



**A Medium and Long-term Strategy for
Indo-Japanese Collaboration
to Support Economic Transformation
in Sri Lanka**

January 2023

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**Pathfinder Foundation
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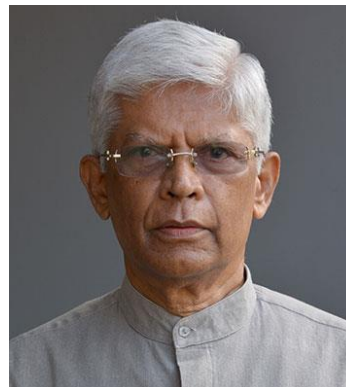
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BaU	Business-as-Usual
BtM	Behind-the-Meter
CBSL	Central Bank of Sri Lanka
CE	Circular Economy
CEB	Ceylon Electricity Board
CIDA	Construction Industry Development Authority
CIS	Commonwealth of Independent States
COP	Conference of Parties
CPC	Ceylon Petroleum Corporation
CSP	Concentrated Solar Power
DMC	Destination Management Company
EGD	European Green Deal
ESMAP	Energy Sector Management Assistance Program
ESS	Energy Storage Systems
EU	European Union
EV	Electric Vehicle
FI	Financial Institutions
FIT	Feed in Tariff
FSRU	Floating Storage and Regasification Unit
GDP	Gross Domestic Product
GHG	Green House Gas
GoSL	Government of Sri Lanka
GWh	Giga Watts per hour
IDA	International Development Agencies
IDB	Industrial Development Board
IFC	International Finance Corporation
IGES	Institute for Global Environmental Strategies
IOC	Indian Oil Corporation
IORA	Indian Ocean Rim Association
IoT	Internet of Things
IRENA	International Renewable Energy Agency
JICA	Japan International Cooperation Agency
LNG	Liquefied Natural Gas
LPG	Liquified Petroleum Gas
LRT	Light Rail Transit
MOU	Memorandum of Understanding
MW	Mega Watts

NCRE	Non-Conventional Renewable Energy
NDC	Nationally Determined Contribution
NES	National Export Strategy
NTP	National Transport Policy
NTPC	National Thermal Power Corporation Limited
NVQ	National Vocational Qualification
PATA	Pacific Asia Travel Association
PPCA	Powering Past Coal Alliance
PPP	Public Private Partnership
PRDA	Petroleum Resource Development Authority
PSPP	Pump Storage Power Plant
PV	Photovoltaics
RDA	Road Development Authority
RE	Renewable Energy
R-LNG	Re-gasified Liquefied Natural Gas
ROI	Return on Investment
SAARC	South Asian Association for Regional Cooperation
SDG	Sustainable Development Goal
SLPA	Sri Lanka Ports Authority
SLR	Sri Lanka Railways
SME	Small and Medium-sized Enterprises
SLCB	Sri Lanka Convention Bureau
SLITHM	Sri Lanka Institute of Tourism and Hotel Management
SLSEA	Sri Lanka Sustainable Energy Authority
SLTPB	Sri Lanka Tourism Promotion Bureau
SLTDA	Sri Lanka Tourism Development Authority
SRV	System Requirement Verification
TEU	Twenty-foot Equivalent Unit
THASL	Tourist Hotel Association of Sri Lanka
TIES	The International Ecotourism Society
TVET	Technical and Vocational Education and Training
UAE	United Arab Emirates
UDA	Urban Development Authority
UGC	University Grants Commission
UK	United Kingdom
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNWTO	World Tourism Organization
USD	United States dollar
VFR	Visiting friends and relations
WB	World Bank

Message from the Chairman

The Pathfinder Foundation (PF) undertook this study to produce a report with concrete recommendations to support the transformation of Sri Lanka's economy to overcome the country's worst economic crisis.

In January 2022, the Pathfinder Foundation's **Study Group for Tripartite Cooperation (Japan-India-Sri Lanka)**, comprising eminent experts Ambassador Prof. Nobuhito Hobo (National Graduate Institute for Policy Studies, Japan), Dr. Mohan Kumar (Research and Information System for Developing Countries India), Dr. Indrajit Coomaraswamy former Governor of the Central Bank of Sri Lanka), and Prof. Shanta Devarajan (Acting Chief Economist, World Bank and Professor at the Georgetown University), held consultations and produced a report titled "***Recommendations for Sri Lanka: Debt Restructuring and Bridge Financing for Humanitarian Purposes***", which was submitted to the governments of India, Japan and Sri Lanka addressing the severe short-term economic challenges. The report can be viewed at www.pathfinderfoundation.org.



As recommended in the report, the Sri Lankan government subsequently discussed with the IMF and other bilateral donors to engage in debt restructuring and bridge financing exercises that could provide immediate relief in addressing the economic crisis.

However, it is essential to think beyond the immediate short-term remedies for the current economic crisis, which is a consequence of many years of macroeconomic mismanagement, corruption, and an overall lack of economic governance. A nationally owned long-term strategy supported by development partners is needed if the country is to ensure a comprehensive exit from Sri Lanka's frequent macroeconomic dilemmas. With its "neighbourhood first" policy, India has become a natural development partner, while Japan has been Sri Lanka's most significant bilateral donor over several decades. Both countries could play a crucial role in reviving Sri Lanka's economy. The complementary strengths of the two countries and their shared commitment to the development of South Asia make such collaboration a powerful instrument for attaining sustained economic growth in Sri Lanka.

Against this backdrop, this report has identified the following prioritised sectors in which Indo-Japanese collaboration would be decisive:

- i. **Low-carbon power generation:** Renewable energy, LNG and grid-connectivity between Sri Lanka and India.

- ii. **Development of Trincomalee as an energy hub** using the Oil Tank Complex as the starting point.
- iii. **Logistics and connectivity:** Ports, airports, railways (including mass transport) and ferry transportation.
- iv. **People-to-people contacts:** Tourism, education, training and skills development.

A Panel of Experts was constituted to undertake an in-depth analysis and propose recommendations for each of the above sectors. The exercise aimed to develop proposals on the prospects for Indo-Japanese collaboration to promote the medium and long-term development of Sri Lanka. I express my profound gratitude to Dr. Coomaraswamy for providing beneficial advice at the initial stage of the discussion with experts.

This report would not have been possible without the contributions made by the team of experts consisting of Mr. Nihal Cooray, Prof. I.M. Dharmadasa, Prof. Siri Hettige, Dr. Malraj Kiriella, Mr. Rohan Masakorala, Eng. Sena Peiris, Mr. Nimal Perera, Dr. Krishnamurthy Ramanathan, Eng. Gamini Senanayake, Dr. Dimantha de Silva, Dr. Tilak Siyambalapitiya and Dr. Vipula Wanigasekara.

Prof. Sirimal Abeyratne, Head of the Department of Economics at Colombo University, made a significant contribution by undertaking to edit the final report. I also wish to thank PF staff, in particular Dr. Dayaratna Silva, Ambassador Ahmed A. Jawad, Ms. Gayathri Nanayakkara Zoysa, Ms Suvini Hettiarachchi, Ms Sarah Hettiaratchi and others, who provided valuable support, including editing, proofreading secretarial work and cover page design.

Last but not least, I would like to express my appreciation to the International Trade Centre (ITC) Geneva, for supporting the launch of the publication.

The Pathfinder Foundation is confident that the report will receive the earnest attention of the governments of India, Japan and Sri Lanka.

Bernard Goonetilleke
Chairman
Pathfinder Foundation

Executive Summary

This report is presented at a time when Sri Lanka is facing an unprecedented economic crisis that has caused a significant socio-economic setback in the country, with rising unemployment, rocketing inflation and increasing poverty. The primary causes for the current crisis are largely due to the mismanagement of macroeconomic policies in the recent past leading to severe foreign exchange shortages and a decline in government revenue. As a result, unprecedented challenges have arisen, threatening the country's progress that demands constructive plans to resurrect the economy. If sustainable solutions are to be found to prevent future occurrences of similar crises, the government should re-examine its policy directions aimed at developing a clear medium and long-term strategic approach for development with international cooperation. This compelling need for development cooperation with partner countries has manifested in recent policy discourses. Sri Lanka must embark on a development pathway consulting with international organizations and other donors to gain effective and sustainable solutions.

The report suggests collaboration with India and Japan to implement recommendations specified in the sector reports for several reasons. First, in the recent past, both countries have begun collaborating on third countries as an integral part of their respective foreign policies¹. Second, India is a natural trade and investment partner for Sri Lanka, considering its geographical proximity and its current "neighbourhood first" policy. Third, Japan has a long-standing relationship with the country providing development assistance. Finally, India and Japan being active and vital middle powers in the Indo-Pacific region, their partnership for project-specific support in Sri Lanka holds significance. With their proven experience, knowledge, and expertise in tackling specific development challenges, both countries could support Sri Lanka financially and technically.

This form of tripartite cooperation is an emerging concept for international collaboration between developed and developing countries for mutual gain. In recent years, the scope of such development cooperation has widened to include joint projects and programs, financial resources, exchange of knowledge, expertise, technical assistance, and sharing best practices and information. A vulnerable developing country like Sri Lanka can utilize tripartite cooperation to signal its specific demands more efficiently, thereby increasing opportunities for joint projects. Having held consultations, the Study Group for Tripartite Cooperation (Japan-India-Sri Lanka) has identified several prioritised sectors where Indo-Japanese collaboration would be productive in addressing specific development needs of the Sri Lankan economy. This report attempts to present such potential areas of collaboration between India and Japan in Sri Lanka-the beneficiary country.

The report is organized into four main parts focusing on identified priority sectors. The sector reports were written by an eminent panel of experts who conducted a comprehensive analysis addressing the role of each sector in transforming the economy, existing policy gaps and challenges

¹ https://www.orfonline.org/wp-content/uploads/2021/04/ORF_IssueBrief_460_India-Japan-Bangladesh-Myanmar.pdf

that need to be addressed in the medium and long term. The aim of the ensuing analysis of sector reports is finally to devise a concrete set of recommendations for tripartite collaboration in joint projects.

1. Low-carbon power generation in Sri Lanka

Switching to renewable energy resources is critically important for Sri Lanka to reduce its heavy reliance on imported fossil fuels to meet its growing energy demand. For example, in 2019, the country's total installed power generation capacity was about 4.2 GW, and only 35 per cent of the total annual electricity demand in the same year was met by renewable energy resources. The rest (65%) was provided by imported and expensive fossil fuels: coal and fuel oil. This is unsustainable, and the future energy generation in Sri Lanka should use a technology mix (solar, wind, hydro, biomass, biogas, etc. and fossil fuels) dominated by green energy technologies. Measures should be taken to rapidly replicate renewables throughout the country while maintaining the available non-renewable energy production to meet the demand. Technologies like nuclear and geothermal may not be suitable for Sri Lanka at this stage due to high costs and associated risks.

As the renewable energy contribution ramps up, fossil fuel use should be gradually phased out. The world is moving away from the carbon economy to achieve a carbon-neutral economy and, ultimately, the hydrogen economy. Sri Lanka must also follow the same approach and global trend. The absence of appropriate energy storage facilities is the 'missing link' to accommodate more weather-dependent renewable energies. The intermittent nature of both solar and wind can be taken care of when it will be possible to use hydrogen as an energy storage medium and as an energy carrier in the future. The national distribution network must be improved gradually, incorporating smart-grid facilities to accommodate all renewable energy contributions. The use of fossil fuels in the transport sector must be reduced by the rapid introduction of electric vehicles. The reliance on combustion engines for transport must be swiftly replaced by electric vehicles based on advanced batteries, hydrogen, and fuel cell technologies.

2. Development of Trincomalee as an energy hub

Trincomalee's visible justification for being considered an energy hub is owing to its deep natural harbour, oil storage tank farm dating back to the late 1930s and availability of land in the district, all of which remain underutilized. Plans to establish coal-fired power generation in Trincomalee were abandoned once in the late 1980s and more recently in 2016 after much work had been completed. Trincomalee has the potential to be the site for coal deliveries (with rail transfer to the power plant on the west coast) and a new oil refinery that would replace the existing refinery in Sapugaskanda (dating back to 1969), which meets less than half the country's requirement of petroleum products. Furthermore, Sri Lanka's future low-cost power generation source will be liquefied natural gas (LNG), which would require a terminal for imports. However, owing to the proximity to customer location, areas closer to Colombo have been proposed to locate the new

refinery and the LNG terminal and LNG-powered new power plants, none of which have progressed toward decisions and financing.

Sri Lanka's energy diversification strategy essentially includes a large share of electricity produced from renewable sources. Northern and Eastern provinces have land and renewable resources to generate electricity economically. Trincomalee, with its potential refinery, LNG terminal and power plants, provides an ideal hub to blend fossil and renewable energy-based electricity production that support each other, to ensure a reliable and cost-effective electricity supply to the national grid. Oil and gas pipelines and electricity transmission lines must be built from Trincomalee towards the load centres in the Western and North-Western Provinces for the country to benefit from such a strategy. If developed as an energy hub, Trincomalee has the potential to provide storage and allied services to the east coast of India and Bangladesh, both of which import large quantities of LNG as well as LPG. Electricity exchange with India through Habarana – Anuradhapura – Mannar – Madurai remains an option as Sri Lanka joins the broader Indian electricity market, hopefully with a grid interconnection between the two countries. Considering the Nationally Determined Contribution (NDC) targets for emission reduction and National Net Zero emission targets by 2050, renewable energy capacity enhancement with maximum green hydrogen production will support net zero emission achievement. The broad spectrum of benefits includes grid buffering to overcome the intermittency of renewable sources, renewable energy storage, greening the transport sector, providing the industry with green feedstock, green ammonia and marine bunkering.

3. Logistics & connectivity

Connectivity, accessibility and mobility are among the key factors influencing land use. Faster and more reliable inter-regional connectivity through ports and airports is vital for transporting goods and services. In contrast, efficient transport systems in urban areas are essential for passenger movement. Sri Lanka, located less than thirty nautical miles from the Indian subcontinent's markets, is also adjacent to the east-west international maritime route. Therefore, an efficient transport system can play a significant role in the supply chain efficiency for regional and global trade and help develop Sri Lanka's maritime trade and logistics. It is essential to study the future trade, economic activity, and development agendas of countries around the Indian Ocean and the interest of global powers to ensure reliable, uninterrupted, and safe movement of people, goods, energy and resource supplies throughout the Indian Ocean and the rest of the world.

The transport sector of Sri Lanka contributes around 10 per cent of the GDP and generates about 6 per cent of employment. Although the Government of Sri Lanka, over the past decade, has invested heavily in transport infrastructure, the transportation systems available are mainly based on roads and railways, while water and domestic air transportation systems are not well developed.

Policy gaps and barriers in the logistics sector have been identified in a few broad areas in previous studies. The solution should have a long-term strategy, which can be accomplished by medium and short-term solutions. Public transport infrastructure development is a vital and integral part of the strategy. Transport investment projects go through a lengthy planning process, where project planning, pre-feasibility, feasibility, detailed design, acquisition (if needed) and procurement take considerable time. Thus, it is important to give priority to implementation-ready projects.

Developing a national policy and a policy framework for logistics and connectivity is essential for Sri Lanka to reach its economic targets. Its focus should be to support the trade and connectivity aspirations of the Indian Ocean rim countries and to link the Indo-Pacific strategic trade corridors to derive more comprehensive economic benefits as a major connectivity centre of the world by expanding the air and sea logistics network.

4. People-to-people contact

The report discusses three sub-sectors; namely, education, training and skill development; and tourism under the broad sector category, people to people contact. While the primary contribution of education is to build human capital, laying the foundation for the employability of the workforce, training and skills development are understood in broad terms covering the entire sequence of the employment cycle. The report highlights the importance of expanding a qualitative workforce that meets the industry demand for accelerating the country's economic transformation. Tourism is included in the analysis as a key driver for economic growth as it is a vital sector for such growth with cultural, ecological and natural attractions, which can be promoted in a wide spectrum of activities, including leisure, medical, and research.

4.1 Tourism

Recently, Sri Lanka's tourism sector has suffered a series of setbacks. They include the Easter Sunday bombings in 2019, the COVID-19 pandemic in 2020, the resulting closure of international borders, and the subsequent economic and political crises that engulfed the country in 2022. Managed professionally and promoted systematically, the sector has the potential to ensure the generation of much foreign exchange and also ensure such inflows are trickled down to the grassroots level. In Sri Lanka, tourism policy formulation, infrastructure development, training and, to some extent, marketing remain the state's responsibility. However, the tourism industry's operational aspects are wholly driven by the private sector, with substantial involvement of the SME segment.

This study examines proposals that can be launched in the immediate and medium term to revive tourism. Since the launch of planned tourism in 1966, the industry has periodically experienced significant upheavals and challenges, both natural and manmade, that have impacted volume and value. To revive the ailing industry, which has considerable potential, medium-and long-term policies are imperative. The three key elements of tourism have been identified as 'attractions', 'amenities' and 'accessibility' (Holloway et al. 1966). While the country is generously endowed

with a wide variety of ‘attractions’, what requires addressing are issues related to ‘amenities’ and ‘accessibility’.

The report also considers emerging travel patterns, particularly those of Millennials and Generation Z. The research highlights areas that will add to the industry's sustainability efforts. In the medium term, the report recommends launching programs that would kick-start the industry, including tapping market niches in India and Japan. For many decades the primary focus of the tourism industry has been ‘round tours’ relying on sun, sand and sea as typical attractions a tropical island could offer. Moving away from these traditional attractions has already begun. However, Sri Lanka should actively identify, develop and promote other attractions the island could offer, bearing in mind that many tourists belong to the ‘repeat visitor’ category.

If Sri Lankan authorities plan to accomplish its envisaged target of 3.3 million visitors by 2025 (per the optimistic scenario by SLTDA), the industry should gear itself by packaging new tourism products efficiently and proactively with immediate effect. Promoting wellness tourism, adventure tourism, trekking, hiking, diving etc., are other areas that would attract visitors in high numbers, particularly the youth. Transportation within the island must be made safe, clean, reliable and comfortable, whether by road, rail or air. To achieve the targeted numbers, the authorities should provide attractive incentives for international airlines, including budget airlines, cruise liners and ferries that connect the island with source markets.

Sri Lanka is not a destination limited to one season, as has been promoted traditionally. In fact, Sri Lanka is a ‘year-round’ destination, with the east coast opening up for tourism since the end of the armed conflict, which point has not been given sufficient prominence in the tourism promotional campaigns. A highly focused promotional campaign should be carried out in traditional source markets and pre-identified potential markets to promote Sri Lanka. Further, a particular year could be designated ‘Visit Sri Lanka Year’ (e.g., 2025 or 2026) with a highly visible promotional campaign to attract visitors in large numbers. Such a campaign will interest visitors who have heard so much about the island but failed to savour what it offers. The support of the private sector will be a prerequisite to making such an endeavour a success.

Tourism is a complex industry that requires the state and non-state sectors to work in unison. This study urges the authorities and the industry stakeholders to give priority to reviewing and implementing the medium and long-term strategies intended to develop tourism, which includes implementing the draft National Policy on Tourism for Sri Lanka (2021) and the Strategic Plan for Sri Lanka Tourism 2022-2025 (April 2022).

4.2 Training and skills development

Embracing advanced technologies is vital for economic development to become a high-income economy. To reach this highly ambitious goal, the country requires competent personnel at all levels. Sri Lanka has adequate educational institutions to develop high-calibre scientists, technocrats, engineers, and senior managers. Still, the workforce does not have equal opportunities or avenues to build their capacities. The report argues that the country lacks well-trained, skilled and competent personnel for technical and operational level occupations hindering industrial growth. A national-level programme addressing all these needs should become a priority for the country to improve the performances of all economic sectors for accelerated growth. The basic assumption is that most technical personnel, including technicians, craftsmen and tourism service providers, lack a proper understanding of the market, cost, environmental issues and other aspects of their services. A system should be developed to improve the skills of craftsmen and micro industries to understand current market trends, associated skills and competencies required to enable them to be important players in the supply chain.

The report elaborates on the training and skills development needs of two specific sectors, namely tourism and light engineering, to support the economic transformation of Sri Lanka as part of a medium and long-term strategy. The training needs of the plastic industry are considered a sub-sector since plastic waste has become a major environmental issue.

While explaining the economic significance of the tourism sector, the report argues that the tourism sector has not offered equitable benefits to the larger community mainly due to a lack of opportunities arising from the absence of skills and competencies to cater to the visitors' needs. Capacity building of youth through training and skills development will facilitate knowledge transfer, ensuring visitor satisfaction and a better quality of life for such groups.

The report also calls to the attention of policymakers the importance of the light engineering sector, which is regarded as the backbone of any heavy industry sector and the primary player of the long supply chain. It argues that many of the industrialized countries, at their initial stages of economic development, have started first strengthening the light engineering sector, which can evolve into large-scale service providers. Furthermore, a highly developed light engineering sector will create more employment opportunities and be the pillar of strength for value addition to the country's natural resources. In particular, skilled workers in light engineering are critically important for advancing micro, small and medium enterprises (MSME) spread across the provinces. Obtaining services from large Colombo-based service companies is beyond their means in addition to being time-consuming. Hence ensuring skilled and competent service personnel equipped with light engineering capabilities across the country is critically important for MSME's survival. Finally, to address the environmental pollution issue related to plastic waste, the report recommends enhancing the skills development programme for plastic manufacturing and plastic waste management.

4.3 Education

The sector report discusses education-related issues that have emerged over several decades and need to be addressed through appropriate policy interventions. Educational reforms have been long overdue. In reforming the education system, policymakers should look at best practices of countries such as India, Japan and others in Asia. Critical thinking, practical skills and multiple literacies should be considered with an enhanced focus on scientific, environmental, technological, and digital fields. Sri Lanka must learn from within, considering its inherent issues and recent experiences and extracting examples from other countries in the region.

The rapid expansion of modern, mass education in Sri Lanka is a post-colonial development. Against this backdrop, the introduction of universal, free education across the country in the early 1940s was a significant development with wide-ranging implications for Sri Lankan society at the time. The free education system, which became popular among the majority of the population, underwent substantial changes in the first few decades after independence due to the influence of emerging politico-ideological forces and the changing economic policies in the country. The policy decision in 1956 to replace English with Sinhala as the official language, though resisted by the Tamils and other Tamil-speaking communities, including more progressive sections of the society, contributed to expanding employment opportunities for Sinhala-educated youth in the state sector. The subsequent amendment to the Official Languages Act permitting the reasonable use of Tamil in the Tamil-speaking North and East provinces enabled Tamil-educated youth to find state-sector employment. An increasing number of people continued to rely on education as an avenue for upward social mobility. As a result, unemployment among educationally qualified youth became a major social issue in the 1960s, leading to widespread youth unrest in the country, culminating in the first violent youth uprising of 1971. In recent decades, economic and social policy shifts significantly impacted the education system. In this regard, the adoption of open economic policies led to a diversification of the education sector resulting in the establishment of Colombo-centred international schools and other private educational institutions, contributing to greater educational inequality.

SECTOR 1: LOW CARBON POWER GENERATION: RENEWABLE ENERGY

Gamini Senanayake

I.M. Dharmadasa

1.1 Introduction

The objectives of this segment of the report are twofold: firstly, to identify the opportunities and challenges to increase the share of renewable energy (RE) in the power generation mix of Sri Lanka, which is considered critically important to put the country in a sustainable development trajectory. Secondly, to make a set of recommendations for renewable energy development, identifying priority areas for Indo-Japanese collaboration as well as to draw the attention of International Development Agencies (IDAs) and Financial Institutions (FIs), which could support the Government of Sri Lanka (GOSL) to create an enabling environment for the right mix of energy generation. IDAs could provide technical and capacity-building support, while FIs could extend vital funding support.

Sri Lanka has achieved nearly 100% electrification for all potential users of the country-barring a few isolated communities. Given this achievement, this analysis does not focus on village-level interventions but on making an adequate supply of sustainable energy available without interruption through the national grid system.

The total installed power generation capacity in 2019 was 4,217 MW, of which around 50% account for RE, including large and small hydro, wind, solar, and biomass. The rest is generated through coal and oil-based thermal power. It was estimated that, of the total annual electricity demand of 14,611 GWh in 2019, approximately 35% was met by renewable energy resources. Electricity demand is expected to grow by 5% annually, and future power generation programs are expected to address this growth in demand.

Sri Lanka has taken several initiatives to implement sustainable energy programs. The fundamental principles of the Energy Policy (2019) guide the country to develop indigenous RE sources to the optimum level while diversifying the generation mix and minimising the heavy dependence on imported fossil fuels. It is stated that renewable sources should be developed considering resource potential, economics, maturity of technology and supply quality. These initiatives are expected to bring renewable energy-based power generation to the forefront in the hope that the RE sector will contribute the major share of the energy supply by 2030.

1.2 Role of the sector in transforming the Sri Lankan economy in achieving sustainable economic growth and development

Energy is an essential input required for the smooth operation of many production and consumption activities, and ensuring energy security is vital to achieving sustained economic growth. From a physical viewpoint, the use of energy that drives economic productivity and industrial growth is central to the operation of any modern economy. Some analysts argue that an increase in energy use directly causes growth in GDP². Energy is not only the material base of economic development, social improvement and enhancement of people's living standards but also a significant factor influencing the living environment.

1.3 Sector-specific global trends: implications on national policies and lessons from other countries

1.3.1 Global trends

1.3.1.1 The Glasgow Climate Pact

Given below are the key outcomes of the COP26 climate summit held in Glasgow, in November 2021, which have some relevance to the theme of this paper.

The 26th meeting of the United Nations Conference of Parties (COP26) was held with the participation of almost 200 member countries, including Sri Lanka, who agreed to the Glasgow Climate Pact. This agreement expects accelerated action on climate in this decade by moving away from coal power, halting and reversing deforestation, reducing methane emissions and speeding up the switch to electric vehicles. For the first time, COP agreed on phasing out unabated coal power. The goal of COP26 was to keep the hope of limiting the rise in global temperature to 1.5°C.

The power sector accounts for a quarter of global greenhouse gas emissions, and coal – the most polluting fossil fuel, is the single most significant contributor to climate change. Maintaining 1.5°C requires immediately halting the building of new coal power plants, scaling up clean power and retiring existing coal fleets in advanced economies by 2030 and globally by 2040.

Sixty-five countries have now committed to phasing out coal, including more than 20 new commitments at COP26. Forty-eight countries are members of the Powering Past Coal Alliance (PPCA). Major multilateral funding agencies such as the World Bank (WB) and the Asian Development Bank (ADB) are committed to ending coal-based energy generation financing. Over USD 20 billion of new public and philanthropic finance has been committed to supporting developing

² Asghar, Zahid (2008). 'Energy– GDP Relationship: A Causal Analysis for the Five Countries of South Asia', Applied Econometrics and International Development, Vol. 8-1

countries to scale up clean power and transition away from coal. In addition to coal, it is also necessary to phase down the use of all fossil fuels across the energy sector. At COP26, 34 countries and five public financial institutions committed to ending direct public support (USD 24 billion annually) for the international unabated fossil fuel energy sector by the end of 2022. This was a significant leap forward and is expected to free these funds in the private sector for deployment in renewable energy.³

1.3.1.2 Key Outcomes of COP27 Climate Summit

It is worthwhile to note the key outcomes of the COP27 climate summit held in Sharm el-Sheikh, Egypt, in November 2022, which has some relevance to the theme of this paper.

Low-Emission Energy: The final text of COP27 contains a provision to boost “low-emissions energy”, which could cover a wide spectrum of alternative energy sources ranging from wind and solar farms to nuclear reactors, and coal-fired power stations fitted with carbon capture and storage facilities. It could also be interpreted as gas, which has lower emissions than coal but is still a major fossil fuel.

Fossil fuels: At COP26 in Glasgow in 2021, a commitment was made to phase out the use of coal. At COP27, some countries wanted to go further and include a commitment to phase out all fossil fuels, but it was not possible to include it in the resolution.

Loss and damage: For nearly three decades, developing countries have been seeking financial assistance for loss and damage – money needed to rescue and rebuild the physical and social infrastructure of countries devastated by extreme weather. Achieving an agreement on a fund at COP27 is a major milestone; however, there is no agreement yet on how financing should be provided and where it should come from.

Adaptation: Building flood defences, preserving wetlands, restoring mangrove swamps and re-growing forests – these measures, and more, can help countries to become more resilient to the impacts of climate breakdown. But developing countries often struggle to gain funding for these efforts. Of the \$100 billion a year, pledged by the developed countries to developing countries by 2020 (a promise still not fulfilled) only about \$20 billion goes to adaptation. In Glasgow, countries agreed to double that proportion, and it was reaffirmed at COP27.

³ COP26 – The Glasgow Climate Pact. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26>

1.3.1.2 European Green Deal (EGD)

The EGD is the European Union's (EU) ambitious and comprehensive plan to become the first climate-neutral continent by 2050 aimed at fundamentally transforming the European Economy. It has goals extending to many different sectors, including energy. A transition to the circular economy is another priority of the Green Deal. The plan includes potential carbon tariffs for countries that do not curtail their greenhouse gas pollution.

EU being one of the most important export markets for Sri Lanka, the new climate and environmental norms and standards arising from EGD will have to be met for future market access. Furthermore, Sri Lanka will have to be prepared for the EU Green Deal by developing organisational skills and understanding the implications of the Green Deal, quantifying the costs of Green Deal levies, benefiting from available incentives, and maximising the opportunities arising from the transition to more sustainable economies. Increasing the share of renewable energy (RE) in the energy mix is one of the specific sustainability initiatives Sri Lanka should adopt to derive the benefit of the Green Deal.

1.3.2 National policies

1.3.2.1 Nationally Determined Contributions (NDCs)

The government of Sri Lanka (GOSL) submitted its Nationally Determined Contributions (NDCs) for the first time in September 2016 as the country ratified the Paris Agreement. NDCs are revised every five years, and the GOSL updated and submitted its NDCs in July 2021 to the United Nations Framework Convention on Climate Change (UNFCCC) as an obligation to being party to the Paris Agreement. Through the revised NDCs, Sri Lanka has committed to reducing electricity sector emissions by 20% (5% unconditional and 20% conditional) in the Business-As-Usual (BAU) scenario from 2021 to 2030. A summary of crucial RE-related interventions of NDCs for GHG emission reduction up to 2030 is as follows:⁴

- Development of hydro-power base to its maximum potential through new large and small-scale hydro-power plants to around 300 MW.
- Develop approximately 800 MW of wind power generation in the Northern and North-Western coastal areas.
- Develop approximately 2,000 MW of solar power capacity using different modalities such as solar rooftops, small-scale, and large solar PV power plants.
- Power generation through biomass and municipal solid waste will be added with an expectation of an appreciable contribution to the power generation capacity.

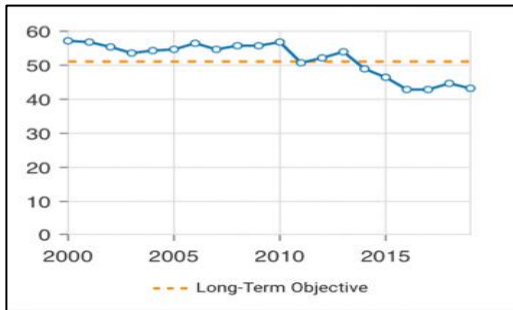
⁴ Sri Lanka - Updated Nationally Determined Contributions, Ministry of Environment, April 2021

- Facilitate the implementation of pilot-scale projects using new RE sources yet to reach commercial maturity and other grid-supporting infrastructures, including behind-the-meter (BTM) and grid-scale energy storage solutions to assist more RE integration.
- Introduce supportive policy measures such as tax benefits, low-interest financing, etc., to expedite the implementation of RE development.
- Pursue Pumped Storage Hydro Power Plant development to accommodate a higher level of intermittent and weather dependent RE to the power generation system.

At the “World Leaders Summit of COP26”, Sri Lanka pledged to increase the contribution of RE sources to 70% of national energy needs by 2030 and phase out fossil fuels. Moreover, Sri Lanka co-led the “Global Energy Compact for No New Coal Power”, which endorsed Sri Lanka’s vision for a low-carbon future to achieve Carbon Neutrality by 2050.

1.3.2.2 Sustainable Development Goals (SDGs)

Figure 1.1 The share of renewable energy in the primary energy mix in Sri Lanka



“Ensure access to affordable, reliable, sustainable and modern energy for all” is Goal 7 of Sustainable Development Goals (SDGs), and therein, to increase substantially the share of renewable energy in the global energy mix by 2030 is Target 7.2. Furthermore, Target 7.a: expects to “enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and to promote investment in energy infrastructure and clean energy technology by 2030”.

Sri Lanka’s achievement of this target, in terms of the share of RE in the total primary energy supply in 2019, was around 42% (Figure 1.1).

