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PART I : SECTION (I) — GENERAL Government Notifications

MINISTRY OF POWER, ENERGY AND BUSINESS DEVELOPMENT

National Energy Policy and Strategies of Sri Lanka

I, Ravi Karunanayake as the Minister of Power, Energy and Business Development do hereby publish the National Energy Policy & Strategies of Sri Lanka referred to in the following Schedule, prepared after reviewing and revising the National Energy Policy and Strategies of Sri Lanka published in the *Gazette Extraordinary* No. 1553/10 of 10.06.2008 as approved by the Government for the information of the general public.

RAVI KARUNANAYAKE,
Minister of Power, Energy and Business Development.

08th August, 2019.

NATIONAL ENERGY POLICY AND STRATEGIES OF SRI LANKA

MINISTRY OF POWER, ENERGY AND BUSINESS DEVELOPMENT - GOVERNMENT OF SRI LANKA



Sri Lanka has achieved several goals set in the National Energy Policy and Strategies (2008) in complete electrification and renewable energy development. The main objective of the National Energy Policy and Strategies declared here is to ensure convenient and affordable energy services are available for equitable development of Sri Lanka using clean, safe,



sustainable, reliable and economically feasible energy supply. This Policy is formulated in alignment with the future goals of Sri Lanka, current global trends in energy and the Goal 7 of the Sustainable Development Goals of the United Nations. This policy will impact the vast realm of social, economic and environmental spheres and pave the way to realize the vision of Sri Lanka in achieving carbon neutrality and complete transition of all the energy value chains by 2050. This document also contains a Results Delivery Framework assigning responsibilities of meeting the stated policy goals to relevant institutions. A draft of this National Energy Policy and Strategies was amended after being subjected to public scrutiny and a review by a committee of experts related to the energy sector before publication.

Implementaion of this policy will be monitored and its impacts will be evaluated by a National Steering Committee appointed by me, comprising of Chairpersons, General Managers and Director Generals of key energy sector agencies and will also include representatives from such affiliate sectors as transport and environment. The Committee will be required to meet at quarterly intervals and report implementation progress to the Cabinet of Ministers and is empowered to co-opt any new members as deemed necessary to represent any relevant sector, This Committee will be chaired by the Secretary to the Ministry responsible for the subjects of power and energy.

The National Streering Committee will be assisted by a Technical Working Group in convening meetings and collation of action plans, progress information and other correspondence with agencies responsible as identified in the Results Delivery Framework. The Committee appointed by the Secretary, Ministry of Power & Energy for the purpose of formulation of National Energy Policy & Strategies will function as the Technical Working Group.

The Policy superseeds all previous policies, strategies, plans and guidelines published from time to time. This National energy policy and implementing strategies will be in effect until it is reviewed in consideration of any major changes in the external environment. Such policy reviews will be conducted at least once in six years. The Results Delivery Framework, alinged with the policy and strategies will be revised in two-year intervals.



NATIONAL ENERGY POLICY AND STRATEGIES OF SRI LANKA

August 2019

Preamble

Numerous are the achievements of the energy sector over the past few decades and numerous are the impending challenges on the energy sector of Sri Lanka.

Our nation has achieved complete electrification and fulfilled many other policy goals and milestones set in the National Energy Policy & Strategies of Sri Lanka (2008).

Sri Lanka is ranked high among the countries with a large share of renewable energy, with a strong commitment to retain this vital attribute of the nation's economic resilience in a world of diminishing energy security.

This policy statement is meant to chart the future course of the energy sector of the country, which in turn will contribute towards a stable economy.

Emerging from decades of internal strife, the whole country has been provided with uninterrupted electricity supply.

Large and small enterprises across the country are looking ahead for better and productive use of material and human resources with the availability of electricity.

Other forms of energy such as liquid and gaseous petroleum fuels too are delivered to the whole country, realizing the dream of providing access to modern forms of energy to all citizens.

The evolving structure of the economy suggests that Sri Lanka will continue its journey along the energy frugal economic development path, with a strong services sector accounting for more than 60% of the GDP. Nevertheless, great strides are being made to steer the economy towards a knowledge fuelled economy, which too will assist to keep the energy intensity of economy at current healthy levels. This policy will pave the way for Sri Lanka to emerge as a strong economy with lesser dependence on energy, in a world constricted by frequent energy crises.

This policy will proactively transform the energy industry from a subsidy-burdened, survival-focused state to an innovation driven catalyser of the national economy, preparing the country for the global energy transition. The newfound economic freedom of citizens will create a conducive environment to improve the quality of energy services to a level where cost reflectivity of prices paid by the citizens will be accepted without any hesitation. This policy will also nurture the energy sector by strengthening the capability of sector professionals to manage the energy sector efficiently and effectively to benefit all Sri Lankans in the long term.

Emerging role of renewable energy, amidst the ever-evolving technological capabilities and new levels of integration made possible by information and communications technology will be recognized as one of the key thrusts to retain the share of renewable energy in the national energy supply. Similarly, energy efficiency across the entire value chain will be improved to keep the growth of energy demand at optimum levels.

This effort assures Sri Lanka's unreserved commitment to fight the challenges posed by climate change by integrating efforts of all stakeholders of the energy industry to a focused, meaningful and a viable response to climate change.

1. Introduction

Global energy industry has entered a decisive phase of transition, where an increasing number of supply options, newer energy carriers and the growing demand, contribute to increase the complexity of the industry. Sri Lanka too, will face this transition during the next few decades, and the energy industry in transition will fuel the growing economy of the country, opening many frontiers and opportunities. This policy spells out ways and means of steering the energy sector in transition to power the nation and its social market economy, aiming at higher levels of stability, security, affordability and sustainability with the least environmental burden, and provide a fertile ground for all public and private enterprises, homes and institutions to flourish in a future, where energy will not be a constraint.

Sri Lanka is ranked in the mid-range of United Nations Human Development Index, while the annual GDP per capita too is in the mid-range, at USD 4,065 (2017)¹. The government's drive to reach the upper middle-income level within this decade intensifies the role of energy in Sri Lanka's economy. As a nation embarking on a progressive social market economy after a three decade-long conflict, a holistic approach to development is desirable, compared with an incremental approach. An energy policy consistent with social and economic development goals is required owing to significant impacts of the energy sector on each social and economic activity of the country.

Sri Lanka maintains a comparatively lower energy intensity of economy, using 0.47TJ of commercial energy to produce one million LKR of GDP². The challenge posed to Sri Lanka is to maintain the lower energy intensity, while accelerating the growth of the economy. Sri Lanka has reached the important milestone of 100% electrification, thereby fulfilling the goal of providing modern energy sources to all the citizens.

¹. The World Bank <http://data.worldbank.org/Country/Sri Lanka>

². Sri Lanka Energy Balance 2016, Sri Lanka Sustainable Energy Authority

Economic growth amidst universal access requires the energy supply capacity to be steadily increased. The growth in demand can also be managed by improving the efficiency of energy conversion. Continued efforts to maintain a low energy intensity status requires to be rewarded with a lower burden on the economy and the environment. Increased efforts on demand management through policy driven incentives are required to meet this goal amidst high economic growth.

Upgrading the transport modes to more efficient systems along with transport infrastructure development and stimulating the use of other forms of energy beyond petroleum products through policy interventions would be required to effectively manage energy use in transport, the largest consuming sector of commercial energy.

