

Environmental and Social Considerations in Detailed Planning Survey
(Technical Cooperation for Developing Planning)

DATE: 22 January 2016

1. Full title of the Project

The Project on Electricity Sector Master Plan Study in Democratic Socialist Republic of Sri Lanka

2. Type of the Project

Master Plan

3. Categorization and Its Reason

The Project formulates generation and transmission development plans in Sri Lanka. Although the Project also considers a distribution development plan, the plan is out of scope of this screening. This is because the distribution development plan consists of projects on the ground and its environmental and social considerations are implemented when each project of the distribution development plan has more tangible contents.

The Project is categorized as a “Category B” project because of the following reasons.

- The Project is not categorized as a large project in the power generation and transmission sector under the JICA Guidelines for Environmental and Social Considerations (2010);
- Regarding impacts to the natural environment, the Project does not select protected areas (e.g. national parks and their parts) as its project areas, and the Project pays special attentions to endangered species in the country.
- Regarding impacts to the social environment, the Project can take appropriate considerations in the plans, and the Project considers the control of the greenhouse gas emissions as much as possible; and,
- The Project neither has sensitive characteristics, nor selects sites which are within sensitive areas defined by the JICA Guidelines.

4. Agency or Institution Responsible for the Implementation of the Project

Ceylon Electricity Board

5. Outline of the Project

(1) Expected Goals which will be attained after the Project Completion

To develop a comprehensive master plan of 25 years for the generation and transmission

development for the whole country.

(2) Outputs

A comprehensive master plan which includes:

- 1) Long-term Demand Forecast;
- 2) Generation Development Plan, Transmission Development Plan and Distribution Development Plan;
- 3) Strategic Environmental Assessment Report; and,
- 4) Power Sector Investment Plans.

(3) Activities

The Project will carry out the following ten tasks jointly by CEB and the JICA Experts.

Task 1: Review of the current situation in the power sector

Task 2: Electricity demand forecast

Task 3: Analysis on primary energy sources for generation development

Task 4: Formulation of generation development plan

Task 5: Formulation of transmission development plan

Task 6: Formulation of distribution development plan

Task 7: Improvement of the power system operation

Task 8: Formulation of long-term investment plan

Task 9: Economic and Financial analysis

Task 10: Environmental and social considerations

Task 11: Drafting the Master Plan

Task 12: Capacity Building for CEB

6. Description of the Project Site

(1) Natural Environment

1) Physical Features¹

The Project Site is the entire Sri Lanka (Figure 1).

Sri Lanka is an island located at the south east of the Indian sub-continent, between 5° 54' and 9° 52' North and 79° 39' and 81° 53' East. Its land area is 65,610 km². The island consists of a south central mountainous region with an elevation of 2,500 m above sea level, surrounded by broad lowland plains at an elevation of 0 - 75 m.

Sri Lanka is in the equatorial and tropical zone, and it is influenced by the monsoons. The country is generally divided into three climatic regions the wet zone, dry zone and intermediate

¹ The information of this section is from Biodiversity Conservation in Sri Lanka – A Framework for Action (Ministry of Forestry and Environment, 1999), Climate Change Secretariat, Ministry of Environment, Sri Lanka web site: http://www.climatechange.lk/ccs_index.html.

zone. Its south-west area is in moist climate (wet zone), the area from north-east to south-east is in dry climate (dry zone), and the middle area (hills and mountains) is in the intermediate climate (intermediate zone).



Source: Central Intelligence Agency (USA, 2001)

Figure 1 Map of Sri Lanka

2) Biodiversity

(a) General

Sri Lanka’s high biodiversity can be derived from a wide variety of climatic, topographic and soil conditions that has resulted in a diverse array of aquatic and terrestrial habitats and also from its zoogeographic features – history of the continental drift and the eventual separation from the Indian continent².

Conservation International, international nature conservation NGO, identifies areas with high biodiversity and needs of urgent conservation actions as “Biodiversity Hot Spots”. Sri Lanka belongs to one of the Hot Spots, “Western Ghats & Sri Lanka”³.

(b) Endangered Species

² The National Red List 2012 of Sri Lanka – Conservation Status of the Fauna and Flora (Ministry of Environment, Sri Lanka, 2012).

³ Conservation International web site.

http://www.conservation.org/where/priority_areas/hotspots/asia-pacific/Western-Ghats-and-Sri-Lanka/Pages/default.aspx

Many of fauna and flora in Sri Lanka are now facing risk of extinction because of increasing human population, and decrease and fragmentation of its forests. In 2012, the Ministry of Environment updated the data and revised the previous Red List of 2007 as “The National Red List 2012 of Sri Lanka – Conservation Status of the Fauna and Flora”.

Table 1 and Table 2 summarize the contents of the Red List 2012.

Table 1 Red List of faunal species of Sri Lanka

Taxonomic group	Critically Endangered	Critically Endangered possibly extinct	Endangered	Vulnerable	Total number of threatened species	Total number of species
Spiders	41 (14)	-	21 (10)	-	62 (24)	501 (257)
Freshwater crabs	34 (34)	-	12 (11)	-	46 (45)	51 (50)
Dragonflies	26 (22)	-	18 (14)	17 (4)	61 (40)	118 (47)
Ants	25 (5)	-	18 (3)	16	59 (8)	194 (33)
Bees	48	-	38	20	106	130
Butterflies	21 (5)	-	38 (10)	40 (7)	99 (22)	245 (26)
Land snails (excluding 21 not evaluated)	80 (70)	-	76 (72)	23 (20)	179 (162)	253 (205)
Freshwater fish	19 (16)	2 (2)	19 (17)	5 (4)	45 (39)	91 (50)
Amphibians	34 (34)	1 (1)	28 (27)	10 (9)	73 (71)	111 (95)
Reptiles (including marine species)	38 (36)	1 (1)	50 (39)	18 (11)	107 (87)	211 (124)
Birds	18	-	18 (7)	31 (11)	67 (18)	240 (27)
Terrestrial mammals	13 (6)	-	25 (8)	15 (4)	53 (18)	95 (21)

Numbers with brackets indicate endemic species.

Critically Endangered possibly extinct is defined as “species with no distribution records in last 60 years” . Total number of threatened species means the total number of Critically Endangered, Endangered and Vulnerable species.

