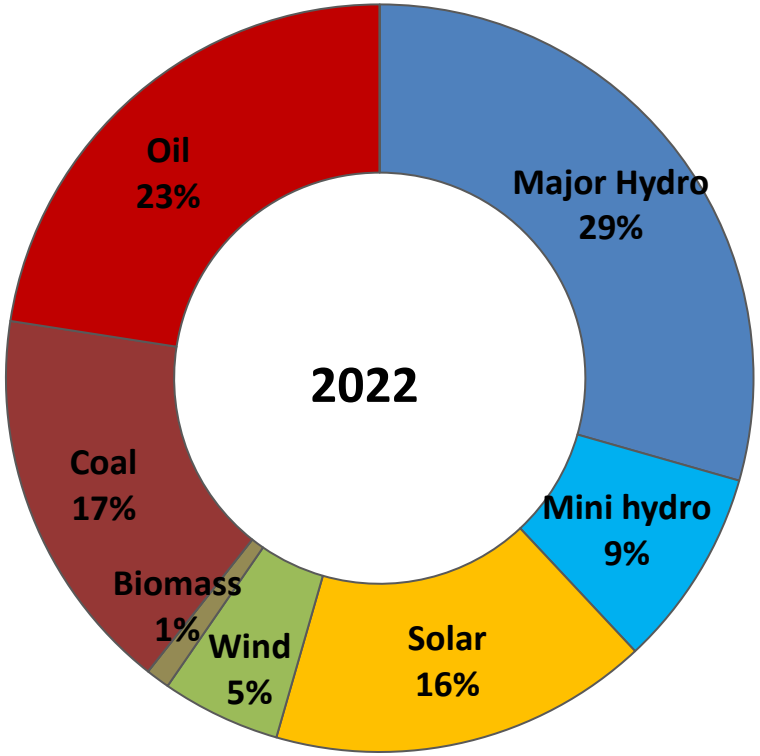
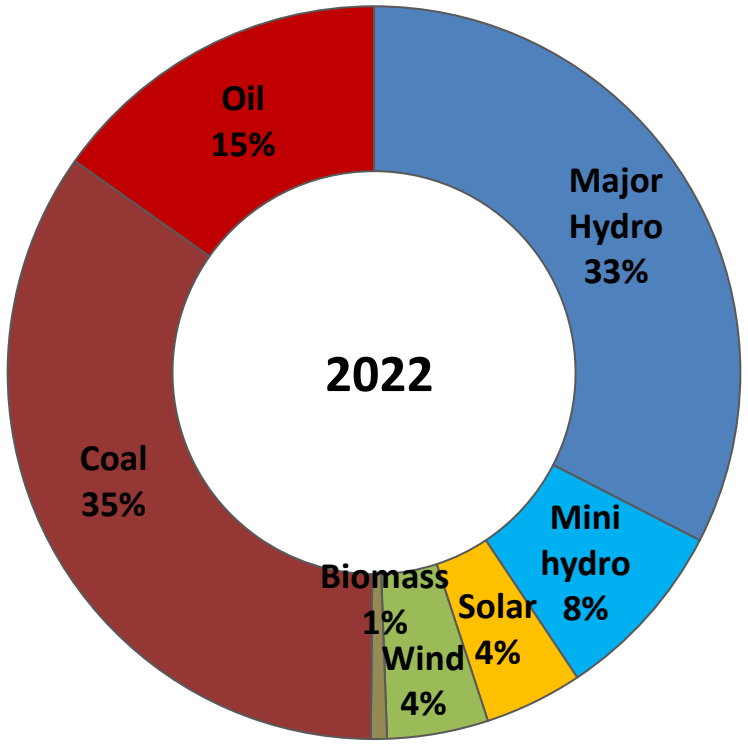
OVERVIEW OF GENRATION PLANNING SRI LANKA

BACKGROUND

PRESENT STATUS OF SRI LANKAN POWER SYSTEM



Capacity Share



Energy Share

INSTALLED CAPACITY AS AT JANUARY 2023

Hydro	Capacity (MW)	Total Capacity (MW)
Laxapana Complex	389	1,418
Mahaweli Complex	816	
Samanala Complex	213	

Thermal	Capacity (MW)	Total Capacity (MW)
Lakvijaya Coal PP	900	1,987
Kelanitissa Power Station	195	
Kelanitissa Combined Cycle PP	165	
Sapaugaskanda Power Station	160	
Uthuru Janani PP	24	
Barge Mounted PP	60	
Containerized Emergency PP	50	
Sojitz Combined Cycle PP	163	
West Coast Combined Cycle PP	270	