The relatively high share of renewable energy (RE) in the country's primary energy portfolio is bound to progressively reduce because the major portion of hydropower potential has already been tapped. With the shifting of household energy use toward fossil fuels, the growing demand for all forms of energy is increasingly being met with fossil fuels. Water resources serve multiple needs, power generation being the third priority after drinking water and agricultural demand, further complicating issues related to projects such as the Mahaweli Stage II development. A paradigm shift of policy is envisaged to defend and improve the share of renewables in the primary energy supply from the level maintained at 55% during the last decade.

The National Energy Policy and Strategies present how Sri Lanka plans to meet the challenge of developing and managing the energy sector to ensure delivery of reliable, cost-effective, and competitively priced energy services from diverse sources to fuel the social market economy.

Sri Lanka weathered many energy crises over the last few decades due to resilience garnered from many deep roots. These roots can be identified as the impressive use of biomass resources, year-round sunshine and higher rainfall, combined with frugal lifestyle of her people and the small geographical expanse of the country.

Having nourished the national economy from these deep roots, Sri Lanka was first in the region to bare fruits, in terms of extending the coverage of the national electricity supply to serve the whole country with an uninterrupted supply. The reliability of energy systems has attracted services sector to the country, leveraging more economic benefits to the country with the least possible input of energy. This has caused a structural change in the economy towards services, in sharp contrast to other developing economies experiencing steep growth in the energy intensity of economy.

Reliability and affordability of both indigenous and global energy supplies will be the most desirable ingredient in this economy in transition. The country is looking into a future where strong emphasis will be on developing the increasingly competitive newly assessed resources for electricity generation such as wind and solar. Biomass, probably the most important energy resource, will play an even more valuable role by making a transformation to a convenient fuel for household use and a dependable resource for industrial thermal energy supply.

Sri Lanka desires to be elevated to an 'energy empowered' nation by developing strategies and conversion technologies to use the vast indigenous resources. Whilst continuous efforts will be made to strengthen the petroleum sector from upstream resource development to downstream diversification, initiatives will be made to elevate the status of electricity as a major energy carrier. Energy transition in the transport sector, from liquid petroleum dominance to other energy carriers will be actively pursued. Electricity will take the pride of place in the quest for discovering new energy carriers, drawing resources from increasing amounts of indigenous resources, whilst securing supply routes for global resources. Whilst securing land resources for important energy infrastructure elements such as gas terminals, electricity generation sites and transmission corridors, energy storage will be taken as a prime carrier to transcend the space and time boundaries which constrained the traditional energy systems.

Aligning Sri Lanka with Goal 7 of the Sustainable Development Goals (SDGs) of the UN, this policy would contribute to achieve universal access to affordable, reliable, sustainable and modern energy for all by 2020, a decade ahead of the UN target. The policy will also contribute to reduce the dependence of Sri Lanka on fossil fuels to below 50% of the primary energy supply and to reduce the specific energy use across all end-uses by 20% of 2015 level, by 2030. This policy will pave the way to realise the vision of Sri Lanka in achieving carbon neutrality and complete transition of all the energy value chains by 2050. The policy provides the necessary space for establishing key manufacturing industries supplying sustainable energy technologies to the local

market and forge alliances with other developing countries through South-South cooperation by developing knowledge products and sustainable energy technologies in line with Goal 7 of the SDGs.

This policy document has three sections:

The National Energy Policy, stating the ten pillars of the policy framework

Implementing Strategies, describing the specific strategies to implement the policy

The Results Delivery Framework, elaborating the specific actions, milestones and the institutions responsible

This policy supersedes all previous policies, strategies, plans and guidelines published from time to time. This national energy policy and implementing strategies will be in effect until it is reviewed in consideration of any major changes in the external environment. Such policy reviews will be conducted at least once in six years. The Results Delivery Framework, (separately published) aligned with the policy and strategies will be revised in two-year intervals.

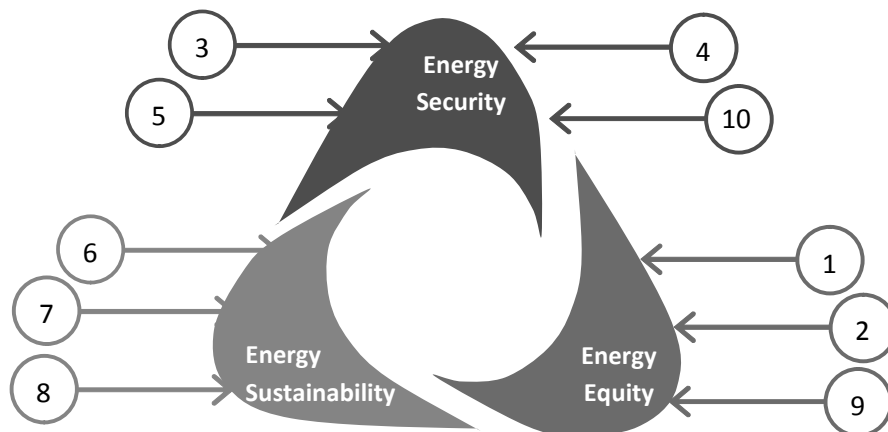
2 The National Energy Policy

The primary objective of the energy policy is to ensure energy security through supplies that are cleaner, secure, economical and reliable, to provide convenient, affordable energy services to support socially equitable development of Sri Lanka. Policy guidelines such as, the 'General Policy Guidelines on the Electricity Industry' as required under Sri Lanka Electricity Act No. 20 of 2009 statutorily required to be issued for each sub sector, are expected to be prepared and issued, based on this national energy policy.

Working through the conflicting demands from the security, equity and sustainability dimensions, known as the energy trilemma, Sri Lanka today is seen to be moving away from the delicate balance of these three forces. The national energy policy is thus founded on ten pillars, rooted in the broad areas impacting the society, economy and the environment, in an effort to counter balance the forces through enhanced equity, security and sustainability, respectively.

1. Assuring Energy Security
2. Providing Access to Energy Services
3. Providing Energy Services at the Optimum Cost to the National Economy
4. Improving Energy Efficiency and Conservation
5. Enhancing Self Reliance
6. Caring for the Environment
7. Enhancing the Share of Renewable Energy
8. Strengthening Good Governance in the Energy Sector
9. Securing Land for Future Energy Infrastructure
10. Providing Opportunities for Innovation and Entrepreneurship

This approach is graphically depicted below:



The ten pillars are described in greater detail below

- 1) Assuring Energy Security**
Primary and secondary energy supplies of the country will be secured to ensure continuity, adequacy and reliability.
- 2) Providing Access to Energy Services**
Access to reliable, convenient, affordable, equitable and quality energy services will be provided to all citizens to improve their living standards and to engage in gainful economic activities.
- 3) Providing Energy Services at the Optimum Cost to the National Economy**
Energy services will be provided at the optimum long-term cost, to lower the burden on the national economy and to achieve competitiveness of locally produced goods and services in international markets.
- 4) Improving Energy Efficiency and Conservation**
Efficient use of energy will be promoted in all sectors and across the energy value chain, engaging both the suppliers and users.
- 5) Enhancing Self Reliance**
Indigenous energy resources will be developed to the optimum levels to minimise dependence on imported resources, subject to resolving technical, economic, environmental and social constraints, with the objective of minimising the vulnerability of energy supplies to external situations.
- 6) Caring for the Environment**
A meaningful contribution to climate change will be made by maintaining the low carbon intensity of the Sri Lankan energy sector. Adverse environmental and social impacts of energy services will be minimised to care for the global and local environment.
- 7) Enhancing the Share of Renewable Energy**
Indigenous renewable energy resources will be developed to the optimum level to attain sustainability and a higher degree of resilience in the energy sector.
- 8) Strengthening Good Governance in the Energy Sector**
Governance of the energy sector to be strengthened to realise accountability, fairness and transparency to achieve investor and consumer confidence. A stable policy environment will be ensured, and the regulatory framework will be further strengthened to assure good governance in the energy sector.
- 9) Securing Land for Future Energy Infrastructure**
Strategic locations for establishing energy facilities and corridors which inter connect such facilities will be earmarked and secured in advance to ensure timely implementation of such facilities and to minimise adverse social impacts.
- 10) Providing Opportunities for Innovation and Entrepreneurship**
Considering the limitation to the scale of markets available in Sri Lanka to breed technology intensive local businesses, the relatively large size of the energy sector will be utilised to nurture local entrepreneurship and innovation.

