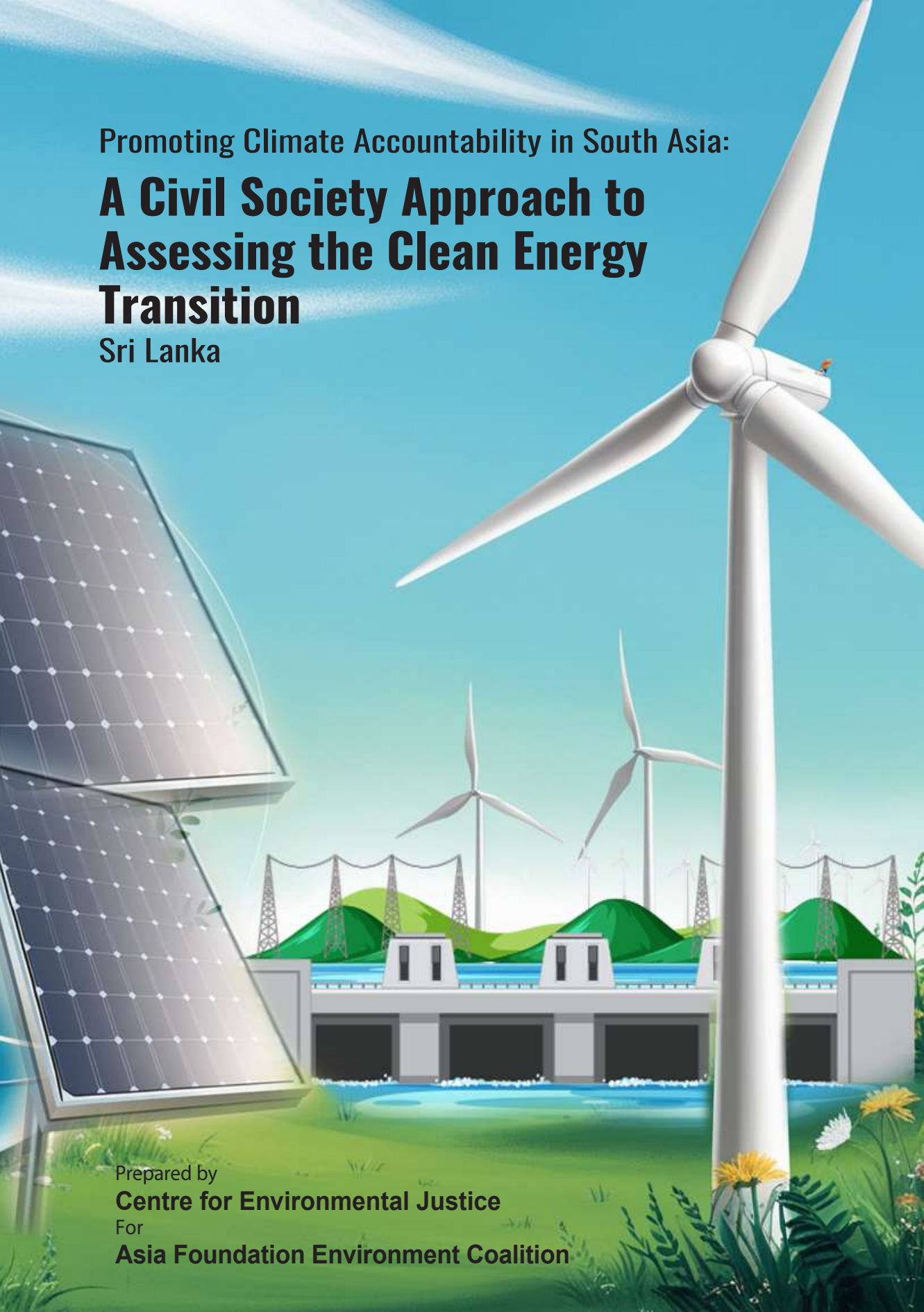
Promoting Climate Accountability in South Asia:

A Civil Society Approach to Assessing the Clean Energy Transition

Sri Lanka



Prepared by

Centre for Environmental Justice

For

Asia Foundation Environment Coalition

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This study presents insights gained from an evaluation of case studies, interviews, and documents to propose a framework designed for CSOs to track clean energy transitions driven by climate commitments. The research was conducted in Nepal, Sri Lanka, and Bangladesh, where the pace of energy transition varies in each country, underscoring the importance of aligning the process with the environmental and social context. These countries are at different stages of development, each with unique characteristics shaped by their historical contexts. While all have set targets following the Paris Accord, these countries maintain these goals in their own formats.

In this report, we present the findings on the Sri Lankan context of solar power, wind power and hydropower (with a focus on mini-hydropower projects), after reviewing several case studies. The proposed accountability framework reflects the lessons learned from these case studies.

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NDCs as entry point to address climate crisis

Sri Lanka, an island nation situated in the Indian Ocean, is uniquely vulnerable to the impacts of climate change. In fact, it ranks among the countries that are most vulnerable to climate change-induced hazards, primarily due to its high population density, low-lying topography, and dependence on natural resources for agriculture, fishing, and tourism. In recent decades, this tropical paradise has experienced significant shifts in temperature and precipitation patterns and so many extreme weather events that the Global Climate Risk Index has consistently placed it among the top ten countries at risk of extreme weather events.

In response to the challenges of climate change, Sri Lanka has taken several steps. Among them are its 2021 nationally determined contributions (NDCs), which are climate action plans required of nations that ratify the Paris Agreement following their being parties to the United Nations Framework Convention on Climate Change (UNFCCC). Sri Lanka's NDCs contain ambitious and progressive goals for cutting greenhouse gas (GHG) emissions and bolstering the nation's ability to withstand the effects of climate change.

Sri Lanka's updated NDCs identify six sectors for mitigation efforts: electricity, transport, industry, waste, forestry, and agriculture. Although not explicitly identified as one of the six, the energy sector is a major area of attention. In that sector, the NDCs highlight a commitment to increase the share of renewable energy, including solar, wind and hydro power, to reduce GHG emissions. The country aims to achieve a 4% unconditional and 10.5% conditional reduction in emissions by 2030.

According to 2021 NDCs, Sri Lanka's per capita GHG emissions in 2010 were 1.02 tons, and its global cumulative contribution in 2019 was 0.03%. Despite this low carbon footprint and its highly vulnerable status, Sri Lanka has committed itself to increasing forest cover by 32% by 2030 and reducing GHG emissions from power (electricity generation), transport, industry, waste, forestry and agriculture by 14.5% in the same period.

In order to realise this ambitious target, Sri Lanka has set the following targets:

- To achieve 70% electricity generation using renewable energy by 2030
- To achieve carbon neutrality in electricity generation by 2050
- To add no capacity from coal-powered plants

As mentioned above, the 2021 NDCs include ambitious targets for renewable energy, particularly wind, hydro, and solar power. The country aims to enhance its renewable energy contribution to the national electricity generation mix by increasing these renewable energies in particular. Achieving the 2021 NDCs' 20% GHG emission reduction target in the country's energy sector amounts to adding approximately 3,867 MW of renewable energy by 2030.

In the base case of its approved Long-Term Generation Expansion Plan (LTGEP), Sri Lanka has set targets of 1,825 MW for wind, 1,950 MW for mini-hydro, and 200 MW for biomass powers.

These targets are part of Sri Lanka's commitment to reducing GHG emissions and transitioning to a low-carbon economy.

Emission Context and NDCs

When it comes to Sri Lanka's GHG emissions context, the energy sector plays a significant role. Sri Lanka continues to rely heavily on non-renewable energy sources that contribute significantly to its GHG emissions. According to data from the International Renewable Energy Agency (IRENA), in 2020, approximately 81% of Sri Lanka's total energy supply came from non-renewable resources, primarily coal, oil, and other fossil fuels. Conversely, renewable energy accounted for about 16% of the total energy supply, with hydro, wind, solar, bioenergy, and geothermal sources comprising the majority of this portion.

This dependence on non-renewable energy translates into high levels of GHG emissions. In fact, in 2021, nearly three quarters (71%) of Sri Lanka's electricity and heat generation–related CO_2 emissions were derived from fossil fuels.

To address this issue, Sri Lanka has committed in its 2021 NDCs to reduce GHG emissions by 14.5% by 2030. It's

an unconditional reduction target, to be accomplished even without external assistance, is 4%.