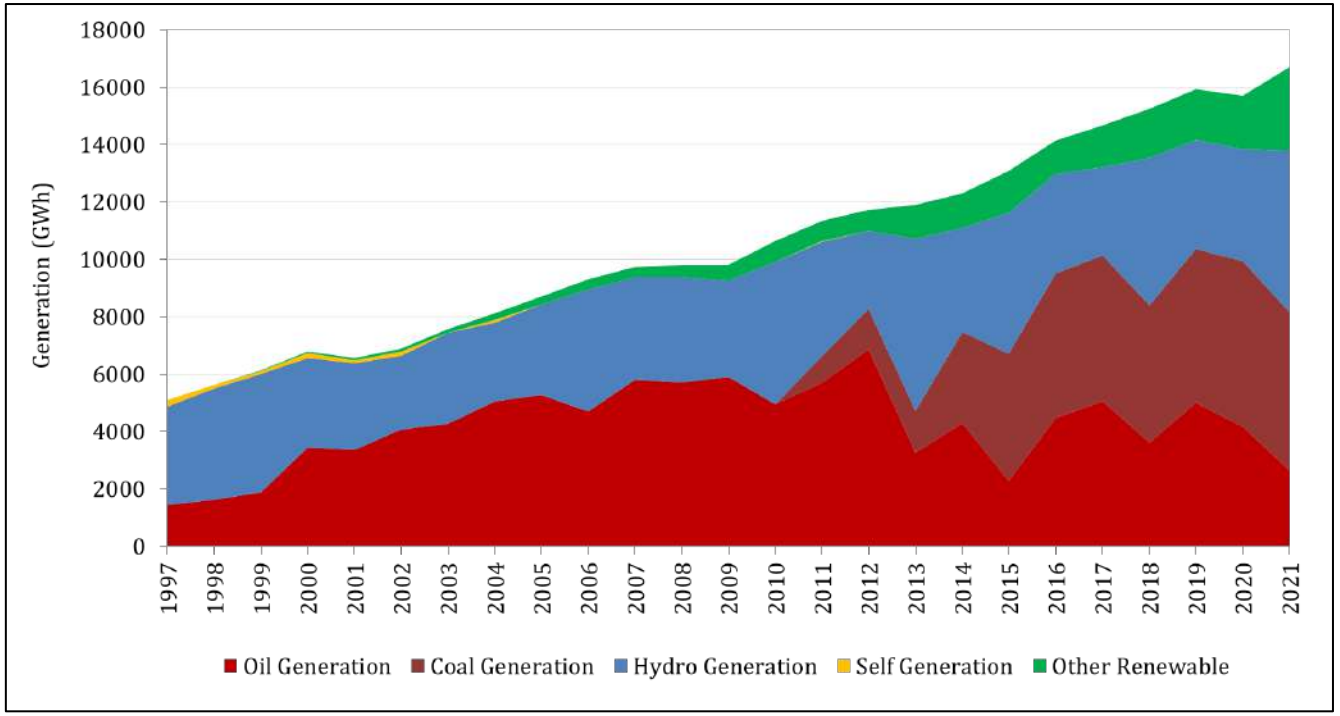
CEB Owned

IPP

Dispatchable

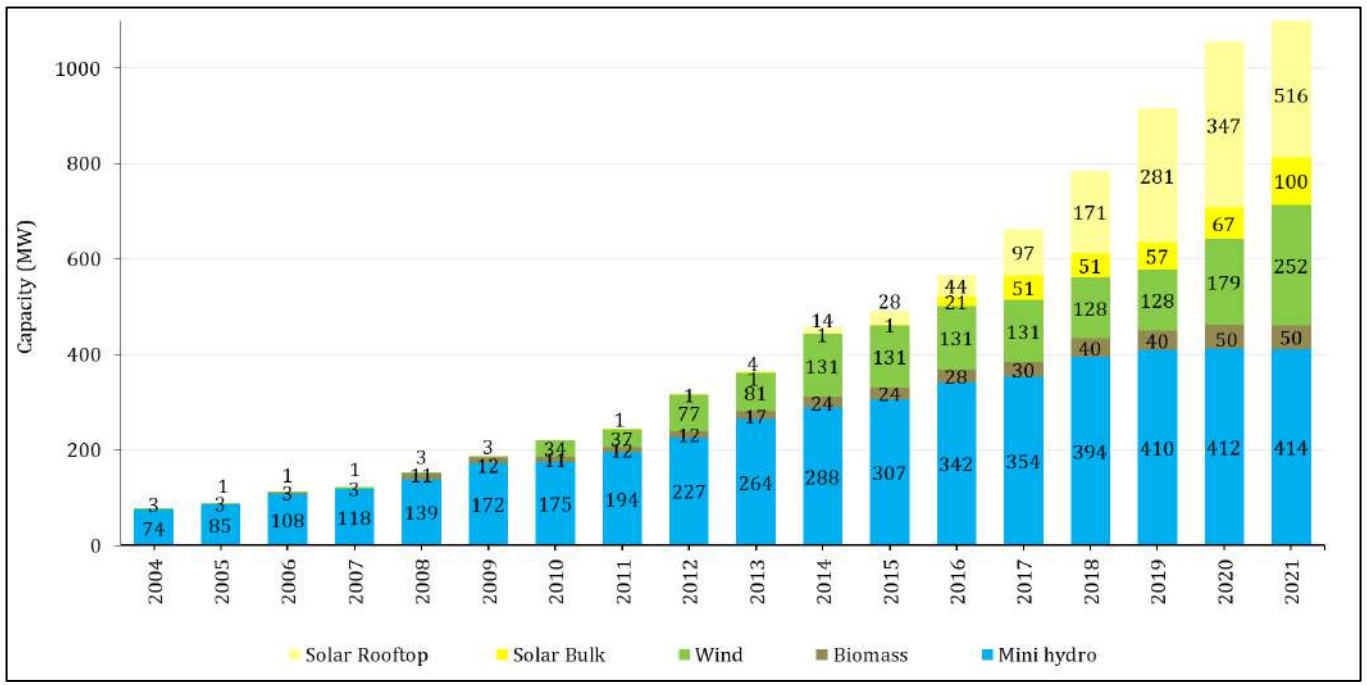
Other Renewables	Capacity(MW)	Total Capacity (MW)
Mini Hydro	414	1,504
Wind	248	
Solar (Ground Mounted)	130	
Solar (Rooftop)	662	
Biomass	50	