3. Implementing Strategies

The broad strategies to implement the national energy policy are detailed in this chapter, aligned with the aforementioned ten pillars:

3.1 Assuring Energy Security

Primary and secondary energy resources and supplies used in the country will be secured to maximise the country's energy supply reliability, continuity and adequacy, and strategic independence by employing the strategies:

- 3.1.1 Diversity in energy resources used in electricity generation will be ensured subject to economic, environmental, technological and operational requirements.
- 3.1.2 Considering the recent price profiles, natural gas would be the next fossil fuel option for the country to broaden diversity. A liquefied natural gas (LNG) terminal of optimum size and technology would be established at the most suitable location. Considering the impact to the country's energy security, operation of the first terminal and LNG procurement shall be kept under state control.
- 3.1.3 Global diversification of energy sources will be pursued to safeguard the supply chain against external geo-political uncertainties.
- 3.1.4 Percentage installed power generation capacity from a single imported fuel shall not exceed 50% of the total installed firm capacity to safeguard against geopolitical uncertainties and fuel price shocks.
- 3.1.5 Adequacy and reliability of transmission and distribution infrastructure in both electricity and fuel supply networks to meet any future contingencies will be ensured.
- 3.1.6 Regular risk and assessments will be conducted to identify and mitigate possible internal, external contingencies that could critically affect the performance of the energy sector.
- 3.1.7 Indigenous petroleum resources will be explored using geophysical surveys, and the national petroleum data repository will be strengthened. Such resources will be strategically developed to introduce into all sectors including power generation, transport, household and industry, as well as to generate futuristic cleaner energy sources such as hydrogen and gas to liquids (GTL).
- 3.1.8 National requirements of electricity will be met with proven generation technologies and fuel sources.
- 3.1.9 Maintenance of strategic fuel reserves in strategic locations in the country will be made mandatory for all key players in electricity and petroleum industries.
- 3.1.10 Local crude oil refining capacity will be expanded to optimally satisfy the country's demand for different petroleum products.
- 3.1.11 Viable cross-border electricity transmission and cooperation with countries in the region will be pursued on the basis of multilateral power pool operation

3.2 Providing Access to Energy Services

Access to reliable, convenient, affordable, equitable and quality energy services will be provided to all citizens to enhance their living standards and to engage in gainful economic activities, by employing the strategies:

- 3.2.1 Access to electricity using either on-grid or off-grid sources and to modern petroleum products will be ensured to all citizens in the country.
- 3.2.2 Small and medium enterprises will be supported by socialising part of initial electricity service connection costs *via* tariffs.
- 3.2.3 Households which remain unconnected to national grid due to un-affordability, even after gaining access, will be connected using innovative financing schemes.
- 3.2.4 New productive uses for electricity in agriculture, rural and primary industries will be encouraged with emphasis on empowerment of women and youth.
- 3.2.5 The supply quality of energy services by electricity, gas and oil utilities will be improved through adoption of appropriate technical and commercial quality standards.
- 3.2.6 Minimum service quality standards will be introduced for common utility services. Additionally, premium services will be offered to customers who are willing to pay for such higher service quality levels.
- 3.2.7 Equipment used in the energy supply chain will be standardised to ensure compatibility, ease of integration and safety of energy supply.
- 3.2.8 Considering the superior reliability, increased safety and lower interference with tree cover, electricity distribution networks will be gradually placed underground in urban areas and converted to insulated aerial bundled conductors (ABC) in other areas.
- 3.2.9 Pipeline transport and vehicle-based transport will be promoted in downstream gas and oil supply sector to improve access by industries and households to feed appropriate distribution networks at the user end.
- 3.2.10 Smart grid technologies will be introduced, and smart metering will be deployed for enhanced customer experience, and to automate power system management, reducing manual intervention where such interventions are uneconomical.
- 3.2.11 Mobile and internet-based services will be introduced to enhance customer convenience.

3.3 Providing Energy Services at the Optimum Cost to the National Economy

Energy Service will be provided at the optimum long-term cost, to lower the burden on the national economy and to achieve competitiveness of locally produced goods and services in international markets by employing the strategies

- 3.3.1 Power plants identified in the Long-Term Generation Expansion Plan will be implemented as scheduled.
- 3.3.2 Receiving, processing, storage, transport and distribution capacity requirements of the petroleum sector will be identified in long term planning and will be developed in time to ensure adequate supply of petroleum products.
- 3.3.3 Rational energy pricing strategies, based on the principles of cost reflectivity across the energy value chain will be adopted through existing and new regulatory mechanisms, to ensure financial health of sector utilities and to discourage wasteful energy use.

- 3.3.4 The government will identify and provide transparently funded subsidies to target groups of energy users in household, industrial and commercial sectors, that deserve special consideration owing to their economic standing and contribution to national economic development priorities.

3.4 Improving Energy Efficiency and Conservation

Energy systems will be effectively managed to ensure efficient use and conservation of energy. Efficient use of energy by all concerned, from utilities to final customers will be pursued employing the strategies:

- 3.4.1 The national energy efficiency improvement and conservation programme will be further strengthened engaging all stakeholders in household, industrial and commercial sectors.
- 3.4.2 Energy efficiency improvement and conservation will be promoted through minimum energy performance standards and labelling of appliances, and by introducing green procurement processes in state and private sector organisations.
- 3.4.3 A home productivity improvement programme, with energy efficiency and conservation as the central theme will be launched to empower women.
- 3.4.4 Taxation and other incentives and disincentives to support the market for efficient technologies will be introduced.
- 3.4.5 Expert energy advisory services will be offered through state and private sector service providers to promote energy efficiency, conservation and energy cost reduction across all end use sectors.
- 3.4.6 Water resources will be recognized as a valuable indigenous energy resource. Efficient use of water by competing users at places where there is a high opportunity cost to water will be enhanced.
- 3.4.7 Conversion efficiency of power generation facilities will be enhanced.
- 3.4.8 A strategic plan for street lighting will be formulated to ensure proper management of street lighting that will enhance the safety of road users, and to contribute to energy conservation with a better aesthetic sense.
- 3.4.9 Automated demand response technologies will be considered as a main demand-side management strategy.
- 3.4.10 Losses in energy delivery networks will be reduced to optimum levels.
- 3.4.11 Losses incurred in petroleum refining will be reduced by continuous technology infusion with new investments.
- 3.4.12 Transport fuel use in petroleum distribution will be reduced by utilising regional storage facilities connected with the rail-based supply network.
- 3.4.13 Virtual offices and video/teleconferencing will be promoted by making necessary changes to organisational working culture as a strategy to minimize physical movement.
- 3.4.14 Transport energy use will be reduced by undertaking 'avoid, shift and improve' strategies with a strong focus on high quality public transport and intelligent traffic management solutions.
- 3.4.15 Economic activities will be developed in dense clusters to benefit from lower logistic costs and improved synergies in special zones identified as smart cities, served by smart grids.