Moreover, the nation aims to generate 70% of its electricity from renewable energy by 2030 and to achieve carbon neutrality by 2050. It has also promised not to increase increasing the capacity of its existing coal power plants.

In order to achieve these targets Sri Lanka recently adopted the following initiatives related to sustainable energy programmes.

- **National Energy Policy (2019)**

The key principles of the Energy Policy (2019) guide the country to develop indigenous renewable energy sources to the optimal level, diversify the generation mix, and minimise dependence on imported fossil fuels. This policy mainly focuses on ensuring the security, equity, and sustainability of the energy supply.

There are also some inconsistencies between the NDC's 2021 commitments and the national energy policy, however. The ambiguities should be carefully investigated in more detail.

- **Waste-to-energy investments and waste-composting measures**

Waste-to-energy (WtE) plants play a role in waste management by reducing the volume of waste sent to landfills by about 87%. WtE plants burn municipal solid waste to produce steam, which then powers electric generators, contributing to energy production. By investing more in WtE, Sri Lanka aims to reduce the open dumping of waste, increase waste collection in closed enclosures, promote WtE projects, and establish large-scale compost facilities.

That said, WtE generates concerns as it emits pollutants and GHGs such as CO_2. The potential disincentive for recycling and the fact that the trade in waste is unregulated are other drawbacks associated with WtE plants. Even if modern emission control technologies are put in place, concerns about the health impacts and environmental effects associated with WtE facilities remain.

A more sustainable approach than WtE solutions is promoting re-use, zero-waste, sustainable packaging materials, and recycling to minimize landfilling.

- **Enabling private investment in renewable energy by supportive policy instruments such as feed-in tariffs, net-metering and net-accounting.**

Electricity in Sri Lanka is generated using three primary sources: thermal power (which includes coal and fuel oil), hydropower, and other renewable energy sources (solar power and wind power). Hydro, whose share is 28%, is the main

source of renewable energy in the capacity mix. Other renewable energy sources such as wind, solar (ground-mounted and rooftop), mini-hydro, biomass and municipal solid waste are also used to generate power. Together, they constitute 30% of the capacity mix.

Sri Lanka's annual electricity demand was approximately 14,611 GWh in 2019. Also 2-19, around 35% of this demand was met by renewable energy resources. The electricity demand is expected to grow by 5% annually and future programs to expand electricity generation are expected to meet this growth.

The country is committed to reducing GHG emissions by 14.5% by 2030, or 4% unconditionally. It also aims to increase forest cover by 32% and to produce 70% of its electricity using renewable sources by 2030 and be net carbon zero by 2050. The objective is to increase the power generation capacity of the country from the existing 4,043 MW to 6,900 MW by 2025 with a significant increase in the proportion contributed by renewable energy. (*Figure 1:*)

- **Reducing the opportunities to build more coal power plants**

Among the significant commitments of the NDCs in terms of emissions in the energy sector are the commitments not to add any new coal power plants, to convert existing fuel oil-based combined-cycle power plants to natural gas plants, and to introduce new natural gas-based power plants.

However, natural gas has its own disadvantages, including dependency on fossil fuels, the emission of carbon dioxide (CO_2), potential methane leaks (another greenhouse gas) during extraction, transportation, and processing, as well as its environmental impact, particularly during fracking.

- **Enhancing Climate Finance Accessibility for Sustainable Development**

Climate finance is often seen as a key factor in enhancing the mitigation ambitions

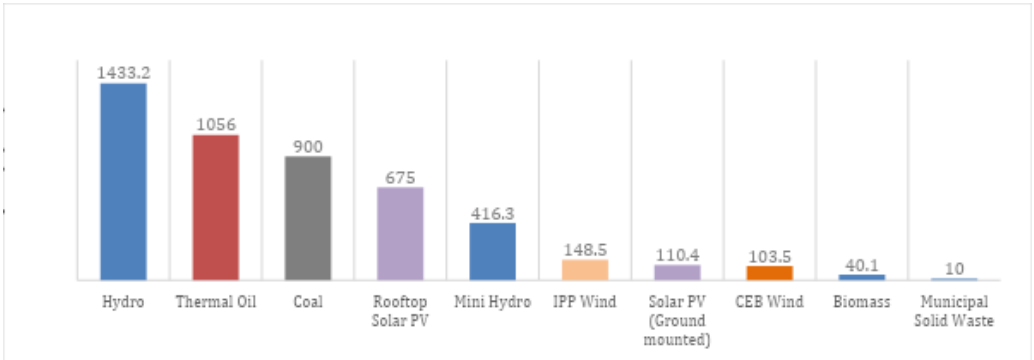

Figure 1: The composition of energy sources by 31 December 2022.
(Source: https://www.pucsl.gov.lk/electricity/quality/environment-and-renewable-energy/)

of developing countries, and a detailed analysis of financing options and co-benefits can help ensure that emission reduction actions are effective and sustainable. Promoting climate finance involves creating robust proposals that align climate actions with wide socio-economic agendas, addressing capacity constraints, ensuring that the requirements and criteria of various funding sources are aligned and compatible, making it easier to secure funding from multiple sources, and developing a clear climate rationale to secure funding effectively.

By improving its access to climate finance, Sri Lanka plans to better implement climate-resilient projects, advance its sustainable development goals, and foster a greener economy.

- **Embracing energy efficiency, the concepts of a circular economy, and cleaner production in all industries.**

Embracing energy efficiency, the concepts of a circular economy, and cleaner production in all industries involve integrating practices that focus on reducing waste, promoting sustainability, and maximizing resource utilization. A circular economy aims to create a closed-loop system that minimizes waste through strategies like recycling, reusing, and remanufacturing.

Energy efficiency plays a crucial role in achieving the goals of a circular economy by reducing energy consumption and Greenhouse Gas emissions. Some large industrial production facilities aim to be carbon-neutral for their marketing advantage and sustainability. The sector pledged to adopt "green" or "eco" concepts when investing in new industrial parks.

By adopting "green" or "eco" concepts, businesses can combat climate change, save on costs, create jobs, enhance resource security, and contribute to a more sustainable future.

However, it is important to consider whether green concepts are, in fact, green because most green concepts promoted and put into practice end up being green only superficially when, in fact, they are harmful to the environment and not green in the slightest. For instance, many argue that the concept of a "green building" is merely greenwashing.

NDC commitments

The long-term target of the Sri Lankan power sector is to achieve carbon neutrality by 2050. It was to achieve this goal that the National Energy Policy and Strategies was framed. To achieve this goal, Sri Lanka has developed a comprehensive implementation plan that includes policy reforms, capacity-building, and financial support. The plan emphasizes the need for external assistance, public funds, and private-sector investment to support the implementation of the nation's NDCs.

NDC #	NDCs and NDC Actions	Timeline
NDC 1	Enhance the contribution of renewable energy to the national electricity generation mix by increasing solar PV, wind, hydro, and sustainable biomass-based electricity generation (Target: Develop an additional capacity of 3,867 MW of renewable energy (965 MW unconditionally and 2,917 MW conditionally) over the BAU scenario[11]	2021-2030
	1.1 Establish wind, solar (rooftop, small-scale and large solar PV), biomass[12], large and small hydropower plants	2021-2030
	1.2 Develop the transmission network infrastructure needed to integrate renewable energy	2021-2030
NDC 5	Conduct R&D activities to implement pilot-scale projects for non-conventional renewable energy sources that have not yet reached commercial maturity and develop other grid-supporting infrastructures as conditional measures	2021-2030
	5.1 Conduct R&D activities to implement pilot-scale projects for new renewable energy sources which have not yet reached commercial-scale maturity	2021-2030
	5.2 Develop pumped storage hydropower plants and pilot-scale storage systems such as behind-the-meter (BtM) and grid-scale energy storage solutions to facilitate integrating renewable energy into the system by improving system flexibility	2021-2030
	5.3 Introduce ICT interventions such as smart grid technologies to support the integration of intermittent renewable energy into the system	2021-2030