1.3.2.3 Lessons learnt

The experience of other countries in reaching their RE targets provides valuable lessons for Sri Lanka to set its own RE targets and to recommend priority interventions. The countries covered in this study are Bangladesh, China, Denmark, Germany, India, Indonesia, Malaysia, Netherlands, Norway, Pakistan, Philippines, Sweden, Thailand, United Kingdom and Vietnam. Given below are a few innovative initiatives by some of these countries.

Europe's largest hybrid wind-solar-storage plant

A hybrid facility is planned to be built in central Portugal with an investment of approximately €600 million. It will consist of a 365 MW PV unit, a 264 MW wind farm, and 168 MW battery storage. It will also be connected to a 500-kW electrolyser (hydrogen generation unit) that will be fed with surplus power that the batteries cannot store. The hybrid renewable energy plant is replacing a 628 MW coal power plant, which should be closed by this year. Workers of the old facility will be integrated with the operation of the new plant. It will also include activities of the primary sector, such as agriculture, livestock, or beekeeping between the solar panels.

India's biggest floating solar power plant

India's biggest floating solar power plant by generation capacity (100 MW) is being developed by the National Thermal Power Corporation Limited (NTPC) at Ramagundam in the Peddapalli District of Telangana. The project aligns with India's commitment to attaining the target of 175 GW of installed renewable energy capacity by 2022, including 100 GW of solar installed capacity. Many major reservoirs in the Southern Region provide a substantial opportunity to use the floating solar option for renewable energy. Another renewable energy plants that will likely be commissioned in the near future are a 25 MW floating solar plant at Simhadri. Thermal power plant near Visakhapatnam and a 92 MW floating solar plant at Kayamkulam in Kerala.

Winding tracts of solar panels are also popping up over water canals in India, where solar installations have been shifted to unusual locations to navigate high land prices. A pilot project was touted in 2012, leading to the first large-scale canal-top solar power plant in the Vadodara District of Gujarat three years later. The Government rolled out the project as a Public Private Partnership (PPP).

South-East Asia's biggest floating solar plant in Indonesia

South-East Asia's most significant floating PV installation (145 MW) is under construction on a 225-ha section of the Cirata Reservoir in West Java in Indonesia. With more than 17,000 islands and 100 reservoirs plus 521 natural lakes, Indonesia is planning an additional 60 floating PV installations as it has a target of 23% of its power generated by renewables by 2025 and 31% by 2030.

1.4 Existing National Policy Framework and ongoing initiatives – A review

1.4.1 National Energy Policy & Strategies of Sri Lanka

The “National Energy Policy & Strategies of Sri Lanka” was approved by the Cabinet of Ministers in August 2019, providing a clear direction for RE development. It primarily focuses on ensuring energy security, equity, and sustainability of the energy supply. As it is essential to maintain a regular power supply with a practical and balanced energy mix, a firm capacity should be maintained with Liquefied Natural Gas (LNG) or indigenous natural gas, high-efficient coal power, large storage hydro, furnace oil refined from national refinery and a non-conventional renewable energy source, which can provide a base power requirement. In addition, Demand Side Management (DSM) activities and transmission and distribution loss reduction activities will support emissions reduction. Furthermore, converting existing fuel oil-based combined cycle power plants to natural gas and introducing new natural gas-based power plants will support emission reduction efforts, contributing to NDCs.

1.4.2 Draft Long-Term Generation Expansion Plan of CEB for 2020-2039

Considering the policy and strategies spelt out in 1.4.1, the “Draft Long-Term Generation Expansion Plan of CEB for 2020-2039” is intended to be the operation plan of the GOSL policy for electricity generation.

1.4.3 100% Electricity Generation Through Renewable Energy by 2050 - An Assessment of Sri Lanka’s Power Sector

Another important document in this regard is the joint publication of the United Nations Development Program (UNDP) and the Asian Development Bank (ADB) in 2019 titled “100% Electricity Generation Through Renewable Energy by 2050 – Assessment of Sri Lanka’s Power Sector”, which suggests a way forward to achieve 100% electricity generation by 2050 through rapidly increasing the share of weather-dependent renewable energy, such as solar and wind.

1.4.4 Sri Lanka Energy Infrastructure Sector Assessment Program and Electricity Sector Master Plan Study

The suggestions contained in “100% Electricity Generation Through Renewable Energy by 2050 – Assessment of Sri Lanka’s Power Sector” were amply supplemented by two other publications of The World Bank (WB) and Japan International Cooperation Agency (JICA) under the titles of “Sri Lanka Energy Infrastructure Sector Assessment Program” – February 2019 and “Electricity Sector Master Plan Study in the Democratic Socialist Republic of Sri Lanka” – March 2018. Financing aspects are highlighted in the WB’s publication.

Given the financial constraints of sector stakeholders and the government's fiscal constraints, the objective should also be to maximize private sector participation in the Non-Conventional Renewable Energy (NCRE)⁵ generation segment to the extent possible while conducting the procurement transparently and efficiently to optimize tariff outcomes. The shared infrastructure (access roads, water supply and drainage, telecommunications, pooling stations inside the parks, transmission lines and substations) benefiting all of the private generators in such NCRE park sites could be implemented by the public sector. The programme should start with projects at the Pooneryn and Moneragala sites, on which pre-feasibility studies were completed as a part of the Sri Lanka Energy Infrastructure Sector Assessment Programme (InfraSAP). The structuring of a competitive tender is underway with IFC support for the Pooneryn site.

The capacity of the power grid to integrate and dispatch NCRE also needs to be assessed and as required, strengthened through various means, including energy storage.

1.5 Policy gaps, issues and barriers

1.5.1 Policy gaps

The “National Energy Policy & Strategies of Sri Lanka” is quite comprehensive, as described before, covering almost all aspects to increase the share of RE in the energy generation mix. However, the implementation of such measures is lagging, and certain target dates have already lapsed. Since the policy and the strategies are in the same document, there may be a necessity to revise the lapsed targets by following the national policy formulation protocol. As EVs could play a significant role in absorbing RE into the energy mix, it is necessary to have a long-term and consistent policy to promote EVs.

1.5.2 Issues and barriers

There are technical challenges regarding the inadequacy of ancillary systems to support the grid in a high RE scenario. High penetration of RE is likely to induce intra-day variability in power supply, which needs to be addressed with a robust ancillary system. Presently, grid balancing is only done through hydro plants. For the replacement of thermal capacity by renewables to be successful, Pump Storage Power Plants (PSPP) are considered very important. PSPP will be essential for managing prominent peak and off-peak characteristics of the daily demand pattern. Achieving Sri Lanka’s ambitious RE targets will be difficult without the necessary ancillary infrastructure.

The high cost of electricity from RE sources is a deterrent to developing new RE capacity. From this perspective, coal is a preferred fuel. However, with technological innovation, a drop in the

⁵ All sources of renewable energy including mini hydro, solar and wind other than large-scale hydropower are considered as NCRE.

price of RE-generated power, such as solar energy, is expected, which could make RE a commercially viable option. Also, with the evolution of storage facilities, the situation may further change and skew towards the incorporation of RE.

1.6 Recommendations for addressing challenges and opportunities

The following recommendations are made under eight categories to increase the share of RE in the energy generation mix of Sri Lanka for sustainable economic growth and development.

1.6.1 Energy infrastructure & financing

- **Policy and regulations** – It is strongly recommended to adopt competitive bidding for solar and wind projects by using benchmark tariffs as the ceiling for a reverse auction instead of continuing with Feed in Tariff (FIT) as these two technologies have sufficiently matured.
- **Investment** - As the investment capacity of the CEB is limited, it is necessary to maximize the private sector's participation in developing renewable energy.
- **Shared infrastructure** -This task should be the responsibility of GOSL / CEB to invest in shared infrastructure such as access roads, water supply and drainage, telecommunications, pooling stations inside the parks, transmission lines and substations etc., so that investing in renewable energy development, for the private sector would become more attractive and financially viable.
- **Wheeling options** – More and more private sector investment could be encouraged, especially for solar rooftop systems, if CEB provides the wheeling facility.
- **SMART Grids** – The national grid should be improved and updated continuously to incorporate rapidly growing RE. Conversion of National Grids into “Smart Grids” occurs around the globe. One method is to train a few young electrical engineers from the CEB in countries like Japan, India, Germany and the UK and bring new knowledge to improve our National Grid.

1.6.2 Solar and wind

Key renewable technologies such as solar PV and offshore wind have achieved significant cost reductions, exceeding expectations. As these technologies improve, so does the renewable potential that can be harvested cost-effectively. Technological development has also accelerated in end-use sectors; for example, EVs are quickly reaching commercial maturity and could play a vital role in the deployment of larger shares of renewables in Sri Lanka, both in the transport and power sectors.

1.6.2.1 Floating solar

Sri Lanka's energy policy is underpinned by the government's ambitious target of generating 70% of power from renewables by 2030. To meet the growing demand, Sri Lanka needs to add an estimated 11,000 MW to its power grid within the next two decades. Solar power is one of the cheapest energy sources, and Sri Lanka has substantial solar resources. However, ground-mounted solar power requires a lot of land and given Sri Lanka's high population density, agricultural needs, and declining forest cover; land availability can be challenging. Floating solar could bring multiple benefits, such as better land utilisation and improved efficiency, and it has the potential to help Sri Lanka meet its renewable energy goals.

One of the first floating photovoltaics was built in 2007 in Aichi, Japan, followed by over 30 other countries on all continents. There are now over 500 projects and, in total, over 2 GW in operation worldwide, including Maldives and India. Over the years, the projects have moved from smaller demonstration projects to significant scales, with large capacity additions in development, for example, in India, Laos, Thailand, Vietnam, and China – the largest markets for floating solar PV.

Adding large-scale floating solar plants would make electricity greener and more affordable and improve Sri Lanka's overall economic competitiveness. By identifying large water bodies for floating solar plants, Sri Lanka can also tap into the multiple benefits of lower evaporation, higher solar panel efficiency due to cooling effect by 5-10%, complementarity with hydropower generation and efficient management of peak hours. While environmental and social impacts must be carefully studied and managed, strategic and well-managed floating solar projects could also improve water quality by limiting algae growth.

Sri Lanka's first-ever floating solar plant, with a small capacity of 42KW (with technical and financial support from Norway under research collaboration between the University of Jaffna and the Western Norway University of Applied Sciences) began operations in 2020, in the premises of the University of Jaffna (Kilinochchi Campus). Experts believe that projects need to be scaled up to about 100MW-200MW to reap economies of scale and for floating solar to contribute to power generation significantly.

In promoting floating solar, the following challenges need to be addressed:

- Increased cost: engineering and construction costs are usually higher than ground-mounted solar farms.

- Safety issues: since floating solar involves water and electricity, more consideration must be given to cable management and insulation testing than on land, especially since cables are in contact with water.
- Degradation and corrosion: a floating solar plant has moving parts subject to constant friction and mechanical stress.
- Systems that are poorly designed and maintained could suffer from catastrophic failures.
- The installation is at risk of degradation and corrosion due to moisture, especially in more aggressive coastal environments.
- Understanding of Water-bed Topography: Developing floating solar projects requires a thorough understanding of water-bed topography and its suitability for setting up anchors for floats.

1.6.2.2 Twinning floating solar and hydropower

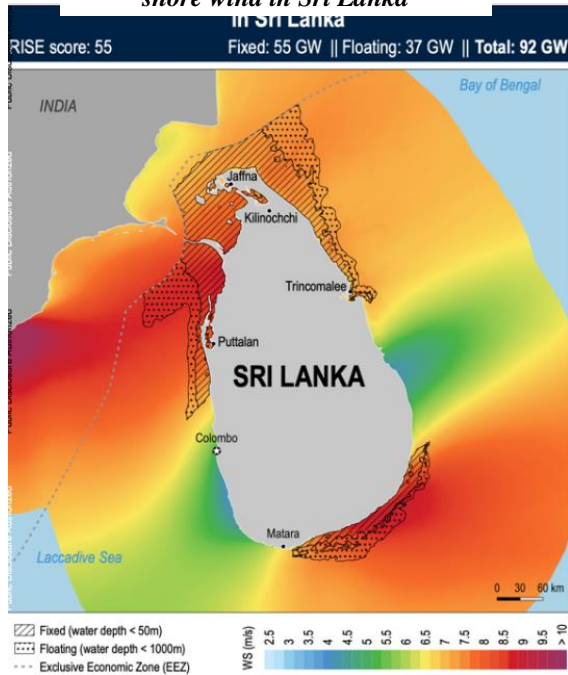
Sri Lanka can gain myriad benefits from twinning floating solar and hydropower. Floating solar can potentially work well with hydropower generation. New power generation also requires new power infrastructure, but the same power infrastructure can be used if a solar system is installed near a hydro facility. Sri Lanka has many water bodies that could potentially be used for floating solar farms. The synergies from floating solar with existing hydropower plants can significantly add much-needed diversity to its power generation mix which could benefit from greater solar power generation during the day with a switch to hydro at night. Seasonally, floating solar could produce power during the dry months, while hydro could play a more significant role in the energy mix during the rainy season.

1.6.2.3 Offshore wind

Offshore wind is a substantial, renewable source of energy for developing countries like Sri Lanka seeking alternatives to fossil fuels for their energy mix and to implement environmentally sustainable energy access solutions.

In 2019, the ESMAP-IFC Offshore Wind Development Programme’s report “Going Global: Expanding Offshore Wind to Emerging Markets” identified 3.1TW of offshore wind technical potential in just eight emerging markets: Brazil, India, Morocco, the Philippines, South Africa, Sri Lanka, Turkey, and Vietnam. Sri Lanka has significant fixed offshore wind potential in shallow waters. The picture below depicts the technical potential of offshore wind in Sri Lanka, which is in the range of 92 GW.

Figure 1.2- Technical potential of offshore wind in Sri Lanka



The offshore wind technical potential is an estimate of the amount of generation capacity that could be technically feasible, considering only wind speed and water depth (Figure 1.2). This is intended as an initial, high-level estimate and does not look at other technical, environmental, social, or economic constraints (extreme weather resilience, mitigating impacts on marine and avian wildlife and income-generating activities like fishing). Once these other constraints are considered, the realistic, practical potential is only a small fraction of the total technical potential. However, given the vast global offshore wind resource, this small fraction is still a significant and abundant energy resource. Just one per cent of the global offshore wind resource could generate enough electricity to meet the current global demand.

Though in general, the plant factor of wind power is around 18-20 %, in the Mannar Basin area off the North-West coast, the plant factor is about 45-50 %, almost identical to coal power plants. With further analysis, careful consideration, and planning, Sri Lanka can harness the power of the wind to reach its clean energy and climate goals. Regional cooperation with India would be crucial in achieving economies of scale rather than attempting to create an independent market with a value chain, where it may not make sense.

1.6.3 Ancillary systems – storage

Storage is the missing link for Sri Lanka’s energy transition. Storage is required for robust peak demand management and balancing system of CEB with the optimum mix of gas turbines, pump storage and battery storage.

- Storage from batteries in solar home systems to those in EVs will be crucial to accelerating RE deployment.
- A Pumped Storage Power Plant (PSPP) is one of the storage systems. However, PSPP may not be a reliable source because of weather variances.
- Grid/utility-scale battery storage is another optional system. By 2025, battery storage may not have emerged as an economical option, but it will be feasible by 2030. International Renewable Energy Agency (IRENA) forecasts a price drop of 50–66% in installed battery storage by 2030, whereas McKinsey forecasts the cost of energy storage systems to fall 50-70% by 2035 as a result of design advances, economies of scale, and streamlined processes.

- Behind-the-Meter (BtM) battery storage could be another option for distributed storage.
- Vehicle energy storage systems (ESS) with smart/flexible charging are another distributed storage system.
- Other options for storage are compressed air-based power generation and cold or heat storage systems (Ice banks or underground aquifers).

1.6.4 Ancillary systems – Green hydrogen

- Making hydrogen (or other gases) that can be stored indefinitely and then burned to generate electricity in conventional gas-fired power plants is another option for storage. Green-hydrogen production via electrolysis of water using solar & wind energy is rapidly becoming feasible (rapid scale-up and commercialisation) not only as storage but also to remove the intermittent nature of solar and wind. The world is moving away from the carbon economy to achieve a carbon-neutral economy and finally to achieve a hydrogen economy. Future fuel and energy storage will therefore be clean hydrogen.

1.6.5 Ancillary systems – Behind the meter storage (Solar Roof Top Systems)

RE resources such as solar and wind farms are essential. However, extreme care should be taken not to utilise fertile lands for energy generation as it will adversely affect food production, hence, food security. Rooftops must be used instead through innovative interventions.

- Comprehensive distributed power generation plan.
- Leasing programs (offers zero capital cost requirements).
- Redirect existing tariff subsidies to low-end household consumers for setting up rooftop solar infrastructure.

1.6.6 Ancillary systems – Transmission & distribution

Given below are some options available in transmission and distribution to increase the share of renewable energy:

- Smart metering
- Smart grid technologies / mini-grids; Delft Island can be a candidate for smart mini-grids with storage (to replace fossil fuel power generation with solar panels and wind turbines).
- Automated distribution systems.
- Demand response systems.
- Wheeling.

- Internet of Things (IoT) and other advanced communication systems.
- Grid Integration / Interconnection with India.
- Advanced wind forecasting.

1.6.7 Ancillary systems – Electric vehicles

Sri Lanka requires a fair and consistent policy for promoting electric vehicles (EVs) owing to multiple benefits, such as their enormous potential for distribution and storage for the electricity grid to absorb intermittent and variable RE generation, especially from solar and wind, in addition to their better-known environmental friendliness.

- Vehicle energy storage systems (ESS) are considered “batteries on wheels” and could be used as distribution energy storage.
- Stationary storage facilities can be built using second-life EV batteries.
- EVs connected to a charger can store power (Grid to Vehicle - G2V) and feed it into the grid if required from Vehicle to Grid (V2G).

1.6.8 Other renewable technologies

GOSL could seek the assistance of International Development Agencies to develop other renewable technologies as listed below, having significant potential:

- Ocean Thermal Energy Conversion (OTEC)
- Ocean Energy (Wave) Conversion
- Geothermal Energy Conversion

1.7 Indo-Japanese collaboration in areas of mutual strength and joint interest

Given below are the areas identified for the consideration of Indo-Japanese collaboration for its mutual strength and interest:

1.7.1 Medium-term

- Floating solar development.
- Introducing Pumped Storage Power Plants.
- Introducing Grid / Utility-scale battery storage.

1.7.2 Long-term

- Off-shore wind development.
- Grid Integration / Interconnection - With offshore wind development, it will be possible to integrate with the Indian grid. By doing so, Sri Lanka can manage better periods of excess supply and demand through power trade.

1.7.3 Capacity-building for green energy production

- Encourage and support RE research in local universities and research institutions.
- Support local entrepreneurs to scale up and commercialise successful research projects.
- Encourage and support public understanding of science to educate the masses to use RE energy sources for sustainable development.
- Add renewable energy subjects to school syllabuses, as educating children at a young age is of paramount importance.

1.8 Conclusion

The share of renewables in energy generation keeps rising and requires a profound transformation from a strongly centralized energy system to a decentralized, flexible and renewable system. Among other auxiliary systems, storage is essential to provide the flexibility required for this shift. Therefore, GOSL must introduce the right policies and remove technical and non-technical barriers to create an enabling environment to develop energy storage systems. This will pave the way for an increased share of renewables in the energy generation mix. In this regard, GOSL could seek IDAs' assistance for feasibility studies, technology transfer and capacity building. Private investment-both domestic and international plays a crucial role. Besides, national financing institutions could provide necessary funding when a conducive business environment is created and maintained.

References

Asghar, Zahid. (2008) Energy– GDP Relationship: A Causal Analysis for the Five Countries of South Asia, Applied Econometrics and International Development, Vol. 8-1

Bellini, E. (2021). Work begins on 145 MW floating solar plant in Indonesia. Pv Magazine International. <https://www.pv-magazine.com/2021/08/05/work-begins-on-145-mw-floating-solar-plant-in-indonesia/>

COP26 – The Glasgow Climate Pact. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26>

Draft Long-Term Generation Expansion Plan of CEB for 2020-2039

PricewaterhouseCoopers (n.d.). EU Green Deal Survey. PwC. <https://www.pwc.com/gx/en/services/tax/publications/are-europes-businesses-ready-for-the-eu-green-deal.html>

National Energy Policy & Strategies of Sri Lanka – 2019

National Policy Framework - Vistas of Prosperity & Splendour

Offshore Wind Technical Potential | Analysis and Maps | ESMAP. (n.d.). https://esmap.org/es-map_offshorewind_techpotential_analysis_maps/

Sri Lanka - Updated Nationally Determined Contributions, Ministry of Environment, April 2021

Sustainable Development Report 2022. (n.d.). <https://dashboards.sdindex.org/profiles/sri-lanka>

UNDP and the ADB, (2019). 100% Electricity Generation Through Renewable Energy by 2050 – Assessment of Sri Lanka’s Power Sector

Wikipedia contributors. (2022, December 29). European Green Deal. Wikipedia. https://en.wikipedia.org/wiki/European_Green_Deal

World Bank Group. (2021, August 25). Sri Lanka Can Gain a Myriad of Benefits from Twinning Floating Solar and Hydropower. World Bank. <https://www.worldbank.org/en/news/feature/2021/08/25/sri-lanka-can-gain-a-myriad-of-benefits-from-twinning-floating-solar-and-hydropower>

World Bank Group. (2019, October 31). Expanding Offshore Wind to Emerging Markets. World Bank. <https://www.worldbank.org/en/topic/energy/publication/expanding-offshore-wind-in-emerging-markets/>

SECTOR 2: DEVELOPMENT OF TRINCOMALEE AS AN ENERGY HUB

Tilak Siyambalapitiya

Nimal Perera

2.1 Introduction

Trincomalee is considered a potential centre to be developed to support multiple economic activities. The natural deep-sea harbour, relatively abundant land and lower population density are some unique features providing enormous opportunities for planned infrastructure development to make economic and social progress. More specifically, Trincomalee has the intact potential to stimulate infrastructure development exclusively focusing on fossil fuel (oil and gas), renewable energy and energy storage facilities, which could transform the area into an energy hub in South Asia. Such an energy hub, equipped with the required infrastructure and logistics, has the potential to attract investment in energy conversion, refining, trading and distribution sectors across the region.

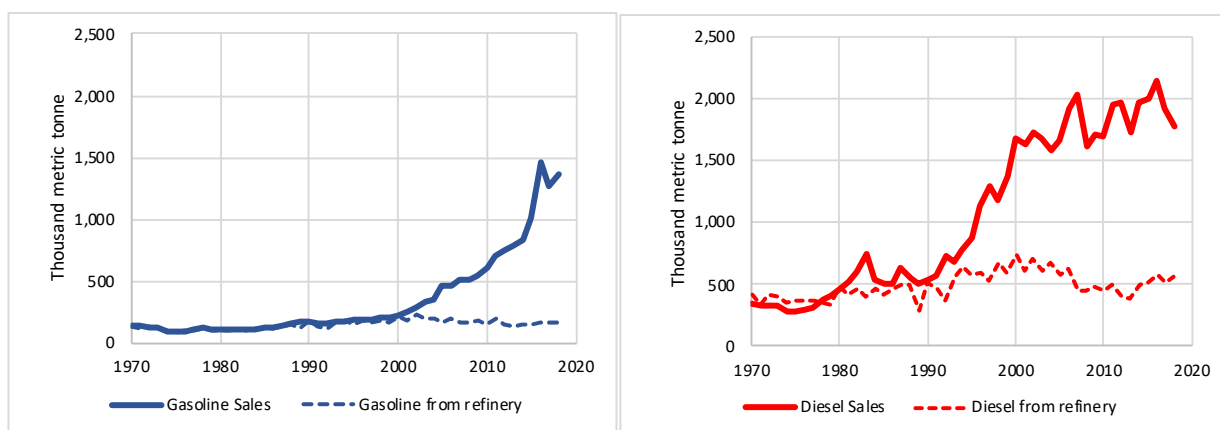
2.2 Potential for development as a liquid fossil fuel hub

Sri Lanka has been using liquid petroleum products for transport, industry and electricity generation; liquid petroleum gas (LPG) for cooking and industrial heating; and coal for electricity generation and industrial heating. Sri Lanka has been planning to increase its liquefied natural gas (LNG) usage for electricity generation, industrial heating and the manufacture of fertilizer.

2.2.1 Liquid petroleum products and refinery industry

The demand for fuel in Sri Lanka is met mainly from two sources: the direct import of refined products and the output of the refinery at Sapugaskanda, the only such facility established in 1969. Though this 50-year-old refinery has been upgraded and modernized with equipment and processes, its capacity has not been adequate to serve the country's petroleum product demand since 2000. Figure 2.1 shows the growth in demand and supply from the refinery. Its capacity is 50,000 bbl/day, whereas the cumulative demand for liquid petroleum products was about 105,000 bbl/day in 2019. Consequently, there is a case for upgrading the existing refinery to the range of 100,000 to 125,000 bbl/day or building a new refinery either at the same location (Sapugaskanda) or a new location.

Figure 2.1 Sri Lanka's historical demand for gasoline and diesel



Source: Data from Sri Lanka Energy Balance 2019, Sri Lanka Sustainable Energy Authority

The need to enhance refining capacity in the backdrop of the widening gap between country demand and refinery supply may be justified based on refinery margin, the difference between the cumulative value of refinery products and the costs of inputs and operation of a refinery. The order of magnitude of the refinery margin, if such a refinery was available in Sri Lanka, has been assessed to be about USD 380 million per year⁶. Table 2.1 shows an assessment of the refinery margin for a refinery with a capacity of 100,000 bbl per day, operating 350 days a year.

The assessment of the future demand growth, the product mix required by Sri Lankan customers, the impacts of policies and policy shifts and the economies of scale of new refineries are beyond the scope of this report. Such analyses pragmatically must be conducted through a pre-feasibility study followed by a feasibility study. If the former is found to have a positive outcome, the latter may be conducted, including a financial analysis to optimise the size and the product mix of a new refinery.

Results indicate that if Sri Lanka had a refinery of the assumed configuration reflected in yields in column 2, the economic benefit in 2018 would have been USD 378 million per year.

⁶ Author's estimates

Table 2.1 Estimated refinery margin for a 100,000 bbl/day oil refinery⁷

Product	Estimated yield per 100 bbl of crude processed	International prices in 2018 (USD/bbl)	Value of products per 100 bbl processed (USD)
LPG	4.7	58.1	273
Gasoline	30.0	84.5	2,535
Kerosene/Jet Fuel	11.5	87.7	1,008
Diesel	43.5	87.7	3,815
Bitumen	3.0	65.0	195
Fuel oil	4.0	65.7	263
Sulphur	1.0		
Total	97.7		8,089
			Value for 100 bbl (USD)
Crude	100.0	68.1	6,815
Gross margin			1,274
O&M (2%)			136
Net margin per 100 bbl of crude oil			1,138
Net margin per bbl of crude oil in USD			11.38
For a 100,000 bpd refinery operating 350 days/year			USD million/year
Value of crude oil input			2,385
Value of products			2,831
Operations and maintenance			48
Net refinery margin			398
Loss owing to re-exporting surplus products			20
Adjusted net refinery margin			378

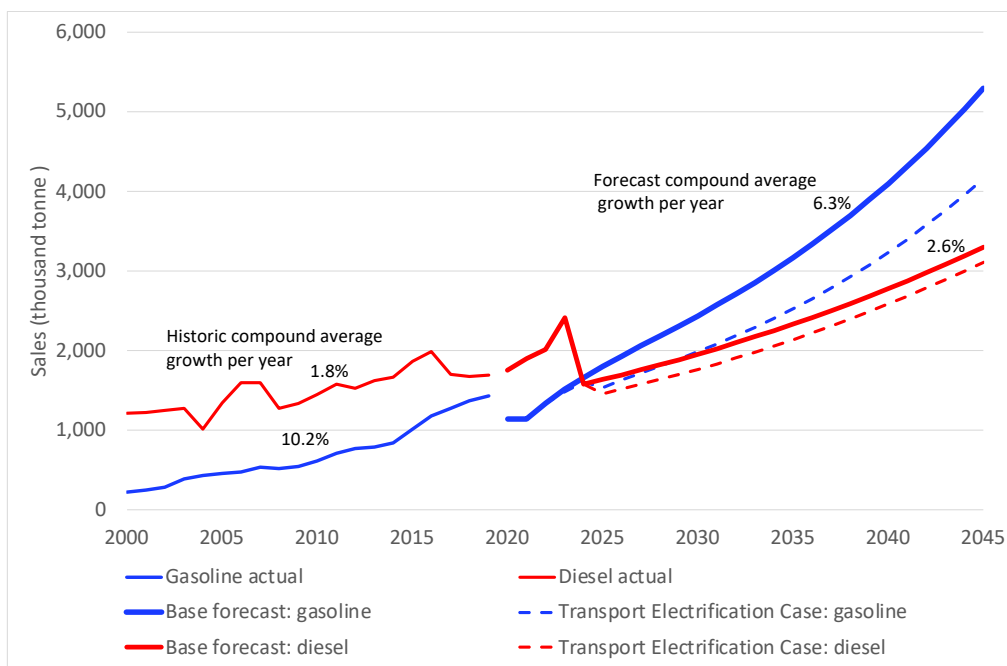
A recent study by the Institution of Engineers in Sri Lanka indicates that the forecast requirements of the two key petroleum products (gasoline and diesel) would be as shown in Figure 2.2. In a business-as-usual case, the sale of gasoline and diesel would increase at 6.3% and 2.6% per year. However, if there is policy-driven electrification of transport, such as railways, buses and

⁷ Estimate based on a typical refinery configuration; the value of products estimated based on actual average international prices in 2018

incentives for electric vehicles, these growth rates will be lower. Nevertheless, fuel sales may continue to rise due to the anticipated increase in the industrialization process and private transport. Significantly, the gasoline demand will exceed diesel by 2025.

Recent events, including the economic downturn in the country, may alter these forecasts, but the long-term trends are likely to continue. However, any significant focus on public transport development and curtailment of private vehicle imports will alter these trends. As such, for the next 20 years, the need for a refinery of capacity in the range of 125,000 bbl/day is confirmed. Clarity on the domestic demand for petroleum products is important because once a refinery is built, surplus products beyond the country's requirement must be re-exported. Being a small-scale exporter, Sri Lanka's surplus petroleum products will not attract the attention of buyers and hence have to be sold even at a loss.

Figure 2.2 *Historic and forecast sales for gasoline and diesel*



Source: A study conducted by the Institution of Engineers, Sri Lanka, 2021(unpublished)

2.2.2 Export potential of refineries

Periodically, there have been proposals to build larger refineries in Sri Lanka, promoted by international investors, to export the output of these refineries. As reported in the media, locations for such refineries have been proposed at Hambantota (in the Southern Province) and Kerawalapitiya (in the Western Province). The advantage of Hambantota as the refinery location is due to its port and the availability of land. At the same time, the greater demand for fuel in the country is centred in the Western Province. Likewise, Kerawalapitiya is already equipped with delivery and storage infrastructure in close proximity to receive crude oil, store and deliver products to the existing Kolonnawa and Kerawalapitiya distribution terminals. Power plants that operate on liquid fuel are located within a 10 km distance from Kerawalapitiya. However, the binding constraints in the populated Western Province would be land scarcity and the more challenging environmental issues. Despite this, the proposals for an investor-owned refinery aimed at either local or export markets or both have not been a reality.

2.2.3 Trincomalee as a potential location for an oil refinery

In 2021, the Ministry of Petroleum Resource Development initiated a feasibility study for a new or upgraded refinery. Considering all facts, if Sri Lanka decides to increase refining capacity, there are two schools of thought as to the location of the refinery. The first is to either upgrade or demolish and rebuild a new refinery at the current location in the Western Province, with space extended by acquiring private land in the vicinity. The advantage is that the crude oil and product storage and delivery infrastructure is already available on-site or in nearby off-site locations. The other school of thought is to build a new refinery in Hambantota or Trincomalee since existing harbours at both locations could facilitate crude oil import, product export and bunkering. Trincomalee has the added advantage of the nearby tank farm and railway connectivity.

2.2.3.1 Use of the oil tank farm at Trincomalee

The oil tank farm at Trincomalee, built by the British, has never been used to its full capacity. After independence in 1948, it has become a forgotten marvel lost in time and covered by jungle. The colonial government initiated the oil storage project in 1924 and completed it in the late 1930s. The farm has 101 storage tanks spread over 827 acres, built with one-inch (25 mm) thick steel sheets. The tanks near the harbour are enclosed in one-foot (300 mm) thick concrete rings.