- 3.4.16 Sustainable neighbourhoods will be used as a key design element in urban development with the objective of reducing energy demand.
- 3.4.17 Energy efficiency will be a primary concern in retrofits, and new building designs will be evaluated for their energy performance on a mandatory basis.
- 3.4.18 Smart technologies, including smart buildings and complete conversion to smart metering will be ensured to convey price signals to customers, altering the demand profile to reduce the overall cost of supply.
- 3.4.19 Fuel efficiency of vehicles would be a key consideration in deciding applicable taxes on vehicles to encourage a higher efficiency vehicle fleet.

3.5 Enhancing Self Reliance

Indigenous energy resources will be developed to optimum levels to minimise dependence on imported resources, subject to resolving technical, economic, environmental and social constraints, with the objective of minimising the vulnerability of energy supplies to external situations and to attain a higher degree of resilience in the energy sector, employing the strategies:

- 3.5.1 Oil and natural gas resources of the country will be explored. Commercial scale exploitation will be strategically phased, giving due consideration to higher future value and possible use in the future as a locally available fuel source to derive cleaner futuristic energy sources such as hydrogen.
- 3.5.2 Indigenous mineral resources such as Thorianite and other similar nuclear fuels with commercial resource potential will be explored, assessed and kept ready for development at the appropriate time when conversion technologies are available.
- 3.5.3 Renewable energy resources will be exploited based on a priority order arrived at, considering economics, technology and quality of each resource.
- 3.5.4 Availability of biomass will be enhanced by establishing dedicated energy plantations or plantations with residue as a potential fuel, in prescribed biomass energy development areas. Commercial availability of biomass and biomass-based fuel products will be encouraged for utilisation in industrial thermal applications and household use. Processed biomass as a fuel source will be facilitated through efficient collection of existing resources, processing, value addition, storage and distribution, and nurturing biomass supply chains.
- 3.5.5 Improved biomass conversion devices such as cook stoves that are free from the general inconvenience associated with traditional biomass-based cooking and offer an experience similar to commercial fuel-based cooking devices, will be introduced and promoted for household use. This strategy will help to retain the share of biomass as a fuel used for cooking applications and to discourage migration to petroleum fuels owing to convenience.
- 3.5.6 Gradual diversification of transport energy in both rail and road transport from present oil dominance to electricity will be encouraged to increase overall conversion efficiency and to relieve the dependence on liquid petroleum fuels as the sole transport fuel. Further, appropriate time of use tariffs will be offered to attract additional demand from electric vehicle charging to periods of lower demand, and additional demand so added will be strategically used to enhance the integration of indigenous sources such as solar and wind.

3.5.7 A sizable fund will be channelled to the Sri Lanka Sustainable Energy Fund operated by the SEA by evoking provisions in the SEA Act for charging a cess on fossil fuel imports and a resource royalty from renewable resources. Purposes of Sri Lanka Sustainable Energy Fund will be broadened to meet the requirements of sustainable energy, electricity and petroleum sectors.

3.5.8 Contribution of the rubber plantation industry as the major fuel wood supplier for thermal applications will be duly recognised and suitable incentives will be provided to enhance the expanse of rubber plantations.

3.6 Caring for the Environment

Natural environment of the country will be preserved, and a meaningful contribution will be made to address climate change, by adopting appropriate low emission processes and mitigation measures employing the strategies:

3.6.1 Environmental impacts of energy facilities will be minimised and mitigated using counter balancing interventions such as carbon sequestration plantations. Existing hydropower catchments and land earmarked for future energy infrastructure too will be considered as potential land for such plantations.

3.6.2 Impacts to the environment in the context of climate change due to the construction and operation of energy sector facilities will be minimised.

3.6.3 Energy supply from cleaner sources and technologies will be encouraged to minimise harm to the local and global environment, while taking into consideration both the impacts on the national economy and the long-term environmental benefits.

3.6.4 Indigenous petroleum and nuclear energy resources will be developed to the optimum level with sufficient environmental safeguards, by encouraging market demand for such resources.

3.6.5 National level plans will be implemented to utilise by-products from power generation with a commercial value, such as fly ash and waste heat.

3.6.6 Nationally Determined Contributions (NDCs) to global emission reduction goals will be made to meet the national emission reduction obligations as agreed.

3.6.7 Social and environmental externalities in the local context pertaining to the energy sector will be studied and factored into decision making.

3.6.8 Opportunities available under carbon trading mechanisms will be exploited and a proper mechanism will be implemented to make use of the potential.

3.6.9 Waste to energy projects will be favourably considered owing to the positive contributions such projects make to dispose municipal solid waste, and any cost above the avoided cost of electricity will be paid by the government/local authorities directly to the developer so as not to burden energy utilities.

3.6.10 Necessary Health, Safety and Environmental (HSE) standards will be introduced and relevant regulations enforced, making it an offence for a person to operate any energy related infrastructure without complying with the prescribed HSE standards.

3.7 Enhancing the Share of Renewable Energy

Energy supply from renewable energy resources in the country's energy mix will be increased to reduce pressure on foreign exchange, as a means of engaging the local community in the energy industry, attain sustainability and to promote the use of environmentally friendly energy sources employing the strategies:

- 3.7.1 Long delays encountered in renewable energy development will be reduced through a centrally coordinated project approval process.
- 3.7.2 Renewable energy investments for electricity generation will be realised through a competitive scheme to reduce the costs and to facilitate wider investor participation.
- 3.7.3 Transmission infrastructure will be strengthened to improve the absorption of electricity generation from renewable sources.
- 3.7.4 Distribution infrastructure will be upgraded with smart grid technologies to facilitate renewable energy-based distributed generation.
- 3.7.5 Research will be conducted to overcome adverse impacts of renewable energy absorption to the power system from intermittent sources such as wind and solar energy.
- 3.7.6 Effective forecasting technologies for wind, solar and rainfall will be introduced so that optimum use of renewable resources could be realised.
- 3.7.7 Energy storage solutions will be encouraged for firming intermittent renewable sources, voltage and frequency regulation, local grid support, peak shaving and improving grid resilience.
- 3.7.8 Innovative financing schemes and financial instruments involving both public and private enterprises will be introduced to encourage renewable energy development.

3.8 Strengthening Good Governance in the Energy Sector

Good governance in all aspects of the energy sector shall be the guiding principle, and good governance in the energy sector will be strengthened to realise accountability, fairness and transparency to achieve investor and consumer confidence. A stable policy environment and regulatory frameworks will be established and further strengthened to assure good governance in the energy sector, employing the strategies:

- 3.8.1 All sub sectors in the energy industry will be brought under respective regulatory framework.
- 3.8.2 Procurement of plant, equipment, crude oil and other fuels, as well as power purchase agreements and similar concessions, will be made through a streamlined competitive bidding scheme ensuring transparency, accountability and avoiding long term delays.
- 3.8.3 Capability of the energy sector professionals to meet challenges in the emerging competitive environment will be enhanced by facilitating exchange programmes between similar entities in foreign countries and cross posting within Sri Lankan sector entities.
- 3.8.4 Digitalisation of the energy sector entities using an enterprise resource planning platform will be taken as a priority, spanning the whole length of the value chain from smart meters, addressable appliances and smart grids that allows further adoption of new technologies such as artificial intelligence (AI), internet of things (IoT) and distributed ledgers to drive efficiency, transparency and optimisation of asset utilisation.