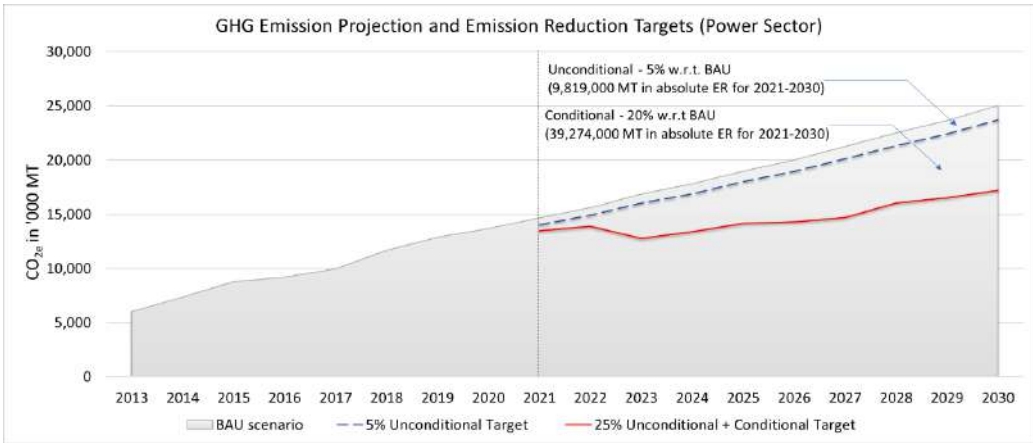

Figure 2: Emission Reduction Projections in the Electricity (Power) Sector.
(Source: Updated Nationally Determined Contributions, Sri Lanka, 2021)

Energy Platforms

The primary renewable energy sources in Sri Lanka include wind, solar, hydro, and biomass. The 2021 NDCs aimed to reduce GHG emissions in the energy sector by 20% and see renewable energy generate approximately 60% of the total electricity generated.

- **Wind power**

Wind power has been gaining momentum in Sri Lanka as the country aims to transition to a more sustainable energy mix. Though wind power is still in its early stages of development in Sri Lanka, with its abundant wind resources, Sri Lanka has the potential to harness wind power on a significant scale. Currently, Sri Lanka has a total installed capacity of 29.9 MW from wind power.

The Mannar Wind Power Project is the largest wind power project in the country. Commissioned in 2021, it contributes to the national grid, helping the government achieve its renewable energy goal with it 10 MW capacity. The project, however, has a serious drawback: it was situated along a bird migration route. The problem was later resolved by installing sensors and an auto-shutdown system after environmentalists raised concerns about whether the project adhered to the ADB's environmental policy.

In 2016, the project was expanded with the addition of 30 state-of-the-art wind turbines, each with a capacity of 1.75 MW. This expansion brought the total capacity of the project to 52.5 MW. The Mannar Wind Power Project is located in Mannar District, a district known for its high wind speeds and consistent wind patterns. The project is part of the Sri Lankan government's efforts to increase the share of renewable energy in the country's energy mix. The government aims to produce 70% of its electricity from

renewable sources by 2030 and achieve net carbon zero by 2050.

Other wind power projects are also in various stages of development in Sri Lanka. The country has considerable available land with wind resources with potential for development. The near-term potential wind power capacity in Sri Lanka is estimated to be around 500 MW.

The windmills in Nuwara Eliya are not part of the national grid; they were installed for local use. Nuwara Eliya, which is situated in the central highlands of Sri Lanka, experiences cooler temperatures and higher wind speeds than does the rest of the country. These characteristics make it an ideal location for generating wind power, although on a smaller scale than does the Mannar Wind Power Project.

Consultations with the community revealed, that certain absurd decisions were made related to wind power plants.

"The [five] Hambanthota Karagam Lewaya windmills were the first windmills established

Wind Power Plant	Expected Contribution (MW)	**Owner**	**Operator**
Ambewela Aitken Spence	3	Aitken Spence	Ace Wind Power
Hambantota	3	CEB*	CEB
Madurankuliya	12	WindForce	Daily Life renewable energy
Mampuri-I	10	Senok	Senok Wind Power
Mampuri-II	10.5	Senok	Senok Wind Energy
Mampuri-III	10.5	Senok	Senok Wind Resource
Thambapavani Wind Farm	103.5	CEB	CEB
Nala Danavi	4.8	LTL Holdings	Nala Danavi
Nirmalapura	10.5	WindForce	Nirmalapura Wind Power
Pawan Danavi	10.2	LTL Holdings	Pawan Danavi
Pollupalai	12	WindForce	Joule Power
Seguwantivu	9.6	WindForce	Seguwantivu Wind Power
Uppudaluwa	10.5	WindForce	PowerGen Lanka
Vallimunai	12	WindForce	Beta Power
Vidatamunai	10.4	WindForce	Vidatamunai Wind Power
Willwind	0.85	Willwind	Willwind

**CEB- Ceylon Electricity Board*

Table 1: Wind power projects and their expected contributions.
(Source: https://en.wikipedia.org/wiki/List_of_power_stations_in_Sri_Lanka).

in Sri Lanka. They were owned by the Sri Lanka Electricity Board and contributed 3 MW to the national grid. But then the government decided to dismantle [the wind turbines] in 2018. Saying that the wind farm was situated on land belonging to the Port Authority, which was later given to a Chinese company under the China Harbour Agreement, the Ceylon Electricity Board had to pay a considerable tax. Then a few small windmills were constructed and opened by the minister, in an act whose exact purpose we do not understand," remarked an interviewee who was reluctant to have his name published.

- **Solar power**

The adoption of solar power as a renewable energy source has gained significant traction in recent years due to its environmental benefits and potential for sustainable energy generation. The NDCs mention promoting generating solar power through different modalities, such as solar rooftops and solar parks, with the expectation that approximately 500 MW will be generated in the short term and that that amount will be expanded to a much higher level by 2030.

Surya Udanaya was a rooftop solar power project initiated by the former president, Maithripala Sirisena. It aimed to promote the use of renewable energy sources, specifically solar energy, to generate electricity. The project involved installing solar panels on the roofs of government buildings, schools, and other public institutions. The generated electricity was then used to power these buildings that housed the systems, reducing their reliance on fossil fuels and lowering their energy costs.

The project was a part of the government's

Figure 3: The small windmills currently operated at Hambantota in place of the 3MW former wind power project.

Figure 4: A rooftop solar panel established at a government Ayurvedic medical centre in Dombagahawela, Siyambalanduwa

broad strategy to transition to clean, renewable energy sources and reduce the country's carbon footprint. It also aimed to create jobs in the renewable energy sector and promote energy independence. It also intended to generate significant benefits for Sri Lanka, including reduced GHG emissions, lower energy costs, and increased energy security.

Sooriyabala Sangaramaya (Battle for Solar Energy) is an initiative launched by the Ministry of Power and the State Minister of Solar, Wind and Hydro Power Generation Projects Development in collaboration with the Sri Lanka Sustainable Energy Authority (SLSEA), Ceylon Electricity Board (CEB) and Lanka Electricity Company (Private) Limited (LECO). This initiative promotes the installation of small solar power plants on the rooftops of households, religious places, hotels, commercial establishments, and industries[1].

Installing solar power plants, however, comes with several challenges that need to be addressed to maximise the effectiveness and minimise the negative impacts of such plants.

Solar panels and many of the other components essential for solar power plants are expensive, so the cost of the initial investment is high. This financial barrier may undermine the widespread adoption of all solar projects, but especially large-scale projects. The cost of components contributes significantly to the overall expense of establishing a solar power plant.

It is expensive to install and maintain a solar power plant, particularly if it is a large one. Among those costs are land acquisition, labour expenses, and equipment

1 https://www.energy.gov.lk/en/soorya-bala-sangramaya

procurement. The need for a significant upfront investment can pose a challenge for organisations and governments looking to transition to solar energy on a large scale.

An often-overlooked aspect of solar power is its environmental impact, particularly that associated with the disposal of components like lead-acid and lithium-ion batteries. Lead-acid batteries contain toxic lead, while lithium-ion batteries contain materials like cobalt that can be environmentally damaging if not disposed of properly. Addressing the safe disposal of batteries is crucial if a nation is to successfully mitigate the negative environmental impacts of solar power.

One critical challenge in implementing ground-mounted solar power plants is just how much land is required for their operation. One estimate suggests that for every 1 MW of electricity produced, 5 ha of land is needed. The need for vast expanses of land can lead to conflicts over land use and raise environmental concerns, especially in regions where land availability is limited. Balancing the need for land with environmental conservation efforts is essential to ensure the sustainable deployment of solar energy infrastructure.