Each tank can hold 12,000 tonnes of fuel, and the tank farm has a total capacity of about 1.2 million tonnes. In 2019, Sri Lanka's demand for gasoline was 1.6 million tonnes. For diesel, it was about 2 million tonnes, which indicates that the tank farm can store about one-third of the annual requirement of the two essential products.

This storage capacity is larger than the combined capacity of existing crude oil and product storage facilities at four key locations: Orugodawatte (crude storage, four tanks, 160,000 tonnes), Sapugaskanda (product storage, 12 tanks, 60,000 tonnes), Kolonnawa (product storage, 40 tanks, 237,570 tonnes) and the relatively new storage facility at Muthurajawela (product storage, 28 tanks, 250,000 tonnes). In Trincomalee, Ceylon Petroleum Corporation (CPC) used 15 tanks in the lower tank farm close to the sea until the farm was handed over to the Indian Oil Corporation (IOC) in February 2003 on a 35-year lease. The IOC, too, used the same tanks previously used by CPC, while all other tanks have been in a state of disrepair.

In January 2022, the government extended the lease for a further 50 years allocating CPC 24 tanks, LIOC 14 tanks and the joint venture company (Trinco Petroleum Terminal) 61 tanks. However, there have been no progress reports concerning the productive use of the remaining tanks or any investment in their rehabilitation. In this context, developing this oil storage facility for a regional energy hub will offer opportunities and challenges, some of which are listed below.

(a) Opportunities

- Use as an oil storage hub for electricity generation needs in Trincomalee and through a coastal tanker to deliver products from Trincomalee to Colombo.
- Use as a fuel bunkering hub for marine fuel bunkering and supply point; in this case, the Trincomalee natural harbour would be a positive factor for fuel unloading operations.
- Use the oil tank farm space to build a natural gas storage facility with a re-gasification facility, for which the Trincomalee harbour will facilitate unloading LNG vessels. It should be noted that natural gas is a low-carbon source of electricity generation (for more details, see Section 1).
- Use the tank farm ground space to develop a concentrated solar power (CSP) based power generation facility (calculated at 5 to 10 acres of land per MW of capacity⁸).

(b) Challenges

- Structural stability of the tanks due to long-term corrosion.
- Need for common or individual retention walls with sealed bottoms around the storage tanks to avoid spillages.
- High rate of evaporation losses due to the inherent nature of the fixed roof structure of the tanks.
- Highly volatile market prices of fossil fuels.
- National GHG emission limitations due to nationally determined contribution (NDC) commitments in the Paris Agreement.

⁸ Solar Energy Industries Association <https://www.seia.org/>

- Global trends in line with the switching of fuel in favour of renewable energy sources.
- Restrictions against funding by global multilateral agencies for the development of fossil fuel-based power generation infrastructure.
- Rapid global technology change towards green hydrogen and green ammonia as a source of shipping fuel.
- Accelerated influences from global climate change mitigation initiatives and global low-carbon product and service demands (low/zero carbon supply/value chain approaches).

The development of the tank farm for regular use requires integration with the development of Trincomalee as an energy hub and a manufacturing hub. These aspects require detailed feasibility studies and economic and financial evaluations before final decisions are arrived at.

2.2.3.2 Use of the oil tanks as a strategic or commercial reserve

Development of the oil storage facility for a strategic or commercial reserve has been proposed from time to time. The indicative advantages are that the strategic oil reserve may be stored in these tanks for 30 days of consumption by Sri Lanka⁹. Sri Lanka's 30-day consumption of petroleum fuels amounts to about 300,000 tonnes or 25% of the capacity of the tank farm.

Prospects for commercial storage, where the current and future market prices are weighed against the cost of holding stocks, would require relevant commercial skills. The newly formed company, a joint venture between India and Sri Lanka, is expected to examine this option in detail.

2.3 Potential for the development of Trincomalee as a natural gas storage hub

In 2014, Sri Lanka decided to build a liquefied natural gas (LNG) storage and re-gasification facility. Previously, there were certain decisions in 2007 requiring new oil-burning power plants which can fire re-gasified LNG (R-LNG) as well. Accordingly, the only oil-burning power plant built since 2007 at Kerawalapitiya can fire fuel oil or R-LNG.

2.3.1 Feasibility Study of 2014

In 2013-2014, a feasibility study was conducted to examine existing options for the LNG facility. The key recommendation was for a land-based terminal to provide 1 million tonnes per year, later expanded to 2 million tonnes per year. Figure 2.3 contains the conclusions of the study.

The study also examines the potential locations of the LNG terminal. It evaluates ten sites shortlisted in a previous study, i.e., Kerawalapitiya, Colombo Port, Athuruwella, Akurala, Godagama, Mawella, Hambantota Port, Panama, Batticaloa Trincomalee. Critical parameters

⁹ National Energy Policy and Strategies, 2019

considered in the analysis were (i) land acquisition, (ii) sea and coastal occupancy, (iii) impacts on nature, ecology, wildlife etc., (iv) social impacts including resettlement, (v) capital expenditure of LNG receiving and re-gasification terminal and additional energy infrastructure, (vi) charter fees of LNG carriers, FSRUs and/or SRVs, (vii) operating expenditure of LNG receiving, storage and re-gasification terminal and (viii) proximity to present/future promising LNG end users.

Kerawalapitiya, Colombo Port North, Trincomalee and Hambantota ranked as the top four candidate sites in the same order. Kerawalapitiya and Colombo Port scored the highest as they are near the potential LNG demand centre. However, due to land availability constraints, the Colombo Port needs careful planning in arranging plants and facilities. The study concludes that Trincomalee is the most promising site if R-LNG or electricity produced from R-LNG are to be exported to South India.

The sites for the R-LNG terminal, as ranked in the study, are summarised in Table 2.2. Having considered Sri Lanka's R-LNG demand, the study recommends Colombo Port to be the location for the R-LNG terminal.

Table 2.2- Comparison of sites for a land-based LNG terminal

Item No.	Critical Parameters	Allocation of Marks (%)	Candidate Project Site			
			(1) Kerawalapitiya	(2) Colombo Port North	(7) Hambantota Port	(10) Trincomalee (Ostenburg Island)
1	Land acquisition	15	15	15	15	15
2	Sea and coast land	10	10	10	10	10
3	Environmental impacts on nature, ecology, wildlife, etc.	20	20	20	20	20
4	Social impacts and resettlement	20	15	20	20	10
5	Capital expenditure incl. additional energy infrastructure	15	5	5	5	5
6	Charter fees of LNG carriers, FSRUs and/or SRVs	5	5	5	5	5
7	Operating expenditure	5	2	2	0	2
8	Proximity to present/future LNG end users	10	10	10	3	3
	Total	100	82	87	78	65
	Rank		2	1	3	4

Source: Energy Diversification Enhancement Project: Feasibility Study for Introducing LNG to Sri Lanka, Oriental Consultants Co., Ltd. (OC), Tokyo Electric Power Service Co., Ltd. (TEPSCO) and Consulting Engineers and Architects Associated (Pvt.) Ltd. (CEAA), 2014

An important question is whether the terminal should be land-based or floating. The study concludes that all the port-based sites are suitable for either land-based or floating terminals. In contrast, the Kerawalapitiya site is suitable only for a floating terminal since it is outside the harbour. The recommendation of the study is for a land-based LNG terminal on reclaimed land in Colombo Port North. The study does not recommend Trincomalee to be the port of choice because its focus was to cater to the electricity demand by operating oil-burning power plants with R-LNG. All such power plants are located closer to Kerawalapitiya and the Colombo Port, within a proximity of 10 km.

In conclusion, the R-LNG demand is expected mainly from power plants, which justifies the terminal being located closer to Colombo.

However, if (i) LNG is to be transhipped, (ii) if R-LNG is to be used for thermal energy requirements in heavy industries or (iii) if R-LNG-fired larger power plants are to support the intermittency of wind and solar power plants, then an LNG hub located in Trincomalee would be most relevant. This aspect requires further study, especially incorporating the following considerations as well:

- (a) Bangladesh has commissioned two floating storage and regasification units (FSRUs) over the past three years and is likely to import increasing quantities of LNG. More FSRUs are likely to be required to serve Bangladesh's growing demand for electricity and gas.
- (b) An LNG terminal (land-based) is being built on the east coast of India, at Ennore in Tamil Nadu.
- (c) An LNG terminal (FSRU) is proposed to be built off the east coast of India, offshore from Kolkata.

Accordingly, there may be advantages of an LNG hub in Trincomalee, unseen in the 2014 study, to serve both power generation and thermal energy requirements. Essential requirements would be to designate a “high-temperature manufacturing industry zone” in Trincomalee (see next section) and to build an R-LNG pipeline from Trincomalee to the Western Province to serve other industries, including export processing zones.

2.3.2 High-temperature manufacturing industry

The Feasibility Study of 2014 examined the potential demand for R-LNG from non-power applications. The potential demand under three growth prospects was defined, and a modest demand for R-LNG was developed, as shown in Table 2.3. Policy interventions stated in the study include mandatory conversion of city public transport to operate on natural gas.

Table 2.3 Demand forecast for non-power use of R-LNG

Projected Year	2020	2025	2030	2035	2040	2045	2050
Growth Scenario	Demand for RLNG (tonne/year)						
Normal Growth (determined by price of RLNG)	1,623	64,119	220,629	409,274	589,094	737,568	829,580
Moderate Growth (inclusive of policy interventions)	286,249	415,740	624,729	835,985	1,046,415	1,214,624	1,309,804
High Growth (inclusive of capital subsidies, industries on higher growth)	286,788	469,081	693,694	1,019,686	1,403,440	1,774,476	2,052,326

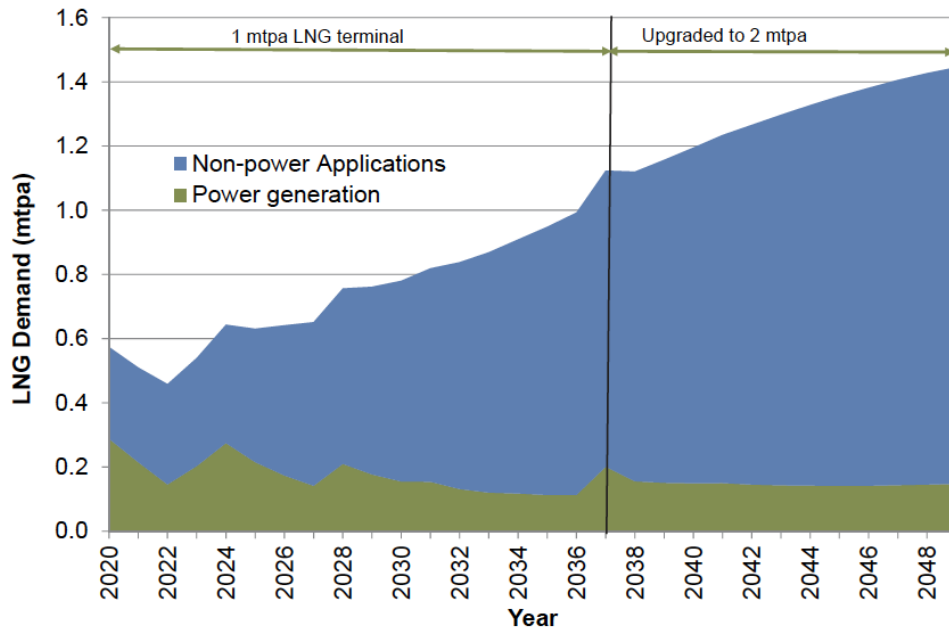
Source: Energy Diversification Enhancement Project: Feasibility Study for Introducing LNG to Sri Lanka, Oriental Consultants Co., Ltd. (OC), Tokyo Electric Power Service Co., Ltd. (TEPSCO) and Consulting Engineers and Architects Associated (Pvt.) Ltd. (CEAA), 2014

Sri Lanka lacks a clean thermal energy source for heating applications in manufacturing. The industries using thermal energy for such purposes include ceramic, porcelain, tiles, rubber products and the textile industry, where the standards for spotless products are rising. Thermal energy for all critical processes is supplied with liquefied petroleum gas (LPG), whereas R-LNG is more appropriate and cheaper.

The study, prepared when coal, oil and LNG prices were lower than at present (2022), largely relies on coal being identified as the preferred fuel for Sri Lanka’s future development of electricity generation. Since 2020, international prices of fossil fuels have increased for various reasons, while it has altered the fuel diversification strategies toward renewable energy.

None of the above studies has focused on the potential chilled water benefits from LNG re-gasification operations, especially from land-based re-gasification systems. Chilled water serves cooling infrastructure, which would be suitable for industrial parks under development and adjacent supporting town infrastructure.

Figure 2.3 Conclusions of the Feasibility Study on LNG terminal (2014)



Note: Conversion of existing oil-fired CCGT plants (600 MW) to gas firing is assumed to be done in year 2020, and their gas consumption is included above. The plan includes a new gas-fired CCGT 300 MW and a gas-fired CCGT 105 MW, both commissioned in 2020. All power plants are dispatched on merit order. The generation expansion model did not select any other gas fired power plant, in the cost optimization path.

LNG price: 13 USD/MMBTU, Coal: 142.8 USD/tonne, Crude oil: 110 USD/bbl

LNG demand for non-power applications is the moderate growth scenario, inclusive of policy interventions.

The forecast is based on scenario analyses, and does not represent an economically optimal scenario

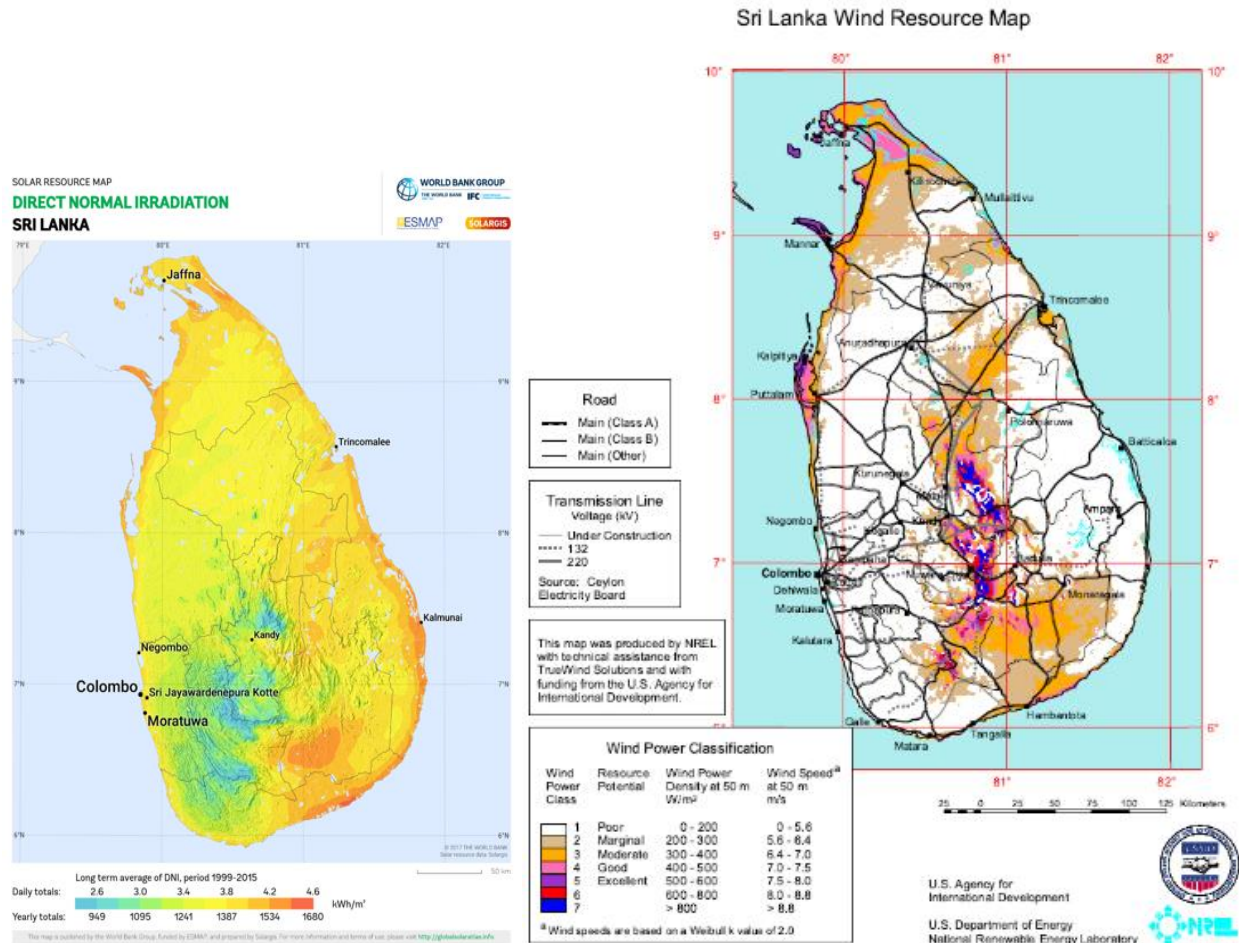
Source: Energy Diversification Enhancement Project: Feasibility Study for Introducing LNG to Sri Lanka, Oriental Consultants Co., Ltd. (OC), Tokyo Electric Power Service Co., Ltd. (TEPSCO) and Consulting Engineers and Architects Associated (Pvt.) Ltd. (CEAA), 2014

2.4 Trincomalee as a renewable energy hub

Figure 2.4 depicts the Sri Lanka solar and wind resource maps. Solar resources are more prevalent in the northern and eastern provinces, while wind resources are stronger in the North-West and Northern Provinces. The detailed land use map and its correlation to the resource maps have been published by the Sri Lanka Sustainable Energy Authority (SLSEA)¹⁰. Solar resources are exceptionally good in the Eastern Province. Power transmission capacity from resource-rich areas to load centres must be strengthened, but a transmission plan is yet to be developed. The plan depends on the sequence of development of various resources and their physical locations.

¹⁰ Renewable Energy Resource Development Plan 2021-2026, Sri Lanka Sustainable Energy Authority (SLSEA), 2021.

Figure 2.4. Sri Lanka solar and wind resource maps



Source: Sri Lanka Solar Atlas, SLSEA

Source: NREL/USAID, 2013

With the minimal development of industries or power generation capacity in the area, Trincomalee is served with a radial transmission line to Kappalthurai and Trincomalee.

In the previous section, it was identified that if Trincomalee is to become an LNG hub, there is a justification for larger industries to establish or move into the industrial zones in Trincomalee. Similarly, industries that require cleaner thermal energy could also move into such zones.

Strong and well-connected transmission network nodes are in Anuradhapura and Habarana, with multiple lines, sometimes forming a loop to improve reliability and maintenance convenience. The proposed India-Sri Lanka transmission interconnection will most likely strengthen the grid further up to Anuradhapura and farther to the south to use the current surplus transmission capacity in the Habarana-Colombo corridor.

A new transmission line was built from Habarana to Veyangoda to accommodate, among other generation capacities in the north and east, the planned coal-fired power plant in Sampur. Since the coal power project is suspended, this corridor will have spare capacity to accommodate

renewable energy developments in the immediate future. However, since the foregone capacity is 500 MW, and renewables require a larger capacity to provide the same energy, the 500 MW of transmission capacity is likely to be exhausted within a few years of wind and solar power developments north of Habarana and Anuradhapura. Additionally, the planned transmission line from Habarana to Trincomalee will have to be completed to facilitate the generation of more electricity, whether renewable or fossil-based generation.

Leaving aside the coastal areas for the development of recreational activities, the Trincomalee District and adjoining coastal districts of Mullaitivu and Batticaloa are rich in solar energy resources, including land availability. As a result, the three districts have the potential to contribute significantly to achieving the renewable energy development targets of the country. Table 2.4 shows the planned land use for solar power development, indicating reasonable availability of land. Further studies are required to examine the capacity that may be developed, considering constraints placed on available lands.

There are several advantages of focusing on Trincomalee and the adjacent areas to the north and south to be developed as a renewable energy hub. Trincomalee requires good transmission connectivity based on the planned development of large power generation and industrial customers. The development of new power-generating facilities in Trincomalee will be mainly for bridging requirements, i. e. to follow the fluctuations of renewable energy sources. Grid stability is most likely to be provided by power plants elsewhere, such as coal-fired and other thermal power plants, which would be operating on R-LNG.

Table 2.4 Availability of land for solar power plant development

District	Land Areas Available (ha)			
	Scrub lands	Barren lands	Sand	Total
Ampara	40,531	22,550	1285	64,366
Anuradhapura	114,980	7,994	-	122,974
Badulla	126,647	3,742	-	130,389
Batticaloa	58,251	16,856	893	76,000
Colombo	1,066	162	191	1,418
Galle	6,454	181	257	6,891
Gampaha	5,121	746	375	6,242
Hambantota	53,217	2,222	1555	56,994
Jaffna	10,051	7,780	5992	23,822
Kalutara	16,468	156	248	16,871
Kandy	22,448	1,122	-	23,570
Kegalle	12,522	469	-	12,991
Kilinochchi	13,913	7,812	2504	24,229
Kurunegala	38,396	1,027	1	39,424
Mannar	32,003	9,283	465	41,751
Matale	31,047	2,930	-	33,977
Matara	2,174	108	137	2,418
Moneragala	202,953	1,844	-	204,797
Mullaitivu	27,579	5,892	651	34,122
NuwaraEliya	33,582	555	-	34,138
Polonnaruwa	60,743	10,996	-	71,739
Puttlam	42,663	5,657	2332	50,651
Ratnapura	62,244	1,883	-	64,127
Trincomalee	46,077	18,087	584	64,747
Vavuniya	23,845	2,427	-	26,272
Total	1,084,975	132,480	17469	1,234,923

Source: Renewable energy resource development plan 2021-2025, SLSEA

2.5 Trincomalee as a Green Hydrogen Energy Hub

The use of hydrogen to store energy, especially electrical energy from renewable energy sources, has now passed the pilot project stage. Its practical implementation has commenced in various spheres, including the transport sector. It is important to note that hydrogen is not a source of energy but a form of energy storage. Compared with other sources, it has minimal environmental and social impacts at the point of production (to store energy) and at the point of use (to deliver the stored energy).

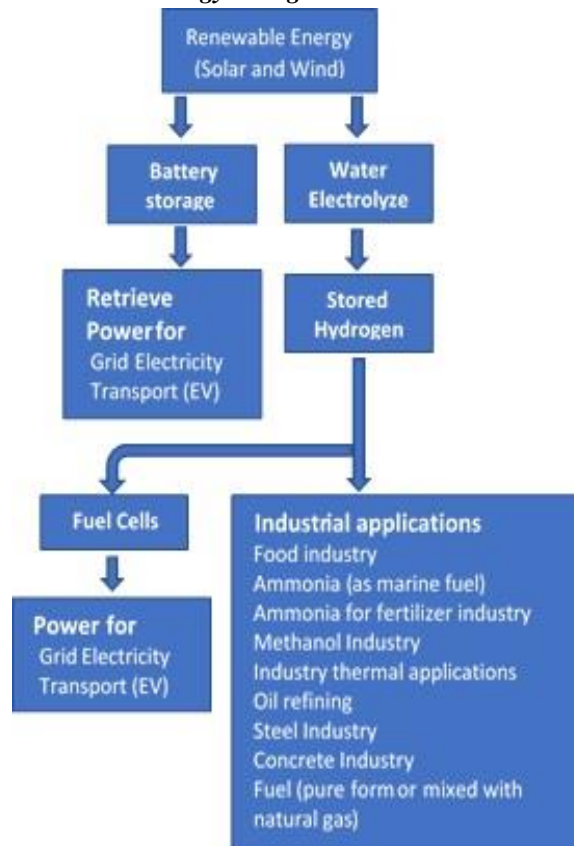
Intermittency in solar and wind power generation may lead to grid power quality issues, including violation of the standard grid voltage levels. The current practice is the automatic disconnection of renewable energy-based power generation to manage power quality. This strategy leads to a loss of productive energy output, affecting the return on investment (ROI).

Given the above circumstances, absorbing renewable energy sources, particularly solar and wind power, to the national grid in increasing quantities will be a challenge. To maximise the utilisation of national renewable energy resources while achieving national sustainability goals, two options are offered:

- Establishing high-capacity battery banks to store energy during intermittent power surpluses and curtailments in the electricity grid.
- Establishing high-capacity electrolyzers to absorb the excess capacities and store hydrogen as a multiple end-use source.

Both the above options will have national and bi-national (considering both Sri Lanka and India) multiple and mutually sustainable benefits. A summary of proposed technical options and approaches is depicted in Figure 2.5 below.

Figure 2.5- Multiple options for renewable energy storage



The main objective of the above options is the maximum absorption of renewable energy into the national electricity grid and other related benefits. Among the other anticipated advantages, green hydrogen will be the added supporting benefit, while it would also strengthen the national sustainable development framework. Both options above are considered proven and technically feasible but require a detailed sustainability analysis accounting for triple-bottom-line impacts and benefits. A brief discussion of the above options is given below.

2.5.1 Grid-connected battery storage systems (GCBSS)

Grid-connected battery storage systems will consist of the following sub-components:

- A grid and battery interface energy management system to monitor both grid voltage and battery capacity, which will be a digitally controlled (IoT) interface even responsible beyond the simple system, but functions as an overall system safety monitor and an operator.
- A battery system is the primary storage component of the GCBSS. Battery technologies are available in a wide spectrum, and the leading technologies are listed below:
 - Lead–Acid (PbA) Battery
 - Nickel–Cadmium (Ni-Cd) Battery
 - Lithium-Ion (Li-Ion) Battery
 - Sodium–Sulfur (Na–S) Battery
 - Redox Flow Battery (RFB)

Considering the characteristics of different battery technologies, energy density (kW/kg), round trip efficiency (%), life span (years) and eco-friendliness, Li-Ion batteries are placed at first rank and Pb-A batteries at the lowest. Table 2.5 shows the comparison of the properties of battery technologies.

Table 2.5 Characteristic comparison of different battery technologies

Battery type / Properties	Energy density (kW/kg)	Round trip efficiency (%)	Life span (years)	Eco-friendliness
Li – Ion	150 – 250	95	10 – 15	Good
Na – S	125 – 150	75 – 85	10 – 15	Bad
RFB	60 – 80	70 – 75	5 – 10	Bad
Ni – Cd	40 – 60	60 – 80	10 – 15	Bad
Pb – A	30 – 50	60 – 70	3 – 6	Bad

Source: Handbook on Battery energy storage systems (ADB)- December 2018

Accordingly, Li-Ion batteries would be the first choice in GCBSS, but their cost will be a major challenge. However, the benefits offered through this option will be in a narrow spectrum, including grid buffering and power returning.

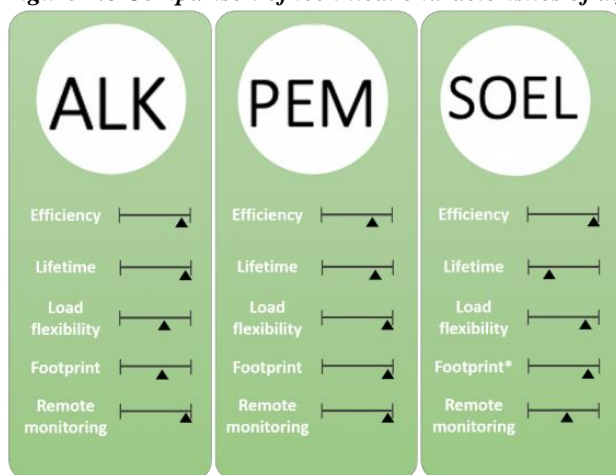
2.5.2 Green hydrogen

Hydrogen is currently used in a wide spectrum of applications, although most hydrogen produced globally does not use renewable energy. Almost all these hydrogen-producing technologies are not eco-friendly due to their greenhouse gas (GHG) emissions and/or negative environmental impacts other than GHG emissions. Currently, global initiatives lean towards switching to renewable technologies, including solar and wind, due to escalating global GHG emissions and resulting global temperature rise (1.5-degree targets). This is essentially from the global energy sector (including the energy industry and transport sectors), which is the main contributor to global GHG emissions¹¹. Sri Lanka has substantial solar and wind resources (Figure 2.4), but the national grid capacity limitations and intermittency have become major challenges for this option. Green hydrogen (GH₂) generation has become more acceptable as a more feasible and sustainable option. Therefore, it is noteworthy that GH₂ offers an energy vector as well as a commodity with multiple benefits beyond the energy sector.

In this strategic approach, solar and wind power generation systems are coupled with electrolyzers to buffer the grid voltage fluctuations, which need to be regulated with IoT interfaces between the national grid and electrolyzers.

Major popular electrolyser technologies are Alkaline (ALK), Polymer Electrolyte Membrane (PEM) and Solid Oxide electrolyzers (SOEL) and their characteristic comparisons are given below (Figure 2.6):

Figure 2.6 Comparison of technical characteristics of different electrolyser technologies



Source: Greensight – Norway

¹¹ Based on the Inter-governmental panel on Climate Change (IPCC) classification

ALK electrolyser stacks are available up to 6 MW, and PEM electrolyser stacks up to 2 MW. The SOEL is still on a laboratory scale with up to 10 kW.

ALK electrolysers have the lowest cost per kW. In commercial scale plants (2 MW +), Alkaline electrolyser plants have a capital cost of USD 800 – 1 000 /kW (or USD 1.8 – 2.3 million USD per tonne of daily capacity).

PEM electrolysers have a higher capital cost of 1400 – 1700/kW (or 3.3 – 4.2 million USD per tonne of daily capacity).

The price difference between ALK and PEM electrolysers largely owes to the maturity of the technology and the use of precious metals in PEM electrolysers. There is uncertainty regarding the investment cost due to the pre-commercial status of SOEL.

Proposed technical options for GH2:

- Introduction of water electrolyser technology as a grid buffering strategy in maximising the absorption of renewable energy to the national grid.
- The use of fuel cell-based power generation using GH2 to manage the demand on the grid, especially during periods of high demand.
- Fuel switching from fossils to GH2 in the transport sector.
- Planning and developing GH2-based industry capacities such as methanol and ammonia.
- Planning for industries with high demand for thermal energy, such as steel, concrete and ceramic with GH2.
- Planning for Trincomalee Green Industry Park with renewable energy, hydrogen and natural gas-based energy.

Sri Lanka has already initiated a feasibility study and a development of a pilot project on GH2. A Memorandum of Understanding (MOU) has been signed between GREENSTAT Hydrogen (India), which is a Norwegian-based energy company, the Petroleum Resource Development Authority (PRDA), India, and the Sri Lanka Sustainable Energy Authority (SLSEA) on behalf of Sri Lanka.

The above MOU consists of four work packages, including:

- Mapping of the supply and demand sides of hydrogen
- Policy and regulatory interventions to promote GH2 investment
- Promoting competitive GH2
- Pilot demonstration of renewable hydrogen.

In addition to the government initiatives mentioned above, several other initiatives have been taken by different organisations, a few of which are listed below:

- GH2 working Group at Sri Lanka Energy Managers Association (SLEMA) for GH2-related national capacity development, business model development, policy development assistance and promotion of research and development (R&D) with networking among national universities.
- GH2 research and knowledge-sharing activities initiated at individual university levels.
- Individual initiatives by private sector organisations such as Ceylon Oxygen (local agent for “LINDE” gas), Diesel and Motor Engineering Limited.

By entering into GH2, the economy of Sri Lanka will enjoy the following benefits:

- National renewable energy capacity enhancement.
- Improved national energy reliability, security and affordability.
- Improved national export capacity development through energy export, including GH2-based marine fuel hub (green ammonia and pure hydrogen-based).
- Green industry promotion and development.
- National environmental quality improvement (especially air quality).
- Assisting national low / zero carbon commitments.

Considering global trends and opportunities, it is proposed to divert the national energy demand management towards renewable energy-based technologies with GH2 as the sustainable energy vector and develop GH2-based industry clusters. In this respect, Trincomalee is proposed to be the feasible and desirable initial step along the renewable energy path, with a fair assessment of its opportunities and challenges.

2.6 Recommendations for further work and studies

Within the prevailing institutional framework, the following studies are required before Trincomalee may be declared as an energy hub, with the qualifier that it will facilitate the delivery and transfer of energy of different forms (fossil fuel, renewable energy, electrical energy and stored energy):

- (a) Review of the feasibility of building Sri Lanka’s planned new refinery at Trincomalee (the presently preferred location is Sapugaskanda, as stated by the Ministry of Petroleum Development in 2021).
- (b) Review of the feasibility study for Sri Lanka’s first LNG terminal (the presently preferred location is an FSRU offshore at Kerawalapitiya) or the second LNG terminal (no location

has been specified, but a previous study ranked the North Harbour of Colombo as the better location).

