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PART I : SECTION (I) — GENERAL

Government Notifications

MINISTRY OF ENERGY

National Policy on Natural Gas of Sri Lanka

I, Udaya Gammanpila as the Minister of Energy do hereby publish the National Policy on Natural Gas of Sri Lanka as approved by the Government for the information of the general public.

UDAYA GAMMANPILA.
Minister of Energy.

17th October, 2020.

1. INTRODUCTION

Exploratory evidence for commercial natural gas and condensate reserves in the Mannar Basin, along with the pursuit of cleaner alternative fuels to enhance the diversity of the country's total energy mix, have heightened the interest in natural gas in Sri Lanka.

Natural gas (NG) provides a cleaner alternative to liquid petroleum and coal that can be used not only in power generation but in multiple other economic sectors as well. Besides being a source of energy, NG is used globally as a feedstock in the manufacture of chemical products such as urea fertilizer, methanol, ethanol and formaldehyde, which form the basic substances in the production of a wide range of industrial and consumer products.

Indigenous NG has a strong potential to contribute to Sri Lanka's energy security because it lacks the additional liquefaction, transport and regasification costs of imported LNG, so its confirmed presence offshore justifies a proactive policy approach to creating demand and building process and reticulation infrastructure.

1.1. Background

The presence of working petroleum systems in Sri Lanka has long been speculated, given Sri Lanka's position at the core of the organically rich African Rift System in pre-historic times. Geologically, the Mannar Basin depositional history is contiguous with that of Mozambique, where some of the world's largest gas reserves were found in 2010 and 2011. The possibility that similar oil and gas deposits could be present in Sri Lanka was confirmed by the Dorado and Barracuda gas and condensate discoveries off the North Western coast in late 2011 by Cairn India. Basin modeling based on modern 2D and 3D seismic, well log and core data has yielded an estimated gas initially in place (GIIP) approaching 2 Trillion Cubic Feet (TCF). These discoveries have propelled further exploration in the Mannar Basin as well as in Sri Lanka's other, predominantly offshore, sedimentary basins in the North and East. Sri Lanka has already commenced exploring a portion of the sedimentary basin located off the east coast for oil and gas prospectivity. Moreover, under the law of the sea convention, Sri Lanka has made a submission for a large sea bed area in the Bay of Bengal sedimentary fan (web link: https://www.un.org/Depts/los/clcs_new/submissions_files/ lka43_09/ lka2009executivesummary.pdf).

Domestic production will enable Sri Lanka to reduce dependence on fossil fuel imports and potentially become an exporter of natural gas in the future. Hence, if managed wisely, natural gas provides a long-term prospect for reducing fossil fuel imports as well as earning foreign exchange. However, the development of indigenous resources of natural gas into a fully operational system capable of fulfilling a substantial portion of the country's energy demand may take several years given the current state of preparation. Hence, the country may have to depend on imported and re-gasified Liquefied Natural Gas (LNG) in the short to medium term.

Natural gas is a relatively clean source of energy compared with other forms of fossil fuels such as petroleum oils and coal. Burning gas produces about 25% less Co_2 than burning petroleum oils and about 40% less than burning coal, per unit of energy released. Hence, besides enhancing energy security, natural gas will also help in reducing environmental problems associated with increased energy use. In the Nationally Determined Contributions (NDCs) to the Paris Agreement on Climate Change (PA), Sri Lanka voluntarily declared her commitment in 2016 to reduce carbon emissions by specified amounts within a given time frame. Switching to natural gas provides an effective way to reduce carbon emissions, thereby helping to achieve national commitments to mitigate climate change. Moreover, zero generation of oxides of Sulphur (SOx) and particulate matter and a low generation of oxides of nitrogen (NOx) and carbon monoxide (CO) stemming from a shift to natural gas will help reduce the risk of health hazards associated with air pollution, in the long term.