Project	Expected Contribution (MW)
Hambantota	1.2
Laugfs	20
Maduru Oya	100
Sagasolar	10
Solar One Ceylon	12.6
Soorya Bala Sangramaya Solar Rooftop Programme	640
Small-scale ground-mounted solar power plants	70
Valachchenai and Vavunathivu	20 (10 each)
1-10 MW solar power plants	147 (in total)
Planned Siyambalanduwa Solar Power Park	100
Mahiyangana Solar Plant (under construction)	100
Proposed floating solar power plants on Chandrika and Kiri-ibban tanks	3,000

Table 2: Solar power projects and their expected contributions.
(Source: https://en.wikipedia.org/wiki/List_of_power_stations_in_Sri_Lanka).

The proposed floating solar power plants on Chandrika and Kiri-ibban tanks are expected to contribute 3 GWh to the national grid once they begin operating[2]. Sri Lanka's Ministry of Irrigation will allocate 0.99 ha of water surface and 0.1 ha of land from the Chandrika and Kiri-ibban tanks for two floating solar power generation pilot projects.

The cabinet of ministers has approved a proposal by the minister of irrigation to allocate space for the two projects, which are themselves the product of an agreement between Sri Lanka's Ministry of Power & Energy and the Korean government's Korea Institute for Advancement. The land and water surface areas will be leased to the Sri Lanka Solar Energy Authority on an annual basis so the two solar pilot projects can be run.

The impact that these floating solar power plants will have on the aquatic ecosystem is a concern.

> *"Solar power is good energy, but why don't they use the sides of a highway to build it? Or rooftops in the dry zone? Why clear vast extents of land in this small country? This land was used by our elephants, deer, and spotted chevrotain[3]. Now it has fallen victim to plant operators."*
>
> - ***Kaluarachchige Sumanadasa, Hambanthota –***

> *"Nowadays plants are established by private companies. The unit price of the electricity they produce is higher than that produced by diesel power plants. Earlier, when a unit of diesel power cost only 12 rupees, a unit of solar power cost 45 rupees. These companies use free natural resources like solar power and land and then charge the government for the power generated. Why cannot the government take over? People suffer from water scarcity and human-elephant conflicts as a result of such extensive land use."*
>
> - ***an interviewee who was reluctant to publish his name, Hambanthota –***

- **Hydropower**

As of 2018, Sri Lanka generated 1,860 MW of electricity from large hydropower plants and 328 MW from small hydropower points for a total of 2,188 MW of hydropower.

2 https://economynext.com/sri-lanka-to-build-floating-solar-power-plants-on-chandrika-wewa-kiriiban-wewa-153225/

3 Spotted chevrotain or Moschiola meminna. Head and body length in the species typically is 55–60 cm. It is dull brown in colour with three or four dotted white stripes going longitudinally along flank (https://en.wikipedia.org/wiki/Sri_Lankan_spotted_chevrotain).

Dam / power station	Capacity/ MW
Deduru Oya	1.5
Nilambe	3.2
Udawalawe	6
Gal Oya	12
Moragahakanda	25
Moragolla	30
Broadlands	35
Bowatenna	40
Polgolla	40
Castlereigh	50
Norton	50
Rantembe	52
Maskeliya	60
Laxapana	75
Kukule Ganga	80
Canyon	100
Dyraaba	120
Samanala	124
Randenigala	126
Upper Kotmale	150
Kotmale	201
Victoria	210

Table 3: Hydropower projects and their expected contributions
(Source: https://en.wikipedia.org/wiki/List_of_power_stations_in_Sri_Lanka).

The Climate Prosperity Plan of Sri Lanka aims to make the country a net energy exporter by 2025 and to have renewable energy production exceed 100% of domestic power needs by 2040.

> *"Having a number of hydropower projects in the same area has a number of social and environmental impacts. Most of these mini-hydropower plants are privately owned. They are profit-oriented and do not care about either the local people or the environment. Sometimes they don't release water downstream until people go on a strike. They do not care about the geology either, including potential effects on the waterbed and land stability that may result in landslides."*
>
> - ***Activist against mini-hydropower in the Kukule River -***

Transition Pathways

Renewable energy is, without a doubt, a good source to promote, and the government of Sri Lanka has taken action in promoting it. The challenge lies in promoting renewable energy at the grassroots level given that numerous inconsistencies may arise when attempting to implement national policies and programs at the local level. Such inconsistencies may actually impair the effectiveness of the plans and programs and even cause serious environmental damage.

Thus far, no thorough research has been conducted regarding or even attention given to the inconsistencies in Sri Lanka's energy commitments. It is imperative, however, that these inconsistencies be examined and given the consideration they warrant, and that debates about them begin. In a first step, we aim to investigate how plans are implemented and what discrepancies resulted from this in this chapter on transitional pathways, using several important renewable energy generating projects, particularly the Upper Elahera Mini-Hydropower, Mannar Wind Power, Siyambalanduwa Solar Power, and Athwelthota Mini- Hydropower, as case studies.

Solar Power Projects

In-depth interviews conducted and observations made during site visits to investigate the environmental impacts of implementing solar power plants yielded several key findings that shed light on the complexities and interconnectedness of these impacts.

First, the clearance of forests to make way for ground-mounted solar power plant projects is a significant concern. Forests play a crucial role in carbon sequestration, serve as feeding grounds, and provide

Figure : Ground-mounted solar power projects displace forest cover and fertile land.

habitats for wildlife. Their clearance disrupts ecosystems and contributes to biodiversity loss. Such a loss of habitat can have cascading effects on wildlife populations, disrupting delicate ecological balances.

Second, solar power plants are often built on fertile land that could otherwise be used for agricultural or horticultural purposes. The selection of such land for energy production raises questions about land-use efficiency and the trade-offs between energy production and food security. Converting fertile land into solar farms can exacerbate food scarcity and land degradation, harming local communities and ecosystems.

> *"In Sri Lanka, solar power is promoted through ground-mounted solar panels which utilize forest and fertile land, a practice which is highly unacceptable."*
>
> - ***Mr. Sanjeewa Bandara, Siyambalanduwa -***

Third, installing solar power plants can result in a localized rise in temperature in the surrounding areas. The large surface area of solar panels absorbs and retain heat, altering local microclimates and potentially exacerbating heat island effects. Solar plant-induced changes in temperature patterns can have far-reaching consequences for both natural ecosystems and human settlements, affecting both biodiversity and public health.

"The temperature in Siyambalanduwa is already high, and due to the deforestation [caused by installing solar panels], the temperature has increased even more."

- ***An activist from Hambantota.***

Moreover, changes in rainfall patterns have been observed in areas surrounding solar power plants. Alterations in land surface properties due to solar panel installation can disrupt natural hydrological cycles, leading to changes in precipitation patterns and water availability. These changes can then exacerbate water stress in already vulnerable regions, adversely impacting agriculture, ecosystems, and human livelihoods.

"There is a change in rainfall, too. Earlier, people in the area depended solely on the annual rainfall to support their agricultural activities, but now they can no longer do that because rainfall has decreased. Now farmers have to seek alternative water supplies for their crops. As a result, annual harvests have also decreased."

- ***An activist from Hambantota -***

The impact on biodiversity extends beyond habitat loss to encompass disruptions to the migratory patterns, nesting sites, and food sources of various species. The fragmentation of habitats due to the development of solar power plant can isolate populations and increase their vulnerability to extinction. This loss of biodiversity not only threatens the integrity of ecosystems but also compromises the services they provide to human societies, such as pollination and pest control.

"Not only has the number of wild elephants decreased, but also that of other animal species such as the sambar deer and the spotted chevrotain."

- ***An activist from Hambantota -***

Furthermore, the presence of solar power plants can have specific impacts on local wildlife, such as wild elephants. The disruption of their migratory routes and habitat can result in human-wildlife conflicts which poses risks to the safety

of both animals and humans. Addressing these impacts requires planning carefully and implementing mitigation measures designed to minimise disturbances to wildlife populations and ensure their conservation.

"They made an extremely stupid choice when they decided to construct a solar power plant that invades forest reserve areas and, as a result, has caused wild elephants to move onto the only accessible land still remaining, a place where humans reside."