- (c) Feasibility of building an export-oriented refinery.
- (d) Feasibility of locating thermal energy-intensive industries in Trincomalee.
- (e) Use of Trincomalee's solar resource availability to project the location as a renewable energy hub with adequate transmission connectivity.
- (f) Developing a hydrogen storage facility sourced from renewable energy-based electricity.
- (g) Feasibility of setting up a CSP power plant using the land resource in the Trincomalee oil tank farm.
- (h) Feasibility studies on converting existing gas turbines to GH2-based systems as a short-time response system in the national grid.
- (i) Research, develop and introduce a sustainable national energy mix formula including national renewable sources, GH2 potentials and minimum baseload dependency with natural gas.

SECTOR 3: LOGISTICS AND CONNECTIVITY: PORTS, AIRPORTS, RAILWAYS (INCLUDING MASS TRANSPORT) AND FERRY TRANSPORTATION

*Rohan Masakorala
Dimantha de Silva*

3.1 Introduction

The transport sector of Sri Lanka, including transportation of goods and passengers and warehousing, contributes around 10 per cent of the GDP and generates about 6 per cent of total employment. In addition, transport infrastructure development would further add to the total contribution to GDP. Over the past decade, the Government of Sri Lanka has invested heavily in road infrastructure. The transportation systems available are mainly based on road and railway, while water and domestic air transportation systems are not well developed.

Road transport remains the primary mode of transportation in Sri Lanka, carrying 95 per cent of passengers and 98 per cent of the freight. The road network of Sri Lanka consists of expressways, main roads, provincial roads, unclassified regional roads and other roads maintained by public sector agencies. The national road network and the expressways are operated and maintained by the Road Development Authority (RDA), and the C and D class roads are under the provincial road development authorities.

Bus transportation is the leading mode of road transport. 46.6 per cent of the demand for transportation in Sri Lanka is provided by buses, out of which 38.2 per cent is provided by private bus operators and 8.4 per cent by the state bus operator.

The Department of Railways (Sri Lanka Railways-SLR) operates rail transportation. The entire railway network spanned about 1,568 kilometres as at 2018. SLR operates approximately 396 trains daily, including 67 long-distance trains. The main hub of railway transportation is Colombo Fort. The market share for passenger transport of SLR is about 6.0 per cent in suburban railway operations.

Colombo and Hambantota are the two main seaports that handle most exports and imports. Other ports, such as Galle, Trincomalee, and Kankasanthurei, handle limited cargo, and others are fisheries harbours. There is limited passenger and freight traffic within the country by water, mainly confined to fishing and tourism. But the potential exists for passenger and goods transportation in inland water bodies.

Sri Lanka has multiple airports; Bandaranaike International Airport (BIA), Mattala Rajapaksa International Airport (MRIA) and Jaffna International Airport (JAF) are international airports, while

other airports handle domestic traffic. Airport and Aviation Services (Sri Lanka) (Private) Limited (AASL) is assigned the task of operating all airports in Sri Lanka. Several domestic aviation companies provide charter and scheduled flights from Colombo International Airport Ratmalana (CIAR) and BIA to tourist destinations and Jaffna. Several water aerodromes are also located in tourist areas.

People and communities connect for numerous reasons while expanding transport networks improve and strengthen connectivity. The following key areas can be identified for the future growth of connectivity, which in modern terms is classified as logistics for supply chain security for global trade.

3.1.1 Energy

Energy is a key component of international trade and transport as well as of the economic development of a nation. Potential economic growth in Indian Ocean countries calls for increased demand for energy resources, be it petroleum or new forms of energy such as LNG, LPG or any other. Port connectivity for such energy sourcing, transportation and storage is an essential component of the economic growth of Indian Ocean countries. Therefore, specialized transport nodes would be required for raw materials and refined energy products to be transported among such countries and for supply chain connectivity through international shipping routes. As the demand for energy rises, there is great potential to develop infrastructure for strategic handling and distribution of energy in the region through effectively managed shipping and storage arrangements. In this context, the Port of Trincomalee can be identified as a strategic location to be transformed into an energy hub for the Bay of Bengal region. Oil/LNG tank storage can be expanded as the regional capacity for such infrastructure needs upgrading. In addition, many international players seem to be looking at harnessing the energy resources in this part of the world and looking for supply chain security options for nations and economic corridors of large countries such as India and China.

3.1.2 Transportation of cargo

Besides passenger transport, ocean cargo transportation can be broadly divided into several sectors: namely, break bulk, dry bulk, liquid bulk, Ro/Ro, energy and containerized transport (passenger transportation within the South Asia region remains almost negligible, although its growth potential appears substantial). Containerized cargo in the Bay of Bengal region, along with general and bulk commodities, has been growing. Nevertheless, its cargo volume remains much lower than that of the Arabian Sea. As a result, transshipment via Sri Lanka, Singapore and Malaysia is the preferred option by shipping companies for containerized cargo. However, it must be noted that the shipping industry will undoubtedly keep increasing the transshipment feeder vessel size as mother ships get larger. Therefore, port infrastructure in the coastal belts of the South Asia region needs expansion to cater to this demand over the next decade.

3.1.3 Coastal passenger movements

The passenger transportation industry through coastal shipping is a promising economic opportunity. Although this opportunity has been largely sufficient in the past, along with the rise in numbers of the middle class, the demand for ferries and small passenger ships has been growing in the littoral states. The trend in increased demand is mainly for linking South Asia and the ASEAN region as well as within the South Asian region. This mode of transportation could even connect river ports to the hinterland through low-draught ferry services. Such connectivity will help small businesses, passengers on pilgrimage, and regional tourism. In the long run, some ports, such as Trincomalee, will be able to attract regional cruise liners to develop it as a turnaround destination.

3.1.4 Minerals

As the global population continues to increase and new sophisticated technologies are developed, it is a matter of time before ocean resources are further tapped. In this sense, it is a well-known fact that the Bay of Bengal (BoB), the largest Bay in the world, has a rich base of minerals in the bordering countries that will attract new ocean-based investments. Activities to harness such resources to store, add value, and transport will be areas for new investments. The anticipated expansion of this activity must be appropriately managed, and securing connectivity would be a new form of engagement for all coastal states surrounding the Bay. This calls for major port facilities and infrastructure investment offshore and within the ports of the countries in the BoB region. In this respect, what is currently available seems far short of the requirement to cater to the demand in the basic shipping sector in the region.

3.1.5 Security

As the region is expected to expand its trade and business activity, the importance of security in the Indian Ocean is an unavoidable issue. Indian Ocean nations must ensure that the region is free from geopolitical tensions and that peace is maintained to develop international connectivity. This will require new infrastructure for coastguards and navies to ensure border control and secure connectivity for cargo and passenger services. A regional coastal support services centre can be provided in a natural harbour such as Trincomalee, which is strategically located close to the east-west shipping route than any other major port in the BoB.

3.1.6 Food

The ocean is a major source of resources for coastal communities and countries which use their maritime corridors for development. The fisheries sector is a crucial driver of economic growth in the region providing livelihoods for the fisheries community along with thousands of fishing villages - a significant proportion of the population. Besides contributing for domestic consumption,

it is also an important segment of the economy providing opportunities for investments and market expansion while ensuring sustainable development. As economic prosperity increases and the demand for food rises along with population growth, it is important to facilitate connectivity between harbours and ports linking fisheries communities and develop related infrastructure and logistics for manufacturing, storage and trading. Therefore, maritime connectivity through coastal shipping activity and cold storage facilities are essential development projects to connect large and small ports in the BoB region.

3.1.7 Distribution

Volumes, distance, time, infrastructure and logistics all matter when shipping options are looked at to connect trade and people. Therefore, achieving economies of scale is one of the most efficient ways of providing such services. Consequently, creating transport nodes to multiple ports and harbours is strategically important. One of the fundamental factors that a shipping company needs to know in route planning is the location of a port from the main shipping artery. Vessel diversions cost both money and time, impacting operating costs. The container shipping industry, which accounts for about 40 per cent of merchandise, uses the hub and spoke model under a fixed liner schedule, allowing mother vessels to call at selected ports around the world and connect cargo at transshipment locations via smaller feeder vessels. Only tankers, bulk and other types of ships make direct sailing on charter voyages.

3.1.8 Linking the needs

Logistics and connectivity in global trade act as pivotal instruments in enhancing the competitiveness of global trade through supply chain efficiency. Logistics alone is valued at over 5 trillion dollars and is considered among the top 3-5 international businesses that create international wealth and employment. For the first time, the COVID-19 pandemic in 2020 highlighted the importance of logistics and global connectivity.

Logistics is the key pillar that brings in the physical movement of cargo and people and their efficient connectivity between production, markets, and businesses such as tourism. However, physical connectivity is one element in modern supply chains as the flow of information, and documentation becomes a deciding factor in speed and turnaround times in logistics and connectivity.

The first decade of the 21st century has ushered a massive technological revolution, whereas the 4th industrial revolution speaks of digitalization and robotics for logistics and connectivity platforms. Time passes rapidly, and geographical locations play a crucial role in attracting logistics players and customers. Presently, logistics and connectivity solutions are integrated and work through coordination between many ecosystems. In this aspect, trade facilitation and legal reforms play a crucial role in being a conduit between cargo and passenger movements in any nation or

region. This will directly impact investment, particularly concerning post-COVID trade developments.

3.2 Role of the sector in transforming the Sri Lankan economy in achieving sustainable economic growth and development

Connectivity, accessibility and mobility are among the key factors influencing the expected land use and the settlement distribution pattern. Fast and reliable intra-regional connectivity through ports and airports is vital for transporting goods and services, while efficient transport systems in urban areas are vital for passenger movement. With over 40% of the GDP being contributed by the Western Province, having an efficient transportation system within the province will significantly impact the country's economic development.

The Colombo Municipal Council (CMC) area attracts about 2 million passengers and around 500,000 vehicles daily whereas in the Western Province passenger transportation by bus accounts for about 48% and about 4% by rail. However, it should be noted that almost 35% - 40% of peak-time corridor-based passenger travel is carried by rail. This shows that when rail has been provided as an alternative, people use it as the primary mode. The Kelani Valley Line, which has been neglected, currently has a 10% peak corridor share. It is mainly due to the current single track and its dilapidated condition. The present rail system is subject to a capacity problem due to infrastructure limitations.

The demand for passenger transportation is expected to double within the next 20 – 30 years, with close to 4.5 million passenger movements drawn to the CMC area. The highest demand will be for the Kandy Corridor, followed by the Negombo, Malabe, Galle Road and High-Level Road corridors. All these corridors, except the Malabe Corridor, have rail connectivity, with a passenger demand of 348,000 per day in both directions, and is expected to grow to 656,000 by 2035. Therefore, it is clear that priority must be given to developing a rail-based public transport option for the Malabe Corridor to cater to the country's traffic congestion issues.

Sri Lanka, an island less than thirty nautical miles from the Indian subcontinent, developing markets and situated adjacent to the east-west maritime route, can play a significant role in the supply chain efficiency for regional and global trade. Connectivity and Logistics have been identified as the main pillars of economic growth of Sri Lanka. The country's National Export Strategy (NES) has included logistics as a key contributor to the Sri Lankan economy in its findings concluded in 2018.

3.2.1 Deep Sea terminals and transshipment at Sri Lankan ports

With the addition of the 2.4-million-TEU deep-sea terminal, the Colombo International Container Terminal (CICT) at the Port of Colombo is now the only deep-water terminal in South Asia equipped with facilities to handle mega-ships. This gives the port the unique advantage of handling the increasing number of mega-ships sailing along the east-west route.

Of the countries bordering the BoB, the leading maritime countries are Bangladesh, India and Sri Lanka. While 95% of India's global trade is conducted via sea routes, the Port of Colombo accounts for almost 20% of Indian trade volumes moving as transshipments. This accounts for approximately 70% of the Colombo Port's transshipment volume. The lack of direct shipping services between Bangladesh, India and Pakistan has also resulted in Colombo being used as a hub port for much of the intra-SAARC trade.

The Trincomalee port, which lies on the country's eastern coast, has a basin depth of 20M and is the second deepest natural port in the world. The harbour includes 1600 hectares of sea mass and 2000 hectares of land mass, almost ten times the area of the Colombo Port.

In 2017, the Trincomalee Port handled 233 ships and 4 million tonnes of cargo movements, accounting for approximately 4% of the Sri Lanka tonnage. Currently, the port handles mainly break-bulk and liquid cargo; it is used primarily by Holcim Lanka and Tokyo Cement Lanka for clinker and gypsum, the Indian Oil Corporation and Ceylon Petroleum Corporation for petroleum products and Prima Company for the transportation of wheat. Container traffic is limited because Colombo attracts most of the current container volumes, and the Trincomalee Port lacks the required infrastructure for handling containers.

3.2.2 Emergence of Hambantota Port

The Hambantota Port is located on the southern tip of Sri Lanka within ten nautical miles from the world's busiest maritime lanes, between the Malacca Strait and the Suez Canal, linking Asia and Europe. It is ideally located at the intersection of the major international shipping routes, and approximately 200 to 300 ships sail on this route daily. Hambantota Port is also strategically positioned in terms of domestic trade perspectives. While it can serve the country's southern half, it is directly linked with the Central and Eastern Provinces through roadway connections.

The Hambantota Port occupies an area of 1,815 hectares and, according to the Master Plan, it can accommodate 33 vessels at a time. When it is fully operational, it will be able to handle up to five million TEUs per annum.

Despite the Hambantota Port's superior geographical positioning in terms of proximity to the main East-West trading route, at present, the Colombo Port continues to dominate the ports in Sri Lanka

in terms of its ability to attract ships. Colombo Port's competitive advantage compared to Hambantota, however, lies mainly in its established reputation.

3.2.3 The changing landscape and impact on port dynamics within the country

The ongoing Colombo Port Expansion Project will add two new deep-water container terminals (East and West Terminals) to the existing four container terminals, increasing its capacity to handle 15 million TEUs over the medium term. Modernization of the older Jaya terminal is also underway, which will involve extending the quay length by 120 meters and procuring three ship-to-shore gantry cranes that would enable the terminal to handle two 330-meter-long ships simultaneously. Developing deep-water capacity and efficiency in the Port of Colombo is necessary to remain competitive in the region, where many other deep-water ports are currently being developed.

3.3 Sector-specific global trends, their implications on national policies and lessons from other countries

As per the NES, “the global logistics and supply chain management industries are expanding, and this is expected to continue. Since the beginning of 2017, global container port throughput has grown by 5.8% compared to the same period in 2016, and it is expected to reach 4.6% annual growth in 2017. The industry—including roads, waterways, rail and air transport, and related logistics services – is growing in value at around USD 350 billion to USD 380 billion per year. The industry's sophistication has evolved with advances in information technology and the Internet of Things. The range of logistics services is extensive, including transportation, customer service and inventory management, warehousing, packaging, material handling, maintenance and information.

Geographical position can give comparative advantages to a country. Increasing logistics efficiency through trade facilitation (TF) requires policy changes, and trade and transport services can bring more investment to the logistics sector and strengthen trade relations with partners.”

In a highly competitive globalized economy, countries have their unique selling propositions. They tend to focus on their core competencies and strengths to gain maximum returns to economic activity to achieve greater prosperity. Some nations have been naturally endowed with resources, geography, location and people. At the same time, some countries have been wise to create such advantageous positions by using sheer strategy and intellect to be ahead of the competition and allocating proper human resources to stay ahead of the curve. Among such innovative nations today, we can see Israel, Singapore, Japan & UAE as superior on many fronts in development and are world leaders in many areas of global industry, including advancement through connectivity and logistics.

The Indian Ocean has around six key shipping and logistics hubs. Among them are Singapore and Dubai, contributing nearly 10% of GDP to the respective countries through connectivity and logistics services. Maritime and aviation-related connectivity has played a significant role in the advancement of these two economies.

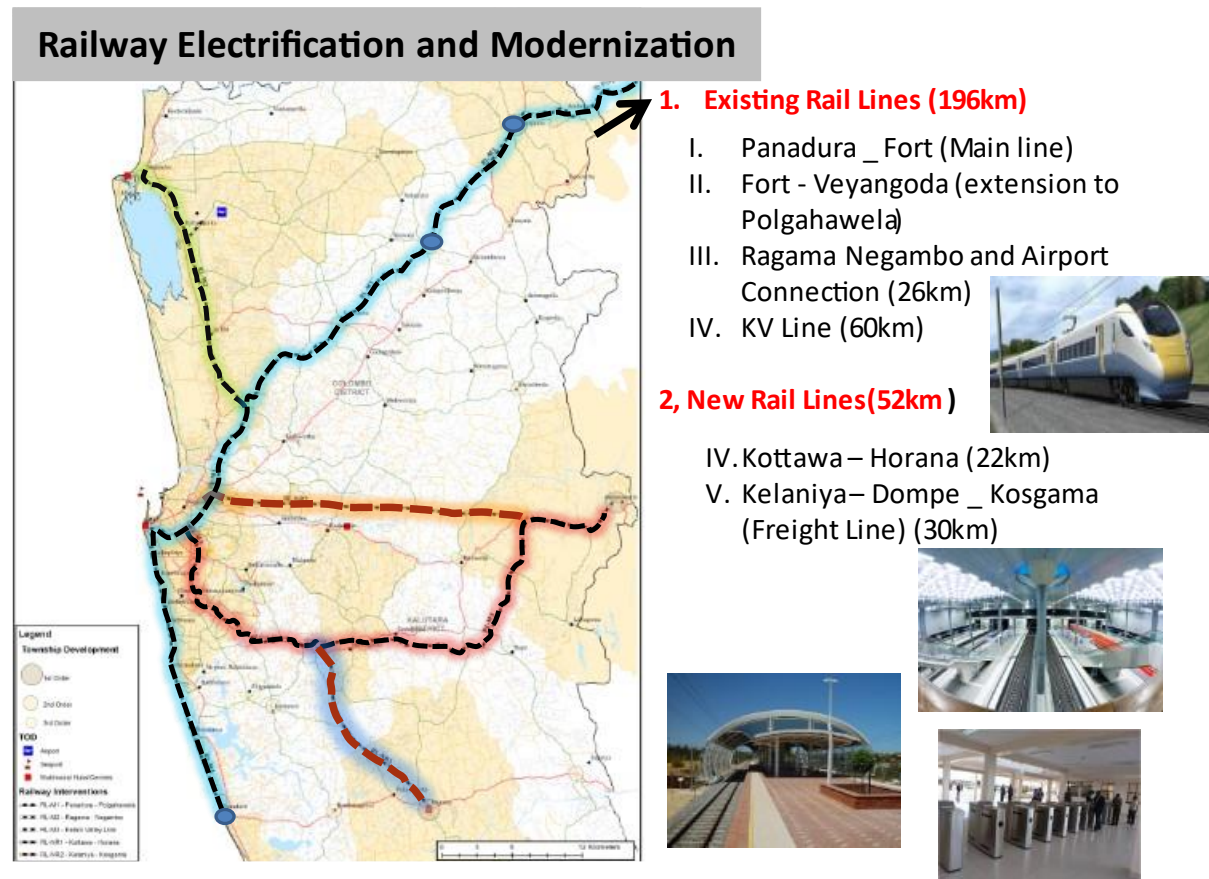
Sri Lanka was once a trading hub, described by Marco Polo as “for its size, better circumstanced than any island in the world”. Indeed, its location has been one major factor that helped the country to be known historically as a major trading and commerce post in the history of Sri Lanka, once known as Tabarobana and Ceylon, among many other names, including the famous Pearl of the Indian Ocean. Geographically, if one studies the global map, it is not surprising why Sri Lanka has been identified as an island in a strategic location. Indeed, its unique selling proposition is its positioning in the centre of the Indian Ocean. At the island's southern tip is the mega east-west ocean highway for global maritime traffic. Given this nature's gift, the island has the potential to be the next big global destination to emerge as a significant logistics and distribution hub in the 21st-century global economic map. In this context, the ports in the country's north, south, east and west can serve various maritime traffic requirements whilst connecting continents and other major regional hubs for the efficient movement of commerce.

3.4 Reviewing the existing national policy framework and ongoing initiatives

The problems in the passenger transport sector have escalated due to incorrect planning over the last 30 years, wrong advice and wrong implementation. The solution identified through various master plans, such as the ComTrans Masterplan and Megapolis Transport Masterplan, are still valid since the problem remains the same. However, considering the economic crisis and the investment capacity of the country, a balance has to be struck between high investment in long-term infrastructure development and short-term solutions to sustain the system until the much-needed transport infrastructure is added to the system.

Proper feasibility studies must be done without ad hoc pilot studies that would result in failed project initiatives. An example is the failed initiative such as the Bus Priority Lanes (BPL), which was implemented based on a pilot study without a feasibility study. In addition, projects such as the ‘Sahasara’ bus reform have not produced any tangible output even after four years of operating a project office. On the contrary, the modernization of the bus fleet with real-time information to the public would provide a much-needed boost to the public transport sector.

Figure 3.1 Railway electrification and modernization



The Megapolis Transport Masterplan 2016 identified the need for existing railway line modernization with upgrades and electrification. The corridors that required rail connection but did not have an existing line were proposed with the LRT option; hence, a 75km LRT network was proposed. The railway modernization was considered with ADB funding under the Colombo Suburban Railway Project (CSRП). The required feasibility studies and detailed designs were completed for all railway lines (Main line, Coastal line, KV (Kelani Valley) line and Puttalam line) and are ready for the tender process. The KV line was selected for the first modernization and was on the ADB pipeline before the government requested ADB to remove it from the pipeline. The reasons for this decision and technical explanations are unknown.

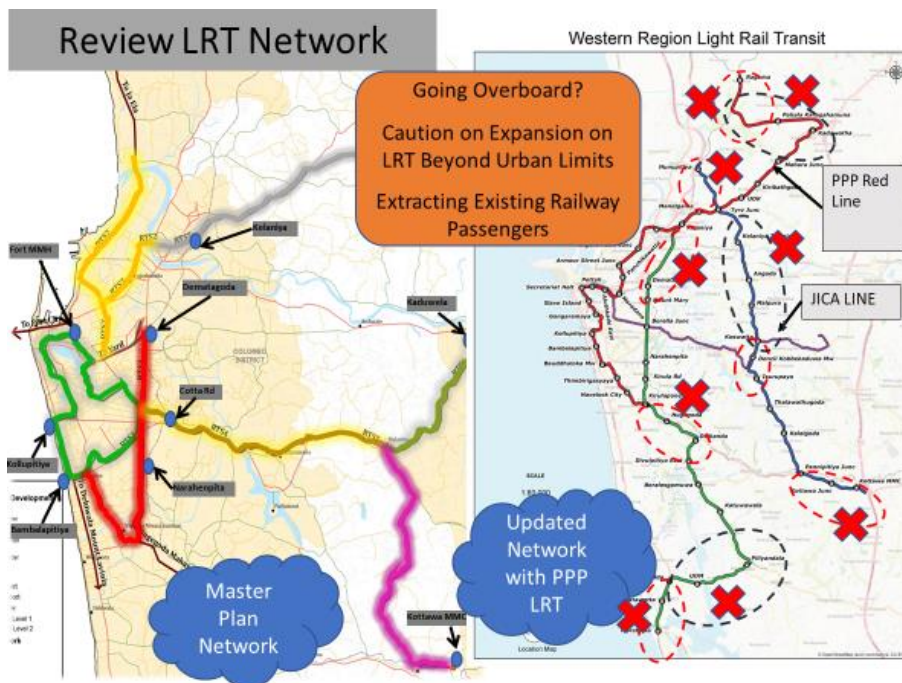
The parliament road corridor, the highest-growing corridor without a railway link, was prioritized for LRT. Initially, a 25km network was selected under JICA funding. The feasibility study was completed in January 2018, which found that the project for a 16 km LRT line from Malabe to Fort was feasible. The project was given Cabinet approval, and the loan agreement was signed with JICA in March 2019 with a 0.1% interest, a 40-year loan, and a 12-year grace period. The project's detailed design started in March 2019 and was tender-ready by 2020, when the project was suspended. Once again, the reason for the suspension was not made public.

The remaining LRT network was considered for private-public partnership (PPP). The findings of the study were questionable for several reasons. The network was expanded for three LRT lines, shown below, with a proposal for a PPP.

1. Red line (Ragama-Kadawatha-Fort – Kirilapone)
2. Blue Line (Ja-Ela – Angoda- Battaramulla – Pannipitiya – Kottawa)
3. Green Line (Kelaniya – Kirillapone – Delkanda – Piliyandala – UoM -Moratuwa)

The routes proposed had duplications along many corridors with existing rail lines and with the JICA LRT line, which is usually avoided when rail network planning is done. The Red Line is probably the only line that looks feasible with the need to adjust the route. The duplication of railway lines and the extension beyond urban limits must be avoided. Thus, it is not recommended to go ahead with the PPP LRT project until a proper review of the feasibility study and proposal has been completed. The Red line is not a priority, which was recommended by the Masterplan to be completed by 2035. Thus, the Red Line can be delayed until a proper review is done, and fresh proposals are floated.

Figure 3.2 LRT Network



3.5 Identifying policy gaps, issues and barriers

The current National Transport Policy (NTP), developed in 2009, is now outdated. The Ministry of Transport formulated an updated NTP in 2019, yet it did not receive necessary approval to be gazetted. Therefore, there is no updated NTP at present. An NTP with prioritization of sector-wise

development is required. Therefore, an immediate adaptation of the National Transport Policy should be a priority.

It is important to understand and study the future trade, economic activity, and development agendas of countries around the Indian Ocean and the interest of global powers to ensure reliable, uninterrupted and safe movement of people, goods, energy and resource supplies throughout the Indian Ocean and the rest of the world.

Logistics sector policy gaps and barriers have been identified in the studies concluded by the Sri Lankan industry. Accordingly, following are some of the recommendations that these studies have presented:

- The creation of an enabling environment, which includes the legal environment and the trade facilitation linked with technologies.
- Promotion of public and private partnerships and investment promotion.
- Development of human resources to meet the global supply chain demands.
- Development of greater skills to facilitate market requirements such as e-commerce.
- Managing global market trends and consumer behaviour which is linked to trade shifts.
- National policy framework.

3.5.1 Attracting the global shipping and aviation industry

The core of a shipping and aviation hub is created by a country's business owners and operators. For example, Singapore, Dubai and India have all their global operators and regional head offices making final decisions for investing and converting the location into a trade hub. The international investment decisions come from the investor of the connectivity mode. Such mega companies will create vertical and horizontal growth in the sector, and the multiplier effect on the country is automatic; Singapore became a financial city because of its strength in the maritime and logistics industry at its inception.

A commercial ship or an aircraft owner or a ship operator looks at a few key components when deciding to call over at a port or an airport; the unit cost per ton or a box of cargo and the maximum freight recovery of an entire voyage per ton or a package is vital. The ease of doing business plays an equally important role.

There are other considerations, which include:

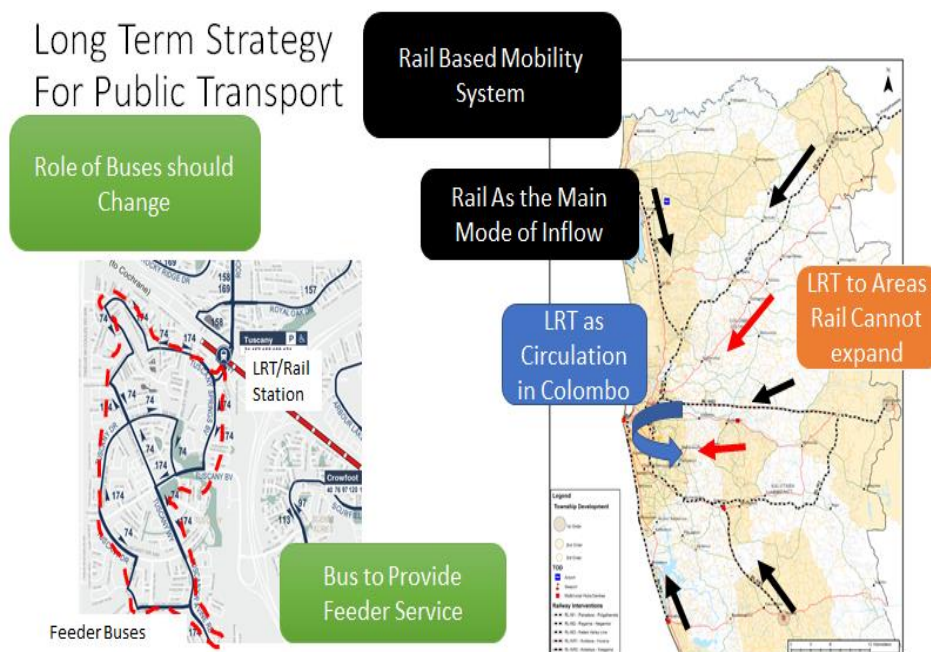
- i. Catchment area and its location for strategic positioning of voyages and route planning
- ii. Volumes and traffic generated
- iii. Energy availability at a competitive cost
- iv. Diverting time from shipping or aviation corridors and access to markets.

In this context, South Asia still lags behind global mega maritime and aviation hubs, except for the Port of Colombo, which has been established as a transshipment hub for containerized cargo due to location and feeder connectivity. Containerized cargo is just one segment of the global shipping industry, which accounts for 40 per cent of merchandise trade. Still, the rest of the shipping industry and types of ships that carry cargo are much greater and bigger in volume. The contribution to Sri Lanka's GDP from international logistics is between 2 to 2.5 per cent.

3.6 Recommendations for utilizing opportunities and facing challenges

The strategy towards a solution should be long-term and sustainable, which can be accomplished by medium-term and short-term solutions. The long-term strategy to solve the transport problem in Colombo must be based on developing all transport modes for users to select the best alternative. Thus, along with a higher quality, efficient public transport network, it is still important to maintain an efficient road network and an expressway network within Colombo. Once an excellent public transport network is developed, introducing policies to deal with congestion pricing etc., resulting in higher parking costs will discourage private vehicle use while providing an option for those who wish to use their vehicles. The right policies will also allow authorities to introduce high vehicle taxes, which will help control congestion in the main cities.

Figure 3.3 Long-term strategy for public transport

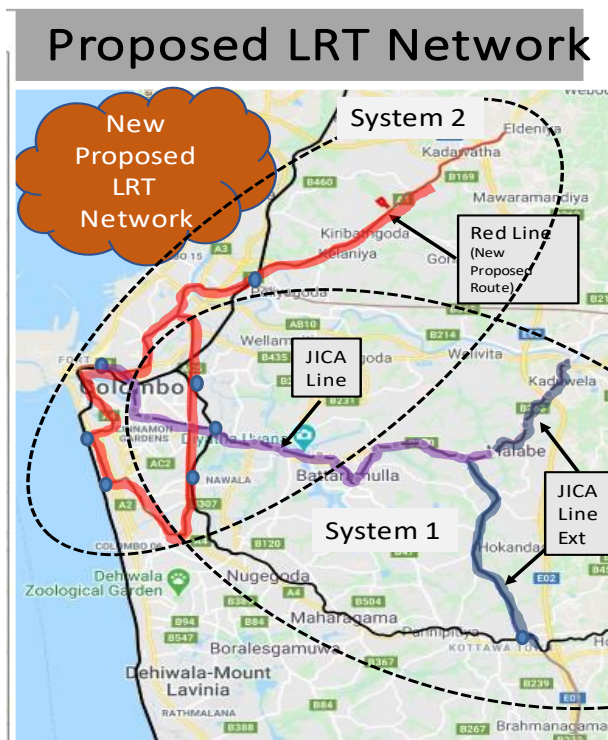


Public transport infrastructure development is a vital and integral part of the strategy, and it has been shown worldwide that an efficient public transport system can solve urban congestion. Therefore, the broad strategy for Colombo should include the following:

- i. Modernize and electrify all existing rail corridors as the main mode of inflow.
- ii. Extend Mass transit (LRTs) to areas where railways cannot be expanded (since travelling on ground-based transportation is not feasible in the urban context).
- iii. Provide LRT as a circulation option within the city.
- iv. Modernize the bus service with a high-quality network with required route changes and institutional rearrangements. The role of buses is to change from feeder systems to rail and LRT Systems so that more passengers are fed to the rail system and provide circular routes in cities.

Therefore, it is clear that if we are to develop Colombo City, the Suburban Rail and LRT will have to take at least 50% of the entire corridor passenger trips. The modelling shows that a planned network can cater to the demand. Together, the KV line and the Fort -Malabe LRT line will create a buffer area covering a major segment of the urban areas for a complete end-to-end solution through public transport. The LRT network can be considered under two systems, which can be operated independently.

Figure 3.4- Proposed LRT network



Already commenced and planned projects for improving public transport should be expedited in the following order.

