Sri Lanka Energy Crisis: The Future

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Summary

The relevant energy technology mix for Sri Lanka at present are indigenous large hydro & mini-hydro systems, biomass, solar farms and solar PV on roof tops, wind and imported fossil fuels.

Sri Lanka is very vulnerable to climate change and made international commitments in relation to an energy transition towards 100% zero Carbon technologies by 2050.

The national electricity grid should be upgraded in a phased manner to absorb more renewables which are freely available and move towards achieving a smart grid.

Current efforts should also be focused on rapid expansion of renewable applications and gradual reduction of the use of imported, expensive and polluting fossil fuels. Other energy solutions such as nuclear are highly inappropriate, unaffordable and dangerous for Sri Lanka.

A phased move towards a smart grid will enable Sri Lanka to produce the future energy carrier, green hydrogen, using excess renewables, and becoming independent and secure as an energy exporting country. Sri Lanka should not miss the green hydrogen revolution and must not regress by remaining dependent on imports of globally dwindling fossil fuel with its environmental and geopolitical risks.

1.0 Introduction

The national electricity grid in Sri Lanka has been failing several times recently, plunging the entire country into darkness, with six island wide blackouts during the past five years.

The Ceylon Electricity Board (CEB) attributes the instability to an outdated grid that cannot accommodate small-scale renewable energy providers. This was proven to be a false premise according to their own committee of investigation. However, the CEB has issued press releases to shut down both rooftop solar systems and mini-hydro systems during festive periods, when the demand for power is lower, with the suggestion being that micro-renewable energy is somehow the cause of the problem.

The CEB clearly does not favour renewable energy from small suppliers. It is, nevertheless, unacceptable to maintain the status quo with imported fossil fuels and

high energy prices. Renewable energy is sustainable and cheaper energy prices will not only help us improve the standard of living of all and attract investors, thereby enhancing job opportunities and national income.

This article openly discusses this energy crisis, considers the root causes of the situation, weighs up current trends in the rest of the world, and recommends a way forward for Sri Lanka's future in relation to its energy needs.

2.0 Energy Supply options for Sri Lanka

Sri Lanka has made several energy-related commitments to the United Nations, including reducing greenhouse gas emissions by 14.5% by 2030, achieving 70% renewable energy in electricity generation by 2030, and aiming for net-zero emissions by 2050. Sri Lanka also signed the No New Coal Energy Compact, committing to not building any new coal power plants. These commitments align with obligations under the Paris Agreement and the UN Sustainable Development Goals.

Is the current energy policy in keeping with these commitments?

The relevant energy technology mix currently is indigenous large hydro & mini-hydro systems, biomass, solar PV on rooftops and solar parks, wind and imported fossil fuels. The term biomass includes the Dendro project, biogas and energy from waste.

Other possible renewable energy sources like waves and tidal are not yet feasible for Sri Lanka. Imported LPG is promoted by the authorities with inaccurate claims of LNG as a clean fuel and information as to the cost of generation is somewhat misleading.

Other energy technologies like geo-thermal and nuclear are not suitable for our island nation not only due to the scarcity of large capital funds (without becoming dependent on and susceptible to foreign geo-political interests) but also the magnitude of their inherent dangers. Nuclear energy cannot meet urgent energy needs. Nuclear power[1] presents further serious issues including problems such as enormous capital costs for commissioning, disposal of radioactive toxic waste, the risk of irreparable damage from nuclear accidents due to natural and manmade causes such as potential harm from tsunami, terror attacks, risks from power failures, and gigantic de-commissioning costs. Nuclear energy is thus *not* "clean" energy although its proponents seek to present it as such.

[1] https://indepthnews.net/why-nuclear-power-plants-are-not-suitable-for-sri-lanka/

3.0 World Energy Scenarios

Since the industrial revolution fossil fuel has advanced two thirds of the world's population. Most of the infrastructure has been established to use carbon-based fossil fuels (coal, diesel & petrol and natural gas).

