initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.  The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.
	Renewables	Renewable energy through Surya Bala Sanramaya	The Commission noted that the set targets under Soorya Bala Sangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.

	Existing and Committed Thermal plants		
	19	It is unreasonable to assume operation of Nothern Power, until 2020, which is not operating now on a court order.	Noted.  The plant operation is currently halted, pending a decision from the courts. Hence, the plant capacity is not excluded from the plan.
	20	Accurate costs for duel fuel plants should be considered, based on the timelines	Agrees.  The duel fuel plants are modelled operation with oil until 2020 (2023 for Sojitz Kalanithissa) and after that with R-LNG
	21	Decommissioning dates for 170 MW furnace oil plants.	The Commission noted that the availability of 170 MW plants are assumed until the end of the planning period.
	Candidate Plants		
	22,23	In the annex 2, the first four entries of gas turbines and combined cycle plants are listed as Diesel powered, while two other combined cycle power plants are listed with fuel as NG. If Gas is available for 2 plants, it is unclear why it is unavailable for the other 4.	Noted.  Both Diesel fired and Gas fired plants are identified as candidate plants. The least cost plants will be selected to the plan out of the candidate plants, subject to other constraints.
	24	With clear government declaration against coal, it is unclear why they are used as candidate power plants.	Noted  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.

	Storage plants		
	25	The document lists 3x200 MW pumped storage plants. It is not clear why this is specified.	Noted. The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.  This does not include pump storage plants.
	26	If the storage plant is used to store excess energy during peak from coal, then the cost of the storage power plant must be added to coal power plant cost	Please refer commnet 25.
	27,28	Why battery storage is not considered.	Noted  Approved plan has not considered battery storage option.  The Commission take the observation into very serious consideration and discuss with CEB on how to incorporate the developing technologies in future generation plans.
	Renewable Energy		
	29	The prices used for renewables, especially for solar is out of date.	Noted. The approved plan is based on the same renewable prices. The Commisiosn will consider this comment in approval of the future generation plans.
	30	The fact that the plan attempts to use a price without the sizing is not warranted.	Agrees. The approved plan has not considered variation in renewable prices based on plant sizes. The Commisiosn will consider this comment in

			approval of the future generation plans.
	Fuel Prices		
		<p>Coal Prices</p> <ul style="list-style-type: none"> <li>• For coal, the assumptions state that the CIF price is used as USD 72.9 and 66.8 per MT. However, the source for such pricing is not provided.</li> <li>• The Newcastle Index (FOB) is 83.73 for Dec 2016, and would come upto 93.73 including USD 10 for freight and insurance. The South African coal price (where we currently buy from) for February 2016 is 83.69 and the Australian price for the same month is 86.31. Thus the figures used by CEB is not justifiable.</li> </ul>	<p>Noted.</p> <p>The Commission agrees with your observation. The approved LCLTGEP considered average fuel prices of the year 2016 from the sources below;</p> <ul style="list-style-type: none"> <li>-Coal price (81.0 USD/MT); NEWC as published by Globalcoal.com + (shipping+ insurance and lightering costs) as invoiced by Lanka Coal for the respective period</li> <li>-Oil Price(LSFO:46.5USD/bbl, diesel : 53.6USD/bbl); Singapore platts + freight and terminal charges from CPC/CPSTL for the respective period</li> <li>-NG price(8.4 USD/MMBtu); 14% of Petroleum Association of Japan, monthly crude oil import cost for the respective period + USD 2.5/MMBtu terminal costs</li> </ul> <p>Fuel prices will be approved by the Commission at input data consultation prior to prepare future generation plans.</p>
		<p>LNG Prices</p> <ul style="list-style-type: none"> <li>• For LNG, the assumption uses 14% of JCC (Japan Crude Cocktail) Price. However, the JCC in December 2016 was USD 46.67 thus the LNG price should be USD 6.53 and NOT the value USD 7.5/MMBTU used.</li> </ul>	<p>Please refer the Commission response to the previous comment.</p>