Despite positive prospects, however, Sri Lanka has no prior experience in natural gas in any economic sector. The closest experience has been the domestic and industrial use of liquefied petroleum gas (LPG). While LPG has become a main source of energy for cooking in the domestic sector across most communities, its use in other areas such as Industrial thermal LPG installations has grown slowly, but on the transport sector progress has not been seen. Some years ago Sri Lanka had a fleet of vehicles that ran on LPG, but this has now reduced to a negligible number mainly due to a lack of policy resulting in poor economy to both users and suppliers. LPG is mainly imported, with a small share being sourced locally as a by-product from the only local refinery in Sapugaskanda, Kelaniya. Sri Lanka's down-stream petroleum industry is mainly focused on the distribution of liquid fuels (i.e. petrol and auto diesel) for transportation, furnace oil for industries and kerosene for domestic, fisheries and other light industrial use. Supplies of petroleum fuels comprise (a) refining imported crude oil (approx. 35%) and (b) direct import of refined products (approx. 65%). Imported products have been the dominant part of local fuel oil sales since the mid-1990s, when demand exceeded the capacity of the local refinery.

As a result of established down-stream petroleum and LPG industries, Sri Lanka already has a legal and institutional framework relating to petroleum. Currently, there are four statutes governing the sector in Sri Lanka:

- Ceylon Petroleum Corporation Act No. 28 of 1961 (amended in 1963 and 1965)
- Petroleum Resources Act No. 26 of 2003 to provide for the exploration and recovery of petroleum in Sri Lanka
- Petroleum Products (Special Provisions) Act No. 33 of 2002 to provide for an alternate procedure for import, export, sale, supply and distribution of petroleum products
- Public Utilities Commission of Sri Lanka (PUCSL) Act, No. 35 of 2002 to provide for exercising licensing, regulatory and inspection functions pertaining to utility industries

Implementation responsibilities of these statutes are vested with several public agencies. Among them are the following key institutions :

- The Ministry vested with the subject of Petroleum (herein after referred as the Ministry).
- The Ceylon Petroleum Corporation (CPC), is a state-owned enterprise (SOE) established with the mandate to carry on business as an importer, exporter, seller, supplier or distributor of petroleum covering the areas of refining of petroleum.
- The Public Utilities Commission of Sri Lanka (PUCSL) was established by Act, No. 35 of 2002 for the purpose of regulating certain utilities industries including the downstream petroleum industry.
- The Petroleum Resources Development Committee (PRDC) is vested with powers and functions assigned to it by the Petroleum Resources Act, No. 26 of 2003, to conduct all upstream Petroleum operations in Sri Lanka with the assistance of Petroleum Resources Development Secretariat (PRDS).
- The PRDS is a government entity entrusted to assist the PRDC in administrating all activities in exploration, development and recovery of petroleum resources by adopting internationally recognized oil and gas field practices with attention to quality, health, safety and environment protection while encouraging local capacity building. This entity is proposed to become the regulator of the upstream sector of Sri Lanka in the planned upstream legislative reforms.

In addition, there are also several institutions indirectly involved with petroleum by way of granting approvals, financing, certifying, capacity building and monitoring operations etc. They include central government agencies (relevant ministries and line agencies including public utilities), local government authorities, financial agencies, private sector companies, academic and research institutes, media and civil society and community organizations. The key subject areas among the central government agencies concerned are; environmental management, marine environmental protection, public finance, transport and motor traffic, ports and shipping, coast conservation and costal resource, power and energy, Sri Lanka standards, higher education, vocational training, defense and economic/ investment affairs.

1.2. Need

There is substantial evidence to indicate that Sri Lanka can reap significant economic, social, and environmental benefits from using natural gas as a source of energy in power, industrial, transportation, household and commercial sectors and as a raw material for industrial purposes. However, the absence of a national policy framework and coherent governance structure to address issues involved either with development of indigenous natural gas resources or use of imported LNG in a cross-cutting way has constrained the effective utilization of this option. Although Sri Lanka has developed legal, regulatory and institutional means to address the use of most petroleum including LPG, they do not fully address the specific issues that may arise with commercial use of natural gas in a wide range of economic sectors satisfactorily.

Introducing a commercially viable natural gas industry into Sri Lanka involves value chain development from up-stream resource extraction activities to down-stream distribution operations which covers a wide range of economic transactions. Following the initiatives taken by GOSL to develop recently discovered gas resources, along with the decision to import LNG for power generation, the importance of strengthening policy, legal, regulatory and institutional frameworks to address the issues involved with economic use of natural gas has been highlighted by many stakeholders. The whole exercise therefore requires the guidance and supervision of a well-articulated national policy. Accordingly, the GOSL through the Ministry, in consultation with relevant stakeholders, has developed this National Policy on Natural Gas for Sri Lanka (hereinafter referred to as 'the NPNG').