- i. Modernizing the bus sector with higher quality bus services and necessary bus route modifications based on a cluster company concept.
- ii. The LRT Project from Malabe to Fort with possible extension to Kaduwela and Kottawa via Athurugiriya.
- iii. Development of Colombo Suburban Rail Projects:
 - a. KV Line
 - b. Coastal Line (Panadura – Fort)
 - c. Main Line (Fort to Veyangoda)
 - d. Puttalam Line (Ragama to Negombo)
 - e. PPP/LRT Line (Red Line).

The transport investment projects go through a lengthy planning process, where project planning, pre-feasibility, feasibility, detailed design, acquisition (if needed) and procurement take

considerable time. Thus, it is essential to prioritise implementation-ready projects such as the Colombo Suburban and LRT projects, which are all tender-ready.

Providing alternatives for road passengers is equally essential, for which road improvements and network additions are vitally important. The efficient use of existing infrastructure could increase the capacity of the roads without heavy investments. The following are some initiatives that could be completed on a short and medium-term basis.

- i. Identifying bottlenecks such as narrow bridges, signalised pedestrian crossings, and bus stops without bus bays would allow these capacity increases.
- ii. In some instances, the existing signal systems have not been updated for over three years. Thus, installing a proper system to monitor and update traffic signals will eliminate unnecessary congestion at signalised junctions.
- iii. Traffic management near schools.
- iv. Traffic law enforcement through digital technologies such as CCTV monitoring.

In the logistics sector, Sri Lanka needs to develop a national policy through consensus and a policy framework ratified by Parliament for logistics and connectivity to facilitate global, regional, and national trade and transport-related economic targets. The focus should be to support trade and connectivity aspirations of the Indian Ocean rim countries and to link the Indo-Pacific strategic trade corridors while benefiting economically as a major connectivity centre of the world by expanding the sea-air and logistics network. The following areas of the industry have to be developed to world-class standards by inviting international participation in building the below-mentioned logistics and connectivity-related ecosystem:

- Legal environment, institutional and administrative structure to be modernized.
- Hard infrastructure to be expanded.
- Upgrade soft infrastructure for trade facilitation.
- Uplift investments & communication links, including promotion and marketing.
- Global indexes and aligning national strategy to be among the first 20 in the world.
- Remove current bottlenecks through existing National Export Strategy (NES) recommendations on Logistics.
- Capacity and skill development, including re-skilling the workforce on technology-based solutions.
- Cyberspace and investment policy.

As markets and production locations shift with the expansion of the global population and the consumer markets, timely and pragmatic decisions must be taken to be competitive in the connectivity business. Sri Lanka as an island, shipping and aviation connectivity will be the two vital parts of international connectivity. At the same time, the domestic transport sector needs a major

transformation for investment and export development to bring about the required efficiency and reduce transaction costs.

3.7 Indo-Japanese collaboration: mutual strength and joint interest

Given below are the areas identified for consideration of Indo-Japanese collaboration for its mutual strength and interest:

Medium-term

- Help develop an overall port, harbour and logistics policy for Sri Lanka in line with global trends.
- Prepare a rail connectivity plan between Colombo and Trincomalee ports to serve the BoB region.
- Support the government's national export strategy and logistics pillar to execute proposed reforms and points of action.
- Provide technical assistance for trade facilitation and training.
- Provide expertise to enhance an integrated domestic logistics strategy connecting ports, airports and inland facilities by rail and road.
- Assist in capacity development in the shipping and logistics industry.
- Arrange visits to Japanese shipping and logistics institutions.
- Approval of the updated National Transport Policy for Sri Lanka.
- Modernizing the bus sector with high-quality bus services with necessary bus route modifications, with cluster company concept.
- LRT Project from Malabe to Fort, with possible extension to Kaduwela and Kottawa via Athurugiriya.
- Colombo Suburban Rail Project - KV line development.
- Identifying bottlenecks such as narrow bridges, un-signalised pedestrian crossings, and bus stops without bus bays would allow these capacity increases.
- A proper system to monitor and update traffic signals will eliminate unnecessary congestion at signalised junctions.
- Traffic management near schools.
- Traffic law enforcement through digital technologies such as CCTV monitoring.

Long-term

- Develop infrastructure in ports and offshore maritime facilities.
- Backward integration for Japanese logistics companies to set up advanced distribution centres in the Indian subcontinent.
- Establish a common inland container terminal for Japanese shipping companies.
- Establish a South Asian maritime training centre.
- Establish facilities for bunkering with new technology.

- Enhance Colombo Suburban Rail Project
 - a. Coastal Line (Panadura to Fort)
 - b. Main Line (Fort to Veyangoda)
 - c. Puttalam Line (Ragama to Negombo)
- PPP LRT Lines (Red Line) with a review of proposed routes.
- Implement a congestion pricing system to enter city limits.
- Parking strategy for inner city parking.

3.8 Conclusion

Plans have been developed for both the transport and logistics sectors. What has been lacking is implementation and remaining steadfast with the decisions that have been made. Therefore, implementation-ready projects with economic benefits should be prioritized per the National Transport Policy. To start with, it is recommended to adopt the draft National Transport Policy developed in 2019.

SECTOR 4: PEOPLE-TO-PEOPLE CONTACT: TOURISM

Vipula Wanigasekara

Malraj Kiriella

4.1 Introduction

This study makes crucial recommendations for the revival of Sri Lanka tourism, which suffered a series of severe setbacks since 2019 and continued through 2021 due to the Easter Sunday bombings, the Covid-19 pandemic and the subsequent economic and political crises that engulfed the country in 2022. Despite signs of recovery in the post-pandemic period aided by the inflows of Ukrainian and Russian tourists, arrivals slowed once again in April 2022 and further retarded three months later due to the economic crisis manifested by power outages, fuel and cooking gas shortages, followed by the political upheaval of serious magnitude. The outbreak of war between Russia and Ukraine in February 2022 also adversely affected the flow of tourists from these two countries. Sri Lankan authorities are currently attempting to revitalise the tourism sector by implementing the “Strategic Plan for Sri Lanka Tourism 2022-2025”¹².

4.2 Historical overview

Sri Lanka was known among international travellers for nearly two millennia. Some historians wrote about the island after visiting the country, and others obtained information from those familiar with the island. For example, around 45 A. D. Pliny, one of the great Roman historians, devoted a chapter in his encyclopaedic work to the four Sri Lankan envoys in the Roman Court during the time of Emperor Claudius. Among those who visited the island were the Chinese monk Fa-Hien (414 A.D.); Marco Polo (1293 A. D.); Marignolli and Odoric (1329 & 1349 A. D.); Ibn Batuta (1344 A. D.); the Chinese Admiral Zheng He (1405-1410 A.D.) and Robert Knox (1660 A.D.), who lived in the country for twenty years, were among many foreigners who left accounts of the country, people and their customs etc.

In the modern period, Sri Lanka has been a popular tourist destination since the 1950s. After identifying the need to establish an institutional framework, the government decided to develop tourism in a planned and systematic manner in 1966, for which the Ceylon Tourist Board Act No. 10 of 1966 (SLTDA, 2018) was enacted. Subsequently, hitherto popular beach holidays were expanded to include round trips to cover world heritage and wildlife sites, making the island a diverse destination. Later, Sri Lanka positioned itself on three pillars as its Unique Selling Propositions

¹² https://www.slttda.gov.lk/storage/common_media/Sri_Lanka-Final_V6_Edited850147500.pdf

(USPs), namely Authenticity, Diversity, and Compactness, giving itself a competitive edge over India, Malaysia, the Maldives, Singapore and Thailand.

Sri Lanka tourism remained a major industry and foreign exchange earner for decades, but not without experiencing vicissitudes of fortune. The following arrival figures demonstrate how the sector endured during short and long spells due to macro elements over which the industry had no control.

Table 4.1: Sri Lanka tourism trends from 2001 to 2018 – Key indicators

YEAR	Tourist Arrivals	Official Tourist Re-ceipts (US \$ Mn)	Receipt per Tourist per day (in US \$)	Employment	
				Direct	Indirect
2001	336,794	211.1	63.1	33,710	47,194
2002	393,171	253	63.4	38,821	57,349
2003	500,642	340	66.8	46,761	65,465
2004	566,202	416.8	72.2	53,766	75,272
2005	549,308	362.3	74.6	52,085	72,919
2006	559,603	410.3	83.4	55,649	77,909
2007	494,890	384.4	79.1	60,516	84,722
2008	438,475	319.5	76.7	51,306	71,828
2009	447,890	349.3	81.8	52,071	72,899
2010	654,476,	575.9	88	55,023	77,032
2011	855,975	838.9	98	57,786	80,899
2012	1,005,605	1,038.30	103	67,862	95,007
2013	1,274,593	1,715.50	156.5	112,550	157,600
2014	1,527,153	2,431.10	160.8	129,790	170,100
2015	1,798,380	2,980.60	164.1	135,930	183,506
2016	2,050,832	3,518.50	168.2	146,115	189,544
2017	2,116,407	3,924.90	170.1	156,369*	202,846*
2018	2,333,796	4,380.6*	173.8	169,003*	219,484*

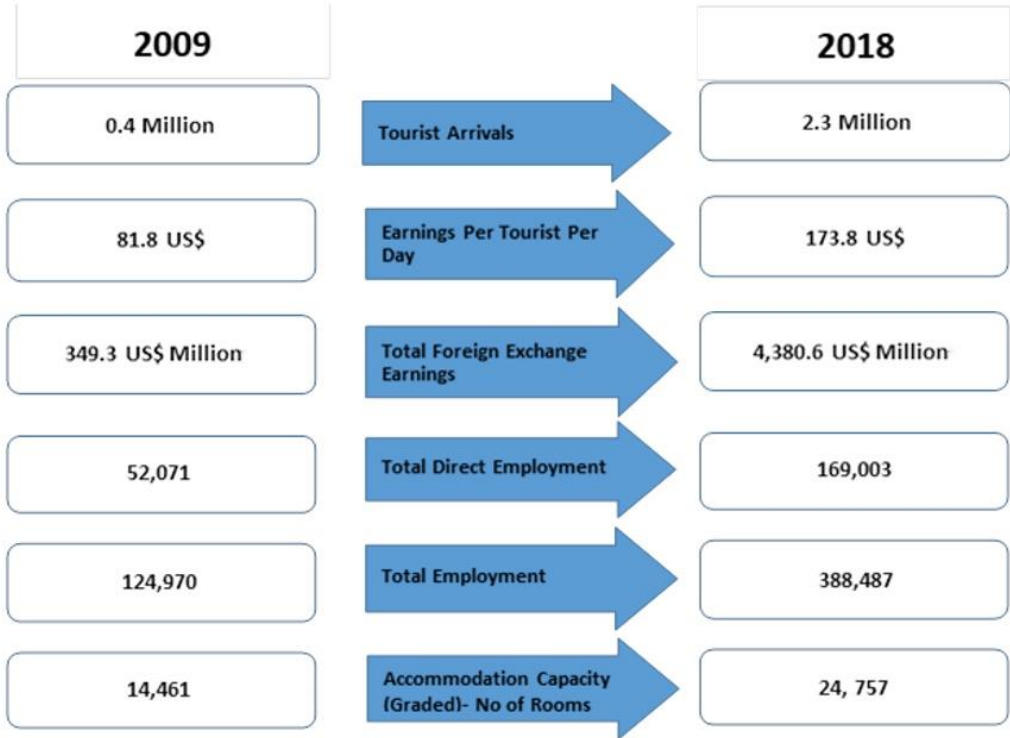
Source: SLTDA 2018

The first milestone for the tourism industry was 407,230 arrivals in 1982 when Sri Lanka was a leading destination above other regional competitors. The steady development of tourism also encouraged authorities to foster new tourist zones in Bentota, Hikkaduwa, and Unawatuna on the island's Southwest coast. At the outset, local and foreign investors brought international brands: Hilton, Taj, Inter Continental and Oberoi, to name a few. That was a promising period for Sri Lanka tourism, which enjoyed a short life.

The ethnic riots in 1983 had an adverse impact on tourism, followed by the decades-long separatist war in the North and East and the Southern insurgency in 1988/89. Until the separatist conflict ended in 2009, tourist arrivals hovered between 250,000 to 500,000 p.a.

The period from 2009 to 2018 was most beneficial for Sri Lanka tourism, with numbers increasing from 447, 890 to 2,333,796, which was a significant growth. During that time, new tourism zones such as Pasikudah, Kuchchaveli, and Kalpitiya were opened up for investment with varying degrees of success. During this period, international hospitality brands such as Shangri-La, Marriott, Mövenpick, Anantara, Avani, Ozo, Onix, RIU, and Best Western entered the industry as critical international players. The industry was optimistic about future growth and was poised to compete with other regional players.

Figure 4.1: Key Tourism Indicators for 2009 and 2018



Source: SLTDA 2018

Using 2018 as a base year is meaningful since it represents the highest point in tourism arrivals (2.33 million) and foreign exchange revenue (USD 4.3 billion). Tourism contributed 4.9 per cent to the GDP that year. The five leading source markets were India, China, the UK, Germany and Australia, and Japan was the 11th registering 49,450 visitors. However, the progress made in 2018 was short-lived as the country has suffered a series of setbacks since 2019, per Table 4.2 below.

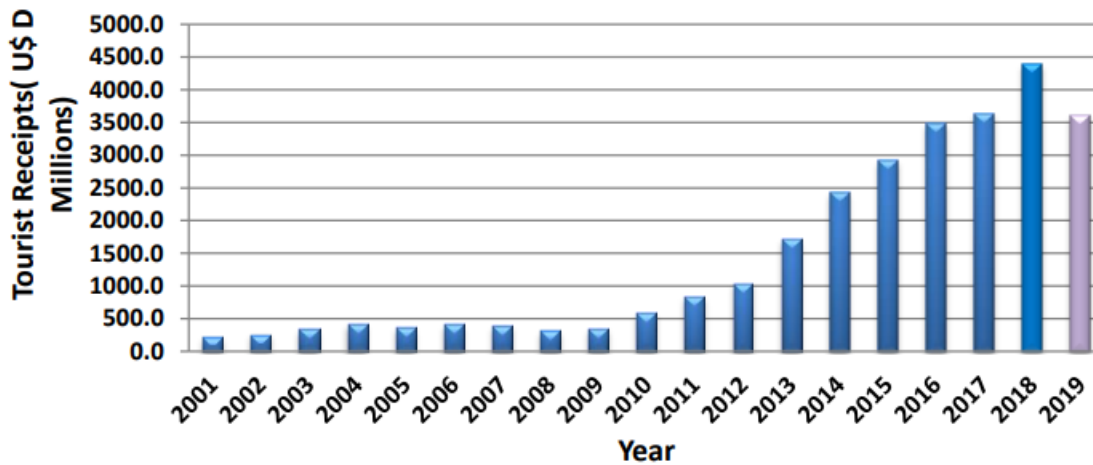
Table 4.2: Tourist arrivals from 2018 to 2022

2018	2019	2020	2021	2022 (up to Oct.)
2.33M	1.91M	507,704	194,495	568,258

Source: SLTDA, Monthly Tourist Arrivals Reports 2022

Sri Lanka recorded over 1.9 million tourist arrivals in 2019, a 21 per cent drop compared to the previous year due to the April 2019 Easter Sunday bombings. It is estimated that the sector earned around USD 3.5 billion in 2019, achieving 77th rank out of 141 countries in the Travel & Tourism Competitiveness Report 2019 of the World Economic Forum. India and China contributed the most significant number of tourist arrivals, followed by the UK, Germany, and France (International Trade Administration, 2021).

Figure 4.2: Tourist Receipts (USD) from 2001 to 2019



Source: SLTDA 2019

Table 4.3: Top Tourism Source Markets in 2018 and 2019

		2018				2019	
Rank	Country of Residence	Tourist Arrivals	Percentage Share	Rank	Country of Residence	Tourist Arrivals	Percentage Share
1	INDIA	424,887	18.2	1	INDIA	355,002	18.6
2	CHINA	265,965	11.4	2	UNITED KINGDOM	198,776	10.4
3	UNITED KINGDOM	254,176	10.9	3	CHINA	167,863	8.8
4	GERMANY	156,888	6.7	4	GERMANY	134,899	7.0
5	AUSTRALIA	110,928	4.8	5	FRANCE	87,623	4.6
6	FRANCE	106,449	4.6	6	AUSTRALIA	92,674	4.8
7	MALDIVES	76,108	3.3	7	RUSSIAN FEDERATION	86,549	4.5
8	USA	75,308	3.2	8	UNITED STATES	68,832	3.6
9	RUSSIA	64,497	2.8	9	MALDIVES	60,278	3.1
10	NETHERLANDS	57,160	2.4	10	CANADA	48,729	2.5
TOTAL		1,592,366	68.2	TOTAL		1,301,225	68.0

Source: SLTDA 2019

4.3 Post-pandemic situation

Confident in tourism prospects, the government declared in January 2020 an ambitious target of earning USD 10.0 billion from the industry by 2025. However, the spread of the COVID-19 pandemic delivered a severe blow to the tourism and hospitality industry worldwide, and Sri Lanka, too, became a victim. To contain the pandemic, drastic measures such as the closure of international airports were resorted to, which delivered a severe blow to the industry, resulting in the closure of tourist resorts and related infrastructure and severely restricting the movements within the country. The skilled workforce, facing a dire situation, sought alternative employment opportunities, and many left the island. Effects of the pandemic were felt from 2020 through 2021, significantly reducing the arrivals by mid-2021, with a slight recovery at the end of 2021, forcing many in the tourism trade to lose their livelihood.

Table 4.4: Arrivals from the top twenty markets from 1st January to 2nd June 2022

Rank	Country	Number of Arrivals
1	India	62,216
2	United Kingdom	46,499
3	Russian Federation	45,049
4	Germany	31,088
5	France	20,230
6	Ukraine	13,711
7	Poland	12,430
8	Australia	12,167
9	Canada	10,822
10	United States	10,145
11	Kazakhstan	7,610
12	Maldives	7,347
13	Switzerland	6,178
14	Netherlands	5,886
15	Czech Republic	5,802
16	Denmark	5,031
17	Israel	4,698
18	Saudi Arabia	4,032
19	Austria	3,496
20	Belarus	2,276
	Other	63,673
	TOTAL	380,386

4.3.1 Strengths of the tourism industry

- Diversity and authenticity - beaches, cultural sites, national parks, forests and sanctuaries and their authentic products and services around the country.
- Eight UNESCO World Heritage sites.
- Opening up pristine areas in the North and East for tourism that were not accessible during the separatist conflict.
- A relatively small island with short distances of travel between various tourist sites.
- Tourism infrastructure development, including hotels and improvements to the road network.
- Two international airports and one regional airport with plans for expansions and upgrades.
- Expansion plans for the domestic light aviation network.
- Colombo and other strategic sea-port expansion and development of the Colombo Port City project.
- Good telecommunication and internet facilities, along with further expansion plans for a robust information technology infrastructure.
- High standard of services such as healthcare and banking.
- Presence of international brands demonstrating confidence in Sri Lanka.
- Accessibility for international airlines to carry passengers to and from Sri Lanka.

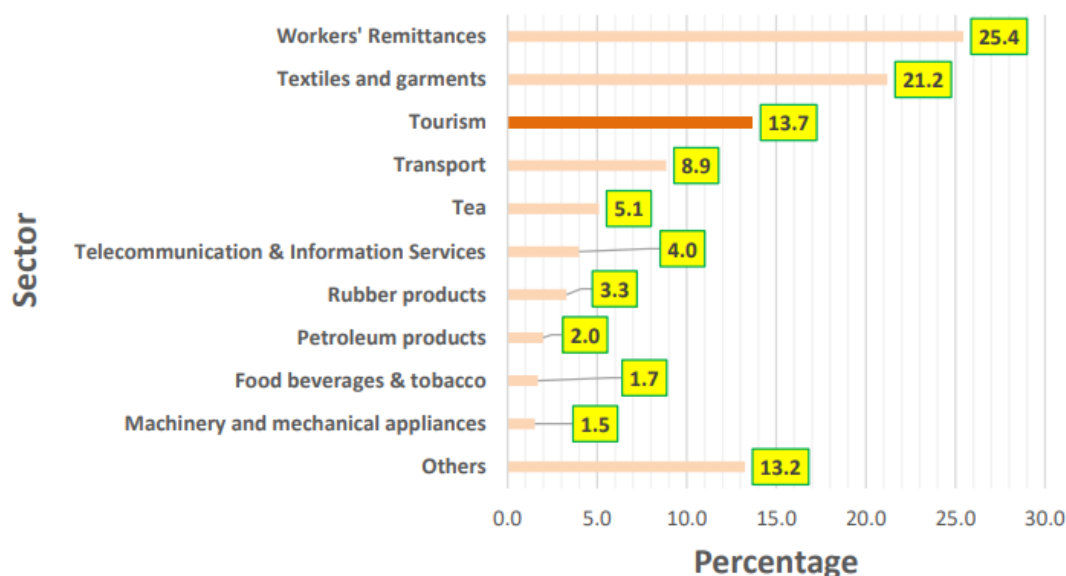
- Regular promotions are being carried out in primary markets.
- Availability of expertise with international exposure in the hospitality trade.
- Tourism-friendly population.

4.3.2 Weaknesses of the tourism industry

- Existence of multiple state institutions administering tourism-related services that confuse consumers in obtaining services.
- Several trade associations exist, but they do not represent all tourism stakeholders.
- Lack of trade and consumer research being carried out to identify market potential in geographic, demographic and behavioural trends.
- The inability of the industry to ascertain the real multiplier effects of tourism.
- Lack of sustainable and green tourism practices in comparison with Sri Lanka's competitors.
- Skilled personnel leave the industry or depart the country for greener pastures.
- Lack of training capacity of skilled personnel to meet industry demands.
- Inability of the cash-strapped and debt-ridden industry to provide optimum service to visitors.
- Lack of marketing activities being carried out in primary and secondary markets.
- Non-deployment of a global positioning campaign to brand Sri Lanka.
- Excessive time required for visitors to travel within the country due to poor road and rail conditions and costly domestic air services.

Tourism was identified as the third largest and fastest growing source of foreign currency in 2018, after worker remittances and textile and garment exports, accounting for almost USD 4.4 billion or 4.9 per cent of the gross domestic product in 2018.

Figure 4.3: Distribution of foreign exchange earnings (Percentage) 2019



Source: SLTDA 2019

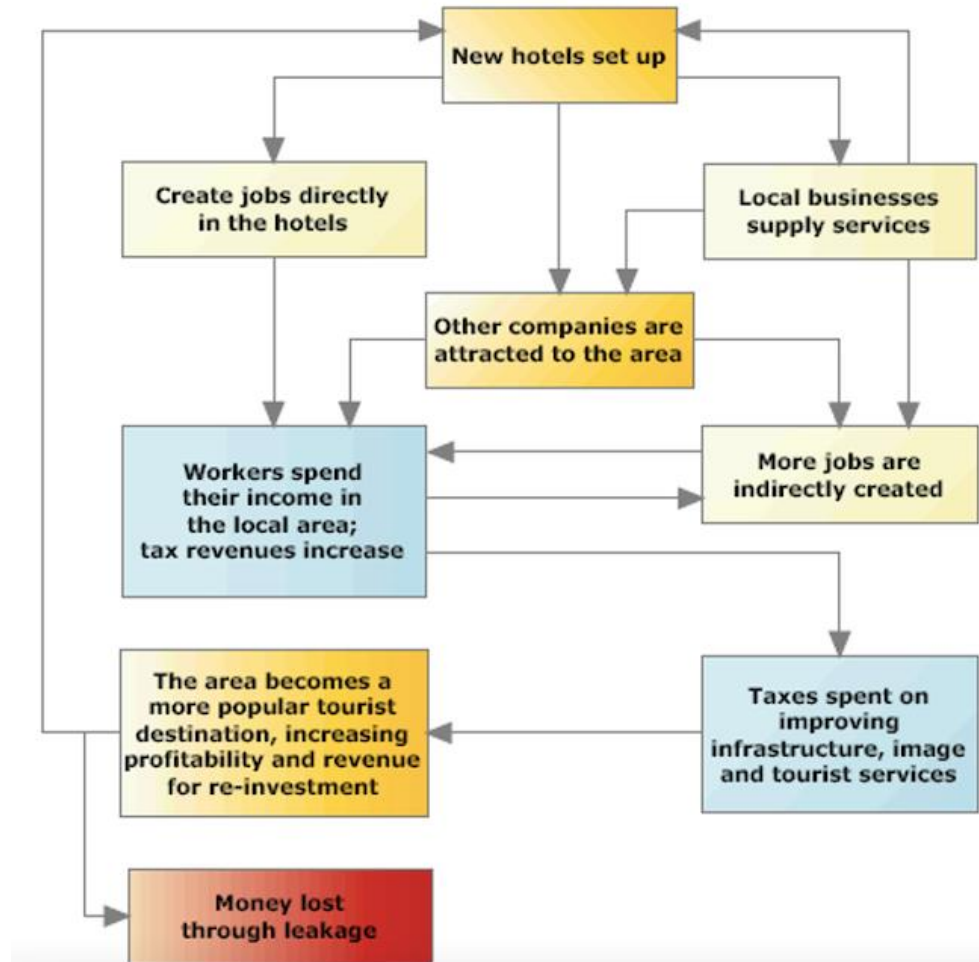
Table 4.5: Components of direct, indirect and induced tourism contribution

Direct Contribution of Tourism	<i>Industries</i>	<ul style="list-style-type: none"> • Accommodation Services • Food & Beverage Services • Retail Trade • Transportation Services • Cultural, Sports & Recreational Services
	<i>Commodities</i>	<ul style="list-style-type: none"> • Accommodation • Transportation • Entertainment • Attractions
	<i>Sources of Spending</i>	<ul style="list-style-type: none"> • Resident's Domestic Spending • Business Domestic Travel Spending • Visitor Exports • Individual Government Tourism & Travel Spending
Indirect Contribution of Tourism		<ul style="list-style-type: none"> • Private tourism investment spending • Government collective tourism spending • Impact of Purchases from Suppliers
Induced Contribution of Tourism (spending of direct and indirect tourism employees)		<ul style="list-style-type: none"> • Food & Beverages • Recreation • Clothing • Housing • Household Goods

Source: WTTC 2012

While this is so, Sri Lanka has not been able to garner the actual benefits of the economic impact due to not having a Tourism Satellite Accounting System (TSA)¹³.

Figure 4.4: Tourism Multiplier Effect



Source: Tourism Australia 2022

4.4 Review of the existing national policy and regulatory framework

4.4.1 Existing policy and regulatory framework

Tourism development is currently governed by guidelines, frameworks, and the directions of the Tourism Act No. 38 of 2005 (TA), which came into effect in October 2007, replacing the Sri Lanka Tourist Board Act No. 10 of 1966. The new TA established four new statutory bodies; Sri Lanka Tourism Development Authority (SLTDA), Sri Lanka Tourism Promotion Bureau (SLTPB), Sri

¹³ <https://www.oecd.org/cfe/tourism/tourismsatelliteaccountrecommendedmethodologicalframework.html>

Lanka Institute of Tourism and Hotel Management (SLITHM), and Sri Lanka Convention Bureau (SLCB) (SLTDA, 2022).

The Tourism Development Fund (TDF) was established under the provisions of the TA, with two significant sources remitting revenue to the fund. Revenues are collected through one-third of the Airport Tax and one (1) ¹⁴per cent of the total revenue of all establishments registered under the SLTDA. Other provisions of the Act include the creation of a Tourism Advisory Committee, the appointment of a Commissioner for Tourism Administration, and a Tourist Police Division.

4.4.2 Tourism development guidelines

The first Tourism Development Master Plan (1967 to 1977) identified six major resort regions: Colombo City, Greater Colombo, South Coast, East Coast, Ancient Cities, and the Hill Country.

The Second Tourism Master Plan covered the period 1992 to 2001. Later, the first Sri Lanka Strategic Tourism Plan (2009-2012) and the second Plan (2011-2016) were developed. A ‘Tourism Strategic Plan for 2017-2020’ was also developed to help the destination progress to Sri Lanka along with the ‘*Tourism Vision 2025*’, but they lacked determined implementation. ‘*Vistas of Prosperity and Splendour*’ and the National Policy Framework (2020-2025) recognise tourism as a vital sector for the country’s long-term economic growth and development. The latest contribution to revive the tourist industry is the “Strategic Plan for Sri Lanka Tourism 2022-2025”, a World Bank-funded project carried out by Jonathan Mitchell, an independent global tourism consultant, who completed the report in March 2022. It provides a four-year strategic plan for the Sri Lankan tourism sector from 2022 - 2025.

4.4.3 Skill development

The Sri Lanka Institute of Tourism and Hotel Management (SLITHM) provides students who enrol in basic level 3 to 4-year academic programs with planned breaks for industrial training. SLITHM has regional schools in Kandy, Anuradhapura, Koggala, Bandarawela, Rathnapura, Kurunegala, Pasikudah, and Jaffna. Still, these institutions cannot meet the demand for admissions due to the high rate of departure of skilled personnel from the country and the ever-increasing local demand to run an efficient service.

Demand for skilled personnel is expected to grow steadily during 2023, with a gradual return to near-normal conditions that prevailed around five years ago, starting from 2025. Unless steps are taken to meet this future potential demand, Sri Lanka will face a critical issue concerning trained personnel at entry, middle and senior levels. To address this issue, authorities should take urgent

¹⁴ In 2019, it was revised as if the yearly turnover is less than Rs. 12 million or the quarterly turnover is less than Rs. 3 million to 0.5 percent but greater than Rs. 3 million to 1 percent.

steps to increase the training capacity of training schools operated by SLITHM and adopt measures to work in tandem with the private sector training institutions. Another measure worth following is to tie up with leading tourism training institutions of international reputation in Europe and elsewhere so that trained personnel completing their courses of study will have employment opportunities either within or outside the country. Another measure worth considering is providing counselling services for school leavers to appraise them of the potential of the tourism sector as a sound career for future advancement.

4.4.4 Marketing and promotion

The Government and the private sector jointly implemented several promotional programs to attract tourists to the country. Sri Lanka Tourism Promotion Bureau (SLTPB) participates in international trade fairs and events, hosts media, trade, and blogger familiarisation visits, newspaper, radio, television, and social media coverage, and promotes the country as a film location destination, among other things. Under the “*So Sri Lanka*” tagline, the Sri Lanka Tourism brand offers eight product attributes: *pristine, heritage, thrills, wild, bliss, picturesque, essence, and festive*, to be experienced as a destination. In 2021, the SLTPB initiated a five-year global communication strategy, and a global promotional campaign is currently underway. Such promotional campaigns should be carried out consistently, focusing on traditional source markets as well as carefully identifying potential markets with promise for the future.

4.4.5 International relations and cooperation

Sri Lanka Tourism has been a member of the UNWTO since its inception. Several UNWTO missions to Sri Lanka have resulted in technical cooperation projects, including developing a Tourism Master Plan. Furthermore, Sri Lanka tourism collaborated with PATA, BIMSTEC, IORA, SA-SEC, and SAARC, as well as other regional and international organisations and NGOs, in mutual collaboration, tourism development, and destination promotion.

4.4.6 Community relations and sustainability

The country’s vision is to establish Sri Lanka as a sustainable destination by ensuring a positive overall balance in environmental, socio-cultural, economic, and experiential impacts for tourists and locals (SLTDA, 2022).

4.4.7 Devolution of authority

Tourism has been a devolved subject since the establishment of provincial councils, with certain powers shared between the central government and the provincial councils.

4.4.8 Ongoing initiatives

Response in the new normal era

Recognizing the importance of supporting the tourism industry, the government and the Central Bank of Sri Lanka (CBSL) implemented a slew of relief measures during the COVID-19 pandemic. They included debt moratoria, concessionary loan schemes, fee waivers, electricity bill relief, one-time grants, and tax breaks, as well as allowing hotel service providers to accept payments from non-residents only in foreign currency to strengthen its foreign exchange earnings (CBSL, 2021).

New Tourism Act

The Tourism Ministry has initiated implementing a new Tourism Act, for which stakeholder inputs were sought in 2020. One of the main goals of the proposed Tourism Act is to merge the Sri Lanka Tourism Development Authority (SLTDA), the Sri Lanka Tourism Promotion Bureau (SLTPB), and the Sri Lanka Convention Bureau (SLCB), allowing the Sri Lanka Institute of Tourism & Hotel Management (SLITHM) to function independently. However, at the end of 2022, no action has been taken to enact the new Tourism Act.

National tourism policy

The Tourism Ministry took steps in 2020 to develop a ‘National Tourism Policy for Sri Lanka’¹⁵, publishing a draft report soliciting public feedback (Daily FT, 2021). Views of the public were sought at the beginning of 2022. It is understood that the Cabinet of Ministers' approval is being sought to affect this policy document. Adopting the policy document may have been delayed due to the change of the Cabinet minister responsible for tourism (May 2022), Secretary of the Ministry and senior officials of SLTDA etc.