Non Dispatchable

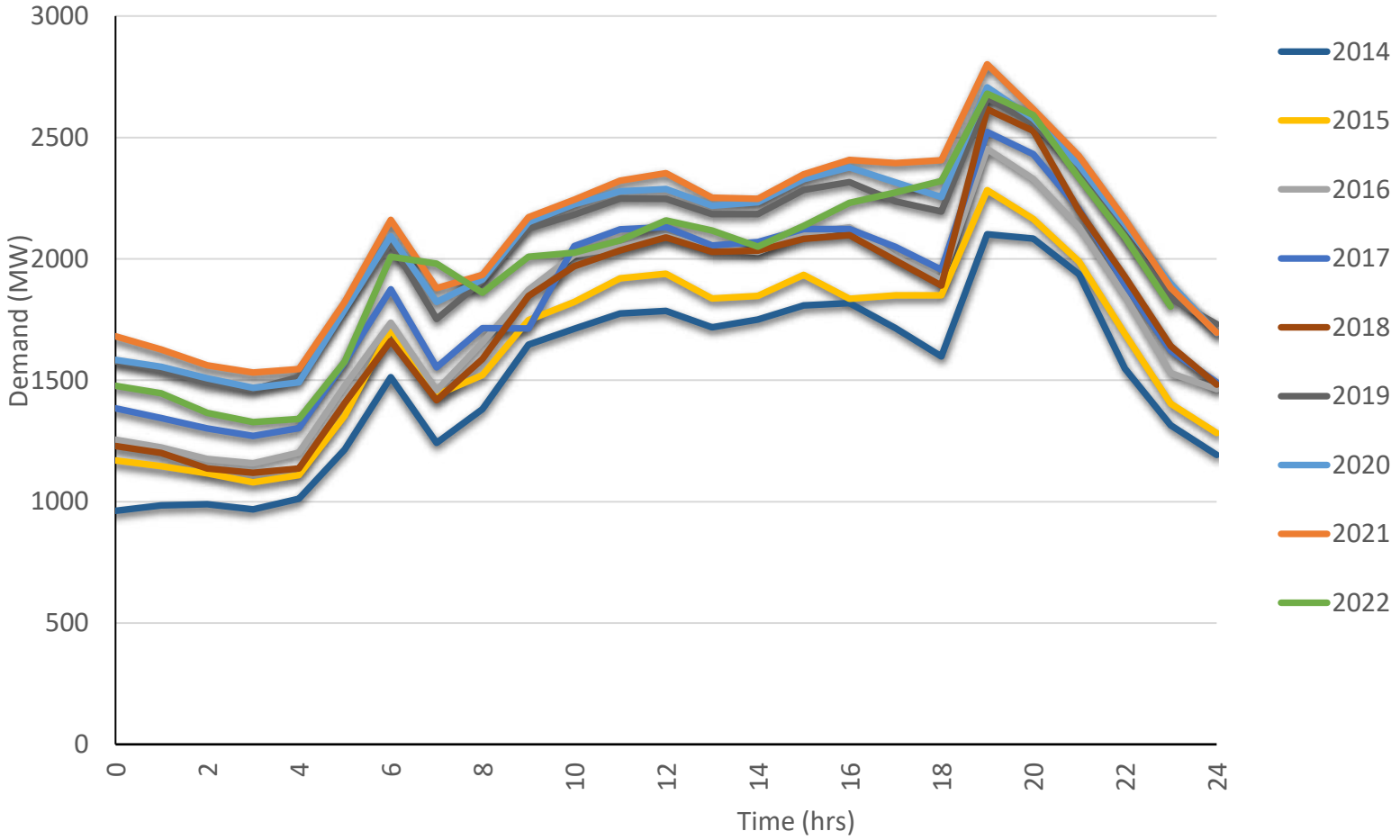


Historical Electricity Generation in Sri Lanka (By Source)

Historical ORE Capacity Additions (By Source)



DAILY LOAD CURVE VARIATION



Policy & Regulatory Background

1. Sri Lanka Electricity Act, No. 20 Of 2009 (As amended) – Section 43
2. National Energy Policy and Strategies - 2019
3. Generation Planning Code under the Grid Code issued by the Transmission Licensee - 2018 – Section 2.15
4. General Policy Guidelines on the Electricity Industry – 2021 - Clause 8,9,15,16,23

Highlights

a) Achieve 70% of electricity generation in the country using renewable energy sources by 2030

b) Achieve carbon neutrality in power generation by 2050

c) Cease building of new coal-fired power plants

d) New addition of firm capacity will be from clean energy sources such as regasified liquefied natural gas (RLNG)

"Provision of new generation plant or the extension of any existing plant.

43. (1) Subject to the provisions of section 8 of this Act, no person shall proceed with the procuring or operating of any new generation plant or the expansion of the generation capacity of an existing plant, otherwise than in the manner authorized by the commission under this section.

(2) A transmission licensee shall, based on the future demand forecast as specified in the Least Cost Long Term Generation Expansion Plan prepared by such licensee and as amended after considering the submissions of the distribution and generation licensees and approved by the Commission, submit proposals to proceed with the procuring of any new generation plant or for the expansion of the generation capacity of an existing plant, to the Commission for its written approval :