Source: The National Red List 2012 of Sri Lanka - Conservation Status of the Fauna and Flora (Ministry of Environment, Sri Lanka, 2012)

Table 2 Red List of floral species of Sri Lanka

Taxonomic group	Critically Endangered	Critically Endangered possibly extinct	Endangered	Vulnerable	Total number of threatened species	Total number of species
Pteridophytes	42 (10)	21 (5)	88 (11)	70 (12)	200 (33)	336 (49)
Angiosperms	218 (1029)	177 (72)	552 (272)	615 (220)	1,385 (594)	3,154 (894)
Gymnosperms	1	-	-	1	2	-

Numbers with brackets indicate endemic species.

Critically Endangered possibly extinct is defined as “species with no distribution records in last 60 years” . Total number of threatened species means the total number of Critically Endangered, Endangered and Vulnerable species.

Source: The National Red List 2012 of Sri Lanka - Conservation Status of the Fauna and Flora (Ministry of Environment, Sri Lanka, 2012)

The International Union for Conservation of Nature (IUCN) prepares “The IUCN Red List of Threatened Species” as “the most comprehensive, objective global approach for evaluating the

conservation status of plant and animal species⁴. Regarding Sri Lanka, IUCN recognizes the status of threatened species as in Table 3.

Table 3 Numbers of globally threatened species in Sri Lanka

Taxonomic group	Mammals	Birds	Reptiles	Amphibians	Fishes	Molluscs	Other invertebrates	Plants	Total
Number	31	16	11	56	45	0	130	291	580

Source: Threatened species in each country (totals by taxonomic group) in IUCN Red List version 2015.2.

It must be noted that The IUCN Red List of Threatened Species is different from The National Red List 2012 of Sri Lanka. The former lists globally threatened species while the latter does nationally threatened ones. Whenever species of Sri Lanka are assessed, their conservation statuses need to be carefully examined and appropriate considerations must be given to them.

3) Conservation Status of the Biodiversity

(a) Protected Areas and Conservation of Forests

Department of Wildlife Conservation, Sri Lanka, manages the total area of 938,771.91 ha as protected areas such as national parks, and Forest Department manages the total area of 1,642,209 ha such as Conservation Forests to conserve important ecosystems (Table 4). Regarding the conservation of the remaining forests, logging ban in natural forests was imposed in 1990, and a change to this policy is not to be anticipated in the near future⁵.

Table 4 Protected areas managed by Department of Wildlife Conservation and Forest Department

	Name	Number	Area (ha)
Department of Wildlife Conservation	Strict Natural Reserve	3	31,574.40
	National Park	22	535,181.50
	Nature Reserve	5	64,585.01
	Sanctuary	64	307,431.00
	Jungle Corridor	-	-
	Refuge	-	-
	Marine Reserve	-	-
	Intermediate Zone	-	-
	Total		938,771.91
Forest Department	National Heritage and Wilderness Area	1	11,187
	Conservation Forest	111	133,791
	Reserved Forest	518	980,241
	Village Forest	-	-
	Other State Forest	-	516,990
	Total		1,642,209

出典 : Department of Wildlife Conservation: Information from Mr. Channa Suraweera, Assistant Director - Natural Resource management, Department of Wildlife Conservation received on 15July 2013.

Forest Department: Progress Report 2011 and Action Plan 2012 (Ministry of Environment), and Forest Performance Report (2014: under the process of approval)

⁴ <http://www.iucnredlist.org/about/red-list-overview#introduction>

⁵ Sri Lanka Forestry Outlook Study (FAO, 2009).

(b) Other Protected Areas

Central Environment Authority (CEA) has nine (9) Environmental Protection Areas⁶ based on the National Environmental Act.

There are six (6) Ramsar Sites⁷, four (4) Man and the Biosphere Reserves⁸ based on the Man and the Biosphere Programme by United Nations Educational, Scientific and Cultural Organization (UNESCO), and four (4) World Natural Heritage Sites and six (6) World Cultural Heritage Sites⁹. There are 70 Important Bird and Biodiversity Areas in Sri Lanka¹⁰. They are identified by BirdLife International, international bird conservation NGO, as key sites for conservation for the birds and associated biodiversity in each country.

(2) Social Environment

1) Politics and Administration

Sri Lanka is a republic country and it has a presidential system and parliamentary cabinet system. The parliament has 225 seats of which members service six year terms of office. 196 out of 225 are elected in respect of 22 electoral districts, while 29 out of 225 are elected at the national level with a system of proportional representation¹¹.

The local administration is managed by the administrative divisions under Ministry of Public Administration and Management, and the local authorities elected by the local people under Ministry of Provincial Councils and Local Government.

Sri Lanka has the following nine (9) provinces: Northern, North-Central, North-Western, Eastern, Central, Western, Sabaragamuwa, Uva and Southern provinces.

2) Population¹²

The population in 2012 is 20,359,439. The rate of annual population growth has been declining since 1953, but it remains at 1.1% during the period of 1981 and 2012. The population density has increased from 230 persons per km² in 1981 to 325 persons per km² in 2012.

3) Ethnic Groups and Religions

Ethnic groups in Sri Lanka are Sinhalese (74.9%), Sri Lankan Tamils (11.2%), Indian Tamils (4.1%) and Sri Lankan Moors (9.3%), and other minority groups include Burghers and Malays (0.5%). Distribution of population by religion shows the following figures: Buddhists (70.1%); Hindus (12.6%); Muslims (9.7%); Catholics (6.2%); and, other Christians (1.4%).

⁶ PROGRESS REPORT 2011 and ACTION PLAN 2012 Ministry of Environment

⁷ Ramsar Secretariat web site: http://www.ramsar.org/sites/default/files/documents/library/sitelist_25_june_2015.pdf

⁸ UNESCO web site: <http://www.unesco.org/mabdb/br/brdir/directory/rescount.asp>

⁹ UNESCO web site: <http://whc.unesco.org/en/statesparties/LK/>

¹⁰ BirdLife International web site: <http://www.birdlife.org/datazone/country/sri-lanka/ibas>

¹¹ The Parliament of Sri Lanka: <http://www.parliament.lk/index.php/en>

¹² Census of Population and Housing 2012 Key Findings, Department of Census and Statistics, Sri Lanka

In Sri Lanka, Vedda is recognized as an indigenous ethnic group. However, in the recent statistics, they have not been counted as Vedda, because they have been integrated into the surrounding other ethnic groups such as Sinhalese and Sri Lankan Tamils. There are no legislations to protect their rights in the forest areas¹³.