- ***Mr. Sumanadasa, Hambantota -***

"Elephants have lost their habitats and food sources, so they travel to areas where people still live and destroy their crops and homes. But most people are aware of and accept the fact that the elephants are not the ones to be blamed."

- ***An activist from Hambantota -***

"An elephant needs to eat around an area of 16 square miles per day. When solar projects take their lands, where will they go and how will they eat?"

- ***Mr. Kaluarachchige Sumanadasa, Hambantota -***

To mitigate the negative environmental impacts of ground-mounted solar projects, alternative approaches such as floating and rooftop solar systems have been suggested. These alternatives minimize land-use conflicts and reduce habitat disruption by utilizing non-invasive installation methods. By prioritizing these environmentally friendly alternatives, the government can minimize the ecological footprint of solar power generation while still maximizing its benefits for sustainable development.

"Rather than advocating ground-mounted solar electricity, they should use land near highways to establish solar panels. Then no one would get harmed. Also, these houses receive sunlight all-day long. Why don't they use these spaces?"

- ***Mr. Kaluarachchige Sumanadasa, Hambantota -***

Many interviewees seemed to Favor using r*ooftops and highways for solar panel installation.*

"One option to avoid the ecological damage solar power plants cause is to install solar power plants next to highways, where there is a large vacant area."

- ***Mr. Sanjeewa Bandara, Siyambalanduwa -***

Wind Power Projects

Wind power is widely regarded as a valuable source of clean energy, yet implementing wind power plant projects at the ground level often introduces both direct and indirect consequences for the environment. Our investigation, conducted through interviews, revealed several noteworthy findings which shed light on these impacts.

Our research highlighted that implementing wind power plants at ground level has several negative environmental impacts. The selection of land for these projects presents significant challenges, leading to widespread effects on the ecosystem. Issues arise due to the need for vast, uninterrupted stretches of land, often leading to conflicts over land use and the displacement of communities. In addition, selecting inappropriate sites can exacerbate environmental degradation, affecting ecosystems and biodiversity and, ultimately, even climate change.

> *"The proximity of the turbine installations resulted in alterations to weather patterns. A decrease in rainfall levels was noted as one environmental consequence of the windmill projects. During construction, vegetative canopy was cleared or removed. The use of forested lands to construct the plant caused deforestation in the area."*
>
> - ***Mr. E. Marynathan, Mannar –***

The construction phase merely serves to amplify this environmental toll. Removing vegetation to install turbines disrupts habitats and accelerates soil erosion, heightening the risk of floods.

The construction of access roads also contributes to soil disturbance, increasing the amount of sediment runoff into nearby water bodies. Furthermore, machinery and construction activities emit substantial noise and vibration, both of which disturb wildlife and local communities. The resultant emission of dust not only degrades air quality but also settles on surrounding ecosystems, impacting plant and animal life.

> *"While Mannar Wind Power Project was being constructed, emissions of dust increased due to construction activities."*
>
> - ***Mr. E. Marynathan, Mannar -***

The most significant impact of wind turbines is on birds and bats whose flight paths intersect with turbine blades. The proliferation of wind farms in avian and chiropteran habitats poses a grave threat to avian and chiropteran populations as

collisions, often fatal, increase. Moreover, the removal of vegetation and alteration of ecosystems disrupts food chains and, as a result, threatens biodiversity. This disruption extends to aquatic ecosystems, where changes in water flow and quality can prompt fish migration, impacting both aquatic biodiversity and the livelihoods of local communities dependent on fishing.

The environmental impact assessment (EIA) process, though crucial for evaluating and mitigating environmental risks, often falls short in identifying and addressing the complexities of wind power projects. Inadequate assessments fail to anticipate or mitigate the full extent of environmental consequences, thus undermining the effectiveness of regulatory frameworks. This failure underscores the need for comprehensive assessments that consider the interconnectedness of environmental systems and the long-term implications of such projects.

Addressing these challenges necessitates exploring alternative approaches to selecting locations for and structures of turbines. The latest, least environmentally damaging technologies should be applied.

> *"Offshore installations offer several advantages, including a reduction in the environmental impact of a wind power stations on terrestrial ecosystems and a mitigation of likely conflicts over land use."*
>
> - ***Mr. E. Marynathan, Mannar –***

By harnessing wind resources from coastal and marine environments, offshore projects can potentially alleviate many of the environmental concerns associated with ground-level installations. However, offshore projects present their own set of challenges, including technical complexities and high costs. Thus, while offshore wind power offers a promising avenue for reducing environmental impacts, careful consideration of its implications is essential.

Mini-Hydropower

The promotion of mini-hydropower as an energy source in countries like Sri Lanka is a more compelling alternative than other non-renewable options. However, the implementation of mini-hydropower plants at the ground level inevitably raises concerns about their significant environmental impact, which may not be easily reversible. To comprehensively investigate the implications of such projects and shed light on the multifaceted dimensions of their effects, a series of interviews were conducted.

These interviews made clear the complex dynamics surrounding the implementation

of mini- hydropower plants in Sri Lanka. First, it was apparent that despite the potential benefits of hydroelectricity, the environmental impacts associated with mini-hydropower are significant. These impacts often outweigh the energy output they aim to generate, suggesting that there is a fundamental imbalance in their cost-benefit analysis.

Moreover, it was observed that the construction of mini-hydropower plants detrimentally affects the natural beauty and serenity of the surrounding landscapes, undermining not just the aesthetic value of the environment but also its recreational and spiritual significance for local communities.

Deforestation, which often occurs during construction, emerged as a major concern.

> *"Significant forest clearance happened during the construction of the power plant, and we experienced a significant increase in temperature afterward."*
>
> - ***Mrs. Mohomad, a resident nearby Soranathota Mini-Hydropower Plant -***

The clearance of vegetation not only disrupts ecosystems but also exacerbates environmental problems such as the prevalent increase in temperatures and alteration in rainfall patterns. The consequent changes can have far-reaching implications for both local and regional scales, impacting agriculture, water resources, and overall ecological balance.

Furthermore, the construction of mini-hydropower plants poses a heightened risk of natural disasters such as floods and landslides. These events not only endanger human lives, agriculture and infrastructure but also exacerbate environmental degradation and habitat destruction.

> *"The canal built to transfer water towards the turbine cut across much vegetation. In addition, this medium-scale hydropower project, during its construction, dug away at the mountain base and used blasters to cut through the rock bed. This activity was felt by villagers living on both sides of the Kukule River mostly because the river as well as this area [where the interview took place] share the same mother rock. It is obvious that this mountain, where they are building this canal and supply road, will soon experience a landslide. Moreover, as the water source for the wells is rock aquifers, we fear that the drying of the river as a result of the diversion of water flow for power generation will result in our wells drying up, creating water scarcity."*
>
> - ***Mr. Lahiru Prabath, a resident of the Kukule River hydropower area –***

Interestingly, our interviews revealed a concerning lack of attention from authorities towards the environmental

Figure : Despite a recent landslide, the construction of the canal is continuing near the Kukule River. As this is privately owned land and a private project, there does not seem to be much concern about the potential disasters associated with the project. (Photograph taken on 17/03/2024)

impacts of mini-hydropower projects. We found that EIA reports were inadequate in accurately assessing and addressing the damages inflicted on the environment, a fact suggesting a systemic failure in regulatory oversight. To mitigate the negative consequences of mini-hydropower projects, they must be implemented judiciously in suitable locations. Doing so necessitates having a comprehensive understanding of environmental sensitivities and ecological dynamics to minimize harm and maximize benefits.

In addition, the impact of hydropower on wildlife and biodiversity, particularly endemic fish species, emerged as a pressing concern as mini-hydropower projects, as they are often constructed in undisturbed segments of water flows where biodiversity is high. The disruption of aquatic ecosystems can then have cascading effects on biodiversity and ecosystem functioning, an impact underscoring the importance of considering the conservation implications of such projects.

Decision-makers must prioritise a holistic and scientifically informed approach to the implementation of mini-hydropower projects. Doing so will require robust environmental assessments, high stakeholder engagement, and transparent decision-making processes aimed at ensuring the development of sustainable energy while safeguarding the natural heritage of Sri Lanka.