- 3.8.5 A guideline on management of digital information to ensure security of digital information, covering the aspects of storing, use and management will be introduced.
- 3.8.6 Digitalisation of utility transactions will be used to secure and store data in cloud based central databases and the data, information and knowledge thus assimilated in the energy sector will be indexed, catalogued and securely stored for future use and will be treated as knowledge assets.
- 3.8.7 A conducive environment shall be created for independent decision making in a transparent and accountable manner, supported by the analyses performed using real time insights produced by digitalisation.
- 3.8.8 Energy sector transactions will be reported by relevant entities to the SEA on a fixed annual schedule, through a working group of officials from key sector institutions to ensure timely publication of the Sri Lanka Energy Balance.
- 3.8.9 Indices which can assist the understanding of energy sector trends will be identified and included in national statistics to help evidence-based decision making.
- 3.8.10 Active engagement of citizens in the energy sector will be promoted using web portals linked to applications for mobile phones, leading to awareness creation, grievance handling and education, targeting the closure of trust deficit, greater acceptance of energy sector projects, user safety and improved end-user behaviour of energy services.

3.9 Securing Land for Future Energy Infrastructure

Considering limitation to land with specific attributes that are required to develop certain technologies and considering the extensive financial losses incurred in the past owing to shifting of sites to locate power plants, strategic locations to establish future energy infrastructure will be earmarked and secured in advance to ensure timely implementation of such facilities and to minimise adverse social impacts, employing the strategies:

- 3.9.1 Suitable sites to locate future energy infrastructure such as coal, natural gas and nuclear power plants, refineries and terminals will be strategically earmarked in advance following preliminary feasibility studies, so that the public can avoid using such sites, resulting in minimal relocation and social impacts at the time of actual development.
- 3.9.2 Best sites to locate large scale renewable energy infrastructure such as wind and solar farms would be identified in advance and marked on a master plan so that they can be developed as large concentrated facilities in phases.
- 3.9.3 Corridors for petroleum and gas pipe transport and for backbone electricity transmission would be identified, giving priority to shared corridors for the benefit of national infrastructure planning. Identified routes would be published for the purpose of giving advance information to the public.
- 3.9.4 Available corridors will be used to lay multiple pipelines and power transmission lines wherever possible.
- 3.9.5 All existing and future underground utility infrastructure including electricity, water, communication, town gas and petroleum would be made available in a common mandatory geographic information system (GIS) to facilitate optimal location of future underground cable routes and pipe transport traces.

- 3.9.6 Roadside utility infrastructure corridors including electricity distribution, sewer, water, communication and gas supply shall be coordinated with transport infrastructure, in such a manner that clear demarcation of ownership, flexibility of maintenance, and room for expansion would be ensured.

3.10 Providing Opportunities for Innovation and Entrepreneurship

Considering the limitation to the scale of markets available in Sri Lanka to breed technology intensive local businesses, the relative vastness of the energy sector will be utilised to nurture local entrepreneurship and innovation by actively engaging the strategies:

- 3.10.1 Electricity will be recognised as the dominant energy carrier of the future, and strategic ventures to utilise local resources in energy conversion and storage equipment will be nurtured as an industrialisation thrust.
- 3.10.2 Development of novel information and communications technology (ICT) applications such as for power system automation, remote control, distributed real time event and data acquisition systems, and smart metering will be encouraged.
- 3.10.3 Sri Lankan enterprises will be encouraged to engage in energy sector infrastructure development.
- 3.10.4 Research and development on introducing, adopting and implementing new and emerging renewable fuel sources, efficient energy conversion and end use technologies will be promoted.
- 3.10.5 Innovation will be facilitated by providing protection to intellectual property, safeguarding the same until commercialisation and by nurturing nascent technologies through financial incentives and tax benefits.
- 3.10.6 Indigenous knowledge and capacities required for energy sector development will be realised.
- 3.10.7 Potential offered by vehicle energy storage systems (ESS) will be studied considering ESS as a local standby energy storage device, deploying those as an automated demand response (ADR) option and a load profile management too.
- 3.10.8 Small scale on-grid distributed and off-grid stand-alone applications using renewable energy with local value addition will be encouraged as an economic development thrust.

4. Results Delivery Framework

This chapter describes the targets and likely timeframes associated with expected policy intents and the assignment of responsibilities of realisation of policy intents. They are to be reviewed in two-year intervals and re-stated for the period ahead.

4.1 Assuring Energy Security

Responsibility

To execute strategies identified to realise energy security, the following targets and milestones will be met by the institutions to which responsibilities are assigned.

- | | |
|---|----------|
| 1a Feasibility of cross border electricity transfer with countries in the region will be studied and documented by end 2021. | MoPE |
| 1b Feasibility of the Sapugaskanda oil refinery expansion project will be evaluated by end-2020 undertaking a study to determine the optimum capacity, and a preliminary investigation on establishing a second refinery will be undertaken by mid-2021 by the Ceylon Petroleum Corporation. | CPC |
| 1c Every player in the petroleum subsector and all grid connected thermal power plants shall jointly maintain a strategic fuel reserve equivalent to a minimum 30 days' consumption at any given time. The Petroleum Corporation and the CEB shall be jointly responsible to agree on targets for local storage capacity to be developed and maintained by either party. All future power plant specifications must contain appropriate storage capacities to be maintained locally. | CPC/CEB |
| 1d A high-level standing committee to be titled as 'Energy Sector Risk Assessment Panel' to be established with sufficient representation from key sectors by end-2019 to assess possible internal and external contingencies that could critically affect the performance of the energy sector. Members of this committee must also include co-opted specialists on the subject of risk assessment and be given the required training on how to identify such risks. This panel must meet periodically and identify such contingencies based on probability-impact analysis and advise sector agencies to prepare plans to mitigate impacts of the same. Secretary of the Ministry in charge of the subject of electricity shall be responsible to appoint and convene this panel. | MoPE |
| 1e An inventory of indigenous energy resources, both renewable and non-renewable, will be developed and published by SEA and PRDS by end-2020. Air borne gravity/magnetic data will be acquired and processed by end 2019 and 2D/3D seismic data in selected locations in Mannar and Cauvery Basins will be completed by 2022. | SEA/PRDS |

4.2 Providing Access to Energy Services

Responsibility

To ensure access to reliable, convenient, affordable, equitable and quality energy services to all citizens to enhance their living standards and to engage in gainful economic activities, the following targets and milestones will be met by institutions to which responsibilities are assigned;