4) Industries

The main industries are agriculture (producing rice, tea, rubber and coconut) and textile industry. Regarding the major export items, 74.2% of them are industrial products (e.g. textile and clothing) and 25.1% are agricultural ones. Since the civil war ended in 2009, the number of foreign tourists have been increasing. In 2014, its number exceeded one million for three (3) consecutive years because of the improvement in the security¹⁴.

Table 5 shows the Gross Product by Industrial Origin and their ratio to the Gross Domestic Product (GDP). Table 6 shows the Work Force by Industrial Origin in the Second Quarter of 2013. The agricultural sector does produce less than others, but, considering its number of the Work Force, it is still the important industry in Sri Lanka.

Table 5 Gross Product by Industrial Origin in 2013

Industry	Product in 2013 (Rs. million)	Ratio to GDP (%)
Agriculture including fisheries	964,766	9.9
Industry	3,308,338	33.8
Services	5,511,568	56.3
Total	9,784,672	100.0

Source: Annual Report 2014, Central Bank of Sri Lanka

Table 6 Work Force by Industrial Origin (Second Quarter of 2013)

Industry	Work Force (person)	Ratio (%)
Agriculture including fisheries	2,404,878	30.3
Industry	2,134,556	26.9
Services	3,390,842	42.8
Total	7,930,276	100.0

Source: Sri Lanka Labour Force Survey, 2013 2nd Quarter, Department of Census and Statistics, Sri Lanka

The real GDP growth rate in 2014 is 7.4% comparing with the 7.2% in the previous year, and the unemployment rate is kept low as 4.3% (4.4% in the previous year). It is important and of high priority for the government to promote investment in economic and social infrastructure¹⁵.

5) Greenhouse Gas Emissions

Table 7 shows the CO₂ emissions from fuel combustion per capita, and the total emissions in Sri Lanka, other South Asia countries, Japan and the average in the World in 2012.

¹³ International Group for Indigenous Affairs: <http://www.iwgia.org/regions/asia/sri-lanka/895-update-2011-sri-lanka>

¹⁴ Ministry of Foreign Affairs of Japan “Basic Data of Sri Lanka (in Japanese)”

¹⁵ Press Release on 29 April 2015 by the Central Bank of Sri Lanka

Table 7 CO₂ Emissions from Fuel Combustion Per Capita, and the Total Emissions (2012)

Country	Sri Lanka	India	Pakistan	Bangladesh	Japan	World
Emission per capita (ton)	0.78	1.58	0.77	0.39	9.59	4.51
Total emissions (million tons)	15.9	1,954.0	137.4	59.6	1,223.3	31,734.3

Source: CO₂ EMISSIONS FROM FUEL COMBUSTION HIGHLIGHTS (International Energy Agency, 2014)

Table 8 shows the change over the years of the CO₂ emissions from fuel combustion in Sri Lanka. In 2012, 45% of total emissions of 15.9 million tons of CO₂ are from the transportation sector and 41% of those from the electricity and heat production sector¹⁶.

Table 8 Change over the year of the CO₂ Emissions from Fuel Combustion in Sri Lanka

Year	1971	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	% change 90-12
Emissions (million tons)	2.7	2.6	3.6	3.5	3.6	5.4	10.4	13.3	12.2	14.5	15.9	335.3

Source: CO₂ EMISSIONS FROM FUEL COMBUSTION HIGHLIGHTS (International Energy Agency, 2014)

Table 9 shows the policies and targets set by the government to tackle the Greenhouse Gas emissions.

Table 9 Policies and Target to tackle the Greenhouse Gas Emissions.

Adaption	<ul style="list-style-type: none"> ➤ Incorporate Climate Change concerns into SEA processes <p>National Climate Change Adaptation Strategy for Sri Lanka: 2011 to 2016 (Ministry of Environment, 2011) recommends it one of the adaptation measures.</p>
Mitigation	<ul style="list-style-type: none"> ➤ In the Energy Sector, the following actions are required to be implemented. <ul style="list-style-type: none"> - Explore the potential of clean and renewable energy sources of the country and enhance their production, accessibility and affordability. - Encourage the utilization of clean and renewable energy sources taking into account the local absorption capacity and long term sustainability. - Take action to improve demand and supply side management to maximize the efficiency of energy utilization. - Introduce economic incentives for less carbon intensive fuels and energy efficient technologies while imposing appropriate fiscal policy to combat detrimental practices <p>The National Climate Change Policy of Sri Lanka (Ministry of Environment, 2012) recommends them as the mitigation measure.</p>
	<ul style="list-style-type: none"> ➤ Electrical Energy Supplied to the Grid from non-conventional renewable energy should reach 10% by 2015. <p>National Energy Policy and Strategy of Sri Lanka (Ministry of Power and Energy, 2008)</p>
	<ul style="list-style-type: none"> ➤ Electrical Energy Supplied to the Grid from non-conventional renewable energy should reach 20% by 2020 <p>Long Term Generation Expansion Plan 2015-2034 (Ceylon Electricity Board, 2015)</p>

Prepared by Survey Team.

¹⁶ CO₂ EMISSIONS FROM FUEL COMBUSTION HIGHLIGHTS (International Energy Agency, 2014)

7. Legal framework of the Environmental and Social Considerations in Sri Lanka

(1) Relevant Laws

National Environmental Act was enacted in 1980 to manage and conserve the environment based on the constitution of Sri Lanka. In 1981, Central Environment Authority (CEA) was established to implement the act. National Environmental Policy and Strategies (2003) states that the government and the people of Sri Lanka effectively conserve the environment for the present and future generations and adequately manage the environment in a framework of sustainable development concept.

Table 10 shows the related laws to the environmental management and conservation in the power generation and transmission development.

Table 10 Related Laws to the Environmental Management and Conservation in the Power Generation and Transmission Development

Natural Environment	Social Environment
Forest Ordinance	Mahaweli Authority of Sri Lanka Act
Forest Act	Soil Conservation Act
Felling of Trees Ordinance	Irrigation Ordinance
Fauna and Flora Protection Ordinance	Antiquities Ordinance
Fauna and Flora Protection (Amendment) Act	Antiquities Act
Mines and Minerals Act	Land Acquisition Act
National Water Supply and Drainage Board Law	Crown Lands Ordinance
National Aquatic Resources Research and Development Agency Act	National Involuntary Resettlement Policy
National Heritage Wilderness Act	State Lands (Recovery of Possession) Act
Flood Protection Ordinance	
Land Reclamation and Development Corporation Act	
Botanic Gardens Ordinance	

Source: A table in “Developing Planning on Optimal Power Generation for Peak Demand in Sri Lanka (JICA, 2015)” was reviewed and revised by Survey Team.