"When we raised concerns over the violations of the conditions of the permit given to these hydropower projects, officers told us that we needed energy and that this was renewable, so they couldn't oppose it. After the recent power cuts, they stopped listening to us at all despite the fact that the owner had openly violated the conditions given in permission letters. What I understand is that as long as these projects are privately owned, they will not be considerate of either the environment or people. They just think about profit. Why can't the government take up these projects, declare watersheds to be conserves, and operate them sustainably?"

- ***Mr. Lahiru Prabath, resident of the Kukule River hydropower area -***

Opportunities and Barriers

1) **Regional coalition-building to reach international platforms**

South Asian Just Energy Alliance (SAJTA) advocates for a sustainable energy transition.

In response to the crucial need for cleaner energy sources in South Asia, activists from Sri Lanka, Nepal, Bangladesh, India, and Pakistan collaborated to produce a comprehensive report on the energy policies in South Asia directed toward achieving net-zero targets. This initiative, led by the Centre for Environmental Justice (CEJ) and its partners, emphasised the environmental and economic benefits of transitioning to cleaner energy.

The South Asian Energy Colloquium (SAEC) held in Kathmandu, Nepal, in July 2023 brought together stakeholders from around the region to discuss shared energy-related concerns. The result was the formation of the South Asian Just Energy Alliance (SAJTA). Guided by the principles of human rights, environmental safety, inclusion, equality, and gender sensitivity, SAJTA emerged as a collective voice advocating for a just transition away from fossil fuel dependence.

SAJTA's advocacy emphasises the unique South Asian perspective on energy, asserting, essentially, that the region should determine its own future with regard to energy utilisation. This alliance believes in reshaping economies, abandoning reliance on fossil fuels, and advocating for a transition that considers the needs of diverse communities, including people with disabilities and indigenous populations.

SAJTA made its presence felt at COP28 by hosting a press conference on

December 11, 2023, highlighting the role of major economies in supporting a just transition in South Asia. Notably, SAJTA was not created due to an external forced or influence; on the contrary, it emerged organically as a result of regional collaboration on producing the report on "Energy Policies in South Asia toward Net Zero targets" led by the Centre for Environmental Justice.

2) **Sri Lanka's economic crisis attracts investors without safeguard policies designed to protect the environment**

Sri Lanka's economic crisis has posed significant challenges to renewable energy, especially in attracting investors, and the resulting desperation for investment has resulted in a lack of emphasis on safeguard policies for environmental protection. The absence of robust environmental safeguards presents a major barrier to the adoption of clean energy sources. This section examines the implications of the economic crisis on the promotion of cleaner energy and the challenges of implementing renewable energy projects when environmental protection measures are insufficient.

Sri Lanka's economic crisis, which is characterised by a high debt burden, inflation, and currency depreciation, has created an uncertain investment climate. Paradoxically, it is in these very circumstances that attracting investors is most paramount for economic recovery and development initiatives. The focus on luring investors, however, often prioritises economic gains over environmental considerations. In particular, investors may be enticed by lax environmental regulations as there will be fewer constraints on their operations and, in consequence, potentially higher profits.

The absence of safeguard policies for environmental protection makes it all the more likely that economics will come first, even at the expense of the environment. Poor enforcement of Sri Lanka's regulatory framework allows businesses to exploit natural resources with minimal regard for environmental consequences. In their pursuit of economic growth, governments may prioritise short-term gains over long-term sustainability, neglecting the need for stringent environmental safeguards.

The neglect of environmental protection measures poses a significant barrier to the promotion of cleaner energy sources in Sri Lanka. While there is increasing global awareness of the need to transition towards renewable energy to mitigate climate change, Sri Lanka's reliance on conventional energy sources persists. Unless they have adequate safeguards, renewable energy projects

may face resistance from environmental activists and concerned citizens who fear the projects' adverse impacts on ecosystems and communities.

The implementation of renewable energy projects underscores the issues resulting from inadequate environmental protection measures. While these projects do offer potential benefits such as reduced GHG emissions and energy independence, if they are not properly managed, they might pose environmental risks. For instance, large-scale hydropower dams can disrupt river ecosystems and displace local communities. Similarly, poorly planned wind and solar installations may encroach upon sensitive habitats or agricultural land.

Furthermore, unless robust EIAs and stakeholder consultations are conducts, conflicts may arise among project developers, local communities, and environmental organizations. Any such conflict will not only delay project implementation but also undermine public trust in renewable energy initiatives. In addition, renewable energy projects without adequate safeguards in place may perpetuate environmental degradation rather than contribute to sustainable development.

Sri Lanka's economic crisis has made it difficult to promote clean energy sources, and the lack of safeguard policies for environmental protection has complicated matters. While attracting investors is crucial for economic recovery, prioritising short-term gains over long-term sustainability will hamper efforts to transition towards renewable energy. Disparities created in implementing renewable energy projects underscore the need to adopt robust environmental safeguards so that economic development is pursued in harmony with rather than in place of environmental conservation. Only through a balanced approach that integrates economic, social, and environmental considerations can Sri Lanka achieve a sustainable energy future.

3) Increased energy demand

The surge in demand for energy in Sri Lanka poses a significant barrier to the promotion of cleaner energy alternatives and, at the same time, increases the country's reliance on traditional fossil fuels. This heightened demand stems from various factors, including population growth, industrial expansion, and increased urbanisation. As the demand for electricity rises, so does the pressure to meet that demand

swiftly, an urgency often leading to the expedited implementation of conventional energy solutions. This rush can impede the adoption of renewable energy sources, which typically require longer planning and implementation periods than conventional sources.

In addition, problems arise when integrating renewable energy projects into the existing infrastructure. Challenges such as grid integration, intermittent energy supply, and the high capital costs hinder the seamless transition to cleaner energy sources. While the potential benefits of renewables—reduced GHG emissions and energy security among them— are undeniable, clean energy plans require strategic planning, investment, and policy support to ensure a sustainable energy future for Sri Lanka.

4) Accessibility

Accessibility to energy, which, in large part is determined by its unit cost, is a critical factor in determining equality and equity, particularly for middle- and lower-class individuals and communities. In Sri Lanka, as in many other countries, the transition to cleaner energy sources presents both opportunities and challenges in this regard. While renewable energy projects promise sustainability and reduced environmental impact, they often require significant initial investment and infrastructure development. This upfront cost can create a barrier for middle and lower-income households, who may struggle to afford the transition to expensive renewable energy technologies such as solar panels or wind turbines. There is a risk that, without adequate support and policies in place, the burden of transitioning to cleaner energy could disproportionately fall on those who can least afford it, thereby exacerbating existing inequalities.

Moreover, if renewable energy projects are implemented without considering the socio-economic context and specific needs of disadvantaged communities affected by the project, there is a risk of further marginalization and exclusion. Thus, addressing the affordability and accessibility of clean energy solutions is crucial to ensuring that the transition benefits all segments of society and promotes greater equality and equity in Sri Lanka's energy landscape.

5) Governmental trajectory toward cleaner energy

The Sri Lankan government's trajectory toward cleaner energy is marked by both promising intentions and persistent barriers. While the nation aims to

transition towards renewable energy sources to mitigate environmental degradation and sustainably meet growing energy demands, several challenges hinder the progress. One significant barrier is the inconsistency between the government's objectives and the practical implementation of renewable energy projects.

Bureaucratic inefficiencies, regulatory hurdles, and the lack of streamlined processes often impede the government's ability to move swiftly toward achieving its stated targets for increasing renewable energy capacity. Political instability and fluctuating policies further complicate that transition by making investors and stakeholders feel uncertain about the nation's direction. Consequently, the government's aspirations to promote cleaner energy and transition towards a more sustainable energy future are stymied by the discrepancy between its goals and plans and the practical implementation of renewable energy projects.

6) Community responses

In Sri Lanka, community responses play a crucial role in shaping renewable energy initiatives. They serve as a barrier to promoting cleaner energy and reveal inconsistencies between commitments and implementation of these renewable projects.

Concerns about the impact of renewable energy projects on livelihoods, landscapes, and cultural heritage often provoke resistance by or opposition from affected communities. Most hydropower and solar projects intersect with community uses of land and resources, thereby making the chances of conflict high. To avoid dispute and foster acceptance and support for renewable energy initiatives, inclusive dialogue, community engagement, and effective communication are essential. Controversy can arise during project implementation when there is a mismatch between the promised benefits of renewable energy and the actual experiences of local communities. The chances of such controversy also are increased by inadequate consultation processes, insufficient consideration of community needs and preferences, and/or flawed planning and execution. Ensuring community support requires proactive efforts to ensure transparency, equity, and accountability throughout the entire project lifecycle as fostering trust and cooperation among stakeholders. If discord is avoided, Sri Lanka's transition towards a cleaner and more sustainable energy future will be that much easier.