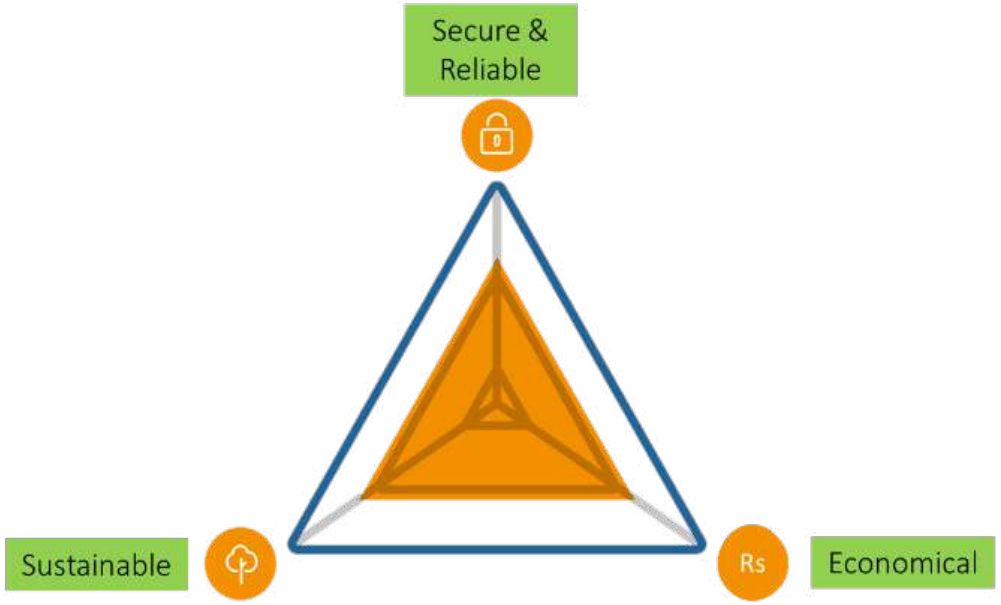
GENERATION PLANNING PROCESS

OBJECTIVES

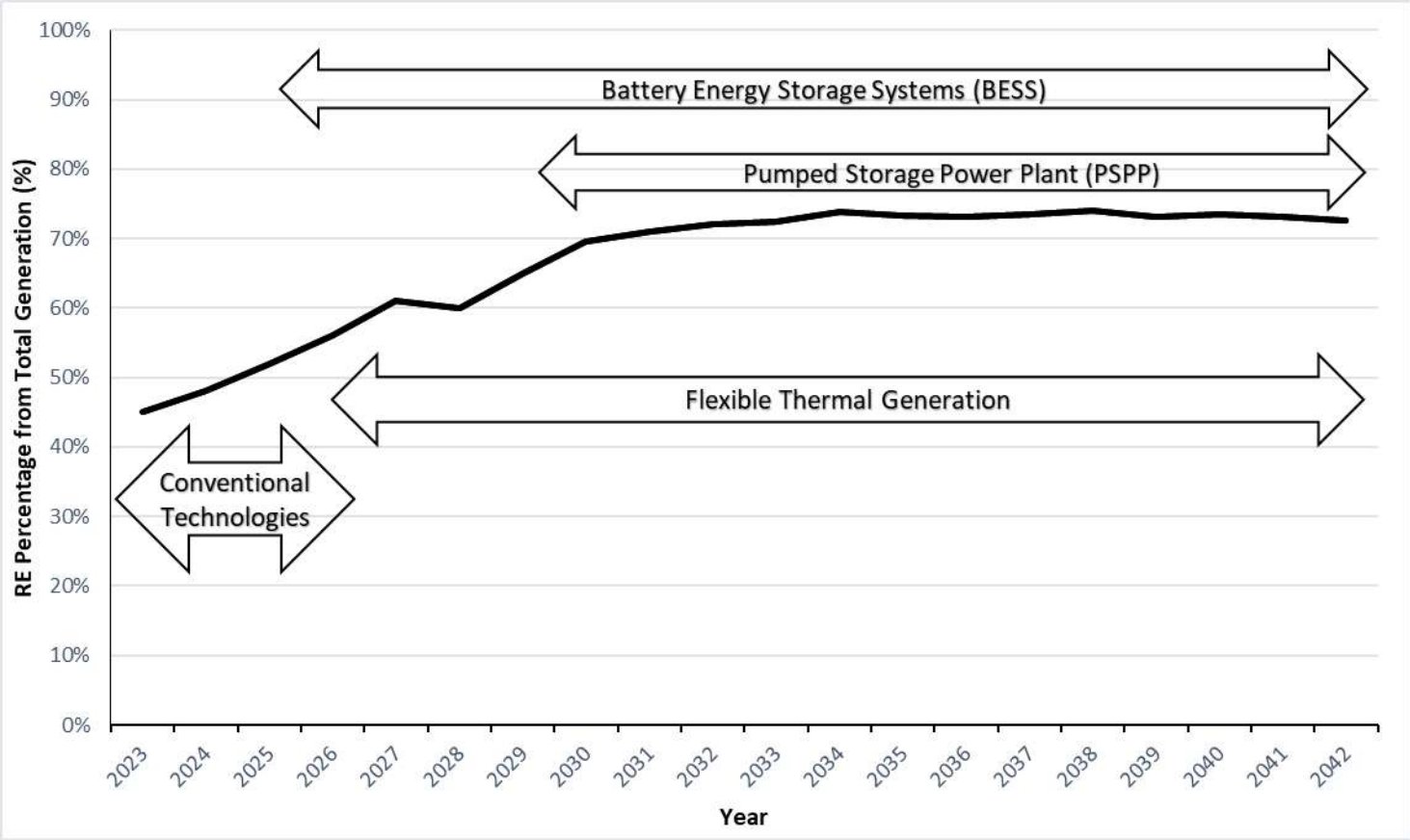
In Sri Lanka generation planning process is a biennial exercise done for a 20 year horizon.

Strives to add a balance between three main competing objectives

a) The security and reliability of electricity supply
b) Sustainability
c) Economics of supply and affordability



Strategy of Achieving 70% RE by 2030 Target



PROCESS MILESTONES

Forecasting of ‘National Long Term Electricity Demand’ for the next 25 years

Identifying the most suitable generating capacity mix and required grid support interventions to meet the forecasted demand for electricity at lowest economic cost while meeting the reliability requirements and declared sector specific policies of the government as required under law.

Investigating the techno economic feasibility of new alternate generating technologies to expand the generating system

Preparing the capital investment program for the expansion of the generating system

Verifying the robustness of the economically optimum plan by analyzing its sensitivity to changes in the key input parameters.