(2) Strategic Environmental Assessment¹⁷

The Cabinet of Ministries decided, in 2006, to introduce Strategic Environmental Assessment (SEA) to all new policies, plans and programs implemented in the country to avoid, reduce and/or mitigate impacts especially cumulative impacts induced by the economic growth. CEA published guidelines for the ministries and authorities to smoothly apply SEA to their policies, plans and programs.

(3) Environmental Impact Assessment

1) National Environmental Act and Environmental Impact Assessment

The Cabinet of Ministries decided to introduce Environmental Impact Assessment (EIA) to all

¹⁷ A simple Guide to Strategic Environmental Assessment (Central Environmental Authority, 2009)

projects in 1984, and EIA was legislated in 1988 by the revised National Environmental Act¹⁸.

Table 11 shows that projects required EIA in the sector of power generation and transmission¹⁹.

Table 11 Projects Required EIA in the Sector of Power Generation and Transmission

1	Construction of hydroelectric power stations exceeding 50 MW
2	Construction of thermal power plants having generation capacity exceeding 25 MW at a single location or capacity addition exceeding 25 MW to existing plants
3	Construction of nuclear power plants
4	All renewable energy based electricity generating stations exceeding 50 MW
5	Installation of overhead transmission lines of length exceeding 10 km and voltage above 50 kv
6	Involuntary resettlement exceeding 100 families other than resettlement effected under emergency situations

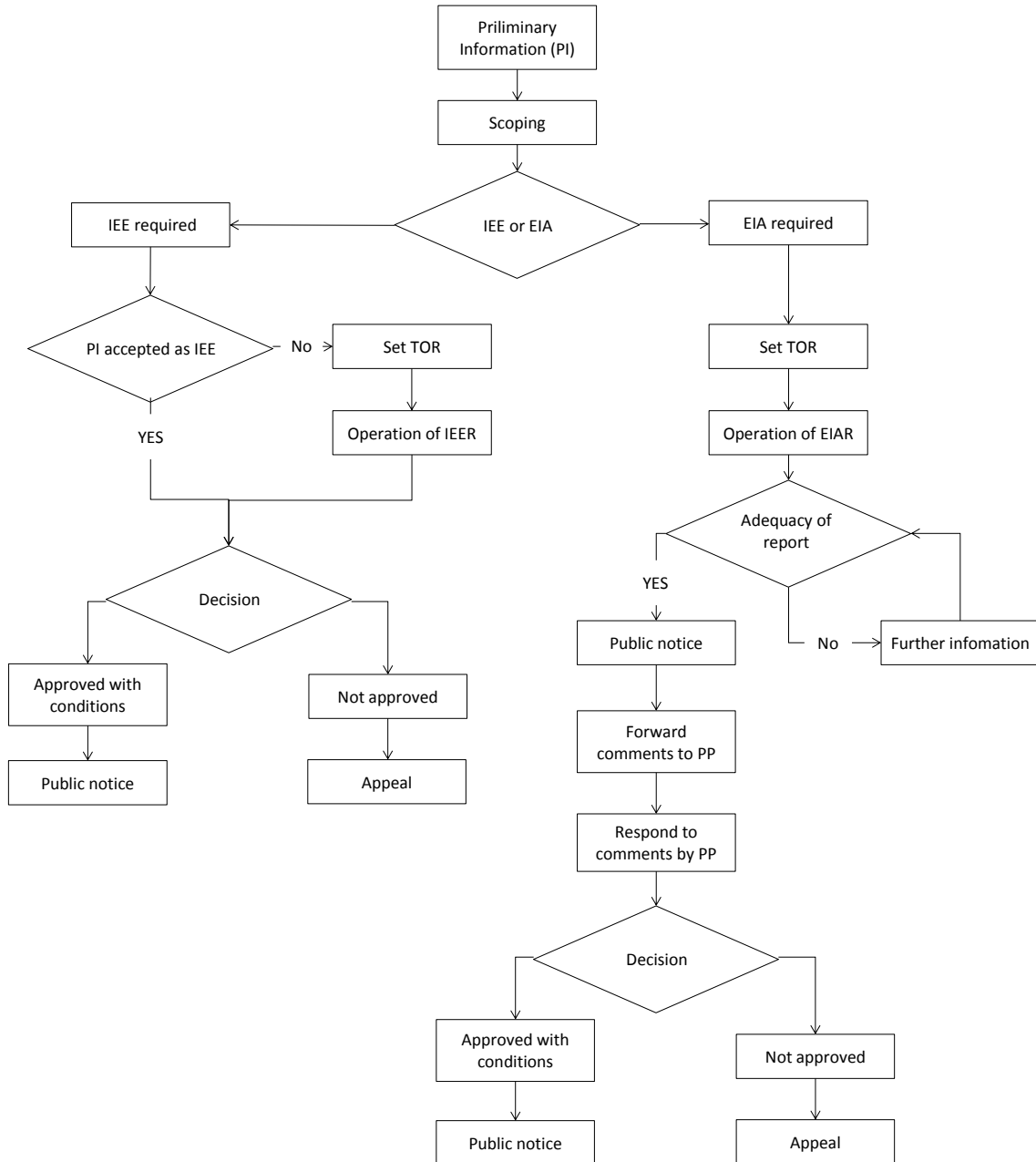
Source: Guidance for implementing the environmental impact assessment process No.1 (Central Environment Authority)

¹⁸ Guidance for implementing the environmental impact assessment process No.1 and No.2 (Central Environment Authority)

¹⁹ Guidance for implementing the environmental impact assessment process No.1 (Central Environment Authority)

2) Process of EIA

Figure 2 shows the flow of EIA process.



Source: The flowchart in “Guidance for Implementing the Environmental Impact Assessment Process No.1 (Central Environment Authority)” was revised based on the advice by the EIA Director (CEA). NOTE: PP=Project Proponent, IEER=IEE Research, EIAR=EIA Research.

Figure 2 Flowchart of EIA Process

(4) Land Acquisition and Involuntary Resettlement

1) Laws Related to Land Acquisition

Table 12 shows the laws related to land acquisition. Besides them, National Involuntary Resettlement Policy (NIRP) was introduced in 2001.