Short-term recovery plan

In May 2022, the Sri Lanka Association of Inbound Tour Operators (SLAITO), in association with THASL, presented a short-term tourism recovery plan to the Minister of Tourism under the “*One Industry One Voice*” initiative outlining 17 key points under the “Revival for Survival” programme.¹⁶ During the meeting, there was an agreement to immediately roll out a marketing campaign in India, the Middle East, Russia and CIS countries.

¹⁵ https://www.tourismmin.gov.lk/web/images/min/Draft_National_Tourism_Policy_english_-_Uploaded.pdf

¹⁶ <https://www.ft.lk/front-page/Industry-moots-17-point-Revival-for-Survival-tourism-action-plan/44-735440>

The top three priorities for the industry, according to the plan, are:

- a) Lobby foreign governments to reverse their current negative travel advisories.
- b) Prioritize the supply of fuel, cooking gas, and electricity to hotels and DMCs providing tourist services.
- c) Carry out marketing efforts targeting risk-averse markets.

4.5 Need to address the bottlenecks in the transport sector

Long-distance visitors take more than 10 hours to reach the island by air. However, once they reach the destination, both long-distance and short-distance visitors have to face considerable difficulties in getting to their local destinations from the airport due to constraints in ground transportation. For example, unlike other leading tourist destinations, there is no regular public bus/rail service to connect the airport with the leading hotels in Colombo. Moreover, a bus ride/rail ride to the east coast could take 6-8 hours, depending on the destination.

4.5.1 Improving the railway travel

Limited services are available to destinations such as Kandy and Jaffna by air-conditioned railway compartments. However, the conditions of such railway compartments and the service provided are less than satisfactory. Further, the procedure involved in booking seats in such train compartments does not encourage tourists to travel by train. Due to financial constraints, the Sri Lanka Railway (SLR) has not been able to profit from the scenic routes in Sri Lanka (e. g. the upcountry route to Badulla via Ella, Idalgashinna, Ohiya etc.) by attracting foreign travellers. As a short-term solution, SLTDA could discuss this matter with the Sri Lanka Railway to see whether there are opportunities for funding the purchase of new air-conditioned luxury rail compartments to provide comfortable rides and collaborate to make train travel an entertaining and exciting way to move within the country. The Ministry of Tourism, Ministry of Transport and SLTDA should engage officials of the SLR to address the prevailing constraints to resolve outstanding issues.

Meanwhile, the authorities should consider long-term solutions to address the inadequacies of travelling within the country. If we begin with the premise that SLR cannot survive without annual financial support from the Treasury, the conclusion is that unless drastic measures are taken, SLR will not be able to improve its services and will gradually go into decay. To address the situation, the authorities need to think out of the box as they had done in the case of the CEB¹⁷. One option is to unbundle SLR. This could be done by making it possible for SLR to lease out the major railway lines and railway stations to investors on the understanding that they will upgrade and maintain the railway tracks, stations and their rolling stock and levy charges from other entities

¹⁷ <https://www.sundaytimes.lk/221204/news/debt-ridden-ceb-to-be-split-into-15-companies-504361.html>

who use the railway lines for passenger and goods transportation. Such an arrangement will be a win-win situation for the Treasury, SLR and its workforce, potential investors, train travellers, tourists, and goods transporters, including petroleum products and shipping containers.

4.5.2 Improving domestic air travel

As for domestic air travel, several companies provide charter flights deploying fixed-wing aircraft and helicopters. At the same time, Cinnamon Air has reintroduced its daily scheduled flights to popular tourist destinations, effective December 2022.¹⁸ Heli Tours, operated by the Sri Lanka Airforce, which provided passenger services to destinations such as Trincomalee and Jaffna, has reportedly suspended its passenger services.

However, the aircraft used for domestic air transportation can accommodate a limited number of passengers, which means ticket prices are high in comparison to the short duration of flights. Around 2017/2018, the government looked into the possibility of providing financial incentives to encourage local service providers to deploy medium size aircraft that can carry 40-70 passengers. However, subsequent developments such as the Easter Sunday bombings and the spread of Covid 19 pandemic put to rest such plans and operators were forced to remain in business by providing occasional charter flights.

Considering the current projections for tourist arrivals for 2023 (1.5 m) and 2024 (3.0 m), there will be no incentive for domestic air service providers to invest capital in adding new equipment to their fleets¹⁹. However, operators will likely reconsider their options if the arrivals continue to grow from 2025 onwards. Against this backdrop, tourism authorities should evaluate the situation in 2023 and 2024 and provide incentives for domestic air operators to improve their services to tourist destinations on the island.

4.6 New programmes to attract tourists

4.6.1 Visit Sri Lanka Year

Sri Lanka has been unfortunate to gain publicity for the wrong reasons. Following the pathbreaking year 2018, during which 2.3 million tourists visited the island, Sri Lanka went through a bad patch starting with the Easter Sunday bombing (2019), the spread of Covid 19 pandemic (2020-2021) and the socio-political and economic uprisings, which shook the country to its foundation. Images of widespread unrest, departure of the political leadership under duress, unending queues for petrol, diesel and cooking gas and widespread disruption of electricity supply went viral worldwide, giving a negative image of the country to the entire world. Travel advisories issued by tourism source countries resulted in arrivals slowing down to a trickle. Although the situation has

¹⁸ https://www.dailymirror.lk/breaking_news/Cinnamon-Air-resumes-daily-scheduled-flights/108-249766

¹⁹ https://www.dailymirror.lk/breaking_news/November-tourist-arrivals-up-by-42-from-previous-month/108-249772

improved considerably since the second half of 2022, those images are still vivid in the minds of potential visitors, who would be inclined to visit other countries in the region which are more stable and secure. Against this backdrop, authorities have an uphill task communicating that Sri Lanka has returned to stability and tourists will enjoy visiting the island.

Sri Lankan authorities will have to come up with new and innovative ideas to popularise Sri Lanka as a safe, secure and enjoyable travel destination. Declaring a ‘Visit Sri Lanka Year’ will be one way to promote Sri Lanka among potential visitors, and such a programme needs careful preparation and collaboration among the stakeholders. For example, 2025 could be designated as ‘Visit Sri Lanka Year’, providing ample time for planning and undertaking preparation. Without a high-pitched promotional programme, it would be a challenging task to expect a large number of visitors to the island by 2025. Hence the need for preparations locally and promotions abroad, both requiring resources and the support of the tourism industry.

4.6.2. Encourage international airlines to make Sri Lanka a destination

4.6.2.1 Being an island, Sri Lanka depends on international airlines to bring most visitors to the country. During the Covid 19 pandemic, major airlines suffered a severe setback and were forced to cut down their services. With the adverse developments during the first half of 2022, Sri Lanka was left with a handful of airlines bringing a trickle of visitors to the country.

4.6.2.2. However, by the end of 2022, it was observed that several major airlines were cautiously returning to the country, with some airlines increasing their frequencies. Since Sri Lanka has revised the arrival figures to 3.375 million by 2025 (Optimistic Scenario),²⁰ in addition to promotional activities, authorities concerned should focus on measures necessary to entice more international airlines to make Sri Lanka a destination. Additionally, those airlines arriving in Sri Lanka should be encouraged to increase their frequencies based on realistic figures. Particular attention should be paid to attracting budget airlines that could produce a high volume of travellers due to low airfares.

4.6.3 The cruise shipping industry

Sri Lanka is close to the international shipping line connecting Singapore with destinations in the Gulf. Sri Lanka has many more tourist attractions than Singapore or our neighbour Maldives could offer. Despite the Covid-19 pandemic, Singapore attracted 143 cruise ships in 2020, against some 400 cruise ships from 30 cruise lines in 2019, carrying 1.82 million passengers. As for the

²⁰ Growth Scenarios for Tourism to Sri Lanka: November 2021-2025

Maldives, app. 60 cruise lines arrive in that country annually. In comparison, in 2018, the best year for tourism, Sri Lanka received 53 cruise liners at the port of Colombo.

Given Sri Lanka's geographic location and attractions, the country could offer a wide variety of exciting sites ranging from cultural attractions to ruined cities and wildlife parks, to name a few. The island is ideally located to be a major destination for cruise ships with three ports in the West (Colombo), East (Trincomalee) and South (Hambantota) to provide unique experiences to the visitors.

However, Colombo Port lacks a dedicated jetty for cruise ships, a terminal for passengers to embark and disembark, and other necessary facilities to provide services to visiting tourists. This contrasts with the Port of Cochin in Kerala, which has two dedicated cruise terminals (Samudrika & Sagarika). The modern world-class facilities are air-conditioned, and the two cruise passenger facilitation centres are equipped with Customs and Immigration conveniences under a single roof.

It is acknowledged that such infrastructure needs high capital investment. Several years ago, Sri Lanka Port Authority (SLPA) was mulling over the matter and came up with plans for a new terminal building but failed to go ahead, perhaps due to financial constraints. As the SLPA's financial situation is not expected to improve dramatically shortly, the next alternative will be to develop the required facilities through a PPP project. In the alternative, bids could be called for an independent investor to take over the responsibility of providing the necessary infrastructure. Meanwhile, the old terminal building could be made available for renovation as an interim measure until the new infrastructure has been completed.

4.6.4 Re-establish the ferry connection with India

Until the late 1940s, a steamship service connected Tuticorin in South India with Colombo. There was also a ferry connection between Talaimannar with Dhanushkodi (until 1964) and later with Rameswaram until the service ended with the escalation of the armed conflict in Sri Lanka in the 1980s. There was an attempt to revive the Colombo-Tuticorin service around 2012, which was not a success, and several attempts were made by the Sri Lankan authorities to restore the service for which Expressions of Interest were called, but the matter was dropped due to unknown reasons.

Currently, India is the leading source market for Sri Lanka tourism. That being the case, reviving the Colombo-Tuticorin service and the Talaimannar-Rameswaram ferry service could be a fillip to attract tourists visiting the two countries for pleasure and pilgrimages. A section of the Colombo Talaimannar railway was rebuilt with Indian assistance and declared open by Prime Minister Modi in 2015. However, the ferry connection to India was not revived for the last seven years. It is reported that both sides are looking at another ferry connection between Jaffna and Karaikal in Tamil Nadu. Ministries of Tourism, Ports & Shipping, together with Sri Lanka Tourism and the

Sri Lanka Shipping Corporation, being the stakeholders, should give priority to the re-establishment of ship/ferry connection between Sri Lanka and India to promote tourism both ways.

4.6.5 Role of the SMEs

Since the Easter Sunday bombings and the subsequent events in the country, the SME sector has gone through immense financial difficulties. Unless special attention is paid to this sector, it will be difficult for them to revive their business establishments. The SME sector represents 90 per cent of the establishments in the country, and those in the service sector, including tourism, provide 17 per cent of the national GDP and 15 per cent of the employment in the country.²¹

4.6.6 No off-seasons for tourism in Sri Lanka

For many decades, tourism in Sri Lanka was mainly focused around the west coast. That focus was due to the northern hemisphere's winter season coinciding with the west coast's monsoon-free season. Further, the armed conflict in the country prevented the development of tourist facilities on the island's eastern coast. However, the situation changed since the end of the conflict in 2009. The east coast began to develop, with many tourist resorts opening up around Arugam bay, Pasikudah, Trincomalee, Kuchchaveli etc. Despite this positive development, those in the tourism industry continue to believe that the tourist season in Sri Lanka will end by April, and the country will be off-season until the next winter season, which begins around November.

Against this scenario, it is essential to highlight that when the west coast season ends around April, the east coast becomes suitable for those who love the sun, sand and the sea. In addition, other attractions, such as ruined cities, wildlife parks, diving, snorkelling etc., could be enjoyed for several months till about late October. Sri Lanka tourism should promote the east coast, the season of which falls around June, July and August, coinciding with the summer in Europe. Consequently, the tourism industry will profit by promoting a campaign that Sri Lanka is “in season” year-round.

4.7 Recommendations for addressing challenges and taking advantage of opportunities

Considering the prevailing policy gaps, issues, and challenges, the following recommendations are made for consideration by the government authorities.

- i. Immediate settlement of crucial issues affecting the tourism industry: Resolve the shortages of fuel, cooking gas, electricity, and other commodities essential for the industry to return to normalcy.

²¹ <https://www.srilankatourismalliance.com/wp-content/uploads/2020/06/Sustain-Sri-Lanka-Proposal.pdf>

- ii. Implement the ‘National Policy on Tourism in Sri Lanka’ on which the Ministry of Tourism invited public comments in November 2021, and the ‘Strategic Plan for Sri Lanka Tourism 2022-2025.
- iii. Develop new drivers promoting wellness tourism, covering physical and emotional well-being, including tranquil retreats, meditation, yoga, and Ayurvedic treatments.
- iv. Promote educational tourism in subjects such as English through short- and long-term programmes. Exchange and homestay programmes for overseas students.
- v. Promote diversity of travellers based on new trends²²: Rather than focusing solely on high-net-worth visitors; facilities should be designed to cater to a wide range of travellers based on their interests, country of origin, and spending capacity.
- vi. Incentivize the informal tourism sector to register with SLTDA, facilitating those in the industry to join mainstream tourism.
- vii. Conduct regular market research followed by promotional programmes in current and potential markets to increase arrivals using a digital technology information base.
- viii. Re-establish and enhance the tourism value chain in existing and new projects for the benefit of all stakeholders.
- ix. Promote sustainable tourism and regulate the adverse environmental impact of the industry.
- x. Improve travel within the island in consultation with the Sri Lankan Railway by offering efficient, clean, comfortable and regular services to selected destinations such as the Cultural Triangle, Ella, Galle, Jaffna, Kandy, Pasikudah, Kandy, Trincomalee etc.
- xi. As a short-term solution, SLTDA should discuss with the Sri Lanka Railway to see whether there are opportunities for funding the purchase of new airconditioned luxury rail compartments to provide comfortable rides to selected destinations and collaborate to make train travel entertaining and exciting for the tourists.
- xii. As a long-term solution, the government should come up with a programme to unbundle SLR by making it possible for SLR to lease out the major railway lines and railway

²² The traditional major tourism source markets for Sri Lanka are India, China, the United Kingdom, and Germany, but since tourism reopened, many visitors have come from the Eastern bloc, with Russia and Ukraine accounting for 25% of arrivals between January and mid-February in 2022. However, due to geopolitical disruptions, these market trends have altered.

- stations to investors on the understanding that the latter will upgrade and maintain the railway tracks and stations and levy charges from those who use the railway lines for passenger and goods transportation. Such an arrangement will be a win-win situation for the Treasury, SLR and its workforce, potential investors, train travellers, tourists and transporters of goods.
- xiii. Domestic air operators will likely reconsider their options if arrivals continue to grow from 2025 onwards. Against this backdrop, tourism authorities should evaluate the situation in 2023 and 2025 and develop an incentive package for domestic air operators to improve their services to popular tourist destinations on the island.
 - xiv. Launch ‘Visit Sri Lanka Year’ (e.g. 2025) to attract tourists in large numbers to the island, which would provide ample time for planning and undertaking preparations. Without a high-pitched promotional programme, it would be a challenging task to expect a large number of visitors to the island by 2025. Hence the need for preparations locally and promotions abroad, both requiring resources and the support of the tourism industry.
 - xv. Since Sri Lanka has revised the arrival figures to 3.375 million by 2025 (Optimistic Scenario)²³, in addition to promotional activities, authorities concerned should focus on measures necessary to entice more international airlines to make Sri Lanka a destination. Additionally, those airlines arriving in Sri Lanka should be encouraged to increase their frequencies based on realistic figures.
 - xvi. International airlines arriving in Sri Lanka should be incentivised to increase their frequencies. Particular attention should be paid to attracting budget airlines, as they could produce high volumes of travellers drawn by low airfares.
 - xvii. Develop facilities for cruise liners at the Colombo port through a PPP project. In the alternative, bids could be called for an independent investor to provide the necessary infrastructure, as is the practice in India. The old terminal building could be made available to the investor for renovation as an interim measure until new infrastructure has been completed.
 - xviii. Ministries of Tourism and Ports & Shipping, together with Sri Lanka Tourism and the Sri Lanka Shipping Corporation, being stakeholders, should give priority to the re-

²³ Growth Scenarios for Tourism to Sri Lanka: November 2021

establishment of ship/ferry connection between Sri Lanka and India to promote tourism both ways.

- xix. Step up skill training by increasing the intake to SLITHM, coordinating with privately operated training schools, increasing affiliations with leading foreign teaching institutions, encouraging foreign institutions to establish training facilities, and conducting counselling services for school leavers to join the trade.
- xx. Take steps to attract international airlines, including budget airlines, to make Sri Lanka a destination, and encourage those airlines already providing flights to the island to increase their frequencies based on reliable forecasts.
- xxi. Encourage and facilitate domestic air operators to provide charter and scheduled services to tourist hotspots on the island, where demand warrants by deploying medium size aircraft at reasonable fares.
- xxii. Pay special attention to the SMEs, including those in the service sector, as they have encountered immense financial difficulties since the Easter Sunday bombings.
- xxiii. Promote Sri Lanka as an ‘in-season-year-round’ destination to attract tourists to the east coast.

4.8 Recommendations for the medium- term and long-term collaboration with India and Japan

These recommendations are categorized under medium-and long-term, as well as various management disciplines with specific references to market potential in India and Japan.

Area of Focus	Medium-Term January 2023 – June 2024	Long-Term July 2024 – December 2026	Potential Donor Contribution
Coordination of the program: engage a Program Coordinator to oversee the medium-term program (Appointment of a professional in the tourism industry).	Medium-Term		Financial assistance to cover administrative expenses

<p>Address the fuel, cooking gas and electricity shortages in the tourism sectors</p> <p>Set up regional allocation centres.</p> <p>Introduce arrangements for the tourism subsector to receive uninterrupted fuel.</p> <p>Make arrangements for the tourism services to purchase their requirements of fuel.</p> <p>Address other shortages such as gas, electricity etc.</p>	<p>Medium-term</p>	<p>Long-Term</p>	<p>Foreign exchange allocation for the tourism and hospitality industry with a mechanism to monitor foreign currency earnings - carry out a pilot project with an oil company in coordination with the Central Bank and Ministry of Finance. Tourism authorities are currently addressing this.</p>
<p>Safety and security of tourists</p> <p>Strengthen and improve the infrastructure and manpower requirements of Tourist Police Centres.</p> <p>Regular training of police officers.</p> <p>Extend tourist policing to all popular tourist areas.</p> <p>Arrange training on the scenario and foreign languages for tourist police officers</p>	<p>Medium-term</p>	<p>Long-Term</p>	<p>Technical assistance and funding for training and infrastructure development</p>
<p>Travel warnings</p> <p>System to have a regular dialogue with foreign diplomatic missions in Colombo and be in regular contact with diplomatic missions to moderate their travel advisories based on improvements on the ground.</p>	<p>Medium-term</p>		<p>State level interventions</p>
<p>Overdue bank debts</p> <p>Facilitate dialogue with the Ministry of Finance and the Central</p>	<p>Medium-term</p>		<p>Provide credit lines for institutions based on future bookings. A pilot project is needed in coordination</p>

Bank on matters connected to moratoria on debts.			with CB and the Ministry of Finance.
<p>Increase accessibility to Sri Lanka</p> <p>Facilitate airlines to resume flights to Sri Lanka by arranging adequate aviation fuel supplies within the country.</p> <p>Recommend joint tourism promotions with airlines targeting tourists.</p> <p>Encourage budget airlines to operate to Sri Lanka from the region.</p> <p>Encourage special charter flights from major destinations.</p>	Medium-term	Long-Term	State-level cooperation to introduce/resume airline operations and set up a state-level committee to address other actions.
<p>Research work</p> <p>Introduce Tourism Satellite Account (TSA) to measure the economic impact of tourism.</p> <p>Identify and promote a few lesser-known destinations.</p> <p>Enter bidding systems for staging mega-events, including golf tournaments and potential sports events.</p>	Medium-term	Long-Term	<p>Technical and funding assistance to set up a TSA by relevant authorities i. e. SLTDA, the Central Bank and the Department of Census & Statistics</p> <p>Technical and funding assistance for research, product development and marketing</p> <p>Technical assistance for gearing professional and events associations for bidding processes.</p>
<p>Selection of target markets/niche markets</p> <p>Conduct Desk Research on pre-determined criteria in consultation with Sri Lanka tourism and target markets for promotion.</p>	Medium-Term		Technical and Financial assistance to establish a research wing at SLTDA.

<p>Conduct online surveys among consumers in target markets.</p> <p>Market surveys and statistical analysis to study market potential.</p> <p>Identify consumer behaviours of future travellers.</p>			
<p>Development of Product /service mix</p> <p>Identify methods to enhance innovativeness and delivery</p> <p>Rearrange product mix for micro markets. e. g., Identify specific packages for FIT and Digital Nomads</p>	<p>Medium-Term</p>		<p>Technical Assistance for the industry to enhance product development</p>
<p>Assist in the development of innovative programs in addition to existing packages.</p> <p>Photography Village lifestyles Film locations Camping and Safari Agri and Organic stays Experiencing biodiversity VFR Special packages – Bring a friend</p> <p>Story-based packages – Zheng He, Fa-Hien, Leonard Woolf, R. L Spittle etc. Leisure Packages –e.g., Pensioners, High-end wellness seekers, BLeisures, Babymooners, Flash-packing, Safari, Voluntourism, Regenerative tourism,</p>	<p>Medium-Term</p> <p>Medium-Term</p>		<p>Technical Assistance for the industry to enhance product development</p> <p>Financial assistance to carry out a social media campaign in India to target corporate meetings</p>

<p>Development of Communication Methods and modes</p> <p>Development of communication mix for each target.</p> <p>Focus on PR, Digital, Online and social media marketing, e.g., Websites, Blogs and Bloggers.</p> <p>Encourage joint promotions with BOI, EDB, Sri Lankan Airlines, Ceylon Tea Board etc.</p> <p>Promotion of Association, Business and Entertainment Events.</p> <p>Find the most suitable strategy to promote Pasikudah and implement a program with a target timeline.</p> <p>Undertaking specific promotions as and when opportunities arise</p>			<p>Financial assistance to carry out a social media campaign to target youth travel in Japan</p>
<p>India</p> <p>Product Development and Promotions for Indian Tourists.</p> <p>Market information on outbound travel.</p> <p>Promotion of Business Events - e.g., Corporate Meetings and Incentives from India (MICE)</p> <p>Develop the required infrastructure and promote Ramayana Tours from India.</p> <p>Honeymoon and weddings</p> <p>Visiting journalists and bloggers, National media tours</p>	<p>Medium-Term</p> <p>Specific focus on two markets, i.e., India and Japan</p>		<p>Financial assistance to set up public/private sector committees and carry out proposed research, marketing and product development activities</p>

<p>Improve the availability of authentic Indian cuisines.</p> <p>Provide research information on provincial tourism development and promotion in India.</p>			
<p>Japan</p> <p>Product development and promotions for the Japanese market.</p> <p>Market information on outbound travel and assist with research on Japanese outbound travellers to obtain necessary information.</p> <p>Youth Travel for education and volunteer programs from Japan (specifically develop short and medium-stay residential study programmes for Japanese travellers to learn English since there is tremendous demand from East Asia).</p> <p>Promote Buddhist trails, temple stays, and mental wellness (meditation and yoga).</p> <p>Promote golf packages.</p> <p>Organize culinary art Food Festivals.</p> <p>Encourage tea tourism and development of Tea Trails and `Tea-related experiential tourism products.</p> <p>Develop and organise architectural tours (Japanese tourists interested in learning about architecture, and Sri Lanka has British, Dutch, and</p>	<p>Medium-Term</p>	<p>Long-Term</p>	<p>Financial assistance to set up public/private sector committees and carry out proposed research, marketing and product development activities</p>

<p>Indian influences in its architecture.</p> <p>Wellness (Sri Lankan ayurvedic treatments are popular among the Japanese.</p> <p>Promote wildlife parks and botanical gardens (certain areas require product infrastructure development, i.e., Kumana, Lahugala etc.)</p> <p>Organize tours for visiting journalists, bloggers, and national media (including TV and radio).</p> <p>To suit the needs of Japanese tourists, quality criteria such as hygiene and safety need to be addressed.</p> <p>Training programmes for service providers on required standards, Japanese language, cuisine, and customs.</p> <p>Obtain space in national trade fairs in Japan and provide assistance to promote the country in public places and state media.</p> <p>Organizing charters from key Japanese outbound destinations adhering to required health and safety standards.</p>			
<p>General</p> <p>Evaluate the results of the implementation of the short-term plan and action on the activities that are not completed.</p>		<p>Long-Term</p>	<p>Technical Assistance</p>

<p>level) a bachelor’s degree in consultation with the UGC.</p> <p>Affiliate with foreign universities to conduct study courses in Sri Lanka.</p> <p>Expand courses offered for National and Chauffer Guides and Site Guides.</p> <p>Introduce research studies linked to tourism. e.g., Yala carrying capacity, Green tourism etc.</p> <p>Scholarship programs for further education overseas.</p> <p>Overall, enhance quality, innovativeness and sustainability in Sri Lanka Tourism Product offer.</p>			<p>qualifications to design, develop and deliver (including physical and of-line etc.)</p> <p>Technical assistance to affiliate Universities in India and Japan</p>
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4.9 Conclusion

Since the Covid 19 pandemic was brought under control with an effective vaccination programme, Sri Lanka was hopeful that it would regain its position enjoyed in 2018, which brought 2.3 million tourists to Sri Lanka, earning 4.4 million USD. The tourism industry was upbeat about the prospects of repeating the performance in 2019, with globally recognised company Lonely Planet naming Sri Lanka as the number one travel destination in 2019, when disaster hit the industry on Easter Sunday. This situation was followed by the Covid 19 pandemic, bringing the industry to its knees for two years. By January 2022, the arrivals were picking up reasonably well until the commencement of the Russian-Ukrainian war in February 2022.

The economic and political crises that followed made Sri Lanka incapable of taking advantage of the post-pandemic recovery of tourism. The rising costs led to unprecedented inflation resulting in mass protests culminating in widespread riots on 9th April and the public uprising three months later, forcing the President and Prime Minister to vacate office. These developments generated a negative image of tourism, which will take considerable time to be erased. The shortages of fuel and cooking gas and the regular interruption of electricity supply associated with the public unrest adversely affected tourism plants and transportation.

While tourist hotels and related service providers faced tremendous pressure, the Central Bank attempted to assist the industry with a slew of financial packages. Despite these measures, today, the industry is in parlous condition, with many small and medium size tourist facilities forced to go out of business. It is estimated that since 2019, 40 per cent of the workforce has left the industry. Tourism is a vital sector that can help the nation to generate much-needed foreign currency, provided proper attention is paid to the industry.

The study's primary objective is to help initiate a few programs from which the industry will benefit in the medium term. Given that the tripartite arrangement includes India and Japan, it would be mutually beneficial to prioritize activities involving these two countries with cooperation from Sri Lankan stakeholders.

The recommendations aim to revive the tourism industry by increasing the arrivals of high-end travellers, amongst others, and raising the contribution to the national economy. Tourism is a private sector-driven industry, and as such, the authorities must work in close cooperation with the private sector stakeholders.

SECTOR 5: PEOPLE-TO-PEOPLE CONTACT: TRAINING & SKILLS DEVELOPMENT

Sena Peiris

Nihal Cooray

5.1 Introduction

This report aims to prepare a Medium and Long-term Strategy to support the Economic Transformation of Sri Lanka by facilitating people empowerment through Training & Skills Development in selected sectors. The basic assumption is that most technical personnel, including technicians, craftsmen and tourism service providers, do not adequately understand the technological, cost, environmental and market issues and other aspects of their services. In addition, the level of work ethic is low. A system should be developed to improve the skills of these craftsmen and micro industries to understand the current market trends and associated skills and competencies required to move forward as an important player in the supply chain. Though formal vocational training is relatively developed, there is no provision for these craftsmen and micro-industrialists to improve themselves through the existing schemes continually.

The sectors selected for the proposed interventions are Light engineering and Ecotourism. Since plastics, including microplastics, have become a major environmental and health issue, plastic manufacturing and recycling are also included as a subsector under light engineering.

Definition of Light Engineering

The light engineering sector (LES) encompasses cottage-level to medium size industries offering various products and services to the local market. Their clients range from MNCs and large local manufacturers to end consumers. The product variety of the Light engineering sector includes all kinds of ferrous, non-ferrous and non-metal products. These include foundry products, machinery, equipment and instruments (electrical and non-electrical), spare parts, electrical and electro-mechanical products, parts of machines and manufacturing products made from ceramics, rubber, plastic, glass etc. Major services in the LES are repair, maintenance, erection, installation, fabrication, support services, consultancy etc. (Source: Bangladesh Light Engineering Policy document)

Light engineering is the backbone of any heavy industry sector and is the preliminary player of an extended supply chain. Most developed industrialized countries have started by strengthening the light engineering sector, which enabled light engineering-based small-scale enterprises to evolve into industrial giants. A highly developed light engineering sector will create more employment opportunities and be the pillar of strength for value addition to our natural resources and the construction sector.

Working Definition of Ecotourism

Ecotourism can be defined as “responsible travel to natural areas that conserve the environment, sustains the well-being of the local people and involves interpretation and education”. (Source: The International Ecotourism Society).

Ecotourism in this report refers to subsectors or niches within the broader tourism industry that benefits different local communities while ensuring minimum environmental harm. Local communities will be the service providers to the visitors offering accommodation, food, transport, interpretation and any other needs of the visitors. The large tour operators will not become a part of the ecotourism, ensuring equitable distribution of earnings from visitors to the community members. The community groups will be responsible for protecting and conserving heritage sites, tourist attractions, and all other assets to enhance the visitors' satisfaction.

The tourism sector is a potentially vital segment for the economic growth of the country with cultural, ecological and natural attractions, which can be promoted for visits and research. This strategy will enable every sector of the industry and services to play a supportive role, provided they are skilled, trained and innovative entrepreneurs.

A circular economy is a global approach for achieving sustainable development through circular material flows with established green growth targets.

The key strategies of a circular economy are reuse, repair, remanufacture and recycling, which require new skills and competencies. Programs to develop new skills among the young generation will orient youth to pursue new business opportunities leading to a prosperous era in a sustainable country.

A skilled, competent and well-versed workforce in global trends is a prerequisite for developing the light engineering and ecotourism sectors. The proposed program can assist in empowering the workforce, including females, to be entrepreneurs or important contributors to the economic development initiatives of the country, facilitating the realization of our ambitious goal of becoming a high-income country.

5.2 Role of the sector in transforming the Sri Lankan economy in achieving sustainable economic growth and development

Sustainable economic growth is economic development that attempts to satisfy the needs of humans but in a manner that sustains natural resources and the environment for future generations. According to conventional thinking, an economy functions in the ecosystem, so it is impossible to separate the economy from its ecosystem; It says an economy cannot exist

without it. The ecosystem provides the factors of production that fuels economic growth: land, natural resources, labour, and capital (which are created by work and natural resources). Sustainable economic growth is managing these resources in a manner that they will not be depleted and will remain available for future generations through decoupling strategies.

'The process of economic development of Sri Lanka has to align to a circular economic model (CE) soon to align with global trends, which will open up more avenues to earn foreign exchange and get over the present crisis. The circular economic model provides low-cost solutions enabling the industry to enter global value chains more efficiently. This new strategy will allow the industry sector, manufacturing and services, to lay a supportive role provided they have skilled, trained and innovative employees.

The circular economy, as a concept, involves using resources more efficiently across the life cycle of a product by closing, extending and narrowing material loops that could result in the decoupling of primary raw material consumption from economic growth. The transition to a circular economy entails approaches that may lead to lower rates of extraction and lower use of natural resources. This, in turn, leads to improved resource efficiency and the promotion of sustainable resource management.

The circular economic approach will generate new markets, attracting us to developed nations that have changed from linear economies to circular economies with established green growth targets. The EU Green Deal to achieve zero climate risk is a good example. In a Circular economic approach, no debates and arguments exist on issues such as import substitution, which would focus mainly on exports.