Conducting scenario analysis to facilitate national level policy making

Conducting contingency analysis to see possible risks in the near term

LTGEP 2023-2042 - KEY SCENARIOS

Policy Constrained Scenarios				Policy Unconstrained Scenarios		
1. **70% RE by 2030 + No Coal (New Policy)**	**2.** **70% RE by 2030 Increasing RE Share beyond 2030 + No Coal**	**3.** **70% RE by 2030 HVDC Interconnection + No Coal**	**4.** **70% RE by 2030 Nuclear 2040 + No Coal**	**5.** **50% RE by 2030 With Coal Option Open Until 2030**	**6.** **60% RE by 2030 With Coal Option Open Until 2030**	**7.** **60% RE by 2030 + No Coal**
Achieving 70% RE energy share by 2030 & Maintaining the share up to 2042	Achieving 70% RE energy share by 2030 & Increasing the RE share to 80% by 2042	Achieving 70% RE energy share by 2030 & Maintaining the share up to 2042	Achieving 70% RE energy share by 2030 & Maintaining the share up to 2042 With Carbon Neutral share to 80% by 2042	Achieving 50% RE energy share by 2030 & Maintaining the share up to 2042	Achieving 60% RE energy share by 2030 & Maintaining the share up to 2042	Achieving 60% RE energy share by 2030 & Maintaining the share up to 2042

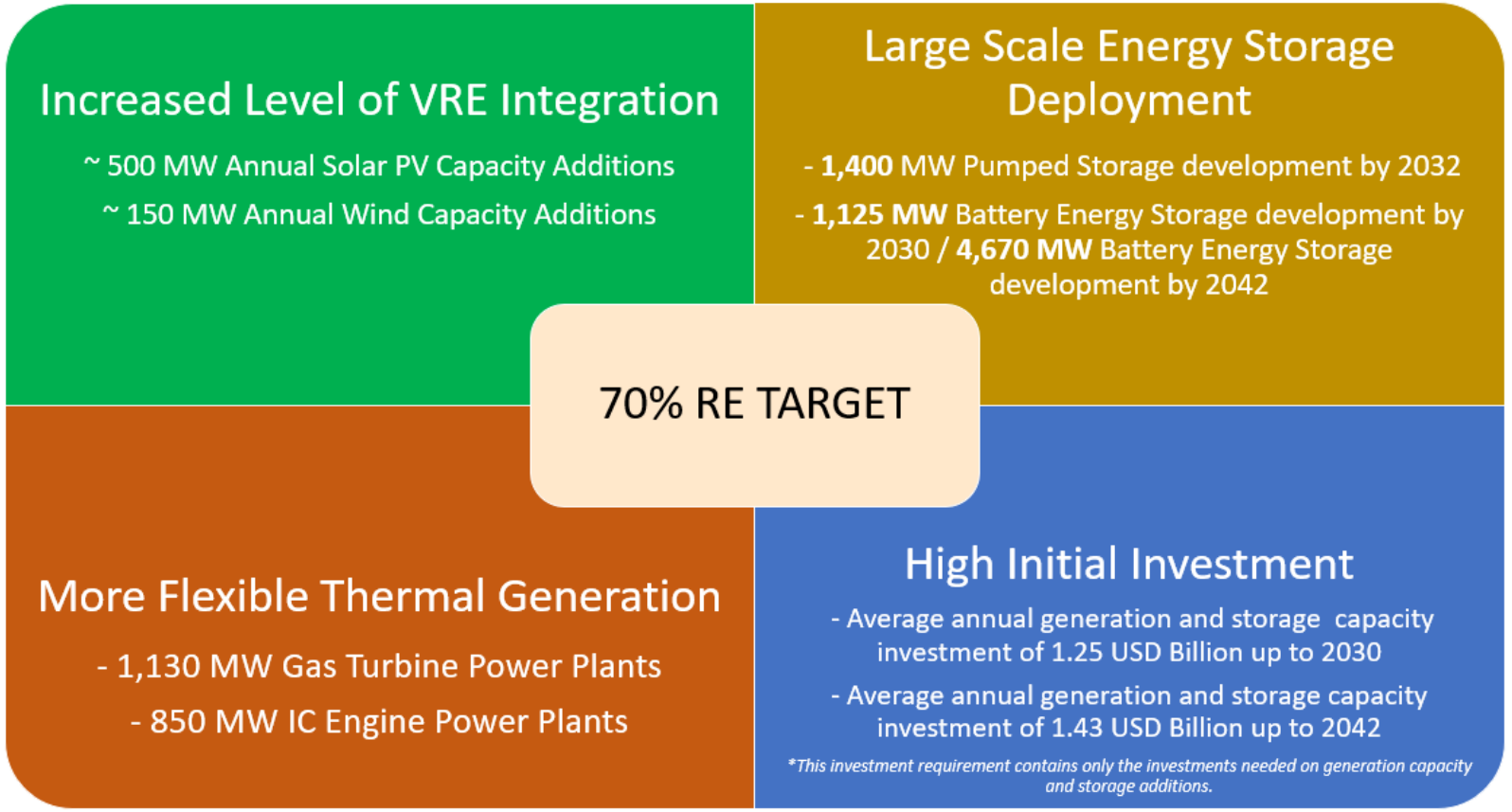
*Scenarios were developed considering fuel costs used for planning studies and imposing limits on instantaneous asynchronous penetration.