This carbon economy has caused numerous issues such as air and environmental pollution, serious health issues, and wider problems like global warming and climate change. Sri Lanka has no indigenous fossil fuel resources and thus our energy security is gravely threatened by heavy reliance of imports.

The remaining one third of the world's population is not connected to electric grids, suffer from abject poverty and are vulnerable to the heavy storms, flash floods, cyclones, hurricanes and tornadoes many of which are engendered by climate change, brought about by "the advancement" of the other two thirds.

Sri Lanka is said to rank as the sixth country most at risk from climate change.

The worldwide community is now moving rapidly to take action to decarbonize the world to mitigate climate change risks.

4.0 The Global Energy Transition

It would be pertinent to begin this discussion with the data presented in a report published in 2024 by the International Renewable Energy Agency (IRENA)[2]. This has compared the energy use in the world in 2022 with the projected target use in 2050.

Table: Comparison of worldwide energy use in the years 2022 and 2050

Year 2022		Year 2050	
Fossil Fuels	63%	Fossil Fuel	12%
Electricity (direct from hydro, solar & wind)	23%	Electricity (direct from hydro, solar & wind)	52%
Traditional Biomass use	6%	Modern Biomass use	15%
Modern Biomass use	5%	Hydrogen (direct use and e-fuel)	14%
Others	3%	Others	7%

The main trends of this energy transition are due to many reasons.

For both climatic reasons as well as equity, the use of fossil fuels will be drastically reduced from 63% to 12%, in favour of direct renewables, which will be doubled from 23% to 52%. Modern biomass and hydrogen are also indirect renewables and hence the total use of renewables would be 81%.

[2] https://www.irena.org/Data/View-data-by-topic/Energy-Transition/WETO-Energy-Demand

5.0 Unique opportunity for Sri Lanka to export Green Hydrogen

Common complaints about the two main renewables, solar and wind power, are said to be their intermittency. Scientists have however been working to solve this problem, and besides storage options, the solution will be the forthcoming Green Hydrogen revolution.

The future energy carrier will be green hydrogen produced by solar and wind power, which are available in great abundance for us. Throughout the world a GH revolution is taking place.

The pressurised hydrogen can be stored, transported and burned whenever needed to produce power, or as a source of thermal energy.

The important takeaway is that when hydrogen is burned for power, only water vapour is produced, *without any air pollution*. Only water vapour is produced during the burning of hydrogen without any air pollution. GH can be stored and burned whenever energy is needed, especially during nighttime.

A ready market exists in the shipping industry which already has stringent deadlines to reduce the use of fossil fuels. Green hydrogen is also used to produce ammonia and methanol, enabling the production of fertilisers and other chemicals in industry. Since hydrogen is a versatile future fuel, scaling up and commercialisation of this innovative energy source is taking place globally.

If Sri Lanka is astute, it can capture a large share of these markets being blessed with year-round sunshine or monsoon rains together with wind power.

According to the statistics published by the Sri Lanka Sustainable Energy Authority (SLSEA), the potential of solar and wind power are 104,000 MW and 102,000 MW, respectively. This brings the total of solar and wind power potential to 206,000 MW whereas the present Sri Lankan power production capacity is in fact less than 5,000 MW.

Our country is thus “sitting on a goldmine” in the forthcoming green hydrogen revolution. However, focusing doggedly on fossil fuels Sri Lanka is at considerable risk of “missing the bus”.

Having missed several opportunities in the past, including in the Information Technology (IT) and Bio-Technology fields, our neighbours saw the opportunities and have been developing their countries exponentially in these sectors.

Instead of continuing to ***import*** expensive fossil fuels, Sri Lanka would be able to ***export*** the green hydrogen produced using our freely available solar and wind power. Exports can be to those countries which are not blessed with such natural resources, notably those in the northern hemisphere such as Europe and North America and bring much needed foreign income.

This is also a far better and safer option than the proposed HVDC cable connection with India, which is fraught with many Energy Security and national sovereignty issues,

Green Hydrogen produced with renewables would help the Sri Lankan economy grow rapidly with an enormous boost of foreign income and redressing any balance of trade deficits that currently blight our nation.