7) EIAs that influence the path to renewable energy

In Sri Lanka, the EIA process plays a pivotal role in shaping the trajectories of energy projects, particularly those that promote cleaner sources. That said, EIAs, while they are intended to ensure sustainable development, often fail to ensure the sustainability of renewable energy projects. This discrepancy is attributable to the lack of clarity in EIA guidelines, inadequate expertise within regulatory bodies to evaluate renewable energy proposals effectively, and insufficient monitoring and evaluation in the post-implementation stage. Inadequate assessment of environmental, social and economic impacts and resultant inability to apply effective mitigation measures during project implementation has resulted in a number of environmental and social crises, including the amplification of human-wildlife conflicts.

It is crucial to enhance the capacity of regulatory bodies to assess renewable energy projects comprehensively. These bodies should be able to incorporate local knowledge by conducting public consultations during the EIA process. The project must foster collaboration among stakeholders, including government agencies, environmental experts, and project developers, to ensure a balanced approach that promotes both environmental protection and sustainable energy development.

Accountability Framework

While implementing renewable energy projects in developing countries like Sri Lanka is crucial for achieving sustainable development, challenges arise at the ground level, sometimes leading nations to violate their environmental commitments. Sometimes, projects are halted midway when adverse environmental impacts surface, rendering earlier investments futile. To effectively and productively promote renewable energy while minimising environmental harm, a robust accountability framework is essential. Interviews with five energy experts suggested several measures that are key to developing such a framework.

1) **Strong Implementation of the EIA Mechanism**

   All five of the experts agree that a more transparent and robust implementation of the EIA mechanism is necessary. Monitoring and evaluation processes need to be more rigorous to ensure adherence to environmental commitments. By enhancing transparency, stakeholders can better understand the potential impacts of renewable energy projects and take appropriate mitigative measures.

   "The EIA process should be more transparent.", Mr. A. Abhayagunawardane, electrical engineer, environmentalist, and social activist

   "The EIA process should be beneficial for finding out where an energy plant should be implemented with the least environmental impact.", Mr. R. Wijemanna, energy expert, accredited energy auditor on the UNFCCC roster of experts

2) Adoption of International Policies

Experts recommend adopting international policies, particularly safeguard policies and mechanisms outlined by organisations such as the Organisation for Economic Co-operation and Development. These policies provide frameworks for assessing and mitigating the environmental and social risks associated with energy projects. By aligning itself with established international standards, Sri Lanka can ensure that its renewable energy initiatives adhere to best practices and minimise adverse impacts.

"Sri Lanka should study other countries which promote renewable energy and the measures they have taken in order to ensure the accountability of their renewable energy power projects and then adopt the appropriate ones into our energy plans.", Prof. Sugathapala, University of Moratuwa, Sri Lanka.

3) Promotion of Diverse Renewable Energy Alternatives

Diversifying renewable energy options, such as investing in ground-mounted and floating solar power plants and rooftop solar projects, can mitigate environmental impacts. By exploring alternative technologies and distribution methods, Sri Lanka can harness renewable energy efficiently while and reduce its ecological footprint. Diversification also enhances resilience and energy security by decreasing reliance on conventional energy sources.

Replacing long-canalled mini-hydropower plants with floating turbines or multi-rotor wind tower is one change to consider.

"There is no need to construct mini-hydropower plants in Sri Lanka anymore as there are better alternatives such as rooftop solar power plants, which generate more energy than mini-hydropower.", Prof. Sugathapala, University of Moratuwa, Sri Lanka.

4) Establishment of Stakeholder Committees

Forming stakeholder committees comprising representatives from relevant departments facilitates informed decision-making. By bringing together diverse perspectives, these committees can assess the broader implications of energy plans and ensure that they align with national development goals. In addition, collaborative decision-making

Accountability Framework

Environmental Impact Assessment (EIA) Process

Key Actions

Conduct thorough EIAs, identify risks, and ensure projects are ecologically viable.

Outcome

Identifying Risks and Mitigating Impacts
Ensuring Projects Are Eco-Friendly
Protecting Ecosystems and Biodiversity

Adoption of International Policies

Key Actions

Align projects with global safeguard policies from organizations like the World Bank and OECD.

Outcome

Aligning with Global Environmental Standards
Ensuring Best Practices for Social and Environmental Safeguards
Reducing Negative Impacts from Energy Projects

Promotion of Diverse Renewable Energy Alternatives

Key Actions

Invest in diverse technologies like ground-mounted solar, rooftop solar, and floating solar plants.

Outcome

Expanding Renewable Energy Sources
Reducing Ecological Footpri
Increasing Resilience and Energy Security

Establishment of Stakeholder Committees

Key Actions

Form committees to involve representatives from government, local communities, and investors.

Outcome

Encouraging Collaborative Decision-Making
Ensuring Stakeholder Consensus
Aligning Projects with National Development Goals

Transparency and Accountability at Every Stage

Key Actions

Establish mechanisms for public participation, project monitoring, and clear reporting.

Outcome

Building Trust and Public Confidence
Enabling Clear and Consistent Reporting
Monitoring and Evaluating Project Performance

enhances accountability and fosters consensus-building among stakeholders.

5) **Ensuring Transparency and Accountability at Every Stage**

By establishing clear mechanisms for public participation, information disclosure, and project oversight, Sri Lanka can build trust among stakeholders and demonstrate its commitment to sustainable development.

"Transparency and accountability are essential throughout the entire lifecycle of renewable energy projects, from planning to implementation to monitoring and evaluation.", Mr. A. Abhayagunawardane, electrical engineer, environmentalist, and a social activist.

Developing a strong accountability framework is crucial for promoting renewable energy effectively and sustainably in Sri Lanka. By enhancing the EIA mechanism, adopting international policies, diversifying renewable energy sources, forming stakeholder committees, and ensuring transparency and accountability, Sri Lanka can navigate the complexities of renewable energy deployment while safeguarding its environment and advancing its development goals.

Accountability Criteria		Expert 1**	Expert 2**	Expert 3**	Expert 4**	Expert 5**
Strong EIA process		.	.	.	.	.
Alternatives	Rooftop solar	.		.		.
	Floating solar	.				.
	Offshore wind power	.	.		.	
	No more mini-hydro power	.			.	
Stakeholders committee		.	.	.	.	.
Planning			.		.	
Monitoring		.	.		.	
Mechanism for ensuring transparency		.		.	.	.
Selecting most suitable location with least environmental impact		.	.	.	.	.

Table 4: Summery of the five expert interviewees' opinions on the accountability criteria

Expert 1- Mr. Wijemanna, Expert 2- Mr. Abhayagunawardane, Expert 3- Mr. Bandara, Expert 4- Prof. Sugathapala, Expert 5- Mr. Dayaratne"

Final Reflections

The promotion of renewable energy is an undeniable pathway towards sustainable development, one which aligns with Sri Lanka's NDCs. However, the implementation of such initiatives often encounters significant hurdles that undermine their intended benefits and exacerbate environmental degradation and climate change. Despite these challenges, the imperative to advance renewable energy projects remains clear. To navigate this complex landscape effectively, the establishment of a robust accountability framework is paramount.

Enhancing the transparency and accountability of the EIA process is a fundamental step towards sustainable renewable energy initiatives. By ensuring comprehensive evaluations and full disclosures of potential environmental ramifications, decision-makers can make informed choices that mitigate adverse effects. Moreover, fostering stakeholder engagement through participatory mechanisms can foster inclusive decision-making, leading to the incorporation of diverse perspectives and expertise.

Furthermore, integrating public participation into decision-making processes enhances the legitimacy and effectiveness of renewable energy initiatives. By soliciting input from affected communities, policymakers can identify and address local concerns, thereby fostering ownership and support for sustainable development efforts. In addition, prioritising projects with minimal environmental footprints underscores a commitment to responsible resource management that balances energy needs with ecological preservation.