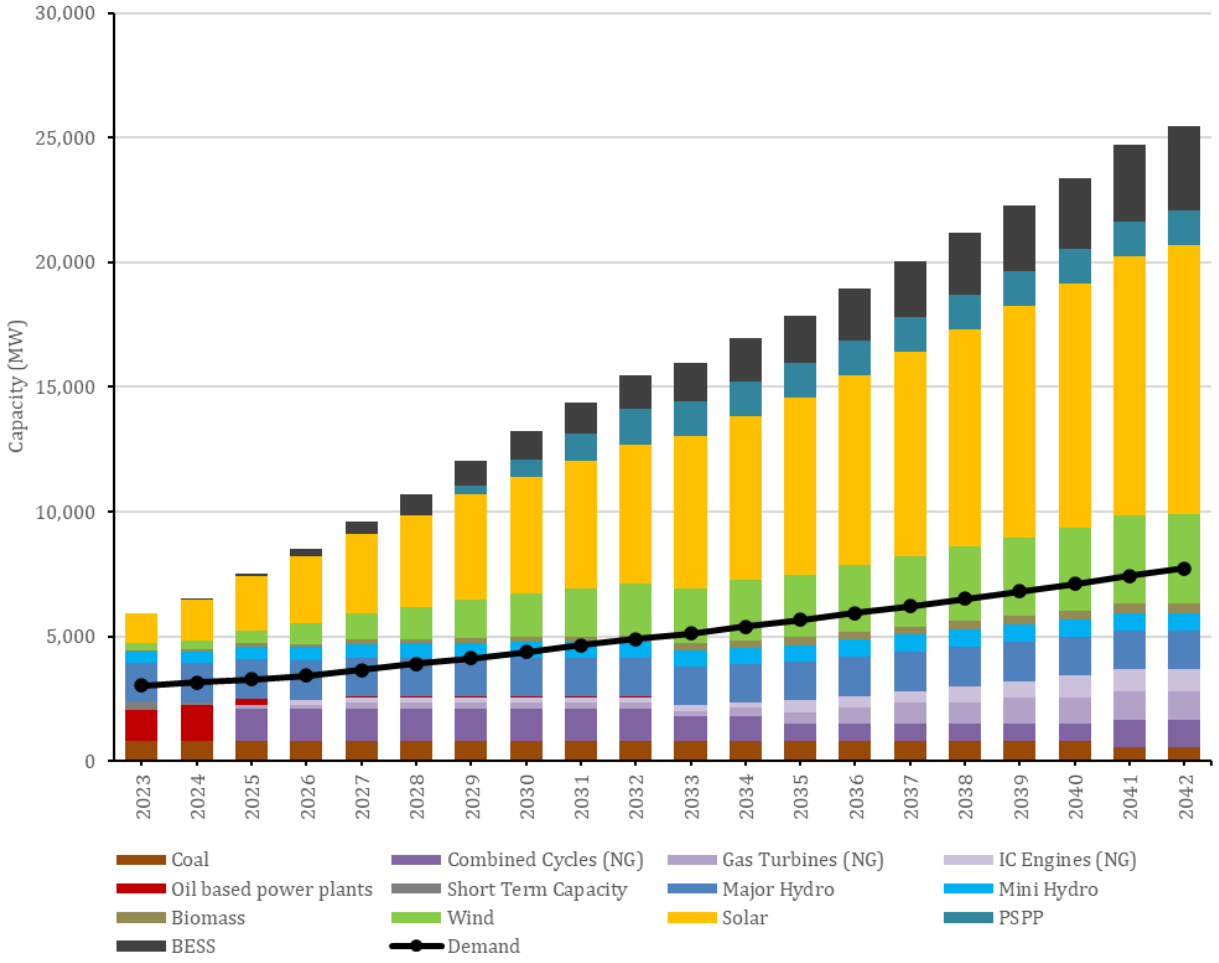
BASE CASE

The base case plan is the policy constrained and operationally feasible least cost plan.

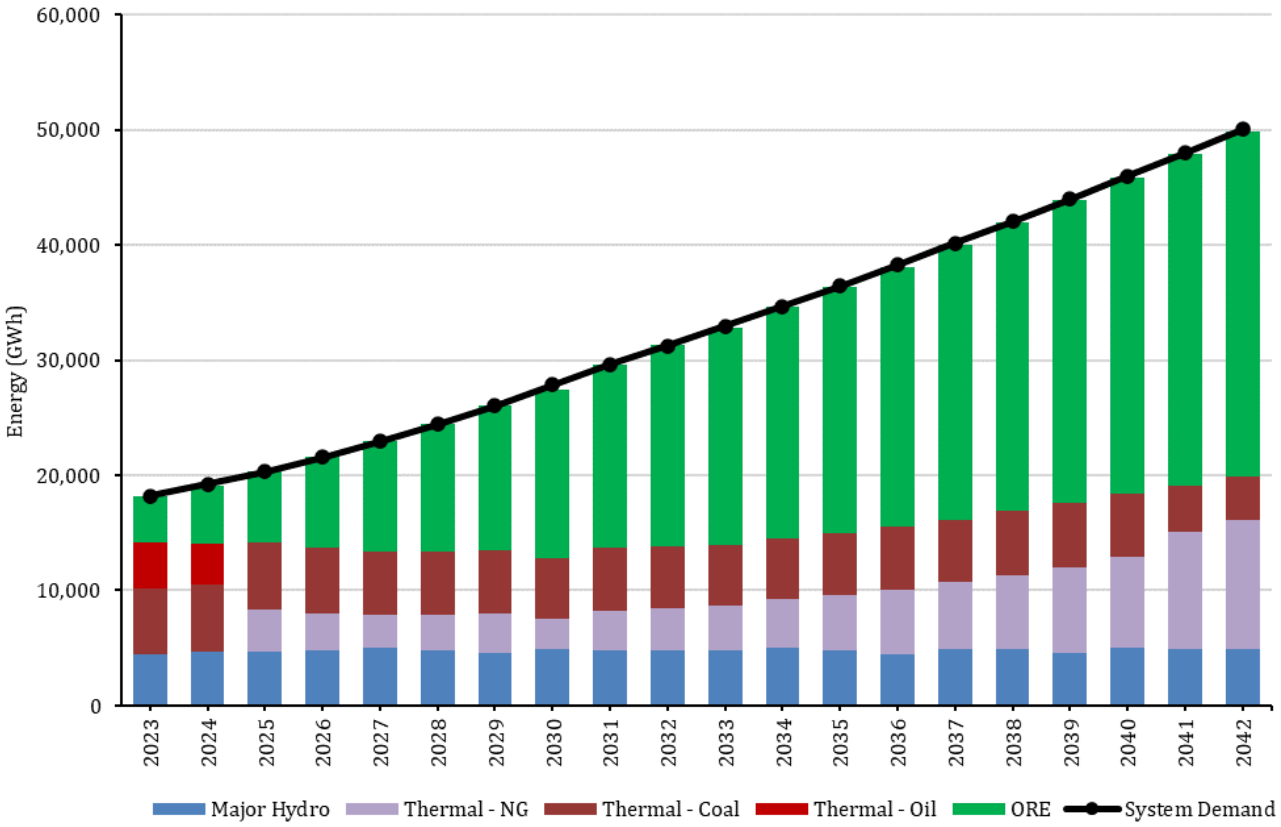
Scenario 1 - Achieving 70 % RE by 2030, maintaining 70% RE beyond 2030 and no coal fired plant additions throughout the horizon