Table 12 Laws Related to Land Acquisition

Land Development Ordinance	No.19 of 1935
Land Grants (Special Provisions) Act	No.43 of 1979
State Land Ordinance	No.8 of 1947
State Land (Recovery of possession) Act	No.7 of 1979
Land Acquisition Act	No. 9 of 1950, No.39 of 1954, No.22 of 1955
Land Settlement Ordinance	No.20 of 1931
Title registration Act	No21 of 1998

Source: Ministry of Lands web site: <http://www.landmin.gov.lk/web/?locale=en>

2) Process of Land Acquisition

Table 13 shows the flow of the land acquisition process.

Table 13 Flow of Land Acquisition Process

Process		Agency in charge
1	Acquisition Application	Applicant Institution - Forward the application through the respective Ministry.
2	Section 2 Direction	Ministry of Lands – Grant authority to enter the land and the decision of Hon. Minister that the particular land is needed for a public purpose.
3	Section 2 Notice	Divisional Secretary - Publish the notice in the surrounding area.
4	Advance Tracing	Superintendent of Survey
5	Section 4 Direction	Ministry of Lands - Inviting objections from the land owners and decision of the Hon. Minister for investigation.
6	Section 4 Notice	Divisional Secretary - Publish the notice inviting objections.
7	Objection Inquiry	Applicant Ministry - Forward recommendations after conducting investigations on objections.
8	Section 5 Declaration	Ministry of Lands - Decision of the Hon. Minister of Lands that the land is to be acquired
9	Section 5 Notice	
10	Final plan	Superintendent of Survey
11	Section 7 Gazette Notice	Divisional Secretary/Government Printer - Invitation notice to investigate the title of the land.
12	Section 9- Inquiry into Title	Divisional Secretary – Investigating title
13	Section 10- Decision on Title Notice, Forward to Court	Divisional Secretary – Determine the title
14	Valuation	Valuation Department
15	Section 17 – Awarding Compensation	Divisional Secretary
16	Payment of Compensation	Divisional Secretary - Allocate financial provisions from the Ministry of Lands or the relevant Institution and make payments to the land owner.
17	Gazetting 38 Order	Ministry of Lands - Take over the land's possession to the Government.
18	Taking undisturbed possession	Divisional Secretary – Take over the possession and hand it over to the applicant institution.
19	Section 44 Vesting Certificate/Registration of State Ownership	Divisional Secretary/Registrar General - Issue vesting certificate to the Institution concerned, after payment of compensations to the land owners.

Note: “Section” in the table is the said section in the Land Acquisition Act.

Source: Ministry of Lands web site: <http://www.landmin.gov.lk/web/?locale=en>

3) National Involuntary Resettlement Policy²⁰

Sri Lanka introduced NIRP in 2001. The objectives of the policy are: (a) to adequately compensate and resettle affected people and restore their livelihood; (b) to implement project without delay and cost increase; and (c) to restore relationship with local communities.

4) Differences between JICA Guidelines and Sri Lankan Regulations

Regarding the regulations related to EIA and involuntary resettlement in Sri Lanka, there are differences between the JICA Guidelines for Environmental and Social Considerations (2010) and the Sri Lankan regulations. Table 14 and 15 show these differences.

Table 14 Differences between Sri Lankan Regulations and JICA Guidelines on EIA

Item	JICA Guidelines	Sri Lankan Regulations
Public Consultation in EIA process	SEA stage: The project proponent is obliged to collect comments and/or concerns from the stakeholders in the affected areas and to reflect the comments and concerns to the plan.	SEA stage: No specific opportunity is provided.
	EIA stage: At the stages of Scoping (draft) and EIA Report (draft), the project proponent is obliged to hold stakeholders meetings (especially for affected people) in the affected area to explain the contents of the scoping (draft) and EIA report (draft). Appropriate comments and concerns should be reflected in the plan.	EIA stage: Stakeholders are provided an opportunity at Scoping. In this case, the stakeholders are usually related governmental organizations (not local people). The stakeholders can submit queries and comments on the EIA report.
Environmental checklist	Environmental checklist is provided by the guidelines for each sector. An EIA report should contain the items in the checklist.	No specific checklist is provided. A Project Approving Agency shall prepare terms of reference for an EIA (or IEE) study.

Source: Developing Planning on Optimal Power Generation for Peak Demand in Sri Lanka (JICA, 2015)

Table 15 Differences between Sri Lankan Laws and JICA Guidelines on Involuntary Resettlement

Item	JICA Guidelines	Sri Lankan Regulations
Resettlement Action Plan (RAP)	The project proponent is obliged to prepare a RAP. If number of resettled household is small (e.g. one household), the RAP can be simplified one. The RAP is firstly prepared as part of the EIA Report.	In case that the number of resettled households is 20 or more, NIRP requires a RAP.
Compensation for land resettlement	Full replacement cost must be applied as much as possible.	The Land Acquisition Act (LAA) provides for the payment of compensation on the basis of “market value” which is defined as the “amount which the land might be expected to have realized if sold by a willing seller in the open market as a separate entity”. The Land Acquisition regulations of 2008

²⁰ Land acquisition and implementation of the national involuntary resettlement policy, A guide for public officials on good practices (Ministry of Land and Land Development, 2013)

		<p>redefines the valuation approach to determine “market value” stating that “in case of land where part of land is acquired and when its value as a separate entity deems to realize a value proportionately lower than the market value of the main land the compensation should be proportionate to the value of the main land.</p> <p>NIRP recommends that compensation for loss of land, structures, other assets and income should be based on full replacement cost and should be paid promptly together with transaction costs.</p>
Compensation for non-registered residents	All residents before the cut-off-date are eligible.	<p>LAA does not have any provision on this issue.</p> <p>NIRP recommends that affected persons who do not have documented title to land should receive fair and just treatment.</p>
Grievance redress mechanism	The project proponent is obliged to have a grievance redress mechanism.	<p>LAA provides a limited grievance redress mechanism whereby certain grievances of the affected persons relating to compensation can be referred to the Board of Review established under LAA.</p> <p>NIRP recommends the establishment of an internal monitoring system by project executing agencies to monitor the implementation of RAPs and handling of grievances. Each project should have its own grievance redress mechanism formally instituted by the project authorities with the support of the Divisional Secretaries of the project area.</p>

Source: Land Acquisition and Implementation of the National Involuntary Resettlement Policy: A Guide for Public Officials on Good Practices (Ministry of Land and Land Development, 2013)

(5) Environmental Standards

1) Air Quality

(a) Ambient Air Quality Standard

Table 16 shows the ambient air quality standard.