Crucially, leveraging international policies and mechanisms can bolster Sri Lanka's efforts towards sustainability. By aligning

with global best practices and standards, the nation can access valuable resources, expertise, and funding opportunities while reinforcing its commitment to combating climate change on a global scale.

In essence, the pursuit of renewable energy promotion in Sri Lanka necessitates a holistic approach that integrates accountability, transparency, and stakeholder engagement. By embracing these principles and implementing targeted measures, policymakers can navigate the complexities of renewable energy development, fostering a greener, more resilient future for generations to come.

Bibliography

1. The Energy Progress report, (2022). Retrieved from https://sdgs.un.org/sites/default/files/2022-06/Tracking%20SDG7%20-%20Energy%20Progress%20Report%20%20Presentation%20-%20Launch%202022%20-%201%20june%202022.pdf

2. Government of Sri Lanka, (2023), Environment and Renewable Energy Report. Retrieved from https://www.pucsl.gov.lk/electricity/quality/environment-and-renewable-energy/

3. National adaptation plan for climate change impacts in Sri Lanka 2016-2025, (2026). Retrieved from https://www4.unfccc.int/sites/NAPC/Documents%20NAP/National%20Reports/National%20Adaptation%20Plan%20of%20Sri%20Lanka.pdf

4. National Energy Policy and Strategies of Sri Lanka, Gazette Extraordinary 2135/61 of 09 August, 2019, https://www.energy.gov.lk/images/resources/downloads/national-energy-policy-2019-en.pdf

5. Government of Sri Lanka, (2021). Nationally determined contributions (NDCs) Sri Lanka. Retrieved from https://www.climatechange.lk/CCS2021/NDC%202021%20-%20English.pdf

6. Kariyawasam, A., & Thoradeniya, B., (2015). Impacts of mini hydropower plants: A research design through preliminary studies. Retrieved from http://ir.kdu.ac.lk/bitstream/handle/345/1327/eng-017.pdf?isAllowed=y&sequence=1

7. Wickramaarachchi, N.C., Rathnayaka, C.B., & Thilini, M., (2021). Small Hydro-power Plants and Disturbances to Environment: Evidence from Sri Lanka. Retrieved from https://jsshr.sljol.info/articles/10.4038/jsshr.v6i3.65/

8. Danthurebandara, R. & Rajapaksha, L., (2019) Environmental consequences of different electricity generation mixes. Journal of Cleaner Production, 210, 432–444. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/ S0959652618333766

9. Priyadarshana, P. G. S., Senanayake, N. S., & Abeyweera, R,. (2019). Assessment

of energy losses in mini hydropower plants in Sri Lanka. Sri Lanka Energy Managers Association Journal, 16(2). Retrieved from https://www.researchgate.net/ publication/303687010_Assessment_of_Energy_Losses_in_Mini_Hydropower_Plants_in_Sri_Lanka TY - JOUR

10. WindForce., (2023). Sri Lanka's Renewable Energy Landscape. LinkedIn. Retrieved from https://www.linkedin.com/pulse/sri-lankas-renewable-energy-landscape-windforcerenewableenergy-kgcwc

11. Friends of the Earth International, (2023). Renewable energy and land use: barriers to just transition in the Global South – report. Retrieved from https://www.foei.org/publication/just-transition-renewable-energy-land-use-report/

12. EconomyNext, (2024). Sri Lanka to build floating solar power plants on Chandrika Wewa, Kiri-ibban Wewa. Retrieved from https://economynext.com/sri-lanka-to-build-floating-solar-power-plants-on-chandrika-wewa-Kiri-ibban-wewa-153225/

13. Union of Concerned Scientists (2018). Environmental impacts of renewable energy technologies. Retrieved from https://www.ucsusa.org/resources/environmental-impacts-renewable-energy-technologies

14. Atasu, A., Duran, S., & Wassenhove, V.L. N. (2011). The dark side of solar power—As interest in clean energy surges, used solar panels are going straight into landfill. Harvard Business Review. Retrieved from https://hbr.org/2021/06/the-dark-side-of-solar-power

15. SciDev. (2011). Small hydropower's negative impact on the environment. Retrieved from https://oilprice.com/Alternative-Energy/Hydroelectric/Small-Hydropowers-Negative-Impact-On-The-Environment.html

16. Serious Environmental Concerns on Proposed Mannar Wind (2024) Retrieved From https://www.dailymirror.lk/news-features/Serious-Environmental-Concerns-on-Proposed-Mannar-Wind-Farm/131-277033

17. Mannar Wind Power Projects: When questions blow in the wind (2023) Retrieved From https://www.dailymirror.lk/news-features/Serious-Environmental-Concerns-on-Proposed-Mannar-Wind-Farm/131-277033

18. Adani wind project in Mannar and ecological threats (2024) Retrieved From https://energycentral.com/news/adani-wind-project-mannar-and-ecological-threats

Annextures:

Interviews- projects and their impacts

Power Technology	Locations	Personnel
Solar	Saga Solar Power Plant- Hambantota District Laughs Solar Power Plant- Hambantota District	Mr. Kalu Arachchige Sumanadasa- Activist Mr. Ajith Wasantha-Activist Mr. Sanjeewa Bandara- Activist, Media one other media person who did not consent to reveal his identity
Wind	Mannar Wind Power Plant- Mannar District (over the phone)	Mr. Edison- Activist
Mini Hydro Power	Soranathota Mini Hydro Power Plant-Badulla District Kukule Ganga Mini Hydro Power Plant- Ratnapura District Giddawa Ganga Mini Hydro Power Plant-Kandy District	Mrs. Mohommad- Villager Mr. Eshan Maduwantha Sivali-Activist Mr. Lahiru Prabath-Activist Mrs. Rajapaksha- Villager

Interviews - National plans and their implementation

No	Name	Designation
01	Dr. Sugathapala	Senior Lecturer Department of Mechanical Engineering, Faculty of Engineering. University of Moratuwa, Sri Lanka.
02	Mr. Ruwan Wijemanna	Energy Expert Accredited Energy Auditor
03	Mr. Sanjeewa Bandara	Journalist, Environmentalist and an activist
04	Mr. Asoka Abeygunawardana	Electrical engineer, environmentalist, social activist
05	Mr. Baddewithanalage Dayaratne	Activist in Mini Hydro Power campaign

PHOTO GALLERY:

Figure 7: Interview with Mr. K. Sumanadasa, on Hambantota solar energy projects and their impact on the community. He's a farmer and has experienced crop raids from elephants. Despite the damage, he advocates for establishing a reserve for elephants who were displaced due to massive development projects implemented at Hambantota. to Ms. Chalani, Miss. Sathsarani and Mr. Dilena Pathragoda, Executive Director of Centre for Environmental Justice joined this discussion.

Figure 8: During the observation visit to the Soranathota Minihydropower project.

Figure 9: Mr. Lahiru Prabath-Activist in the Kukule river Mini hydropower campaign explaining the issue during the investigation visit along the Kukule river to Ms. Chalani and Miss. Sathsarani of Centre for Environmental Justice.

Partners of the Asia Foundation Environment Coalition:

Centre for Environmental Justice (CEJ) - Sri Lanka

Centre for Environmental Justice (CEJ) is a national-level environmental organization based in Sri Lanka working for the promotion of Environmental Good Governance and Environmental Justice since 2004. CEJ engages in Research on chemicals of concern including environmental health and safety, environmental awareness, litigation, and advocacy,and promotes citizens' science.
https://ejustice.lk/

Centre for Policy and Dialogue (CPD) - Bangladesh

Centre for Policy Dialogue (CPD) seeks to be the leading institution for in-depth research and dialogue to promote inclusive policymaking in Bangladesh and strengthen regional and global economic integration. CPD was established in 1993 with the vision of creating an inclusive society based on equity, justice, fairness and good governance.
https://cpd.org.bd/

ISET Nepal Services Pvt. Ltd.- Nepal

Iset-Nepal Services Pvt Ltd., a sister organization of ISET-Nepal, operating since April 2018 is part of a regional network of CSO's and is recognized as a credible think tank that has extensively worked on environmental governance and climate action. The organization generates evidence for policies through interdisciplinary research, reflective learning, communication and outreach, policy engagement, and organizational development.
https://isetnepal.org.np/about-us/iset-nepal-services-pvt-ltd/

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