Key Highlights of Base Case





Cumulative Capacity by Plant Type in Base Case

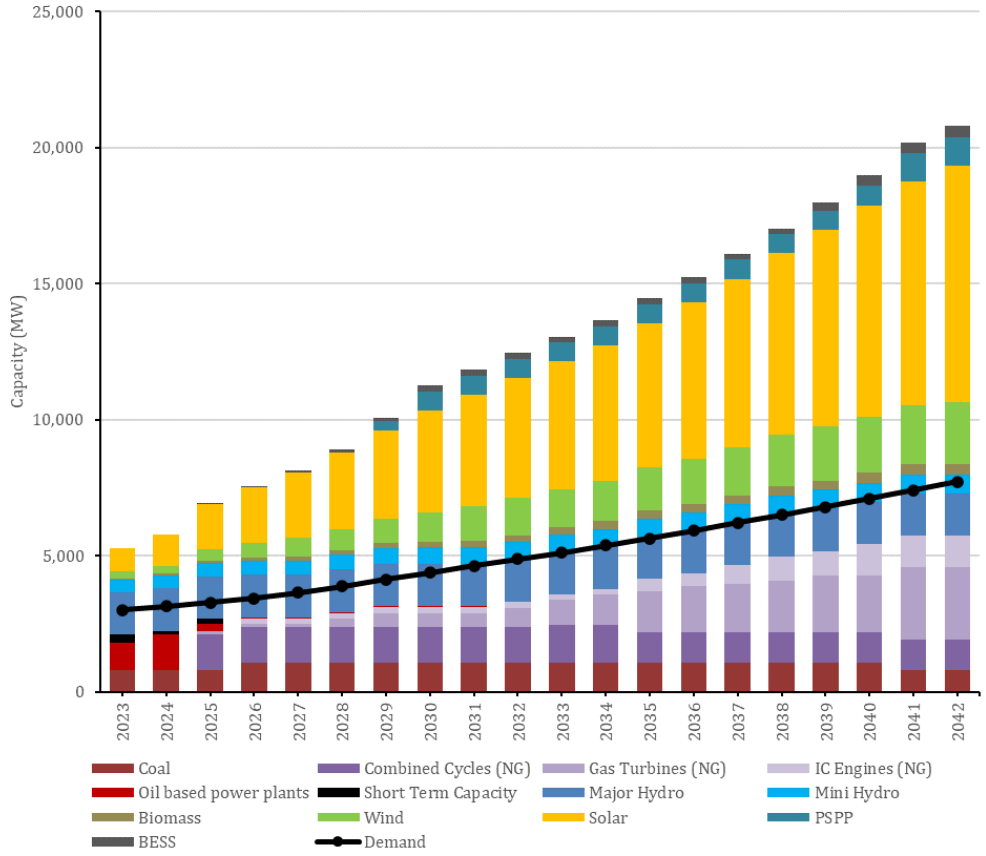


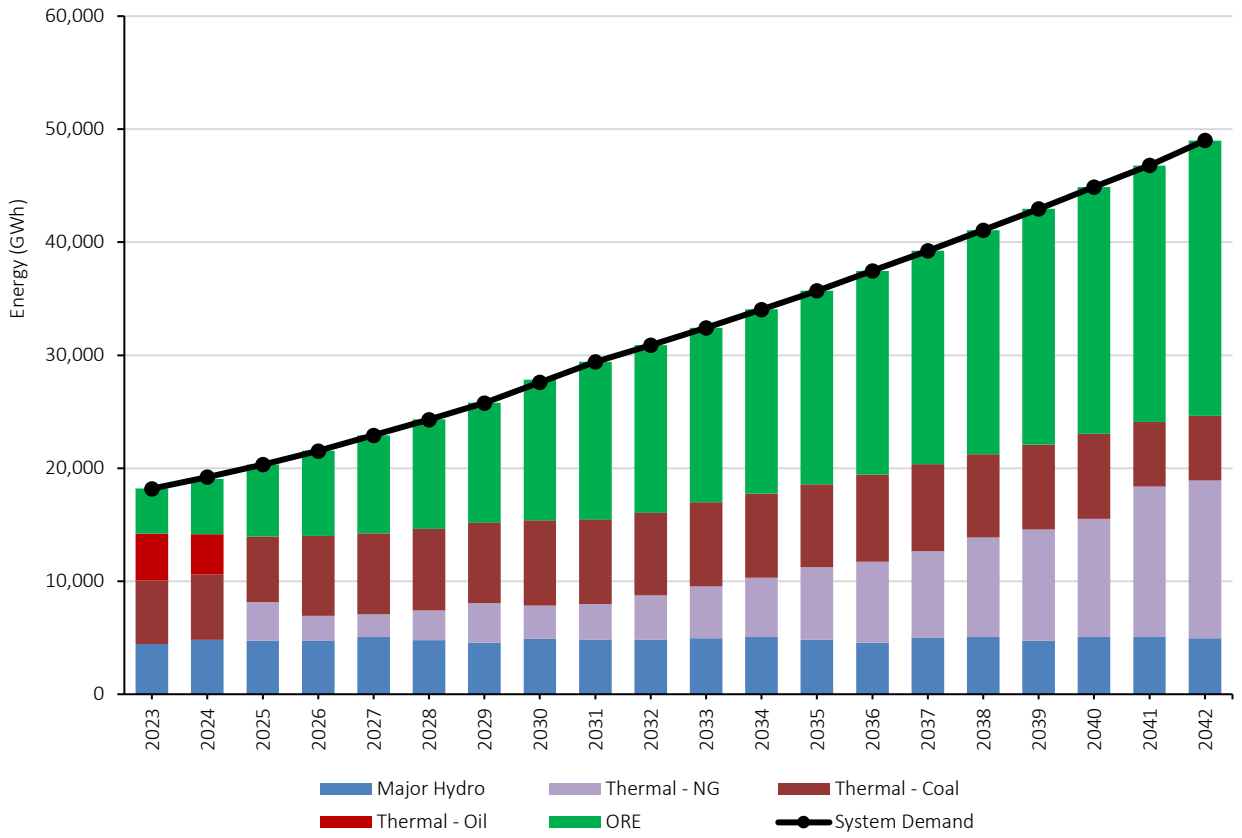
Energy Mix over Next 20 Years in Base Case