5.2.1 The tourism sector

The tourism sector includes foreign as well as local travellers. Foreign visitors bring us foreign exchange, while local visitors add to the revenue of the stakeholders of the tourism value chain. Tourism can be considered a major contributor to the local economy. Still, unfortunately, the economic benefits to the community are insignificant as only large tour operators were reaping benefits from mass tourism activities. In the past, the primary tourism focus was on mass-scale tourism. The focus on high-end visitors through ecotourism was not a priority. In ecotourism, the visitors occupy environmentally and socially friendly eco-lodges or green hotels while the neighbouring communities provide services such as food and travel facilities. The concept of ecotourism is comprehensive and can be applied to Sri Lanka effectively. The country has a diverse nature of natural and man-made resources, which can be harnessed to offer exquisite and unique experiences to small groups of high-end visitors, causing minimum environmental harm while enhancing the social and economic standing of the communities. Engaging members of communities in ecotourism will ensure the protection of natural and man-made tourist attractions as that will be of community interest. In

ecotourism, the investment in facilities for visitors is also comparatively small. The development of widely spread diverse tourist attractions across the country is of national interest as it adds to its intrinsic and extrinsic value.

Sri Lanka Tourism Strategic Plans (2017-2020) and (2022-2025) are mainly based on promoting mass tourism. Implementation of these policy measures and action plan did not materialize during the last few years due to the pandemic and frequent changes of top officials of the government.

A workable strategic action plan for developing all the potential ecotourism opportunities through community participation and then strengthening the capacity of the community groups for service provision and the operational phase is a must. Proper marketing and tourism promotion across all potential source countries [and inviting them to visit Sri Lanka] have to be further strengthened after the internal ecotourism infrastructure and community empowerment have been completed.

While traditional mass tourism based on sun and sea is promoted by large tour operators, the niche market for ecotourism, which can earn more foreign exchange, will help to improve the community's economic well-being while protecting and conserving natural and ecological legacies through community participation at no extra cost.

This sector needs assistance to educate, train and develop skills and competencies of identified community groups on ecotourism-based service provision, details of which will be discussed later.

5.2.2 Small and micro enterprises in the light engineering sector

The economy's expansion needs more opportunities for value creation and value addition to our naturally available and manmade resources. When local and foreign investors invest in large-scale industries, small-scale businesspersons' entrepreneurial and innovative abilities are not harnessed through that process. For example, the waste of fruits and vegetables from farms to the retail market is over 40%, and solutions cannot be found only by large-scale industries. The volume of agricultural waste can be brought down by addressing the issue at the local level. Similarly, the agricultural sector transition to low-input agriculture cannot be done with large industries.

The development, strengthening and empowering of SMEs is a priority that will contribute to regional industrialization and evenly distributed income generation across all provinces instead of the current Western Province-based centralized model. A key requirement for small and micro industrial (SMI) development is the fabrication of simple machinery, equipment, fixtures and fittings required by the enterprises. Therefore, strengthening the light

engineering sector is very important. The light-engineering sector was neglected during the last several decades forcing the country to depend on imports.

A sub-sector within the SMIs, which has global and national importance, is the management of plastic waste. The plastic sector has developed independently due to the high market potential for plastics, a versatile substitute material with many advantages. However, the unsustainable management of post-consumer plastics has caused a global problem only second to climate change. An international study has ranked Sri Lanka as the 5th biggest ocean plastic polluter. Therefore, the development of the plastics sector, with particular attention to waste plastic reprocessing, will be a national as well as global obligation.

5.3 Sector-specific global trends, their implications on national policies and lessons from other countries

Global tourism was having an upward trend until the pandemic caused the collapse of the whole sector. Before the pandemic, Ecotourism was becoming the global trend over mass tourism. The International Ecotourism Society (TIES) believes that ecotourism, where small groups of high intellectuals visit countries for explorative experiences, is the most suitable for developing countries. Sri Lanka, as a high biodiversity hotspot with many cultural and natural heritage attractions, as well as unique body and mind healing cultures such as Ayurveda and meditation retreats, can offer a variety of ecotourism opportunities to visitors. This will align with our traditional hospitality and tourism policies and the roadmap. Nepal, Cambodia and Indonesia have offered visitors a wide range of ecotourism packages and reap economic benefits for their rural communities. The attractions they promoted are more related to Buddhist archaeological sites such as Lumbini, Angkor Wat and Borobudur in Nepal, Cambodia and Indonesia, respectively. Sri Lanka has much to offer visitors more than ancient temples. Our ancient irrigation tank system and the “Ellanga” (cascade) systems are unique worldwide. In addition, the recent findings of a unique steel-making process utilizing wind-powered furnaces can attract many academics and researchers.

The light-engineering sector was developing in the country till about 1994 but started declining since then. Manufacturing of light industrial machinery, which was stepping up, slowly crashed entirely as the light engineering sector was neglected. The personnel with light-engineering skills migrated for greener pastures, but no proper programs were implemented to develop new personnel with light-engineering skills. This situation made our country depend on foreign manufacturers for the simplest machine or equipment at higher costs, making our small enterprises non-competitive with imported products. The unavailability of a sound industrial policy and many factors related to industrial development worsened the situation, deepening the plight of small enterprises and causing a shortage of skills in the light-engineering sector. Many Asian countries, such as India, Vietnam, and Thailand, promoted and

facilitated small enterprises. Now they are enjoying the fruits of their policy as many of these small enterprises grew in size and became exporters of various products and articles.

On plastic waste management, Sri Lanka has adequate policies and legal instruments. Globally plastic waste management has a very high priority, and several international projects have been launched as multi-country initiatives. Several international donors have commenced projects in Sri Lanka to eradicate plastics from rivers and oceans. Since these projects are not harmonized, and proper training and skills development are not included other than general awareness, the situation on plastic waste management has not improved. Technology integration to small and medium plastic manufacturers, skills and competence building and improvement of die and mould design & fabrication, which are vital for the plastic and rubber industry, are lacking. Well-developed local Die and Mould industry can attract foreign investment in high-tech industries. The development of the plastic sector should be aligned with the globally practised “circular plastic economy” to create more employment and income generation opportunities while eliminating plastic pollution.

5.4 Reviewing the existing National Policy Framework and on-going initiatives

Sri Lanka has developed a draft tourism policy which has to be finalized and approved by the Cabinet of Ministers. Still, a Tourism Strategic Plan for 2022 to 2025 is in place, which is the continuation of the 2017-2020 strategic plan. The new strategic plan focuses more on the recovery of the tourism sector, which was severely affected by the 2019 Easter Sunday terrorist attacks, followed by the COVID-19 pandemic.

Sri Lanka has a well-documented Technical and Vocational Training (TVET) policy and action plans. Also, a large number of technical schools belonging to the government, as well as technical schools run by the private sector, are available. Still, they are underperforming with very low productivity. Several certification programs are initiated in many vocations referred to as NVQ certification of different levels, from very basic to advanced levels. In addition, some technical institutes such as German Technical Training School offer higher national diplomas, which have very high recognition in countries like Australia, but the same recognition is not given to NVQ certification in foreign countries.

These schemes must re-examine their effectiveness and delivery efficiencies and be redesigned to suit modern-day needs.

The serious shortcomings are the non-availability of entrepreneur development courses with or followed by counselling for the passing-out students. On the other hand, several technical colleges are not functional due to a lack of resources and finances.

5.5 Identifying policy gaps, issues and barriers

5.5.1 Strengthening policy

The political instability and the prolonged economic crisis have caused a delay in the implementation of many actions identified in the Tourism Strategic Plan. The Strategic Plan has to include ecotourism-based activities and developing resources to promote the niche market through broad promotional activities.

The resource requirements for institutions, development of new entities, strengthening of Sri Lanka Ecotourism Foundation, provision of technologies and institutional capacity building together with empowering community groups on conservation of tourist attractions, service provision to visitors and site interpretation (guidance at sites) are some areas to be addressed

Specific policy changes are required in the vocational training field. It is appropriate to make a vocational certificate compulsory for all masons, carpenters, electricians, motor mechanics, general mechanics, welders and all other crafts to operate any shop or to undertake contractual work.

CIDA can play a lead role with the Vocational Training Authority (VTA) in formulating a certification and registration program with several grades for career advancement by those engaged in different trades and crafts.

The legal instruments implemented by UDA, housing authorities, local authorities, and other public institutions can make the certification compulsory to streamline the implementation process.

5.5.2 Employment opportunities

Revenue generation at District Secretariat (DS) level by small industries will enhance employment opportunities for rural youth, who could later secure foreign employment in skilled vocations. There should be internal mechanisms to discourage unskilled workers from seeking employment in foreign countries and encourage them to qualify for skilled occupations.

5.5.3 Gender mainstreaming

Many females are employed in formal tourism entities, primarily in urban areas. Rural females do not have sufficient opportunities in the tourism sector. The ecotourism sector opens up several opportunities for females to engage in service provision and create small handicrafts and other articles of interest to visitors. Therefore, ecotourism will be a crucial business opportunity for most of the disadvantaged rural female groups.

The females can engage in community tourism to serve tourists by offering homestays, meals, services as guides, and other unique Sri Lankan forms of entertainment.

Special provisions should be made for females to receive training and skills development in non-traditional fields to qualify as carpenters, electricians, repair mechanics, welders etc. Females are now a majority in most of advance learning institutes, and the opportunities for females who are less educated should be expanded for training and certification. The capacity building among young females can potentially develop many rural micro-entrepreneurs who can contribute immensely to the national economy.

There is potential to create skilled employment opportunities for females along the plastic value chain. These employment opportunities can be even for females with low education levels who can be trained for specific activities.

Another category that has been neglected and does not have opportunities is differently abled people. Instead of side lining, they can be trained in appropriate trades and crafts and engage in economic activities to empower them to improve their quality of life while contributing to the national economy.

5.5.4 3R approach to achieve Circular Economy

The Circular Economy approach now talks more about repair and reuse. In Europe, the right to repair act and reuse (one of the 3R) has become law. To create more employment opportunities, Sri Lanka must promote circular material flows by establishing electrical, electronic, and consumer durable repair shops. Irrespective of the level of imports, the repair industry must be prioritised. Some of these will eventually expand to become large industries, trading houses and service organizations.

5.6 Recommendations

5.6.1 Tourism sector

Under the current situation, the promotion of high-end visitors is expected to benefit the country; as such, visitors are more interested in the educational aspects of the visit. They also value the conservation of the environmental and social values of the country. Also, small-scale investment to build eco-friendly tourist accommodations such as eco-friendly lodges using local materials will be another advantage. Promoting homestay is a popular community tourism aspect; therefore, these actions can be encouraged among communities in popular tourist areas. A thorough study of the new tourist attractions has to be carried out by academics and tourism professionals. While there are traditional tourism sites for mass tourism

focusing on such things as the sun and sea as well as commercial activities in urban cities, the high-end intellectuals prefer eco-lodges and homestays as they are willing to learn about local culture; these differences in the tourism industry should be exploited for the development of the sector.

5.6.2 Small and micro industries and light engineering sector

The sector needs a revival from a very low level. Strengthening the Industrial Development Board to assist small and micro industries is essential. Vidatha (science and technology) centres are established in all Divisional Secretariats; Vidatha officers have been appointed to support small and micro industries providing extension services on technological issues. It is necessary to revive TVET institutes which should be supported with performance-based resource allocation mechanisms.

The Divisional Secretariats can undertake surveys of all welding shops, lathe shops, vehicle repair shops, etc., to provide mandatory training on key aspects such as quality assurance, housekeeping, and safety and health. They may be required to renew their trade licenses periodically at the respective Divisional Secretariats.

5.6.3 Recommendations for skills development in the plastic industry

Plastic waste management is a critical sub-sector in the light-engineering sector. To improve this sector, developing the plastic industry and supporting services is necessary. It is essential to have one-stop-shop type centres that could provide technical know-how, develop trainers to train the workforce in the field, and undertake research and development (R&D) activity for the industry. Entrepreneurs have first-hand knowledge of such institutions, and they provide technical services for the plastic industry and supporting services such as the Die and Mold industry.

Consumer products fabricated in medium or large quantities out of plastic, rubber or metal parts using various production processes such as cold or hot cutting & pressing, die-cast, injection and extrusion of plastics require the support of the Mold and Die making industry. Molds, dies, and press tools-making facilities capable of design, manufacture, testing and repair are important to develop any manufacturing sector. Even if the country imports Die and Molds, repair and maintenance facilities are still needed for the industry to advance.

Skills & Development

- Within the context of a circular economic (CE) approach, the importance of improving the capabilities of the light engineering sector has been highlighted in every discussion forum on CE. Promoting this sector will contribute to the advancement of the

construction industry, adding value to agricultural products and other small machinery industries. Additionally, building the capacity of workers in the light engineering sector is expected to improve the conditions of several sectors ranging from medical to casting and foundry, as well as the blacksmith industry.

- Improve facilities for youth to conduct skills training to increase the possibility of employability. This should include exposure of youths to industries in foreign countries to broaden their knowledge and skills in their respective field.
- There is a need to communicate with representatives and experts from each sector to identify specific issues they face and receive practical insight to contribute to the policy-changing process.
- Following the Japanese model/ approach to the 4th Industrial revolution may provide useful insight into improving Sri Lanka's technical competence, resulting in enhancements in several sectors. Further, following up on bilateral agreements that include technical cooperation with China and India will improve technological capabilities.

5.7 Identifying areas for Indo-Japanese collaboration

5.7.1 Short- and medium-term actions

Recommendations common to different subsectors

- i. Inculcate productivity culture by reintroducing 5S, Kaizen, and collaborative working for improving productivity.
- ii. Initiate a country-wide 3R (Reduce, Reuse and Recycle) programme.
- iii. Train a group of experts on productivity, green productivity, total productive maintenance and other associated subjects and promote productivity programs in all organizations at the Ministry of Industries²⁴.
- iv. Develop curricula for short-term programs on financial management, taxation and reading and understanding financial statements.
- v. Develop training modules to train repair technicians for all medium and high-tech plants, components and equipment. (a key strategy in circular economy)
- vi. Initiate a school company programme-YESL (Young Entrepreneurs Sri Lanka) to attract senior students in schools to run businesses and instill the concept of entrepreneurship²⁵.
- vii. Develop an entrepreneurship module to be introduced to all training programmes in tourism, light engineering and others.

²⁴ Lessons can be learnt from the initiative by Late C V Gooneratne for a productivity decade in 1994-2004

²⁵ Lessons can be learnt from the Late Patrick Amarasinghe's school company program YESL with FCCISL

Tourism Sector

- i. Conduct a detailed study on all potential ecotourism opportunities and attractions.
- ii. Develop a training package with several modules on ecotourism service provision (The training package developed by the Sri Lanka Ecotourism Foundation can be taken as the base document for this task)
- iii. Train a group of trainers on all aspects of ecotourism so they can be mobilized to train community groups.
- iv. Introduce training to selected community groups in currently popular tourist destinations within the country as a pilot programme.
- v. Develop a set of guidelines for all tourist sector personnel to adhere to with ecotourism destinations and activities.
- vi. Introduce an accredited personal certification program for tourism service providers according to ISO 17024.

Light Engineering Sector

- i. Conduct a survey and a study on the available technical and vocational education courses, their current status, and the institutions offering these courses.
- ii. Develop a prerequisite training programme for all technical personnel in light- engineering sector on basic mathematics, reading of drawings, safety and good housekeeping.
- iii. Select a vital sector, such as the construction sector, to develop efficient, technically advanced suppliers in light-engineering-based services²⁶.
- iv. Commence training of repair technicians in selected technical training institutes.
- v. Introduce a state-of-the-art (zero downtime) monitoring and maintenance system for all public sector institutions with trained repair technicians (the project can commence with the hospitals, where broken-down instruments are about 50% of the total).
- vi. Select a sector to develop the repair and reuse services (Micro and SME sectors will benefit from the large industries, including exporters).
- vii. Sharing of experiences and knowhow of India on the use of biogas, including exposure visits for micro industries and SMEs
- viii. Identify important items such as Cutting tools, special steels, and welding rods required for MSMEs and facilitate importing so that they can continue their operations.
- ix. Study the recently launched National Action Plan for Plastic waste management supported by IGES Japan and identify potential areas for intervention.

²⁶ At present, the Ministry of Rural Industries is keen on developing the blacksmith sector

- x. Promote advanced technologies such as sensors and automation (components of Industry 4.0), which can be applied to small industries to improve quality assurance and precision in performance²⁷.

Plastic manufacturing and recycling sector

The Die and Mold industry is facing a severe shortage of skilled workforce. The following short-term plan is suggested for the training of employees to develop those who are presently engaged in Die and Mold making by imparting skills for systematic ways to design, develop and manufacture dies and molds:

- i. Establish a technical institute like the Central Institute of Petrochemicals Engineering & Technology (CIPET) India, in collaboration with a suitable institution such as the Industrial Development Board (IDB) or a public-private partnership-PPP (chamber/Government/Private sector) to train the youth and develop the Die and Mold industry as a vibrant support service.
- ii. Engage foreign experts as visiting lecturers on practical issues, new international trends and developments.
- iii. Policymakers and industry leaders to visit an institution such as CIPET (India) to comprehend our gaps in the plastic sector capacity building.
- iv. As there is no state-of-the-art institution to develop Tool Designers and Tool & Die makers in Sri Lanka, an action plan may be developed with the priority actions:
 - a) Organize in-plant training in foreign institutes for technical college students (e. g. German Tech and ATI) who are in the final year (tool machinists), which will also enable them to appreciate the importance of this trade, and how it has grown globally and adaptation of the new learnings locally.
 - b) Universities and institutes offering National Diploma in Technology, HND in Engineering and ATI programmes to develop courses and curricula for tool designing and arrange two-year postgraduate diplomas in recognized foreign institutes.
 - c) Include Mould and Die making as a compulsory subject in the mechanical engineering syllabus in all Sri Lankan government universities and other technical institutions.

²⁷ Recently an initiative was launched with the assistance of FCCISL, SLITT and Western Sydney University led by Dr. Ramanathan to introduce Industry 4.0 to Sri Lanka

5.7.2 Long-term measures

1. Initiate Student Exchange Programmes with Japanese and Indian universities for small industries to obtain technical assistance²⁸.
2. Setting up a model recycling industrial estate for value addition to waste technical materials and products (guidelines can be obtained from the Eco-Town programmes of Japan).
3. Establish a model reprocessing facility or facilities to develop reprocessing and value addition for demonstrational and training purposes.
4. Establish technology incubators for micro-industrialists to develop innovation and entrepreneurship while embracing new technologies and opening gateways to global markets.

The following four tables summarize the above recommendations for each sector:

TRIPARTITE STUDY GROUP – RECOMMENDATIONS			
Sector 1: General			
Area of Focus	Medium Term	Long term	Potential Donor assistance
Productivity Improvement in small and micro industry Sectors	Inculcate productivity culture by reintroducing 5S, Kaizen, and collaborative work culture.	Strengthen the productivity award scheme initially held by the National Productivity Secretariat (NPS) and the Sri Lanka Association for Quality and Productivity (SLAQP) award program to reward and motivate industries.	Support from the Japan Productivity Center (JPC) Recommence Japanese volunteer scheme.
	Initiate a country-wide 3R (Reduce, Reuse and Recycle) program	Hold a National Conference on 3R once every 3 years.	Link up with the 3R Initiative of Japan.

²⁸ Another successful initiative that worked well but did not continue was the RD collaboration with a Swedish university on innovative technology. The FCCISL identified the research and technology needs of SMEs; a Professor from Sweden visited Sri Lanka, studied and identified a small team to visit Sri Lanka to work out solutions with the SMEs. This model can be extended to other universities.

	Train a group of experts on productivity, green productivity, Total Productive Maintenance and other associated subjects and promote productivity programs in all organizations)	Develop productivity measurement and data collection mechanisms in selected light engineering sectors.	1. Seek support from the Asian Productivity Organization (APO). 2. Seek support from India's National Productivity Council (NPC).
	Promote productivity programs through the NPC and an industry chamber. Conduct demonstrational programs in 10 selected Light-Engineering clusters.	Through the lessons learnt from the demo project, develop island-wide programs.	Strengthen and build capacity in local institutions through JICA/APO/NPC support
Entrepreneurship development	Develop curricula on financial management, taxation and reading and understanding financial statements (Financial literacy)	Establish an accreditation program for trainers and/or training institutions.	Support from India to Sri Lanka Accreditation Board (SLAB)
	Develop an entrepreneurship module to be introduced to all training programs in tourism, light engineering etc.	Initiate a school company program – YESL, to attract senior students in schools to run businesses and instil the concept of entrepreneurship	Support FCCISL to restart the YESL project through donor funding
	Develop training modules to train repair technicians for all medium and high-tech plants, components and equipment.	Set up common support service centres in major industrial centres. Develop and test a certification scheme for repair shops.	India has developed a system of common services for the light-engineering sector.

TRIPARTITE STUDY GROUP – RECOMMENDATIONS

Sector: Light Engineering

Area of Focus	Medium Term	Long term	Potential Donor assistance
Develop a database of the light engineering sector.	Conduct a survey/ study on the available technical and vocational education courses, their current status, the institutions offering these courses and the inadequacies in these institutions, including why some institutions are closed,	Revise or improve the existing annual survey of the manufacturing industry conducted by the Department of Census and Statistics to reflect all light-engineering sector activities. (The disparities of SME sector reporting by different institutions should be eliminated to maintain consistency)	UNIDO support
Training	Develop a prerequisite training program for all technical personnel in the light engineering sector on basic mathematics, reading of drawing, safety and good housekeeping.	Strengthen and support private PPP initiatives for training	Benchmark with existing programs in Japan and India
Capacity Building	Select a vital sector, such as the construction sector, to develop as efficient, technically advanced suppliers in light- engineering services and products	Establish a technology incubator for these micro-industrialists to develop innovation and entrepreneurship while embracing new technologies and opening gateways to global markets.	The Indian model
Training for repair technicians for circular material flow	Commence training of repair technicians in selected technical training institutes	A Model Reprocessing facility or facilities to develop the reprocessing and value addition for demonstration and training purposes.	Support to identify Circular economy models and network For Global value chain connectivity

Improve maintenance mindset in the public sector.	Introduce a state-of-the-art (zero downtime) monitoring and maintenance system for all public sector institutions with trained repair technicians.	Identify or assess the application of the Industry 4.0 concept to hospitals and the energy sector maintenance.	Support to learn from international best practices.
	Select a sector to develop the repair/reuse services	Establishing a commercial interface to create a market for Used/ repaired products among the communities.	EU support
Application of renewable energy	Sharing of experiences and know-how of India on the use of biogas for micro, SM including exposure visits	Prepare a design guide and set up a testing facility.	India
Streamline the supply chain of essential materials.	To identify essential items required for MSMEs and facilitate importing so they can survive. Conduct a fast-track need assessment.	Establish/Upgrade supporting services for Heat treatment, Electroplating and 3D printing. Under this, the IDB electroplating centre in Peliyagoda needs to be revived.	IDB is supported by customers with donor support.
Advance to Industry 4.0 level	Promote advanced technologies on a small scale (components of Industry 4.0), Continue evaluation of potential companies for Industry 4.0 Gap assessment	Establish a centre to assist Industry 4.0 transformation at a selected Chamber of Commerce.	The Japan/University of Western Sydney in the 4.0 group

TRIPARTITE STUDY GROUP – RECOMMENDATIONS			
Sector: Tourism			
AREA OF FOCUS	MEDIUM-TERM	LONG-TERM	POTENTIAL DONOR CONTRIBUTION
Ecotourism potential identification	Conduct a detailed study on all potential ecotourism opportunities and attractions available in the rural parts of the country	Establish a permanent training and development centre for Ecotourism service providers by supporting Sri Lanka Ecotourism	Support to follow the promotional campaigns used by other countries to attract tourists to high-end markets

	including indigenous villages and practices (Water heritage sites, indigenous steel/brass industry), Medicine such as Hela vedekama Preparation of a directory	Foundation and create a network of service providers	
Training of ecotourism service providers	Develop a training package with several modules on ecotourism service provision	Introduce an accredited personal certification program for tourism service providers according to ISO 17024	Technical and financial support with a pilot project
Training of trainers' group	Train a group of trainers on all aspects of ecotourism so that they can be mobilized for the training of community groups	Conduct training programs such as accredited certificate courses	
Community empowerment through capacity building	Introduce training to selected community groups in currently popular tourist destinations within the country as a pilot program	Replicate the efforts in the whole island	
Standardize the ecotourism sector performance	Develop a set of guidelines for all tourist sector personnel to adhere to with ecotourism destinations and activities	Implementation of a strategic action plan for standardization	Support using the guidance documents available in other countries to develop equivalent documents, standards etc.

5.8 Conclusion

The programs launched in the past to facilitate people empowerment through Training & Skills Development in the light engineering and tourism industry sectors have not been effective, mainly owing to a lack of focus and continuity. For successful implementation of the proposed activities, policymakers need to understand and appreciate the importance and impact of the light engineering sector and tourism industry. This will enable the government to reach an understanding with the Governments of India and Japan and optimize the benefits from the assistance granted towards these sectors.

A strong light engineering sector is advantageous for countries that are fast transforming into a circular economy. All manufacturing and service sectors are linked to the light engineering sector, which is vital in the supply chain. This applies to domestic as well as globally linked industries. A set of indicators needs to be developed to measure performance to steer the programmes in the correct direction. The indicators must also measure the impact of LES on other major economic sectors, such as the construction sector. In addition, the plastic industry should be supported if we are to manage increasing environmental pollution problems effectively

The results will be visible within 5 to 10 years, with a marked improvement in employment opportunities contributing to the provinces' GDP and the rural communities' economic well-being. The programme may be replicated in other sectors to create equal economic and employment opportunities for the country's disadvantaged or under-employed social groups.

SECTOR 6: PEOPLE-TO-PEOPLE CONTACT: EDUCATION, DEVELOPMENT AND PUBLIC WELFARE

Siri Hettige

6.1 Introduction

The rapid expansion of modern, mass education in Sri Lanka is a post-colonial development. Against this backdrop, the introduction of universal, free education across the country in the early 1940s was a significant development with wide-ranging implications for Sri Lankan society at the time. The free education system, which became popular among the majority of the population, underwent significant changes in the first few decades after independence due to the influence of emerging politico-ideological forces and the changing economic policies in the country.

This state policy intervention occurred during the transition from colonial rule to self-rule. It was influenced by the broadly liberal environment where egalitarian ideas of equity, equality of opportunity and unhindered social mobility were widely held by an emerging middle class largely exposed to socialist thinking emanating from an influential group of politically active intellectuals who had returned from higher education in England. Educational opportunities available in the country before the introduction of free education were highly unequally distributed as the colonial education system was dominated mainly by fee-levying private schools that catered to the emerging elites and schools managed by catholic and Christian denominations. The emerging native elites wanted to promote schools based on their religions, such as Buddhism, Hinduism and Islam. Establishing such schools in urban centres added more complexity to the colonial education system. This situation began to change gradually with increasing school enrolments in all parts of the country. It was also facilitated by introducing native languages as medium of instruction in primary schools. Yet, the teaching of English side by side with native languages continued to produce a mostly bilingual educated middle class that both private and public sector institutions readily absorbed.

The free education system that became popular among all segments of the population underwent significant changes in the first few decades after independence due to the influence of not only emerging politico-ideological forces but also the changing economic policies in the country. What is also noteworthy here is the impact of rapid population growth in the decades following independence. For instance, the country's population doubled between 1946 to 1971, from just over 6 million to 12 million. Given that the state sector was expanding steadily after independence, it became a significant source of highly valued employment for youth with educational credentials, further increasing the demand for education. The policy decision by the government in 1956 to replace English with Sinhala as the official language, though resisted by the Tamil community and other Tamil-speaking minorities, contributed to an expansion of employment opportunities for

Sinhala-educated youth in the state sector. A subsequent amendment to the Official Language Act allowing the use of Tamil in the Tamil-speaking North and East enabled Tamil-educated youth to find state-sector employment in their areas. However, the issues around language and employment did not subside due to diverse circumstances.

The above and other developments continued to have significant impacts on the education system. More and more people continued to rely on education as an avenue for upward social mobility, and education essentially became a way of gaining certificates required for white-collar employment. Given the fact that colonial economic policies did not facilitate the emergence of a diversified economy, what evolved in the country was an export-import economy dependent on the export of a few agricultural and primary commodities to generate revenue to pay for industrial and other imports. This situation began to change gradually after independence.

With the country's expansion of primary and secondary education, a steady increase in the demand for tertiary education was expected. The two universities in the country in the early 1950s could no longer meet the growing demand for university places. This situation persuaded successive governments to establish more universities in the next few decades. Though initially, products of local universities were absorbed by both public and private sectors, the supply of graduates soon outstripped the demand, resulting in increasing graduate unemployment. Unemployment among educationally qualified youth became a major social issue in the 1970s, leading to widespread youth unrest in the country. This situation prepared the ground for the first violent youth uprising in 1971.

The above developments generated considerable interest among researchers, international agencies and policymakers in issues connected with education and employment. The employability of educated youth, particularly graduates, became a major topic of policy debate in the late 1970s. The then government made some efforts to change the university Arts curriculum to provide job-oriented courses. These changes helped rationalize the recruitment of unemployed graduates by various state institutions to some extent, though graduate unemployment continued to be a socio-political issue into the 1980s.

6.2 Economic liberalization and education

The post-1977 economic liberalization, following the election of a regime committed to liberal and even neo-liberal economic policies, set in motion a process of wide-ranging socio-economic transformation in the country. Educational policies followed by the new administration were in line with the changing demand for educational services from newly emerging social classes due to the steady expansion and increasing integration of the economy with the global economy. Emerging new privileged classes demanded private health, education and other services. The government

readily responded by facilitating the expansion of such services resulting in the emergence of vibrant private health and educational institutions, particularly in urban areas.

The establishment of private schools, international schools and private professional and technical higher education institutions, often affiliated with international institutions, created opportunities for affluent families to enroll their children in such institutions bypassing state schools and universities. People who could afford to send their children for higher education outside Sri Lanka did so, often with the hope of finding greener pastures for them in the developed world. English being the medium of instruction in private and international schools, youth leaving such schools with educational certificates could easily find lucrative employment in the expanding corporate sector in the country.

The above developments had significant social and political implications. On the one hand, social disparities became more pronounced, while on the other, unequal life opportunities created by the widening income disparities and the emergent gap between private and public education gave rise to new class-based political tensions and conflicts. Increasing agitations by a large section of students in public universities in the early 1980s, particularly against the proposals to establish private universities, created student unrest in the state universities, often resulting in violence. These developments culminated in widespread violence within and outside universities in the late 1980s, closing state universities for extended periods.

Youth unrest, in general, and student unrest, in particular, have been very much connected to persisting or growing educational inequalities over the last several decades. The widespread sense of social injustice and unequal opportunities felt by underprivileged youth has underpinned the above unrest. In recent years, the expansion of higher education through the establishment of more regional universities while continuing brain drain and a low level of public investment in education led to inadequate facilities in schools and universities. This situation has not changed very much over the years. For instance, despite the increasing emphasis on Science, Technology, Engineering and Mathematics (STEM) education by authorities and education professionals, many rural schools lack facilities for offering a science stream for GCE (AL). This situation has prevented many rural students from following science-based courses, resulting in a vast undergraduate population in Arts and Commerce with fewer employment opportunities. As a result, high unemployment rates among them have encouraged governments to absorb them into the state sector for often non-existent jobs at low salaries.

As evident from the above account, educational development and expansion in post-independence Sri Lanka have been guided largely by social, demographic, economic and political pressures rather than wider societal considerations such as economic and development, social cohesion, social justice, equity, social solidarity, scientific and digital literacy, social citizenship, caring and sharing, team and community work, responsible consumption and environmental consciousness. So,

the larger national goals of education can be determined by considering both the intrinsic value of education and the larger purposes of education from a broader humanistic perspective. Faced with enormous global and local challenges such as climate change, ongoing pandemics, pervasive environmental pollution, persisting and widening inequalities, geopolitical tensions and even the prospect of a third world war, even involving the use of nuclear weapons, the education system can play a catalytic role in transmitting the knowledge, skills, ideas and values that are necessary for living and working in the modern world.

In view of the above, Sri Lanka's education system needs to be reformed to prepare younger generations not only to fit into the demands of the economy and secure an appropriate and desired livelihood but also equip them with the knowledge, ethos, values and behaviour patterns that have become critically important for them to be socially responsible citizens serving the wider society, including humanity at large. In this sense, the education reforms needed in the country are wide-ranging, as many of the changes that have taken place over the last several decades have not been in the direction outlined above.

In the following few pages, an attempt is made to outline the needed reforms under several themes that are listed as follows:

- a) Structural problems and educational inequality.
- b) Scope of the public education system.
- c) Inequitable public school system.
- d) School curriculum, free exploration and hands-on learning.
- e) Teacher training.
- f) Second language teaching and learning.
- g) The world view and educational attainment.
- h) Ethical, moral and citizenship education.
- i) School-community relations.
- j) Beyond school education; issues in tertiary education.

a. Structural problems and educational inequality

As mentioned earlier, the introduction of free education in the early 1940s was aimed at creating an equitable and accessible education system for all but the elite denominational schools, though integrated into the new system, continued to maintain their superior status. When a new scholarship scheme was introduced (when?) to enable underprivileged and rural children to move into better schools depending on their performance at the examination, these schools became the prime target of their parents. In the absence of a program to upgrade all rural and urban under-resourced schools to a higher level, the scholarship scheme further reinforced the unequal school system in the country. Once again, it is children from poorer families whose capacity to prepare children for

the competitive Grade 5 scholarship examination who were often left behind in ill-equipped schools to pursue their further studies.