It is a no brainer.

6.0 What is the shape of energy in Sri Lanka now?

The CEB's position is that they cannot balance the grid due to the power produced and fed to the grid from privately owned roof top micro-solar and mini-hydro systems.

We note the press release of 13th April 2025 to requiring the temporary pause of rooftop solar to protect grid stability[3]. This claim is adequately debunked by the Committee report on the recent blackout. The link to the CEB press release is reproduced below[4] for ease of reference.

The higher echelons of the CEB appear therefore to be seeking regressive measures contrary to the stated objectives of the present government and in violation of international obligations of Sri Lanka as a part of its Agenda 2030 or Agenda 2050.

The renewable energy sector could generate not only clean and affordable energy at a fraction of the price but also enormous skilled employment opportunities.

From three small solar companies in the early 1990s there are now over 300 active solar companies maintaining some 40,000 jobs for locals. Further development of micro renewables would assure not only thousands more jobs for engineers but will provide opportunities for more local women to be trained in installation and related engineering work as a part of the gender parity sustainable development goals.

The somewhat "reluctant" attitude of the CEB towards renewables is clear. If this is not the case, we would ask the CEB to state its position clearly and to demonstrate a genuine willingness to improve the national grid to enable Sri Lanka to be in lock step with the rest of the world on clean and renewable energy. Moreover, as a state-owned organization we urge the new Government authorities to require the CEB comply with international commitments and trends.

The remainder of this article looks in depth at these issues and provides recommendations.

[3] https://www.dailymirror.lk/breaking-news/CEB-requests-rooftop-solar-owners-to-temporarily-switch-off-systems/108-306638

[4] https://www.newswire.lk/2025/04/12/april-13-to-21-increased-risk-of-power-disruptions-request-from-ceb/

7.0 The Main issues for the power sector in Sri Lanka

7.1 CEB's preoccupation with imported and expensive fossil fuels

During the early stages of renewable energy development, one might have imagined that a certain "visionary approach" would have been necessary as these technologies were relatively expensive just as with any other new technologies. However, far thinking researchers in the field saw the limitless potential and impact renewables presented for the development of Sri Lanka and now renewables present the cheapest, cleanest and safest of energy options.

Interest in renewable energy increased over time and led to the formation of the Sri Lanka Sustainable Energy Authority in 2007 and the introduction of programmes such as the "Soorya Bala Sangramaya" in 2011 with Net Metering and further expansion in 2016 with Net Accounting and Net Plus schemes.

In the early 1990s, an RE consortium was established using a Higher Education Link programme between the UK and Sri Lanka and this organised a series of high-profile conferences.

At one of these conferences, the policy maker of the CEB declared *"The future of Sri Lanka is Coal, Coal & Coal*". The position appears not to have shifted. What is the reason for this regressive approach? Developed countries have been closing their coal mines since coal belongs to the dark ages of energy supplies.

Fossil fuels are finite resources, coal is the most damaging fuel, and it adds carbon dioxide, sulphur dioxide, nitrous oxide, and particulate matter contributing both environmental pollution and respiratory illness. Coal ash, produced at a rate of 291,000 tons a year, is another hazard, which is dumped on open ground currently.

7.2 CEB's resistance to renewable energy

CEB is a government owned organ formed to serve the nation. Citizens of Sri Lanka appreciate and value the work of its staff who work hard to provide an essential service to her people. However, the CEB's unwillingness to change and ongoing resistance towards renewables was not only disappointing but has now become entirely unacceptable.

Whilst the stated energy policies place renewable energy high on the agenda and certainly, by 2050 Sri Lanka has made international commitments to supplying 100% of its needs via zero carbon energy, and 70% renewable energy by 2030, there has clearly been little or no effort to invest in renewable energy infrastructure.

Had the CEB done so diligently, in compliance with the dictates of international commitments and common sense, no lone macaque nor weather pattern could have caused nationwide power outages. What guarantees that another monkey would not

trample a transformer again? It beggars belief that the entire nation should be kept in the dark across three days because of one primate[5].

