



Your ref:

My Ref: DGM(CS&RA)/GEN/05-07

Date: December 01<sup>st</sup>, 2022

Director General  
Public Utilities Commission of Sri Lanka  
6<sup>th</sup> Floor, BOC Merchant Tower  
No.28, St, Michael's Road  
Colombo 3.



Dear Sir,

**SUBMISSION OF THE DRAFT LONG TERM GENERATION EXPANSION PLAN (LTGEP)  
2023-2042**

This has reference to letters PUC/LIC/2022/TL/97 dated 2022-11-04 and PUC/LIC/2022/TL/98 dated 2022-11-21 addressed to Additional General Manager – Transmission, requesting further information in order to approve the Least Cost Long-Term Generation Expansion Plan 2023-2042. Accordingly, the response to the requested clarifications are forwarded herewith as **Annex-1 & Annex-2**.

Further, we earnestly request if any further clarifications are required by the Commission, to arrange a meeting at a mutually convenient time as we have originally requested the same in CEB letter DGM(CS&RA)/GEN/05-07 dated 2022-09-14.

Yours faithfully,

**CEYLON ELECTRICITY BOARD**

Eng. (Dr.) D.C.R. Abeysekera, (Dr.) D.C.R. Abeysekera  
General Manager  
Ceylon Electricity Board

(Authorized officer for Licenses EL/GB/09-001, EL/T/09-002, EL/D/09-003, EL/D/09-004, EL/D/09-005, EL/D/09-006)

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## **Clarifications on draft LTGEP 2023-2042**

### **1. Reason for not considering biomass technology for the optimization**

The biomass capacities proposed in the base case plan are based on the resource development plan received from SLSEA. As the overall potential for biomass is limited and the implementation is subjected to many factors including supply continuity of source fuel (biomass) as mentioned in the LTGEP, it is not practical to consider biomass for optimization. However, to realize the biomass potential projected in the resource development plan, annual capacities are proposed in the base case and it is also explicitly mentioned that *“the capacity additions are not strictly limited to the planned capacities and further capacity additions shall be considered depending on the feasibility and success of implementation.”*

### **2. Source of the characteristics of candidate thermal plants mentioned in the Table 4.2**

Simple cycle and combined cycle gas turbines - Gas Turbine World 2020 GTW Handbook and older versions of the same publication

Coal – Feasibility studies

IC Engine-From IC Engine manufacturer technical literature

### **3. Source of the Capital and Fixed O&M Cost of ORE Technologies mentioned in the Table A5.7**

We have already clarified vide our letter reference DGM(CS&RA)/GEN/05-07 dated 2022-11-11 as a reply to similar clarification previously sought by PUCSL on the same matter.

### **4. Reason for not including the results of sensitivity studies conducted under different SNSP limits (mentioned in the letter Ref: DGM (CS & RA)/GEN/05-08 dated 12th October 2022) in the plan.**

The evaluation of a sensitivity based on present value cost of different SNSP limits needs to consider both operational cost reductions as well as investment cost requirement. Although it is possible evaluate operational cost reductions through long term planning studies the exact investment requirement on intervening technologies requires further detailed studies on finer time frames. The scale of further operational cost saving compared to the indicative investments is not significant at present, but is required to be further studied to gradually increase the SNSP levels through the planning horizon.

### **5. Reason for not internalizing the environmental mitigatory measures into the capital costs of candidate LNG, Diesel, Wind and Solar Plants. (Mentioned in the letter Ref: DGM (CS & RA)/GEN/05- 08 dated 12th October 2022)**

For thermal candidate options, all the standard emission reduction measures generally included in the package are considered when determining the capital costs which includes the necessary mitigatory measures to comply with the local emission standards. Any additional measures required should be properly evaluated on a common basis (for thermal and renewable both) and included after a comprehensive analysis is carried out to determine the costs associated with those measures.



**6. Basis for the estimation of handling charge of LNG as 2 USD/MMBtu.**

We have already clarified vide our letter reference DGM(CS&RA)/GEN/05-07 dated 2022-11-11 as a reply to similar clarification previously sought by PUCSL on the same matter.

**7. Does the net generation figure in Table 3.1 comprise the rooftop solar energy contribution of LECO customers? if not why?**

The net generation figure shown in the Table 3.1 does not include rooftop solar energy contribution of LECO consumers. However, measures will be taken to include this value under net generation figure in the table of 'Electricity Demand in Sri Lanka' in our next plans.



**4<sup>th</sup> Clarifications on draft LTGEP 2023-2042**

1. **Can the contraction of GDP in 2022 and 2023 (projections made by the IMF, World Bank and ADB) be considered for reviewing the demand forecast?**

Yes. It can be reviewed in the next planning cycle considering these latest projections.

2. **Reason for not considering to increase SNSP level beyond 65% by incorporating synchronous condensers. Does it impact the plant schedule in Base case, if the SNSP level is increased beyond 65%?**

We have considered the possibility of introducing synchronous condensers. The exact capacity requirement of Synchronous condensers requires additional studies on finer timescales. The exact requirement and associated cost for the same has not been considered as mentioned in chapter 6 of the report.

If the SNSP level is increased beyond 65%, the plant schedule of the Base case plan will not change.

3. **Has the synthetic inertia which could be provided by the battery energy storage systems (BESS) been considered when limiting the SNSP to 65%?**

The capability of providing synthetic inertia through grid forming inverters is very well understood as the technology is emerging as a promising option. The Battery Energy Storage Systems provide the Fast Frequency Response as ancillary services which are necessary to even to increase the SNSP level to 65%. Such measures are practiced already by other countries which are embarking on high VRE penetration levels.

It is to be understood that in future systems both synchronous inertia and synthetic inertia are complementarily required and detailed investigations in finer timescales are to be conducted.

4. **Reason for not studying the impact of internalizing the cost of externalities (for all technologies) in the planning exercise at least as a separate scenario**

Cost of externalities should be properly evaluated on a common and acceptable basis (both for thermal and renewable). It can be included in future planning cycles as a separate sensitivity, after a comprehensive analysis is carried out.

5. **Reason for not considering the historical slow demand growth for the demand growth projection of this plan. Have you considered the errors in historical predictions in previous plans and used correction factors to forecast the demand with reasonable accuracy in this plan? if yes, what are the correction factors?**

Historical demand growth has been already captured. Furthermore, the errors in predictions in previous plans has been evaluated and time trend analysis has been adjusted to reduce the difference between actual demand and forecasted demand.



**6. Basis for considering 600MW nuclear power reactors in the plan which are not available at present**

The capability of the Sri Lankan power system to facilitate a single unit without compromising the stability of the system was considered in determining the appropriate unit size of the candidate nuclear power option. Almost all the conventional nuclear reactors currently available are beyond 1000 MW range which are not feasible to be connected to the system within the study horizon. However, several conventional reactor-based power plants have recently been installed in China which have plant capacity around 600 MW.

**7. What are the temperature and pressure considered in the given heat rates of the candidate thermal power plants (Table 4.2)? Have these heat rates reviewed for local conditions?**

Heat rates considered for planning studies are all based on ambient conditions (Converted from ISO conditions to ambient conditions).

**8. Were the potential domestic battery storage installations by customers and TOU pricing to LV customers considered in forecasting the future demand?**

These factors will be further studied and considered in future planning cycles considering the institutional involvement in promotion of such and potential for implementation.