		<ul style="list-style-type: none"> <li>• It is not clear why CEB uses the JCC index. Japan LNG price has always been higher than all other LNG prices, so there is no justification on using the same. (Singapore is fast emerging as a LNG hub, and Platts has much lower prices than Japan. Both India and Pakistan both have long term contracts with Qatar at around USD 6 per MMBTU.)</li> <li>• CEB should obtain LNG prices from PRDS based on the “delivered at pipe cost”, as this will be the operative price for power plants in Sri Lanka</li> </ul>	
	Power Plant Costs		
		How coal jetty cost is considered	The approved LCLTGEP 2018-37 has considered the costs of coal harbour, jetty and coal transport infrastructure in the decision given.
		The costs given for NG power plants is 1114/kW and for coal 1786/kW and 1916/kW. If one uses WEIO PG Assumptions ( <a href="http://www.worldenergyoutlook.org/weomodel/investmentcosts/">http://www.worldenergyoutlook.org/weomodel/investmentcosts/</a> ) the most expensive LNG power plant cost is in Japan and is 1100/kW. The appropriate costs for coal (Japan costs) is 2100/kW for subcritical and 2400/kW for supercritical. why it uses the most expensive LNG	Noted the observations. The capital costs used for the study are based updated thermal plant cost database, revised during the Project on Electricity Sector Master Plan Study in Democratic Socialist Republic of Sri Lanka 2016.

		plant and not selecting the most expensive coal power plant.	
		CEB has been claiming that it wants to install 'clean coal technology', which in industry parlance means coal power plant with carbon capture and sequestration (CCS). A coal power plant with CCS costs USD 5900/kW.	
		The timeframe used by CEB for coal power plant construction (4 years) is infeasible	Noted the comment.
12. Mr. Parakrama Jayasinghe		Permit more flexibility in the planning process not rigidly adhering to the stipulation of the present Planning Code, particularly based , WASP IV	Noted The Commission has already initiated to revise the planning code and will consider the mentioned comment when revising the code. The future generation plans would be prepared adhering to the new planning code.
		Provide means to include renewable resources as candidate power plants It is understood that the CEB has	The Commission agrees that the present planning software has its own limitations on modelling renewable energy and transmission costs.

		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	<p>CEB has already communicated to the Commission that they are in the process of building capacity for the staff to use the OptGen software in next generation planning. The latest software allows CEB in modelling variable renewable energy as well as transmission costs.</p> <p>The Commission encourages the licensee to adopt and use the best practices in the world to develop the future LCLTGEPs.</p>
		cost of externalities for each type of generation must be included	<p>The approved LCLTGEP 2018 -37 considered the externality costs.</p> <p>Reference for costs of externalities: The Case of RCREEE Member States September 2013.</p> <p>At the same time, the Commission agrees that it is required to consider location specific damage costs. But, such studies are not available locally at present and time limitations do not allow the Commission to do fresh studies at this point.</p> <p>Thus, the Commission will discuss with the CEB to develop studies to identify values that are most relevant to Sri Lanka to be incorporated in future LCLTGEPs.</p>
		changes in national policy have to be taken into account as a primary consideration	<p>The Commission noted.</p> <p>The Commission has noted that the plan is not fully complied with the national renewable targets (eg. Paris Agreement and Surya Bala Sangamaya), as other renewable energy (ORE) integration capability of the system is limited by the stability, operational</p>

			and economic constraints. Therefore the Commission will strictly consider the observation to be incorporated in approving future generation plans.
		The stake holder consultation for a revised planning code should take place soon after the date set for the submission of the LTGP 2018-2037 With participation of 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.	Noted.  The Commission has already initiated to revise the planning code and will consider the comments recived in this consultation when revising the code.
		Demand forecasting needs to be validated based on verification of past forecasts Vs actuals	Noted. The Commission noted that the demand forecast is based on the past actuals. Please refer Section 3.3 of the plan.
		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	Noted. The Commission also noted that the CEB has projected Other Renewable Energy (ORE) according to the study of "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028". As per the study, optimum ORE capacity has been integrated into the system up to 2028 (20% energy

			share) and continued throughout the planning horizon. The Commission will consider the observation to be incorporated in approving future generation plans.
		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.	Noted. The plan is prepared based on the economic cost. Hence, subsidies are not accounted either in case of fossil fuel plants, or in case of renewables.
	1.a,b	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 Thus the data on cost of funds must be on a more equitable basis for the comparison	Noted. The plan is prepared based on the economic cost. Hence, taxes subsidies are not accounted either in case of fossil fuel plants, or in case of biomass plants.