8.0 A numbers game

Back in January 2025, the independent power regulator the Public Utilities Commission of Sri Lanka predicted a 44 billion LKR surplus profits[7] for the CEB and recommended that a reduction in price be passed on to the consumer. Following initial resistance by the CEB it would appear a public consultation led to some cuts ensuing.

In 2024 public finance[6] reported a quarterly profit of 34.5 billion LKR with a total net profit of 93 billion LKR for the CEB.

"Despite a drop in revenue, the CEB posted a 67 percent profit increase to 34.5 billion LKR for the quarter ending June 2024, largely due to lower financial expenses and costs."

Despite these profits, a few weeks ago, CEB announced that the unit price for roof top solar pay back schemes would be scrapped altogether or reduced further in what was clearly a move to disincentivise the use of a freely available renewable energy source. See more about this here[7].

There are just over 100,000 rooftop solar systems in Sri Lanka which belong mainly to private households, funded through their hard-earned income or using a bank loan.

Given there are around 7 million consumers of electricity in the country we do not understand how a mere 100,000 roof-top solar panels could possibly render the entire national grid to be so fragile.

It is disingenuous for a country to commit to Agenda 2030 and make commitments at UN COP meetings on climate change, only for a state organ like the CEB to discourage and seek to extinguish the renewable energy sector.

In July 2024, CEB reduced the solar tariff from Rs 37 per unit to Rs 27 in violation of a cabinet decision which required such reduction to be approved by the regulator PUCSL (Public Utilities Commission). This behaviour suggests that CEB regards itself as being unaccountable even to the PUCSL. The CEB's latest proposal is to further reduce the pay back to Rs 19, 17 or 15 per unit, depending on the production level or to scrap it altogether.

5 https://edition.cnn.com/2025/02/13/asia/sri-lanka-power-outages-monkey-intl-hnk/index.html

6 https://publicfinance.lk/en/topics/sri-lanka-s-ceb-used-rs93bn-profit-to-settle-dues-minister-1724223981

7 https://midpoint.lk/2025/03/31/4903/

Incongruously, we understand the CEB continues to seek to import emergency fossil based power at much higher rates of over Rs. 70 per unit.

Why?

We find no logical explanation offered to paying so heavily for imports of fossil fuels whilst thwarting the renewable energy sector from expanding.

As a part of its Clean Sri Lanka strategy, perhaps it would be pertinent for the new Sri Lankan government to consider not only complying with the COP international commitments to offer clean renewable energy but also to consider if any potential "conflict of interests" exists within the Sri Lankan energy sector.

Similar pay back schemes to Net plus or Net plus plus are available throughout the world as a means of encouraging citizens to take advantage of the move towards Net zero and to promote the universal use of renewable energy as a means of addressing climate change.

The CEB's concerted efforts to undermine and reverse renewable energy commitments and its own failure to invest in the grid infrastructure to support a move towards a 100% renewable energy goal by 2050 is apparent.

The further unit price reduction on pay back schemes and the recent press releases leaving the country in the dark over vacation periods were all the more perplexing since the Asian Development Bank approved a further loan for $200 million in November 2024 to improve the country's energy infrastructure: See "*ADB has approved a $200 million loan to upgrade Sri Lanka's power grid, enhance renewable energy integration, reduce power interruptions, and modernize infrastructure.*"[8]

Have these funds now been released, and have they yet been applied for the purposes for which this loan was offered by ADB?[9]

We understand ADB funding given to develop the infrastructure for enhanced absorption of distributed renewable energy has largely been used to develop higher capacity HT transmission lines and not the much cheaper distribution sector development of roof top Solar PV. Failure to install 20 MW grid scale batteries targeted by Jan 2024 increasing up to 100 MW by 2026 would be an example of the many issues in CEB's infrastructure plans.