Table 16 Ambient Air Quality Standard

Pollutant	Average Time*	Maximum Permissible Level		+Method of Measurement
		µg/m ³	ppm	
1. Particulate matter – aerodynamic diameter is less than 10 µm in size (PM10)	Annual	50	-	Hi-volume sampling and gravimetric or beta attenuation
	24 hrs.	100	-	
2. Particulate matter – aerodynamic diameter is less than 2.5 µm in size (PM2.5)	Annual	25	-	Hi-volume sampling and gravimetric or beta attenuation
	24 hrs.	50	-	
3. Nitrogen Dioxide (NO ₂)	24 hrs.	100	0.05	Colorimetric using saltzman method or equivalent gas phase chemiluminescence
	8 hrs.	150	0.08	
	1 hr.	250	0.13	

4. Sulphur Dioxide (SO ₂)	24 hrs.	80	0.03	Pararosanilene method or equivalent pulse fluorescent
	8 hrs.	120	0.05	
	1 hr.	200	0.08	
5. Ozone (O ₃)	1 hr.	200	0.10	Chemiluminescence method or equivalent ultraviolet photometric
6. Carbon monoxide (CO)	8 hr.	10,000	9.00	Non-dispersive infrared spectroscopy
	1 hr.	30,000	26.00	
	Anytime	58,000	50.00	

* Minimum number of observation required to determine the average over the specified period –

03 hour average – 03 consecutive hourly average

08 hour average – 08 hourly average

24 hour average – 18 hourly average

Yearly average – 09 monthly average with at least 02 monthly average each quarter

+ By using chemicals or automatic analysers

Source: Environmental Norm, Board of Investment of Sri Lanka 2011

(b) Emission Standard

There is no standard yet.

2) Water Quality

(a) Ambient water quality

There is no standard yet.

(b) Emission Standard

Table 17 shows the emission standard for industrial waste water unto inland surface waters.

Table 17 Tolerance Limits for the Discharge of Industrial Waste Water into Inland Surface Waters

No.	Parameter	Unit	Tolerance Limit Value
1	Total suspended solids	mg/l, max.	50
2	Particle size of the total suspended solids	µm, less than	850
3	pH at ambient temperature	-	6.0-8.5
4	Biochemical Oxygen Demand (BOD ₅ in five days at 20 °C or BOD ₃ in three days at 27 °C)	mg/l, max.	30
5	Temperature of discharge	°C, max.	Shall not exceed 40 °C in any section of the stream within 15m downstream from the effluent outlet.
6	Oils and greases	mg/l, max	10
7	Phenolic compounds (as phenolic OH)	mg/l, max	1
8	Chemical Oxygen Demand (COD)	mg/l, max	250
9	Colour	Wave length range 436nm (Yellow range) 525 (Red range) 620 (Blue range)	Maximum spectral absorption coefficient 7m ⁻¹ 5m ⁻¹ 3m ⁻¹
10	Dissolved phosphates (as P)	mg/l, max	5

11	Total Kjeldahl nitrogen (as N)	mg/l, max	150
12	Ammonical nitrogen (as N)	mg/l, max	50
13	Cyanide (as CN-)	mg/l, max	0.2
14	Total residual chlorine	mg/l, max	1.0
15	Flourides (as F-)	mg/l, max	2.0
16	Sulphides (as S2-)	mg/l, max	2.0
17	Arsenic (as As)	mg/l, max	0.2
18	Cadmium (as Cd)	mg/l, max	0.1
19	Chromium, total (as Cr)	mg/l, max	0.5
20	Chromium, Hexavalent (as Cr6+)	mg/l, max	0.1
21	Copper (as Cu)	mg/l, max	3.0
22	Iron (as Fe)	mg/l, max	3.0
23	Lead (as Pb)	mg/l, max	0.1
24	Mercury (as Hg)	mg/l, max	0.0005
25	Nickel (as Ni)	mg/l, max	3.0
26	Selenium (as Se)	mg/l, max	0.05
27	Zinc (as Zn)	mg/l, max	2.0
28	Pesticides	mg/l, max	0.005
29	Detergents/surfactants	mg/l, max	5
30	Faecal Coliform	MPN/100 ml, max	40
31	Radio Active Material: (a) Alpha emitters (b) Beta emitters	micro curie/ml, max micro curie/ml, max	10 ⁻⁸ 10 ⁻⁷

Note 1: All efforts should be made to remove unpleasant odour as far as possible.

Note 2: These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the tolerance limits are multiplied by the 1/8 of the actual dilution.

Note 3: The above mentioned general standards shall cease to apply with regard to a particular industry when industry specific standards are notified for that industry.

Note 4: Pesticides as per World Health Organization (WHO) and Food and Agriculture Organization (FAO) requirements.

Source: Environmental Norm, Board of Investment of Sri Lanka 2011

3) Noise Standard

Table 18 shows the noise standard.

Table 18 Noise Standard

Area	LAcq T, dB (A)	
	Day time (06:00 – 18:00)	Night time (18:00 – 06:00)
Low Noise (Pradeshia Sabha area)	55	45
Medium Noise (Municipal Council/Urban Council area)	63*	50
High Noise (EPZZ of BOI & Industrial Estates approved under part IVC of the NEA)	70	60
Silent Zone (100 m from the boundary of a courthouse, hospital, public library, school, zoo, sacred areas and areas set apart for recreation or environmental purposes)	50	45
Construction activities	75	50

* Provided that the noise level should not exceed 60 dB (A) inside existing houses, during day time.

Source: The table in “Environmental Norm, Board of Investment of Sri Lanka 2011” is revised by the author.

8. Provisional Scoping

A provisional scoping exercise is conducted for generation and transmission development plans, and the result is shown in Table 19.

In Table 19, “Thermal power” includes coal-fired, diesel and gas-fired thermal power plants, “Hydro power” includes pumped storage power plant, and “NCRE (non-conventional renewable energy)” includes wind, solar, mini-hydro and biomass power plants.

In the provisional scoping, offshore gas and oil development and LNG terminal development are included because they are as closely related infrastructure development.