- | | |
|---|----------|
| 2a To encourage prospective small and medium scale industries and businesses, the initial cost of obtaining an electricity connection, which may be considerable at present compared with the capital cost of the business, will be reduced by offering a special concessionary package under which the entire cost of the transformer for contract demands up to 100kVA will be waived-off and be socialised through | CEB/LECO |
|---|----------|

	distribution tariffs. This should be fully implemented from January-2021 by CEB/LECO, accompanied with an appropriate campaign giving wide publicity through media.
CEB/LECO	2b The initial cost in providing a new connection to recover infrastructure cost by electricity distribution utilities will be completely phased out by end-2022, to all categories of customers. Such costs will be socialised through distribution tariffs, aiming at improving the country's rank below 50, in 'ease of doing business' index.
CEB/LECO	2c Optional 'same day' service connections to households and other retail customers to be provided on the payment of a premium fee for any prospective customer by mid-2020. Similarly, a portfolio of other cost recovery services shall be offered at a premium for customers who are in need for expeditious service delivery. Timeline for regular service will be subject to codes on commercial quality specified by PUCSL.
SEA	2d Commercial supply of biomass and biomass-based fuel products will be doubled to reach one million tonne per year for using industrial thermal applications and households through the establishment of 20,000 hectares of biomass plantations within the period 2020-2023 as an initiative of SEA. Government land, soft financing and other fiscal incentives will be offered to businesses that provide fuel wood including dedicated energy plantations and other commercial plantations.
SEA	2e To encourage improved, convenient, commercial biomass fuel products and conversion technologies for household use, SEA shall ensure that fiscal incentives are provided to entrepreneurs who are engaged in the manufacture and distribution of equipment using such technologies (e.g. improved cook stoves and mini-gasifiers) by end-2020. SEA shall ensure a minimum 5% penetration of improved stoves using commercialised biomass fuels by 2021.
PUCSL	2f Supply quality standards of fuels supplied by petroleum utilities will be determined and enforced on a voluntary basis by mid-2020 and on mandatory basis by end 2021 by PUCSL, and quality test reports will be published.
PUCSL	2g Supply and service quality standards of energy services by the utilities will be determined and enforced on voluntary basis by end 2020 and on mandatory basis from end 2021 by PUCSL.
CEB/LECO	2h All new low voltage distribution networks will use all-insulated ABC with immediate effect. Low voltage overhead electricity distribution networks outside urban areas will be completely converted to all-insulated ABC by 2025. Distribution networks in urban areas will be converted to an underground network by 2030.
CEB/LECO	2i A technical audit covering the whole value chain of the utilities will be carried out. Specifications, status and standards of key equipment will be recorded, and a standardisation programme will be launched within 2020 by the CEB and the LECO.
CPC/PRDS	2j Feasibility of extending and introducing new pipeline transport facilities for both liquid and gaseous fuels to serve dense clusters of industrial and residential users will be studied by 2021.
CEB/LECO	2k Five pilot projects, covering the five distribution licensees will be launched by the CEB and the LECO within 2020 to identify smart grid and smart metering technologies which can deliver value to the country.

21	Smart meters and pre-paid meters shall be offered on-demand to any customer by mid-2020.	CEB/LECO
2m	At least 50% of all standard services offered by the CEB and the LECO to be made optionally available through mobile and internet platforms too, including payments and tracking of progress, by mid-2020 so that customers are not required to visit utility offices to initiate such services. By end-2021, all standard services to be offered optionally via mobile and internet.	CEB/LECO
4.3 Providing Energy Supply Services at the Optimum Cost to the National Economy		Responsibility
To ensure that energy services are provided at the optimum long-term cost to lower the burden on the national economy, the following targets and milestones will have to be met by the institutions to which responsibilities are assigned;		
3a	A transparent pricing methodology for electricity and fossil fuel products will be developed and implemented by mid-2020 by the CEB, the CPC and other sector players through a regulatory mechanism established by the PUCSL.	CEB/CPC/ PUCSL
3b	The life-line electricity tariff will be limited only to low-user household customers using less than 30kWh per month. A study will be conducted by MoPE in 2020 to decide other target groups of energy users that deserve special consideration, the subsidy amount and the source of funds.	MoPE
3c	A short-term and medium-term planning mechanism, and a continuous planning procedure will be established for the petroleum sector, including both liquid and gaseous fuels by end 2019. First plan to be issued in 2020.	MoPRD
4.4 Improving Energy Efficiency and Conservation		Responsibility
Energy systems will be efficiently managed and operated while ensuring efficient utilisation and conservation of energy. The following targets and milestones will have to be met by the institutions to which responsibilities are assigned.		
4a	Specific energy use in end-user activities will be reduced by 10% of 2015 level by 2023 as part of the national energy efficiency improvement and conservation programme, saving 1,243GWh of grid electricity generation by 2023.	SEA
4b	Minimum energy performance standards for LEDs and energy labelling for air-conditioners, personal computers, refrigerators, ceiling fans, linear fluorescent lamps/ballasts and induction motors will be enforced by mid-2020.	SEA
4c	Penetration of efficient, low smoke, low soot biomass cook stoves will be increased to 10% of households by 2022. Processed, commercialized biomass-based fuels used in such stoves will be made widely available across the retail market by creating an enabling environment.	SEA
4d	'Energy Manager' scheme will be implemented on a mandatory basis by end 2019 to designated users and extended to the remaining institutional users by 2020.	SEA
4e	Reduced duty and taxation of efficient equipment supported by an accelerated depreciation scheme will be offered to building renovation and retrofitting industry to improve the energy efficiency of the existing building stock by 2020.	SEA

SEA	4f A differential taxation scheme for commercial buildings will be introduced, based on a simplified energy utilisation index by end 2020. A similar scheme to support the market for efficient technologies will be introduced by end-2020, through a green procurement process led by the state sector.
CEB	4g Power generation facilities will be subjected to a thorough energy audit to evaluate generator efficiencies and efficiency of auxiliary systems, and a sector-wide efficiency improvement programme will be launched in 2020.
MoPE	4h A lighting standard for street lighting, to cater to rural, urban and major road illumination including other public space lighting requirements will be introduced and implemented on a mandatory basis within 2020.
LECO	4i A pilot scale automated demand response project will be implemented by mid-2021, and the techno-economic viability of the intervention will be documented for scaling up as appropriate.
CEB/LECO	4j Overall system losses in the electricity grid will be reduced to 7.5% of net generation by 2020.
CEB/LECO	4k Reactive power management will be further intensified by introducing a scheme to discourage demand for reactive energy by end users through an appropriate volume-based fee.
MoT&CA	4l Modal share of mass transport will be enhanced by a margin of 10% compared to the 2016 share by 2023 by adopting avoid, shift and improve strategies and intelligent multimodal transport management solutions for major cities in the country, by Ministry of Transport and Civil Aviation.
MoPA&M	4m At least 30% of all government institutional head offices and regional head offices to have teleconferencing facilities to hold tele-meetings by 2021. All main government offices must have teleconferencing facilities by 2020. The participation of officers, who require more than one hour of travel time to participate at meetings must be discouraged from attending physically and be connected <i>via</i> teleconferencing facilities established at all ministries from end 2019.
MoPE	4n All routine services offered at government agencies that do not require physical presence must be made available <i>via</i> internet or mobile phone to minimize transport energy use from 2020.
SEA	4o A performance-based energy efficiency building code for commercial buildings will be made mandatory by end 2019 and a voluntary scheme for domestic sector will be introduced by end 2019.
MoM&WD and UDA	4p Incorporation of building management systems with a focus on energy management and future opportunities in smart grid driven automated demand response will be made a mandatory planning criterion for all commercial developments by 2020 by the UDA.

4.5 Enhancing Self Reliance

Responsibility

Indigenous energy resources will be developed to the optimum levels to minimise dependence on imported resources and to attain a higher degree of resilience in the energy sector. The following targets and milestones will have to be met by the institutions to which responsibilities are assigned.