	c	<p>The comparison is made on widely differing unit sizes which make the specific cost of the Dendro Plants unreasonably high.</p> <p>I.A minimum size of 50 MW is proposed for this reason.</p> <p>II unit size impacts both the specific capital cost as well as the operating efficiency.</p> <p>III Economically viable storage mechanism , land available for biomass cultivation as an integrated energy/ agro , no inventory cost.</p>	<p>Noted.</p> <p>In this plan capacity of 5MW Dendro Power Plant is considered and this is modelled from the data received from the Sustainable Energy Authority.</p> <p>The Commission appreciate if you provide the basis for the proposed minimum plant size, its impact on specific cost and operating efficiency and viability of fuel supply, for consideration in future generation plans.</p>
	d	Low specific cost of biomass plants(without cost of externalities)	We appreciate if you would provide the basis of this calculation, with references.
	2 to 4	<p>-Low cost of externalities in Biomass plants</p> <p>-spin off benefits to local economy/ economy of rural areas</p>	<p>Noted.</p> <p>The commission agrees with your view on benefits to the rural economy.</p>
	5, 10	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	<p>Noted.</p> <p>For this study, variable renewable energy share is projected based on the study "Integration of Renewable Based generation into Sri Lankan Grid 2017-2028". As per this study optimum ORE capacity is integrated in to the system up to 2028 (20% energy share) and continued the optimum level in the planning horizon.</p> <p>However, future targets can be reviewed considering the implementation of major thermal power plants and with advancements of Other Renewable Energy</p>

			technologies.
	6	Compliance with National Policies. - no room to consider any more coal power plants	Noted  The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
	7	No reference given as to how the different capital costs for different technologies have been picked up.Recommend data from CERC: <a href="http://www.cercind.gov.in/2016/orders/SO17.pdf">http://www.cercind.gov.in/2016/orders/SO17.pdf</a> . (with an adjustment)	Noted the observations. The capital costs used for the study are based updated thermal plant cost database, revised during the Project on Electricity Sector Master Plan Study in Democratic Socialist Republic of Sri Lanka 2016. The Commission will further study the capital cost data from the Central Electricity Regulatory Commission (CERC) and will communicate to CEB to consider and incorporate in the future generation planning.
	8	Contribution that can be made by an aggressive DSM process is ignored	Noted  The Commission noted that the demand reduction targets based on the Demand Side Management initiatives are currently being identified by the Presidential Task Force and the Sustainable Energy Authority.  The Commission will communicate to CEB and SEA to take the required actions to incorporate the impact of DSM in next generation plan.
		The energy intensity is on a decreasing trend. Thus the direct linkage of demand growth to GDP growth is no longer valid.	The Commission agrees that the energy intensity has shown a decreasing trend. The Commission noted that the past electricity demand and DGP growth (Figure 1.1) has shown a

			direct correlation.
	9	Consideration of “Surya Bala Sangamaya”	The Commission noted that the set targets under Soorya Bala Sangramaya for the year 2020 (200MW) has been considered in preparing the plan, but the target for the year 2025 (1000MW) has not been considered in the plan.
	11	Priority should be to study the feasibility of using existing hydro systems as Pump Storage plants	Noted the comment. The planning study has considered the locations of pump storage power plants, based on the Introduction of PSPP were based on the results of two studies, “Development Planning on Optimal Power generation for Peak Demand in Sri Lanka”. The study has considered existing hydro systems as well.
	12	Capital cost reduction of renewable sources and new technologies such as distributed generation.	The approved plan has considered capital cost reduction for solar plants only.(initial 1400USD/KW gradually reduced to 900USD/KW by 2025).  The Commission will communicate to CEB to consider cost reduction trends of other renewables technologies also in future generation plans

13. Prof. Kumar David		Cancellation of Sampur Coal plant is costly and technically unsound decision. Propose to go ahead with proposed coal plants but gradually shift to other technologies	Noted. Cancellation of Sampur Coal power plant was a decision by the Government. The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.
14. Eng. M V R Perera		Coal is the cheapest option and are required for economic development	Noted The approved LCLTGEP 2018 -37 considered the externality costs (social and environment costs) and power plants qualify according to the least cost principals were approved.