Table 19 Provisional Scoping of the Project

Category	No.	Environmental Item	Evaluation		Explanation on impacts	Individual evaluation (Before and during construction / Operation and maintenance)			
			Before and during construction	Operation and maintenance		Thermal power	Hydro power	NCRE	Transmission line
Pollution Control	1	Air quality	B-	B-	<p>During construction: Some adverse impacts are expected.</p> <p>Operation and maintenance (O/M): From thermal power plants, pollutants such as SO_x, NO_x, and PM are emitted. Coal stock yard needs to be appropriately managed.</p>	B-/B-	B-/D	B-/D	B-/D
	2	Water quality	A-	B-	<p>During construction: Water contamination is expected during the construction of offshore gas and oil terminal and LNG terminal.</p> <p>O/M: Ash dumping sites and coal stock yards of coal-fired thermal power plants need to be appropriately managed.</p> <p>Impacts induced by the operation of offshore gas and oil terminal are unknown.</p>	A-/B-	B-/D	B-/D	B-/D

3	Wastes	B-	B-	<p>During construction: Some adverse impacts are expected.</p> <p>O/M: Ashes from coal-fired thermal power plants need to be appropriately managed.</p>	B-/B-	B-/D	B-/D	B-/D
4	Soil contamination	B-	B-	<p>During construction: Some adverse impacts are expected.</p> <p>O/M: Ash dumping sites of coal-fired thermal power plants need to be appropriately managed.</p>	B-/B-	B-/D	B-/D	B-/D
5	Noise and vibration	B-	B-	<p>During construction: Some adverse impacts are expected.</p> <p>O/M: Noise from generators of thermal power plants and low-frequency noise from wind turbines are expected.</p>	B-/B-	B-/D	B-/B-	B-/D
6	Subsidence	D	D	No impacts are expected.	D/D	D/D	D/D	D/D
7	Odor	B-	D	<p>During construction: Some adverse impacts are expected.</p>	B-/D	B-/D	B-/D	B-/D
8	Sediment	A-	D	<p>During construction: Impacts to the sediments are expected during the construction of offshore gas and oil terminal and LNG terminal.</p> <p>Some adverse impacts are expected during the construction of thermal power plants</p>	A-/D	B-/D	B-/D	D/D

					and hydro power plants.				
Natural Environment	9	Protected areas	D	D	The Project does not select any protected areas (even their parts) as the project areas.	D/D	D/D	D/D	D/D
	10	Ecosystem	C	B-	<p>During construction: Important ecosystems should be avoided as the project areas.</p> <p>Considering the characteristics of fauna and flora in Sri Lanka, it is necessary to pay special attentions to species and ecosystems anywhere in the country. Although the Project could give impacts to the ecosystems, it depends on areas selected.</p> <p>At the moment, sites are not selected and the impacts are unknown.</p> <p>Impacts induced by offshore gas and oil development are unknown.</p> <p>O/M: Thermal discharge from thermal power plants could give some impacts.</p> <p>Wind mills could give impacts to birds.</p> <p>Cumulative impacts by mini-hydro, wind and solar power plants need to be well examined.</p>	C/B-	C/B-	C/B-	C/C
	11	Hydrology	B-	B-	During construction: Some adverse	B-/D	B-/B-	B-/D	D/D

					<p>impacts are expected during the construction of hydro power plants, and thermal power plants.</p> <p>During the construction of tunnels, groundwater system could be affected.</p> <p>Impacts induced by offshore gas and oil development are unknown.</p> <p>O/M: Reservoir of hydro power plant could give some adverse impacts to nearby groundwater system.</p>				
	12	Topography and geology	C	D	<p>During construction: Although adverse impacts could be expected due to the extraction of concrete aggregates and soil from new sites, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.</p>	C/D	C/D	C/D	D/D
Social Environment	13	Involuntary resettlement	C	D	<p>Before construction: Although involuntary resettlement is avoided and minimized as much as possible, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.</p>	C/D	C/D	C/D	C/D
	14	Poor people	C	C	<p>Before and during construction: Although necessary considerations are</p>	C/C	C/C	C/C	C/C

					given to poor people, impacts are unknown. Detailed information is to be collected during the implementation of the Project. O/M: Although positive impacts to the economy of Sri Lanka are expected, their ripple effects to those people are unknown.				
15	Indigenous or ethnic minority	C	C	Before and during construction: Although necessary considerations are given to indigenous and ethnic minorities, impacts are unknown. Detailed information is to be collected during the implementation of the Project. O/M: Although positive impacts to the economy of Sri Lanka are expected, their ripple effects to those people are unknown.	C/C	C/C	C/C	C/C	
16	Local economies, such as employment, livelihood	B+	B+	Before construction: If land acquisition and involuntary resettlement take place, there are impacts to local economies. But at the moment, the impacts are unknown. Detailed information is to be collected during the implementation of the Project. During construction: Positive impacts to local economies are expected.	B+/B+	B+/B+	B+/B+	B+/B+	

					O/M: Positive impacts to the economy of Sri Lanka are expected, and their ripple effects to local economies are also expected.				
17	Land use and utilization of local resources	C	B-		Before and during construction: Impacts are unknown. O/M: There could be conflicts of interest on the selection of the development areas. For other cases, impacts are unknown. Detailed information is to be collected during the implementation of the Project.	C/C	C/C	C/B-	C/C
18	Water usage	B-	C		During construction: Some adverse impacts are expected O/M: Although necessary considerations are given to water utilization, impacts from thermal and hydro power plants are unknown. Detailed information is to be collected during the implementation of the Project.	B-/C	B-/C	B-/C	B-/D
19	Existing social infrastructures and services	B-	C		Before construction: Although some adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the implementation of the	B-/C	B-/C	B-/C	B-/D

					Project. During construction: Some adverse impacts are expected. O/M: Although necessary considerations are given to avoid and minimize impacts, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.				
20	Social institutions such as social infrastructure and local decision-making institutions	C	C		Before construction: Although some adverse impacts could occur, the impacts are unknown. O/M: Although necessary considerations are given to avoid and minimize impacts, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.	C/C	C/C	C/C	D/D
21	Misdistribution of benefits and damages	C	C		Although some adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.	C/C	C/C	C/C	C/D
22	Local conflicts of interest	C	C		Although some adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the	C/C	C/C	C/C	C/D

				implementation of the Project.				
23	Cultural heritages	C	C	Although necessary considerations are given to avoid and minimize impacts, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.	C/C	C/C	C/C	C/C
24	Landscape	B-	A-	During construction: Some adverse impacts are expected. O/M: Regarding thermal and hydro power plants, although it is considered to avoid and minimize impacts, the impacts are unknown. Detailed information is to be collected during the implementation of the Project. Wind and solar power plants give adverse impacts to their surrounding landscapes.	B-/C	B-/C	B-/A-	B-/B-
25	Gender	C	C	Although some adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the implementation of the Project.	C/C	C/C	C/C	C/C
26	Children's rights	C	C	Although any adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the	C/C	C/C	C/C	C/C