The NPNG expresses the intention of the Government of Sri Lanka (GoSL) to expand the sustainable use of natural gas across all sectors to maximize the economic value of a low-carbon energy source and industry feedstock that will soon be produced locally. It will be revised regularly during the industry's development to ensure that the changing requirements of all stakeholders are met, and each version will contain an action plan (Gas Utilization Master Plan – see Section 4.1.5.9) that will be updated accordingly.

1.3. Purpose and Context

The NPNG is intended to address economic, technical, commercial, environmental, safety and social issues that are expected to arise due to introduction of natural gas as a new source of energy and industrial input in Sri Lanka. Hence, it is anticipatory and forward looking. It places the natural gas industry in the realm of broad national agenda towards sustainable development. Hence, the vision, goals and objectives of the NPNG have been identified in line with the broad direction of GoSL's macroeconomic policies, relevant sectoral policies in areas such as energy, industry and transportation, as well as national commitments towards the Sustainable Development Goals (SDGs) and NDCs to Paris Agreement on Climate Change. The NPNG is expected to complement such policies, strategies, and commitments by ensuring energy security, contributing to the national economy and protecting the environment.

1.4. Rationale

The rationale of the NPNG is to facilitate establishing an economically viable, environmentally sustainable, and socially responsible natural gas industry in Sri Lanka. To achieve this, the Policy upholds the roles of the Government, private sector, civil society, consumers and the public.

As per the Petroleum Resources Act, No. 26 of 2003, the absolute ownership of indigenous resources of natural gas is vested in the State, along with the overall responsibility of sustainably developing and using the resources for the maximum benefit of the present and future generations of the country.

The private sector has been recognized as the engine of economic growth by successive governments of Sri Lanka. There are many regional examples of commercially successful natural gas-based enterprises run by the private sector. However, being capital intensive and requiring advanced technological developments, the global natural gas industry has consolidated into large corporate structures motivated to acquire market share that can curtail the competition. Since healthy competition is essential for consumer welfare and the sustained growth of market economies, the Government has a vital role to play in creating opportunities for competitive services and products and then ensuring a level playing field for participating private sector entities.

Besides fulfilling the roles of both trustee of indigenous resources and regulator of the local market system, the Government, is also expected to play other multiple roles in areas such as: overseeing the development of infrastructure; facilitation of investments; promoting good industrial practices; safeguarding the environment; minimizing health risks to the people; averting accidents due to mishandling; adopting internationally accepted norms, codes and standards; regular monitoring of the conduct of other players, and; protection of the rights of consumers as ultimate beneficiaries. The NPNG aims to establish a transparent, accountable, and inclusive process of governance to fulfill the multiple roles by the Government and other stakeholders including the private sector in an effective manner. Since

international expertise and Foreign Direct Investment are an essential part of the initial stakeholder spectrum, the NPNG will pay special attention to factors that improve the ease of doing business, reduce market risk, and increase demand so that Sri Lanka can benefit from the knowledge and technology transfer these entities offer. Civil society, media and the public also have important roles to play here, so that a viable system free of abuses, malpractices, corruption and anti-competitive behavior, will be established and maintained.

2. Vision, Goals and Objectives

The vision, goals, and objectives of the NPNG are presented in this section. This includes a broad vision statement and a set of key policy goals and objectives.

2.1. Vision

The vision of the NPNG is to achieve sustainable economic, social, and environmental benefits to Sri Lanka by introduction of natural gas as a resource, energy source and as an industrial feedstock to a wide range of economic sectors.