- 5a Feasibility studies on the use of natural gas/renewable energy-based hydrogen and GTL in transport and other sectors will be carried out by 2022. SEA/PRDS
- 5b Renewable energy resources will be exploited based on a priority order arrived at, considering economics, technology and quality of resource. Wind is identified as the second most promising renewable energy resource after hydropower and highest priority is given to develop wind to realize a minimum 20% share of electricity generated from renewable energy sources excluding major hydro, by 2022 by the SEA in association with relevant public and private sector players. SEA
- 5c At least 10,000 hectare of unproductive land will be prescribed as biomass energy development areas, and leased to developers by the SEA starting from 2020 over a period of 5 years to develop as commercial timber cum fuel wood plantations. SEA
- 5d Biomass supply chains in five regions will be supported through improved collection of biomass residue, mixed cropping and certification of sustainable extraction for a three-year duration until they reach commercialisation through a pilot project by 2020 by the SEA. SEA
- 5e The most widely used suburban rail corridors between Colombo and the Airport, Avissawella, Negombo, Panadura and Veyangoda will be upgraded and electrified by mid-2023, and other viable railways in provincial city suburbs will be upgraded and electrified by 2025. MoT&CA
- 5f At least 20% of all new light vehicle registrations shall be electric vehicles in 2022. At least 25 new public electric vehicle charging stations with DC rapid charging capability will be established at strategic locations by the CEB/LECO by 2020. SEA will encourage the private sector to set up their own charging stations to complement the CEB/LECO efforts, by securing fiscal incentives to the industry. CEB/LECO/SEA

4.6 Caring for the Environment

Responsibility

A meaningful contribution to climate change will be made by maintaining the low carbon intensity of Sri Lankan energy sector. Adverse environmental and social impacts of energy services will be minimized to care for the global and local environment by achieving the following targets and milestones by the institutions to which responsibilities are assigned;

- 6a The CEB is to reduce incremental carbon footprint of electricity due to future coal power plant additions by reducing GHG emission levels using carbon sequestration plantations. A feasibility study will be done by the CEB in 2020, outlining possible sequestration plantation options, land availability and financial analysis. CEB

MoMD&E	6b Stack emissions of energy sector facilities will be constantly monitored and reported in the public domain by 2020, to manage and reduce emission burden from the energy sector.
CPC/LIOC	6c A closed loop storage and distribution system will be established gradually by the CPC starting from 2020 for lighter fuels with high potential for vaporisation.
MoPE/ MoPRD	6d HSE standards for all energy sector utilities will be introduced by 2020 and fully implemented by 2022.

Responsibility

4.7 Enhancing the Share of Renewable Energy

Renewable energy resources in the country's energy mix will be increased, meeting the targets and milestones;

MoPE	7a An advisory committee comprising ministry officials in-charge of different line agencies/custodians of land resources will be appointed to coordinate the approval of renewable energy projects and acquisition of land resources for such projects by end 2019.
CEB	7b After careful analysis of the network constraints, dispatch options and resource characteristics, a comprehensive renewable energy grid integration plan will be published by the CEB from 2020 and periodically updated.
SEA/CEB	7c A fully-fledged competitive bidding scheme for renewable energy investments will be implemented through a resource development programme to realise a pipeline of 'ready to invest' projects by mid-2020 by the SEA, realising 20% of generation with a cumulative renewable energy generation capacity of 1,600 MW by 2023.
SEA/CEB	7d Applications received by the SEA when feed-in tariffs were on offer, but held up due to the termination of feed-in tariffs, which are at various stages of the approval process will be channeled to a competitive bidding model by using suitable interim approaches such as offering project proponents preferential treatments when they were opened up for competition considering the maturity of a project, investments made, <i>etc.</i> A list of such alternate options will be jointly developed by the CEB and the SEA by mid 2020 for different technologies, considering their inherent attributes so that all such projects in abeyance could be expeditiously developed within a competitive bidding framework by end 2023.
CEB/SEA	7e Advanced forecasting systems for hydro, solar and wind energy will be established by the CEB along with other relevant line agencies by end-2020.

- 7f A premium green tariff/green energy certification package will be offered to all interested electricity customer segments as an optional tariff and a portion of incremental proceeds will be used for renewable energy development by crediting to the Sri Lanka Sustainable Energy Fund. CEB/LECO

4.8 Strengthening Good Governance in the Energy Sector

Responsibility

A stable policy environment will be established and regulatory frameworks will be further strengthened to assure good governance in the energy sector by achieving the following targets and milestones by the institutions to which responsibilities are assigned.

- 8a Ministry in charge of the function of petroleum resource development shall ensure that necessary legislation for upstream petroleum development are enacted by mid-2020, including necessary legislation to establish an upstream petroleum development regulatory mechanism. MoPRD
- 8b Establish a regulatory framework and empower an independent regulatory institution by enacting the necessary legislation to regulate downstream petroleum industry, by end-2020. MoPRD
- 8c Functional units of CEB to adopt independent financial reporting from financial year 2019, in accordance with the Electricity Act 2009. MoPE
- 8d Digitalisation of the electricity utility sector will be launched by 2020, and completed through a phased approach by 2022, covering the whole value chain from the optimal operation of core assets to managing customer relationships. CEB/LECO
- 8e A data governance policy for ensuring the proper management of digital information of energy sector utilities will be introduced to ensure security, data quality and privacy by mid-2020. MoPE/
MoPRD
- 8f Reporting of energy sector transactions by key sector entities will be regularised by appointing a working group under the leadership of the SEA by end 2019, and the Sri Lanka Energy Balance for each year will be published by the SEA within the first six months after the end of each calendar year, commencing with that of year 2019. MoPE
- 8g All energy sector projects and investment opportunities will be identified and documented in self-standing project concept formats from 2020 by each agency for easy take-up by investors and development partners on a competitive basis. MoPRD/
MoPE
- 8h Key Performance Indicators (KPIs) aligned with economic goals will be introduced for energy utilities by end-2019, monitored and published by the respective Ministries from 2020. MoPE
MoPRD
- 8i Establish clear guidelines to implement public-private partnership in developing energy infrastructure, by mid-2020. MoPE
MoPRD
- 8j Study and report the potential benefits and pre-requisites, and an action plan to establish a wholesale market for electricity and to allow power wheeling in the transmission and distribution network, by end-2020. MoPE

SEA 8k An application will be developed for mobile phone access by 2020, to engage the end users to increase awareness on best energy options, record grievances, price trends and energy efficiency improvement by extending the online energy database already operated by the SEA

Responsibility 4.9 Securing Land for Future Energy Infrastructure

Strategic locations to establish future energy infrastructure will be earmarked and secured in advance to ensure timely implementation of such facilities and to minimise adverse social impacts by achieving the following targets and milestones by the institutions to which responsibilities are assigned.

MoPE 9a A strategic facilities layout map, identifying suitable sites to locate future energy infrastructure such as coal, natural gas and nuclear plants, refineries and terminals will be prepared by 2020 in consultation with the National Physical Planning Department by a joint committee appointed for the purpose.

SEA 9b A master plan identifying the best sites to locate large scale renewable infrastructure such as wind and solar farms would be formulated and published by end 2019 with a development time horizon 2020-2025.

CEB/CPC 9c Petroleum, gas pipe transport and backbone electricity transmission line corridors that are to be developed during 2020 - 2030 will be identified and published as a map by a joint committee by 2020.

CEB 9d Based on already available GIS elements, a national GIS database depicting existing and future underground utility infrastructure including electrical, water, communication and petroleum will be established by 2020 by the CEB.

MoPE 9e An inter-agency utility corridor coordination authority to resolve conflicts will be established by 2020.

Responsibility 4.10 Providing Opportunities for Innovation and Entrepreneurship

Considering the vastness of the sector, opportunities available for research and development, and local value addition in the energy sector which can improve sector productivity will be actively pursued to engage the Sri Lankan innovators and entrepreneurs.

MoPE 10a A 25% local preference will be granted to Sri Lankan enterprises and joint ventures led by such enterprises to encourage such enterprises to engage in energy sector infrastructure development, from 2019.