					implementation of the Project.				
	27	Infectious diseases such as HIV/AIDS	C	D	During construction: There is no information on infectious diseases, and impacts are unknown.	C/D	C/D	C/D	C/D
	28	Labor conditions	B-	D	Before construction: Although some adverse impacts could occur, the impacts are unknown. Detailed information is to be collected during the implementation of the Project. During construction: It is necessary to pay attentions to labor conditions.	B-/D	B-/D	B-/D	B-/D
Others	29	Accidents	B-	D	During construction: It is necessary to pay attentions to accidents in and around sites.	B-/D	B-/D	B-/D	B-/D
	30	Trans-boundary impacts / global warming	A-	A-	During construction: At offshore gas and oil development sites, greenhouse gases are emitted. Although there is a possibility to clear forests at some extent for constructing solar power plants, the impacts are unknown. Detailed information is to be collected during the implementation of the Project. O/M: Thermal power plants emit greenhouse gases.	A-/A-	D/A-	C/D	D/D

					Regarding pumped storage power plant, greenhouse gases are emitted from other power plant when water is pumped up. Impacts from offshore gas and oil terminal are unknown.				
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A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. A further examination is needed, and the impact could be clarified as the study progress.

D: No impact is expected.

9. Alternative to the Project Activities including “Zero (without project)” Option

Alternatives to the project activities will be studied in the Project.

10. Result of the Consultation with the Recipient Government on the Environmental and Social Considerations including Roles and Responsibilities

The Detailed Planning Survey Team explains that the Study shall comply with the national laws and guidelines and the “JICA Guidelines for Environmental and Social Considerations (2010)”. Both parties agree on the compliance to ensure that appropriate considerations shall be implemented for the environmental and social impacts expected by the Project implementation.

The Team also explains that a Strategic Environmental Assessment (SEA) shall be conducted in the Study as a master plan study, and it shall involve related stakeholders.

11. Terms of Reference for the Environmental and Social Considerations

(1) Rationale

The Project is a master plan study, and it is required to conduct a Strategic Environmental Assessment (SEA) as the Environmental and Social Considerations for the Study. The SEA is required by the following guidelines.

- A simple guide to strategic environmental assessment, Central Environmental Authority; and,
- JICA Guidelines for Environmental and Social Considerations (2010).

The Project deals with electricity development of which power plants emit Greenhouse Gases. The National Climate Change Adaption Strategy for Sri Lanka 2011-2016 also recommends “incorporating climate change concerns with SEA”.

(2) Description of the SEA

1) Objectives

The objectives are;

- (a) To identify and assess potential impacts induced by the Project and the closely related facility developments (i.e. the off-shore oil and gas development and the LNG terminal development projects);
- (b) To avoid, reduce and mitigate these impacts;
- (c) To collect comments from stakeholders and reflect them to the options proposed by the Project;
- (d) To evaluate the options from the technical, financial and environmental points of view; and,
- (e) To select the optimal option for the Project.

2) Survey area

Sri Lanka

- 3) Methodology and the flow of the implementation of the SEA
 - (a) Baseline surveys are conducted on the environmental and social conditions of Sri Lanka and proposed areas by the Project. The following items should be well surveyed.
 - Laws and regulations (including standards) of Sri Lanka related to the environmental and social considerations (including SEA and Environmental Impact Assessment);
 - Protected areas such as a national park and internationally recognized important habitats;
 - Endangered species especially the point endemic species; and,
 - Social conditions of Sri Lanka and the proposed area by the Project.
 - (b) Planning the options, expected impacts on the social and natural environments are avoided, reduced and mitigated as much as possible.
 - (c) A scoping exercise for the options is conducted.
 - (d) Based on the results of the scoping, social and environmental surveys are conducted to collect more information.
 - (e) Evaluation of the impacts of the options are analyzed and evaluated, and an entire evaluation exercise is conducted with the technical, financial and environmental points of view.
 - (f) A monitoring system of the selected option is recommended.
 - (g) Comments from the stakeholders are collected and reflected in the process of developing the options and selecting the optimal option. It is therefore required to hold at least two stakeholders meetings - the 1st one is held just after the development of the options; and the 2nd one is held just after drafting the final report.

12. Other relevant information

There are some notes for the implementation of the Project.

(1) Stakeholders

Stakeholders of the Project are theoretically the people of Sri Lanka. However it is impossible to obtain comments from the entire population. It is therefore recommended to invite academicians, non-governmental organizations, and experts on the social and natural issues in Sri Lanka to the stakeholders meeting.

Regarding the governmental organizations, Table 20 lists relevant governmental organizations of the Project. When the Project starts, based on this list, careful considerations should be given, and more organizations especially local authorities shall be added if necessary.

Table 20 Relevant Governmental Organizations

1.	Central Environmental Authority	7.	Department of Archeology
2.	Climate Change Secretariat	8.	Sri Lanka Tourism Development Authority
3.	Department of Wildlife Conservation	9.	Ministry of Agriculture
4.	Forest Department	10.	Sustainable Energy Authority
5.	Coast Conservation Department	11.	Petroleum Resources Development Secretariat
6.	Ministry of Lands		

Prepared by the Survey Team

(2) Offshore gas and oil development

It is not clear when the development and production start at the moment (as of October 2015).

Regarding the Environmental and Social Considerations, Petroleum Resources Development Secretariat, the executing agency, has already taken necessary steps to implement the Considerations. However, at the moment, they concentrate their effort only in the offshore (marine) area and have just started the baseline surveys in the offshore area. It is necessary to monitor the progress of their activities.

(3) Greenhouse Gas Emissions

In December 2015, there is the 21st Conference of Parties of the United Nations Framework Convention on Climate Change is held in Paris. The Project has to monitor its results carefully.

(4) Protected Areas and Endangered Species

Considering the situations of ecosystems and species in Sri Lanka, when the Project selects its development areas, it is important to avoid not only nationally designated protected areas by Department of Wildlife Conservation, Forest Department and Central Environment Authority but also Important Bird and Biodiversity Areas identified by BirdLife International.

Careful attentions and considerations should be given to endangered species especially “point endemics”.

End of the document