On the other hand, as already mentioned, disparities within the public education system were a product of a low level of public investment in education, hovering around 1.6% of GDP over the last several decades. On the other hand, the considerable influence that Old Boys /Girls Associations exercise over their respective schools' affairs helps privileged schools attract more resources from public and private sources and maintain their superior status. The situation of disadvantaged rural schools is quite different in this regard.

With the expansion of private and international schools in the early 1980s, inequality within the education system became more pronounced. The introduction of English medium teaching in these schools enabled children to become bilingual as against the vast majority of children and youth attending most public schools who remain mostly monolingual, usually competent only in their mother tongue. Naturally, this situation has had wide-ranging implications for their identity formation and future higher education and employment prospects.

b. Scope of the public education system

As is well known, preschools have been an essential part of children's education in many countries. Widely known as early childhood education, preschool education is necessary for primary education. But, in Sri Lanka, preschools are run mainly by private individuals or entities and, therefore, vary widely in terms of educational activities, their structure and quality, depending on how these are organized and managed. While some are poorly resourced and rudimentary, others are run by private entities employing well-trained teachers. Some private and international schools offer pre-grade programs, some of which are highly structured, covering numeracy, language, handwork, physical activities, etc. Many parents, particularly in rural and disadvantaged areas, do not send their preschool-age children to any type of facilities mentioned above. The children who have had the benefit of preschool education of some sort most probably have a head start when they are admitted to primary school. This is an important issue given the highly unequal nature of the public-school system. Against this backdrop, it is logical to accept preschool education as part of general education and take measures to provide such facilities for all children from an equity and social justice point of view.

c. Inequitable public-school system

As mentioned earlier, the introduction of a universal, free education program made public funded education available to school-aged children in all parts of the country. However, it did not lead to equal access to good quality education in well-equipped institutions. In other words, many schools, particularly in rural and estate areas, remained poorly resourced, often without competent teachers.

Since a good score at the Grade 5 scholarship examination enabled many pupils to be admitted to better-equipped urban schools, those who stayed in the village and estate schools remained disadvantaged. Though many of these schools also have GCE (AL) classes, these are often confined to the Arts and Commerce streams, without any facilities to offer GCE Advanced Level Science stream to students who desire to do so. This situation adversely affects students from disadvantaged social backgrounds without the necessary financial resources to travel to well-equipped urban schools. Schools without such facilities constitute about two-thirds of the secondary schools in the country, indicating the gross inequitable nature of the public school system.

The above situation is a major obstacle to the advancement of science and technology education in the country at a time when there is a widely recognized need to make use of modern technology not only for economic development but also to equip younger generations with the knowledge and skills to embark on careers connected with the propagation and application of modern technologies to solve diverse problems that we face not only at a national level but also globally. The following quote from the National STEM Policy and Strategy Statement of the Government (2020-2030) clarifies the situation:

“Policymakers need to design programs that empower the younger generation with the ability to think creatively, critically and deeply so that they have a better chance of becoming innovators, educators, researchers and leaders capable of resolving the pressing issues of a country as well as facing tomorrow’s world with confidence” (Page 6).

Educational inequalities have significant implications not only for educational opportunities but also for employment opportunities for young people. Today, Sri Lanka’s education system is characterized by numerous inequalities of diverse forms. In this regard, unequal access to science and technology education within the system is highly significant. This is particularly relevant when science and technology fields are changing constantly and rapidly. These developments also change the nature and types of employment everywhere. Lack of access to science and technology education can deprive many youths, particularly in disadvantaged areas of opportunities to acquire knowledge and skills needed to secure employment that demands new skills and capabilities. Moreover, inadequate human resource development in such areas can also hamper the development of industries that rely on the ready availability of persons with the right skills and capabilities.

d. School curricular, free exploration and hands-on learning

As is well known, the education system in Sri Lanka has long been heavily biased towards preparing children for competitive national examinations. This practice has encouraged children to rely on rote learning and additional private tuition. This situation has discouraged pupils from spending time reading, learning a second language, doing hands-on activities and free exploration of things in their natural and social surroundings. While earning good grades at examinations is the primary

objective of most children and youth, parents and teachers expect them to concentrate on examinations. This tendency no doubt prevents them from developing their full potential. Many children have a range of aptitudes that can be developed, provided necessary conditions and opportunities are made available for them. As a result, many do not develop skills that can be useful in their future endeavours, like finding employment, training opportunities and living a versatile adult life. As is well known, scientific literacy, critical thinking and analytical skills, environmental literacy, digital literacy and competency in a second or third language are critically important for living and working in a fast-changing environment. Given that we live in the internet age, when information, educational and scientific material etc., are readily available through multiple sources, some of the skills mentioned above are extremely useful for students to reach out to such material.

e. Changing profile of teachers and teacher training

The challenging educational environment in Sri Lanka described earlier demands teachers to adapt to the new environment and acquire the skills needed to do so. This means that the teacher's profile also has to be changed in keeping with the new demands placed on education. The way the school system is organized today, where teachers are usually considered subject specialists to guide the pupils in specific subject areas, they are not expected to be versatile and multi-skilled. This tendency cannot be changed overnight. While the long-term strategy to change this situation can be refashioning teacher education and training programs, in the short and medium term, refresher training programs designed to achieve new skill development, attitude change, change of teacher profiles etc., can be introduced. Teachers need to be not just educators disseminating facts and figures to students but also learners who adapt to the needs of a changing education system and the dynamic wider environment. In this regard, bilingual competency and digital literacy have become critically important.

f. Second language teaching and learning

Changing language policies of post-independence regimes have significantly impacted the entire education system and the teacher population. It is well known that an implicit bi-lingual policy was embedded in the Free Education Program, popularly known as the Kannangara reforms. While children commenced their school education in their respective mother tongues, within a few years, they were introduced to the English language, enabling them to acquire some English language skills within a few years. The fact that the teachers at the time were also bilingual facilitated learning a second language. The change of official language from English to Sinhala and later to Tamil almost eliminated the requirement for a second language as regards public sector employment. As a result, over time, most of the teachers within the public education system also became monolingual. The result was the gradual deterioration of second language teaching in most schools. These developments also resulted in the de-facto segregation of most schools on ethnolinguistic lines, further reinforcing the tendency towards monolingualism. This situation naturally had a significant

impact on the process of identity formation among children and youth in the country, particularly in rural areas. This tendency has had wide-ranging implications for not only the teaching and learning processes but also inter-community relations in the country, contributing to violent conflicts that emerged in the country in recent decades. The lack of multi-lingual skills among educated youth also restricted their opportunities for further education and employment prospects, particularly among disadvantaged youth in rural and estate youth with significant economic, social and political implications.

g. Worldview and educational attainment

Modern education has long been considered the world over as a way of gradually broadening the horizon of children and youth. It has also been considered a facilitator and an enabler of their adaptation to a changing environment, particularly when the changes are transformational concerning material, social, cultural and ecological conditions. The development of modern science has changed our understanding of the world around us as never before. The corresponding change in the world views of successive generations of people has helped them to understand the global and local challenges based on new knowledge and figure out how to respond to and manage them to avoid diverse negative consequences. In this regard, modern education has a critical role to play in preparing children and youth to face the emerging realities as they move into diverse fields of study that not only equip them with new knowledge but also capabilities needed to play a critical role in enabling societies to face local and global challenges successfully.

In many traditional societies, the social transformation required overcoming the dominance of archaic belief systems by striking a balance between science and religion, often leading to the secularization of society. This has happened in many societies to varying extents, depending on a whole range of circumstances, such as the nature of the emergent state, education systems and the role of belief systems and religious institutions in society and politics. In this regard, it should be noted that scientific literacy has not become part of the lives of many people in Sri Lanka and attachment to belief systems and archaic ritual practices remains strong and pervasive. This development is despite the massification of education and the proliferation of media institutions, indicating the insignificant role both have played in this regard. This cannot be surprising, given that media institutions provide much greater space for religious programming than science programming.

Colonial and post-colonial developments in Sri Lanka in this regard have helped perpetuate the highly significant role religion and ritual play in the lives of a large majority of people, and the education system has not been spared by its influence. As mentioned earlier, most of the prominent schools in the country have been connected to diverse religious denominations, including the dominant religion, Buddhism. As a result, religion has long been a part of people's identities and worldviews. This is also reflected in public life in the country. People continue to be swayed by influences emanating from religious institutions. Moreover, most media institutions regularly

allocate considerable media space for religious programming and even some traditional religious practices. On the other hand, scientific discussions and programs receive much less media attention and no doubt; such media practices reinforce the tendencies mentioned above.

h. Ethical, moral and citizenship education

There have not been any significant efforts in Sri Lanka to express ethical, moral and citizenship education within the country's education system. American educational philosopher John Dewey's well-known publication on Democracy and Education (1916) shows the importance of citizenship education in any modern education system. Given that instrumental values have taken precedence over substantive values like public good and social solidarity in recent years in Sri Lanka, efforts need to be made to incorporate them into the educational process using appropriate pedagogical strategies. Some of the efforts might have to begin early in the education process.

i. School-community relations

School children come from diverse communities. Yet, the educational process within educational institutions is often disconnected from the communities where the educational institutions are located. On the other hand, a conscious strategy to link the school with the surrounding community can enrich the educational process and provide opportunities for students to have a first-hand experience with many things they study from textbooks. These may relate to both natural phenomena and social and cultural matters. These may also include contemporary issues like climate change, environmental pollution, sustainable development, epidemics, disasters, linguistic diversity, and inter-community relations.

j. Beyond school education: issues in tertiary education

The main focus of this paper has been on school education. Yet, given the highly significant nature of the tertiary sector in terms of its contribution to development, human resource development, research, etc., some brief analysis of the key issues in the sector is necessary to identify possible ways of rationalizing the sector to improve its performance.

As mentioned earlier in this paper, higher education did not receive much attention from colonial rulers in Sri Lanka. Though a medical school was established in the latter part of the 19th century, the first university college covering other areas of study was established only in 1921, namely, the University College, Colombo. But university education expanded after independence with the establishment of several universities in the first two decades following independence. Moreover, what happened in the general education sector also had significant implications for the tertiary sector. These included rapid expansion of the school population, change in the media of instruction, increasing inequalities in the general education sector and increasing demand for university

education. The more recent expansion of university education following the increase in publicly funded universities has also been a highly significant development.

Reflecting the distribution of students across academic streams within the public school system, a majority of university students continue to follow the Arts and Commerce streams. Employability of these graduates remains low, often encouraging successive governments to absorb them into the public sector. This has become a serious issue in recent years. On the other hand, the corporate sector continues to absorb graduates and others with the skills and competencies on a competitive basis. Many of the graduates from the Arts and Humanities are often left out as they usually do not possess the skills in demand.

6.3 Conclusion

What is discussed above in this study points to some of the long-standing and more recently emergent issues and challenges in the education sector in Sri Lanka. These issues and challenges need to be addressed through appropriate policy interventions. Yet, given that the nature and quality of school education have significant implications for higher education, addressing these issues is more than likely to benefit the latter.

Recommendations:

As indicated in this study, the issues related to education have emerged over several decades and impacted not only education but all other sectors to varying extents. So, the prospects of the younger generations, in particular, and the entire country, in general, are also at stake. Hence, there is an urgent need to develop a national plan of action to address the issues and remedy the shortcomings without further delay. It is necessary to point out at the outset that short-sighted, ad hoc and populist measures taken in the recent past have made the situation worse over time. This trend has to be checked as early as possible by adopting a firm policy decision to do so at the highest level. What is given below are some key policy recommendations.

- i. First and foremost, public policymaking in education should be professionalized through the institution established for the purpose, namely National Education Commission (NEC). Given the tendency in recent decades to politicize many state institutions, it is a good idea to bring NEC under Independent Commissions.
- ii. As mentioned in this study, in recent decades, the structure and process of education substantially deviated from the free public education system established under the Kannangara education reforms. These deviations need to be addressed through a significant increase in state funding, 3-5% of the GDP over time, which is critically important to reduce structural inequalities that affect the quality of education and equal access to quality education.

Present rural-urban disparities are unjust and exert considerable social and economic pressure on many low-income families due to additional costs in accessing better-equipped urban schools. A significant, overall improvement in public education is also critically important in a context where private and international schools often run as business ventures. They have become more and more attractive to higher-income groups in the country compared to most state-funded schools.

- iii. Preschool education in the country today is highly uneven, and it is not recognized as an integral part of the education system. As a result, many private and civil society entities run preschool services of highly uneven quality. Many children, particularly in rural areas, do not attend preschools. Given that children attending good quality pre-schools tend to have a head start when admitted to public or private primary schools, many others begin school without having that advantage; it is necessary to provide equal opportunities to all children. This can be done by recognizing preschool education as an essential part of the public education system and ensuring all children have access to quality preschool education. Such a program can be implemented in collaboration with local councils for logistical reasons.
- iv. Nearly two-thirds of secondary schools conducting GCE (AL) classes do not have the facilities to offer an A/L Science stream. As a result, many students attending these schools are often compelled to move into Arts and Commerce streams unless they can proceed to schools that offer Science stream. But, with more resources allocated to the above schools to commence all streams, students could continue their studies in any stream at all schools reducing unnecessary student mobility.
- v. Present pervasive preoccupation with competitive national examinations by almost all stakeholders within the public education system has many adverse effects. It distorts the role of the teacher in the educational process. Often the teacher is reduced to a subject specialist at the expense of multiple roles the teachers are expected to play today. It also restricts the learning process of children and retards their intellectual, moral, and social skills development. These, in turn, restrict their future prospects and prevent them from adapting to the fast-changing local and global environment.
- vi. De facto segregation of most schools on ethnolinguistic lines since independence and the neglect of teaching second and third languages have promoted monolingualism among most children and youth in the country, leading to adverse educational, social and cultural consequences. As a result, many teachers have also become monolingual, relying almost entirely on educational and reading material in their mother tongue. On the other hand, a lack of competency in a second language is a major obstacle to promoting social cohesion and inter-community relations in a country where three languages are spoken. Against this background, an effective and accelerated second and third language teaching program at school and community levels has become critically important.

- vii. Instrumental values guide the present examination-oriented education system, and the larger purpose of education to broaden the worldview of children and youth is largely neglected. This gap has become a major issue today because of the need to help children and youth focus on major challenges facing humanity, such as climate change, pandemics, geopolitical conflicts, widening global inequalities and environmental degradation. So, education can no longer be narrowly focused on educational credentials, employment and individual success.
- viii. Many educationists have emphasized the need to go beyond the subject matter in textbooks and rote learning. It is widely recognized that what happens in the classroom needs to be connected to real-life situations beyond the classroom, i.e. the wider social, cultural, environmental and community contexts. This is where linking school with the community can provide opportunities for students to test their newly acquired concepts, knowledge and ideas in real-life situations.
- ix. Revamping the education system to address the diverse issues identified above demands a change in the teacher's profile. They have to play a dynamic role beyond conventional classroom teaching, requiring the teacher to possess multiple skills to play the new role. This is where the training of teachers needs to be carefully examined to figure out how to prepare them to play the newly defined role. What is also necessary is to recognize the pivotal role the teacher has to play and improve their working and living conditions accordingly.
- x. Finally, a sound education system cannot be narrowly focused, for it has wide-ranging benefits to society, not just those who use it to achieve individual goals. Therefore, investing in education is an investment in the present and future well-being of the entire population in a country. In this sense, investment in public education becomes a priority for the country.

The improvements expected from the aforementioned policy changes will ease some of the problems in higher education. Those who complete school and go for higher education will be better prepared and equipped for further instruction. In other words, they will likely be better products of our universities and tertiary education institutions.

References

Hettige, S.T. (1992). *Unrest or Revolt: Some aspects of youth unrest in Sri Lanka*, a collection of essays edited by the applicant, published by The German Cultural Institute, Colombo. (Reprinted in 1996)

(1998). *Globalization, Social Change and Youth*, (ed), Colombo; CASS/German Cultural Institute

(1999). *Economic Liberalization, Qualifications and Livelihoods*, in *Assessment in Education*, Volume 7, No. 2

(2000). *Readership Survey of Sri Lanka 1997-98*, Colombo: Ministry of Cultural Affairs

(2001). *Globalization, Electronic Media and Cultural Change: The Case of Sri Lanka* – (eds.) Hettige, S.T. et al., Colombo: German Cultural Institute

(2002). *Sri Lankan Youth; challenges and responses*, co-edited with M. Mayer, Colombo, FES

(2004). *Pseudo-Modernization and the Formation of Youth Identities in Sri Lanka*, in Mukherji, P. and Sengupta, (eds.) *Indigeneity and Universality in Social Science*, New Delhi: Sage Publications

(2005). *School to Work Transition of Youth in Sri Lanka*, (with Mayer, M and Salih, M., Geneva: ILO.

(2005). *Perspectives in Social Development in Sri Lanka*, (ed.), SPARC: Colombo

(2007). *Modernization, Education and Social Justice in Sri Lanka* in Kumar, K. and Oesterheld, J. (eds.) *Education and Social Change in South Asia*, New Delhi: Orient Longman Ltd.

(2008). *Youth, Peace and Sustainable Development in South Asia*, Colombo. CEPA (edited with an Introduction)

(2013). *Globalization, Education and Youth Employment* (co-authored with Angela Little) London: Routledge

(2014). *Social Transformation and Youth: changing life chances of youth in Sri Lanka*, co-edited with Elvira Graner, University of Heidelberg, Germany and Harini Amarasuriya, OPU, Sri Lanka

(2015). *Governance, Conflict and Development in South Asia*, Delhi; Sage Publications, co-edited with Eva Gerhard, University of Bielefeld, Germany

(2022) *Higher Education and Social Change in South Asia: From Intellectual Elitism to Equality of opportunity* in Cote, J. and Picard, S. (eds.) *The Routledge Handbook of the Sociology of Higher Education*, Second edition

AUTHOR BIOGRAPHIES

Eng. Gamini Senanayake



Eng. Gamini Senanayake graduated in 1977 from University of Moratuwa in Sri Lanka (B.Sc. Engineering (Hons)) specializing in Mechanical Engineering. In 1994, he was awarded the Master of Business Administration (MBA) degree with a Distinction in the discipline of Industrial Policy & Corporate Strategy by Maastricht School of Management in The Netherlands.

He has over 45 years of experience as a Professional Engineer and as an Organization Leader and had served in semi government and private sector establishments in Sri Lanka and Singapore as well as in international development agencies.

He is a Life Fellow and a Corporate Member (Chartered Engineer) of Sri Lanka Institute of Engineers, Corporate Member (Professional Chartered Engineer) of The Institute of Engineers Australia and a Corporate Member Sri Lanka Energy Managers Association (Founder Member) and is an Accredited Energy Auditor.

Prof. I.M. Dharmadasa



I.M. Dharmadasa, PhD is an Emeritus Professor at Sheffield Hallam University in the United Kingdom. He has four decades of research experience in both industry (BP Solar) and academia. His research focuses on the development of next generation, low-cost and high-efficiency solar cells using electroplated semiconductors. Current efforts are focused on developing graded bandgap multi-layer solar cells. Prof. Dharmadasa has published over 260 articles, six patents, and two books on “Advances in Thin Film Solar Cells” and “Graded Bandgap Multi-Layer Solar Cells”. In this process, he has successfully supervised 30 PhDs, 14 years of postdoctoral research and examined 32 doctoral candidates. He is also actively involved

in the promotion of clean energy for sustainable development and reduction of poverty. He has designed, piloted in 2008, monitored for several years and now replicating the “Solar Village” project. Five large solar villages have been established, and the replication is in progress.

Dr. Tilak Siyambalapitiya



Dr. Tilak Siyambalapitiya graduated from University of Moratuwa, Sri Lanka, in Electrical Engineering in 1982. He holds a PhD in Electric Power Engineering from University of Cambridge, UK. For ten years he worked in Sri Lanka Ministry of Power and Energy, and at Ceylon Electricity Board on energy efficiency and power generation planning, respectively. From 1994 to 1998, he was the Principal Engineer in the Power System Planning Division of Saudi Arabia. Since 1999, he works as an international energy consultant based in Sri Lanka. He has worked in countries in south Asia, south-east Asia, and east Africa, advising governments, electric utilities, banks and industries on electricity industry-related policy and planning initiatives, energy costing and pricing, and on renewable energy development initiatives.

He was the President of Sri Lanka Energy Managers Association from 2004 to 2006. He is a visiting lecturer at Universities of Moratuwa, Peradeniya and Jaffna, Sri Lanka, and an external examiner of graduate students at several Universities, in the areas of electric power engineering, renewable energy development, energy efficiency and demand management.

Mr. T.F. Nimal Perera



Mr. Nimal Perera is a product of University of Colombo in 1983 and later has earned Post Graduate qualifications in Industrial Engineering, Business and Financial Administration, Pollution Control Engineering, Industrial waste management and Efficient Energy use in Industry from local and overseas universities and institutions.

Mr. Perera is a Chartered environmental professional in Sri Lanka. He currently works as a National Consultant in the field of Energy, Environment, Climate change & Sustainable development. Mr. Perera is the President to SCP Forum Sri Lanka, Member of the board of trustees to the Asia Pacific Roundtable on Sustainable Consumption and Production (APRSCP) and Chairperson to the consumer consultative committee to the Public Utilities Commission of Sri Lanka (PUCSL).

Some of his professional affiliations include, Past President to the Sri Lanka Energy Managers Association, Life member to the Sri Lanka Association for the Advancement of Science (SLAAS), Institute of Environmental Professionals Sri Lanka and GHG Management Institute (USA). He is a member of the national expert committees to national Climate Change Mitigation Expert committee, National Energy Award evaluation panel and Presidential Environmental Awards

evaluation panel (Industry sector). Mr. Nimal Perera was recognized with a special award “Environmental Achievement Award” by United States – Asia Environmental Partnership Programme (USAEP) in 2006.

Mr. Rohan Masakorala



Rohan Masakorala is an Honors Graduate in Economics with a second major in Business Administration & Marketing from Connecticut State University U.S.A. Diploma in business management from Houston University Texas USA & certified in supply chain management from Cranfield University U.K. Counts thirty years of experience through factory floor to the global commerce(exports-Imports) and ports, logistics and distribution systems. Founder member of Singapore Shipper’s Academy (2010), founder, and CEO of Shippers’ Academy Colombo (2011) and Shippers’ Academy International (Australia) (2021). Consultant logistics to UN International Trade Centre (ITC) Geneva Switzerland, chairman of the National Exports Strategy on logistics to the Export Development Board of Sri Lanka and the Director General of Sri Lanka Association of manufacturers and Exporters of Rubber products. A UNESCAP certified trainer on global supply chains and logistics and have served/serving as secretary general to many international industry intuitions and government/ private boards and serve as an independent shipping, global commerce consultant, writer/ and an international speaker. Have been involved in the development and design of the commercial distribution and hub concept for free zones, customs reforms, export strategy and port and business development strategy and international payment policies for international trade. A former chairman of the Sri Lanka Shippers’ Council & Association of Shipper’s Councils of Bangladesh, India, Pakistan & Sri Lanka (ASCOBIPS), served as the first Secretary General of the Asian Shippers’ Council representing 16 countries in Asia/Oceania and a founder strategy partner of Global Shippers Forum U.K. (2009-2011) Has a special focus on Indian ocean trade (IORA), logistics and shipping with a focus on South Asia/East Africa related business development. formerly a working group member of the International Chamber of Commerce (ICC), Paris, on trade terms development (INCOTERMS). Life member of Economics Association of Sri Lanka and the Wildlife and Nature Protection Society of Sri Lanka

Dr. Dimantha De Silva



Dr. Dimantha de Silva is a Senior Lecturer at Department of Civil Engineering at University of Moratuwa, Sri Lanka. He received his M.Sc. in Transportation Engineering and B.Sc. in Civil Engineering from the University of Moratuwa, Sri Lanka. He completed his PhD in Transportation Engineering from University of Calgary, Canada. He has over 20 years of transportation engineering experience in Sri Lanka, Canada and in USA. From 2006 to 2014 he worked as a Transportation Engineer in Canada, developing activity-based transport demand models, spatial economic land use models for policy testing in macro and micro policy planning. In 2014 he has returned to Sri Lanka to join the University of Moratuwa. He was the team leader developing the Megapolis Transport Masterplan. He has been instrumental in developing the Google Transit for Sri Lanka and development of software tools to use Google traffic data on many transportation planning. He has been involved in all major suburban railway development project feasibilities, LRT feasibilities and all major road feasibility projects in Sri Lanka since 2014.

Dr. Vipula Wanigasekera



Dr Vipula Wanigasekera - CIM UK, MBA and PhD, has been employed in different managerial capacities in the private sector prior to joining Tourist Board of Sri Lanka as Director Marketing. Later he joined the Diplomatic service of Sri Lanka and functioned as Counselor in Kuala Lumpur from 1997 - 2000 and Consul General in Oslo from 2000 to 2005 after having commissioned the first diplomatic mission in Norway. Upon returning to Sri Lanka, Dr Wanigasekera rejoined the Ministry of Tourism as CEO, Sri Lanka Convention Bureau from 2005-2016 with a two-year concurrent position of Director General, Tourism Development Authority and Project Director of World Bank Tourism Project.

He entered academia full time in 2016 serving Plymouth University UK and currently he is a senior lecturer at Edith Cowan University – Perth, Australia. Once a Nationalized services basketball player, he has produced several research papers and published 02 books. His ‘Pointers to Enlightenment’ paved him way to conduct meditation sessions for tourists. Dr Wanigasekera is also qualified in Carnatic Music from IFA - UK, and Ayurveda Therapy from IICA SL.

Dr. Malraj Kiriella



Dr. Malraj B. Kiriella is a multi-disciplinary expert having over thirty years of professional work experience in travel and tourism industry in Sri Lanka. He has worked in different capacities in senior management level positions in national tourism administration, in the areas of research and planning, marketing and promotions, compliance and standardization, international relations and sustainable development. Currently he is the Founder/Owner of South Asia Multidisciplinary Advisory Services (SAMAS).

He held positions as the Director General of Sri Lanka Tourism Development Authority (2015-2018) and also as the Managing Director of the Sri Lanka Tourism Promotion Bureau (2010-2011). Furthermore, he worked as the Director Research and International Relations, Director Standards and Quality Assurance, and Director Marketing of the National Tourism Organization of Sri Lanka. Prior to joining Sri Lanka Tourism, he worked at Sri Lankan Airlines.

Dr. Kiriella completed his Bachelor's, Master's, and Doctorate degrees in Economics from the University of Colombo. He also holds a Bachelor of Laws Degree from the Open University of Sri Lanka. He is a Chartered Manager Companion (CMgr CMI) of the Chartered Management Institute (CMI), UK and also an Attorney at Law by profession. He was awarded the Fellowship in International Affairs Management by the United Nations Institute for Training and Research (UNITAR) in 2004. He also holds the UNWTO Practicum Diploma awarded by the United Nations World Tourism Organization. He was a Visiting Research Fellow of the George Washington University, USA in 2002.

Eng. V.R. Sena Peiris



V R Sena Peiris is a mechanical Engineer graduated from Faculty of Engineering, university of Peradeniya in 1972. He worked as an Engineer, Chief Engineer, Works Manager, General Manager and Technical Director in several manufacturing organizations in the country.

In 1997 he was trained as a Cleaner Production Professional by UNIDO. In 1998 he joined Small and Medium Enterprise Developers as a consultant in Environment and Industrial Engineering. In 2002 Mr Peiris became the Founding Director/CEO of National Cleaner Production Centre of Sri Lanka. Since 1992 Mr Peiris has changed his focus to Energy and Environment and with the Cleaner Production Expertise, he led the promotion of CP in Sri Lanka. Subsequently he

underwent training in Life Cycle Analysis, Eco Design, Green Productivity and Hazardous Waste Management and became the pioneer in introducing these new concepts to Sri Lankan professionals by bringing in international trainers. He is a certified Energy consultant and engage in promotion of modern renewable energy.

He served as team leader in several nationally important projects. Mr Peiris was a member of Board of Trustees of Asia Pacific Roundtable for Sustainable Consumption and Production and was the president of this regional network during 2011-2014. He is a member of many professional Institutions and is a chartered environmental Professional of IEPSL.

He is an accredited GHG assessor and is a member of the Sri Lanka Accreditation Board accreditation committee for certification bodies. He serves as a partner/director of Business and Industry Development services pvt Ltd. Further he is the Chair of the National Expert Committee on Climate Change Mitigation and President of Lanka Responsible Care Council. He serves as a visiting academic in several universities and institutes.

Mr. Nihal Cooray



Mr. Nihal Cooray is a BSc (Hons) qualified engineer and a Chartered mechanical engineer of Institution of Engineers (Sr Lanka) with over 46 years' experience in industry. He also obtained a Post Graduate Diploma in Industrial engineering from OUSL. and he is a certified Cleaner Production assessor. Currently, he is an advisor of the Board of Trustees of the Asia Pacific Roundtable on Sustainable Consumption and Production (APRSCP) and a member of the Mechanical Engineering Sectoral committee of the Sri Lanka Standards Institute.

He has worked in manufacturing Industry comprising Cement, Hardware & Agricultural implements, Plastic & Rubber and Dies & Molds.

He worked in the Small and Medium Enterprise Developers (SMED) project for over 16 years providing variety of services to SMEs and large enterprises throughout the island. He was also involved in establishing the National Cleaner Production Centre under FCCISL supported by UNIDO which assisted many industries in Sri Lanka for implementing proactive environmental management processes. His most recent work has been the contribution he made in the preparation of the National Action on Plastic Waste Management in Sri Lanka. Currently he functions as the manufacturing sector expert on behalf of Industrial Services Bureau in the preparation of the National Policy on Industry.

Prof. Siri Hettige



Siri Hettige is Emeritus Professor of Sociology at the University of Colombo and an adjunct Professor at RMIT University, Melbourne, Australia. He is also Chairman of the Steering Committee on Social Innovations at the National Science Foundation, Sri Lanka. Professor Hettige held the positions of Professor and Head, Department of Sociology, Dean, Faculty of Arts and Senior Student Counselor, University of Colombo. He has also held visiting academic appointment at a number of overseas universities in such countries as the USA, Australia, Germany, UK, Finland and Switzerland. He held the founding Chair of Sri Lanka Studies at the South Asia Institute, Heidelberg University, Germany 2016-17. He has also been active in many professional and academic associations, both nationally and internationally, regularly participating in their activities.

Siri Hettige's research and publications spanning over four decades have covered such wide-ranging areas as social inequality, social development, social policy, migration, sociology of education, urban issues, social and ethnic conflict, sociology of youth, governance and identity politics. Some of his work has been published by leading international publishers like Sage, Routledge and Macmillan. His most recent book *Towards a Sane Society* was published by Sarasavi Publishers, Sri Lanka (2015).

Dr. Dayaratna Silva



Dr. Silva is an International Trade Economist with over 30 years of experience in economic development, trade and trade facilitation. He earned a Bachelor of Commerce degree (Honours) with a first-class from the University of Peradeniya. He possesses several postgraduate qualifications, including a Ph.D. in Economics (University of Melbourne) and a master's degree in International Economics (University of London) and a Postgraduate Diploma in Economic Development (University of Colombo).

He currently serves as the Executive Director of Pathfinder Foundation, prior to which he worked for the International Trade Centre in Geneva as the National Project Coordinator of the EU-Sri Lanka Trade-Related Assistance Project. He served as a Senior Economic Affairs Officer/Deputy Head attached to the sub-regional office (SRO) of UNESCAP in New Delhi. He also served as Director of Commerce at the Department of Commerce, Ambassador and Permanent Representative of Sri Lanka to the WTO in Geneva, Consul General to UAE, Minister (Economic and Commercial) in Geneva, Brussels and London. In his career at the Department of Commerce, spanning over 25 years, he handled multiple duties, including overseeing and safeguarding Sri Lanka's interest in multilateral negotiation in WTO, UNCTAD, ITC, GSP, GSTP, SAARC and BIMSTEC. Dr. Silva has extensive knowledge of trade-related issues, including the EU-GSP, trade policy and facilitation, trade capacity development and promotion.



Pathfinder Foundation, Riverpoint, 339/6, Negombo Road, Peliyagoda
pm@pathfinderfoundation.org