SEA 10b A coordinated research and development network involving all research and development organisations will be established by the SEA, assembling both industry and academia in a grand

alliance by mid-2020, and ten pilot projects on home grown renewable energy conversion technologies and ten energy efficiency improvement technologies will be introduced by the SEA by mid-2021, protecting intellectual properties amassed until commercialisation.

- | | | |
|-----|---|----------|
| 10c | Smart grid pilot projects will be deployed in five identified locations to demonstrate the possibilities of better management of generation, transmission and distribution assets, to allow new and present customers to use electricity in the most efficient manner and to allow large scale/deep penetrated deployment of dispersed renewable energy generators using advanced ICT in measurement, control and management of electrical grids by end 2020 by the CEB/LECO. | CEB/LECO |
| 10d | An automated demand response pilot project will be implemented, and impacts documented to allow economic evaluation of the same as a future generation option by end 2021, by the CEB/LECO. | CEB/LECO |
| 10e | Digitised data accumulated from the advent of digital technologies in utility operations will be retained, processed and used as a knowledge asset. | CEB/LECO |
| 10f | Indigenous knowledge and capacities required for energy sector development will be nurtured by introducing a contribution-based reward scheme to encourage individual efforts by sector professionals and pooling of knowledge resources across the energy sector by 2020. | SEA |

GLOSSARY

advisory committee

a statutory committee comprising of experts on a particular subject area appointed to provide advice to the board of management of the Sri Lanka Sustainable Energy Authority

automated demand response

automatic control systems that respond to supply conditions or contingencies and act to alter the customer demand to reduce overall cost of supply

building management systems

a control system in a building that manages the energy converting equipment with an objective of improved energy efficiency and demand management

carbon neutrality

condition of balancing the carbon emissions released to the atmosphere by human activities and absorbed from the atmosphere

carbon sequestration

natural process by which atmospheric carbon dioxide is absorbed by plants through photosynthesis and held in a solid form for long durations

demand side management

managing the demand for electricity in electricity systems by interventions in the end user facilities

dispatch

system operators or 'dispatchers' control the output of grid connected generating units to meet system demand. This process of controlling is called generator dispatch. If controlling is by way of an instruction, it is termed a 'dispatch instruction'

dispatchable

dispatchable generation refers to sources of electricity that can be started/stopped and the power output adjusted as and when requested by system operators

distribution infrastructure

electricity network operating under 33kV connecting customer loads to the national grid

downstream

segment of the petroleum fuel supply chain which distribute refined products to customers

electrification

providing access to electricity distribution lines. Sri Lanka provided access to all potential customers, of which about 99.5% have an active electricity connection

energy carrier

A substance or phenomenon that contain energy in different forms which can be converted into a usable energy form to deliver an energy service when required or stored for later use

energy crises

shortage of supply or conversion capacity, quantities or finances to serve the customer demand for energy

energy intensity of economy

quantity of energy required to produce one unit of value addition to the economy

energy services

functions performed using any form of energy which are means to obtain or facilitate the delivery of work, a desired service or a state

energy transition

the trend of lessening dependence on finite energy resources and making efforts to increase the use of renewable energy

firm (power generating) capacity

Power generation capacity that can be guaranteed to be available for dispatch by system operators. Sources such as mini hydro, solar PV and wind do not fall under this definition as their capacity is determined by the availability of the respective resource at the time. 'Run of the river' hydropower plants having sufficient storage at their regulating head ponds to operate for at least a few hours are considered as firm capacity as the system operators can plan the times they are to be dispatched.

fly ash

lighter ash from a combustion process, typically trapped by an emission control system

fossil fuels

energy resources that do not undergo cyclic replenishment within a human time scale

green energy certification

certification of buildings or energy converting systems that meet certain specified standards of efficiency or contributions to pre-defined sustainability indices

green procurement processes

procurement processes in which credit is given to the degree of contribution to sustainable conversion and use of energy and other resources

green tariff

a pricing structure for electricity that includes a premium to meet incremental costs of using emerging technologies that have lower irreversible impacts on society and the environment than others

hydropower catchments

surface of earth which receives rainwater and feed the water into a reservoir or a river, to feed one or several hydropower plants

Indigenous energy

renewable and non-renewable energy resources that are found within the territory or the exclusive economic zone of Sri Lanka

installed power generation capacity

rated capacity of output of a power plant

intermittence

inherent nature of variation of the supply of energy sources with time

liquefied natural gas

liquefied form of natural gas, typically stored in insulated vessels cooled down to minus (-) 160 degrees Celsius

load profile

the pattern of using electricity, by a customer or a region or a country

local preference

a percentage limit up to by which a priced bid from a local bidder is accepted, in preference to a bid from an international bidder

low carbon intensity

low use of fossil fuels to supply an energy service

low voltage

400 volt three-phase or 230 volt single-phase

Long Term Generation Expansion Plan

a long-term plan showing details of the power plants to be made available for future use, compiled and published by the Ceylon Electricity Board

natural gas

gas produced from oil fields or gas fields, contains mostly methane

system (network) losses

energy losses incurred in the supply of electricity in transmission and distribution through the national electricity grid

off-grid

users and electricity generating systems serving such users without being connected to the national electricity grid

on-grid

electricity generating systems or users connected to the national electricity grid

power pool operation

a system in which generators pledge capacity available for a period ahead, to which buyers (typically distribution companies or customers) bid to purchase electricity

primary energy

energy as it occurs in its natural form, includes both renewable and non-renewable forms

proven generation technologies

electricity generation technologies that have been developed to a level of wide commercial use

renewable energy

energy resources that undergo cyclic replenishment within a human time scale

secondary energy

energy available in a form different to its origin as a result of some energy conversion process

smart grid

a group of technologies deployed to increase responsiveness of power grids to better manage its generation, transmission and distribution assets, to allow new and present customers to use electricity in the most efficient manner and to allow large scale / deep penetrated deployment of dispersed NRE generators using advanced ICT in measurement, control and management of electrical grids to reduce overall cost of electricity and environmental burden of electricity systems on the long run by differing investments and reducing operational costs

social and environmental externalities

social and environmental impacts and costs resulting from any economic or commercial activity

social market economy

a socioeconomic model combining a free market capitalist economic system alongside social policies that establish both fair competition within the market and special treatment to vulnerable sections of the society

socialized through distribution tariffs

costs not charged to individual customers but included in utility assets, for which cost are allowed to be averaged across all customers

Sri Lanka Energy Balance

annual compilation of energy sector statistics published by Sri Lanka Sustainable Energy Authority

strategic fuel reserves

quantities of fuel stored for later use, in anticipation of breakdown of regular supplies to a particular energy facility, location or region

sub sector

a segment within a sector which can be described based on certain common attributes

supply chain

entities, facilities, processes, information, and resources involved in delivering a product or service from a point of occurrence to an end user

Sustainable Development Goals

a universal call to action to achieve seventeen global goals to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by the United Nations general assembly in 2015

transmission infrastructure

electricity network operating above 33kV connecting generation facilities to the distribution grid

universal access

access to modern energy sources, usually means that an electricity distribution line is available within 100m of the potential customer premises

upper middle-income

The World bank defines an upper middle-income country to be where the gross national income is between USD3,896 to USD12,055 per person

upstream

segment of the petroleum fuel supply chain which involves exploration of resource sites, mining and delivery of extracted resources to refining facilities

variability

change of quantity of energy with time from a particular energy resource, attributed to a natural phenomenon

waste heat

thermal energy intentionally or inadvertently lost from a combustion process