[8] https://publicfinance.lk/en/topics/adb-approves-200m-sri-lanka-loan-for-battery-storage-grid-upgrade-1732523099#:~:text=ADB%20has%20approved%20a%20%24200,power%20interruptions%2C%20and%20modernize%20infrastructure.

[9] https://www.adb.org/sites/default/files/publication/27797/sri-2024.pdf

The World Bank announced on 7 May 2025 its approval of a $1 billion loan to support growth in Sri Lanka of which $185m is to be applied to the energy sector.[10] The agreement is "Supporting new solar and wind generation equivalent to 1 gigawatt of capacity, aimed at lowering electricity costs for families and businesses. The project is expected to mobilize over $800 million in private investment and includes $40 million in guarantees."

It is also common knowledge from previous Cope committee discussions, that Senior CEB engineers' salaries were between ~Rs 400,000 and ~900,000 per month, and their income tax was paid by the CEB and not by the individuals themselves. Could this be a violation of the Income Tax regulations? It removes individual responsibility for taxpayers. We understand the organisation has also approved an automatic salary increase of 25% after every three years.

By comparison the current salary of a senior medical doctor is believed to be about Rs 94,000 pcm, and a graduate teachers' salary is about Rs 54,000 pcm. There appears to be a considerable disparity for essential services.

Whilst we appreciate the hard work of CEB staff, it does beg the question whether more money should be reinvested in the grid infrastructure to better serve the nation than in such lucrative salaries for state employees in the energy sector.

Indeed, the recent press release seeking to temporarily shut down roof top solar and mini-hydro systems appears only to demonstrate the failure of the CEB to meet its own responsibilities in updating the national grid.

9.0 Recommendations for the future of Sri Lanka's energy

a) At present we have a very fragile grid and the CEB should strenuously endeavour to minimize energy leakages and improve the grid by replacing weak transformers and grid lines. Such continuous improvements will enable us to move gradually towards a "Smart Grid" enabling absorption of large amounts of freely available intermittent renewable energies like wind and solar.

b) Currently we have ~2050 MW of renewables installed, comparable to hydroelectricity. When solar power is plentiful during daytime, hydro power can be reduced simply by controlling the water flow without any technical difficulties. This is one way of assuring energy storage while balancing the grid energy. In addition, Battery Energy Storage Systems (BESS) and pumped water storage plants should be introduced.

c) The future energy carrier is green hydrogen (GH) produced by electrolyzing water using both wind and solar. GH can also be converted into ammonia and methanol to produce fertilizer and be applied for other industrial uses, and for

[10] https://www.worldbank.org/en/news/press-release/2025/05/07/world-bank-group-to-boost-jobs-and-private-sector-growth-in-sri-lanka-with-1-billion-support-package

thermal energy in industry. Sri Lanka already has the Sobhadanavi LNG plant which is already commissioned but cannot be used for lack of supply of LNG. Renewables can bridge the gap.

d) Sri Lankan energy should be produced by a technology mix, including large hydro & mini-hydro systems, biomass, solar, wind and some limited imported fossil fuels which must be phased out. While accelerating renewable energy use, reliance and perpetuation of imported fossil fuel must be gradually reduced.

e) Local solar energy companies should install high quality solar energy systems and provide good after-sales services. The SLSEA must introduce adequate consumer protection guidelines and mandate to regulate the Solar PV service providers. PV companies should also collaborate with local electronic departments to manufacture accessories like inverters to create new jobs and reduce the total cost of the systems. As a country reliant mainly on agriculture, solar water pumping and drip irrigation systems should be introduced for enhanced food production.

f) The optimal use of renewable energy and the move away from fossil fuels should include the development and encouragement of the use of electric vehicles. Solar powered charging stations could be provided whilst EV are introduced in a phased manner.

g) It is important to increase public awareness through government funded campaigns and schools' programmes. The public must become aware of the risks of using imported and expensive fossil fuel and the benefits of renewables. Individual efforts should be encouraged to gradually reduce the use of fossil fuels and increase renewable energy products to achieve a cleaner environment, health benefits and enhanced standard of living conditions.