REFERENCE CASE

The reference case plan is the policy unconstrained and operationally feasible least cost plan. This case indicates the least cost development pathway as well as provides a basis for comparison to other scenarios that are constrained by policies.

Scenario 6 - Achieving 60 % RE by 2030, maintaining 60% RE beyond 2030 and no coal fired plant additions beyond 2030





Present Value Cost Comparison between Reference Case and Base Case (in million USD)

Cost Type/Scenario	Investment Cost (million USD)	Operation Cost (million USD)	Total Cost (million USD)
Reference Case	7,946	9,561	17,507
Base Case	10,119	8,753	18,872
Difference	-2,173	808	-1,365

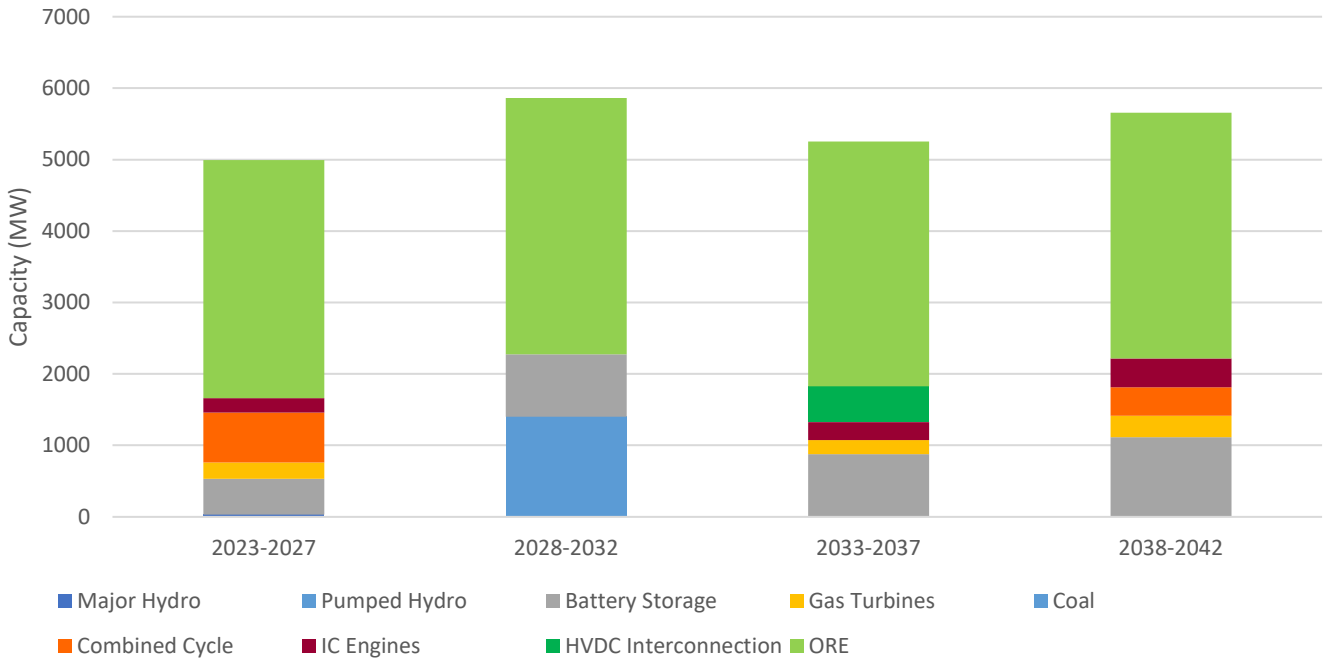
Comparison of the Sensitivities of the Base Case Plan

	Present Value of costs during the planning horizon	Deviation of Present Value Cost from Base Case	
	(Million USD)	(Million USD)	%
Base Case	18,872	-	-
Sensitivities on Base Case			
Demand Variation			
High Demand	20,584	1,712	9.8
Low Demand	17,228	- 1,644	- 8.7
VRE and Storage Delay (by 2 years)	19,054	182	1

CROSS BORDER TRADE

Scenario 3: Achieving 70 % RE by 2030, maintaining 70% RE beyond 2030, no coal fired plant additions throughout the horizon and considering cross border interconnection with India

Only a scenario analysis is done for 1000 MW Indu-Lanka interconnection as the project is not committed as of now. Even though the scenario does not qualify as the lowest cost scenario, the cost difference between the said case and the base is marginal and we expect the cost gap to further diminish in the future studies.



Capacity Additions by Plant Type

1 x 500 MW HVDC Interconnection is schedule for operation by 2034 at a transfer price of 10 US Cents/kWh