2.2. Goals

The NPNG envisages achieving the following goals:

- Increase penetration of natural gas in all sectors towards achieving a minimum 30% of the total energy mix by 2030
- Create an avenue of foreign exchange earnings established through export and any viable commercial activities using natural gas and derivative products
- Minimize the emission of greenhouse gasses to help achieve the aspirational targets set by Sri Lanka's NDCs to Paris Agreement on Climate Change
- Reduce the level of other harmful gasses that contribute to local air pollution minimized so that ambient air quality standards specified by the CEA can be adhered to
- Create a robust framework that encourages national and international private sector participation in investments, technology transfer and all other effective contribution towards the development of natural gas industry and related industry clusters
- Institute a robust framework of statutory, regulatory, and institutional arrangements to bring about effective behavioral responses of producers, suppliers and consumers of natural gas by 2021, and
- Progressively grow the number of skilled employment and business opportunities with high local value content, generated through a steady stream of foreign and local investments in natural gas-based industries

2.3. Objectives

The overall objective of the NPNG is to provide guidance and direction for the sustainable development of the natural gas value chain ensuring optimal and equitable benefits to Sri Lanka in the short-, medium- and long-term. This is to be achieved through realizing following specific objectives.

- Ensure uninterrupted supply of natural gas to key economic sectors from domestic production and imports,
- Encourage and promote the use of natural gas as an alternative source of energy in prospective sectors, including power, transport, industries, commercial and residential sectors, substituting emission intensive energy sources,
- Promote the use of natural gas as a feedstock in industries with technical and economic potential such as fertilizer, chemical and petrochemicals production,

- Promote and facilitate investments by international and local investors to undertake commercial production of natural gas from indigenous resources through a fiscally attractive NG-specific Petroleum Resource Agreement,
- Develop necessary infrastructure and logistics to enhance the supply of natural gas to the local market, bunkering and export markets from both domestic production and LNG imports,
- Adopt a transparent and competitive process of procurement of LNG enabling the country to competitively source LNG at the lowest sovereign risk,
- Develop pricing and market sharing mechanisms that enable consumers to access natural gas at affordable prices, while ensuring attractive returns to the investors on long-term sustainable basis,
- Adopt globally accepted health, safety, environmental, social and gender safeguard standards in up-, mid- and down-stream sectors of natural gas industry,
- Formulate and enforce a robust policy, legal and regulatory framework which will ensure smooth functioning of all operations with regard to exploring, producing, refining, processing, importing, regasifying, storing, exporting, reticulating and consuming natural gas, including approvals, licencing and permitting of up-, mid- and down-stream operations pertaining to the natural gas industry,
- Regulate the natural gas supply chain to ensure the long-term interest of the consumers with respect to price, quality and reliability is achieved,
- Ensure internationally accepted codes of conduct, governance, transparency, and best industry practices are in place for all operations involving up-, mid- and down-stream sectors of natural gas industry,
- Promote the establishment of regional bunkering facilities to ocean-going vessels operating on LNG at Sri Lankan Ports as commercial ventures and explore the options to export/re-export natural gas, and
- Develop local human resource expertise, and technological skills as well as introduce incentive schemes to enhance the capacity of local businesses willing to take part in natural gas and allied industries so that the value of local content is maximized.

3. Key Policy Principles

The NPNG is built upon six main principles. Selecting policy measures to achieve the goals and objectives of the NPNG was done under the guidance of these principles.

3.1. Ensuring Energy security

Energy security implies uninterrupted supply of energy at affordable prices, minimizing the fluctuations in physical availability and cost. The internationally accepted dimensions of energy security are availability, accessibility, affordability, and acceptability (choice). The NPNG aims to enhance all four dimensions of energy security by introducing and promoting the use of natural gas as an alternative source of energy for key economic sectors while also reducing Sri Lanka's dependency on imported fossil fuels.

3.2. Protection of environment through cleaner energy

Natural gas provides a relatively clean alternative to emission-intensive petroleum fuels and coal, of which the share in the national energy mix is growing in opposition to the increasing global trend of de-carbonizing energy systems. Hence, increasing the share of natural gas in the energy mix through substitution of petroleum fuels and coal would help the protection of environment through reduced emissions, mitigate the impacts of climate change and decrease the human health risks and ecosystem losses associated with air pollution and global warming.

3.3. Ensure minimization of health, safety and environmental risks

While offering prospective benefits for the national economy and environment, NG is a product that needs to be handled with extreme care due to its highly flammable nature. Unless proper safety precautions are taken,

handling of NG, LNG and CNG could lead to hazardous events causing loss of human life and damage to property. Therefore, ensuring the public health, safety, and environmental protection through adoption of internationally accepted safety standards, codes of conducts and best practices is a key principle that guides the NPNG.

3.4. Optimal use of indigenous resources

Petroleum has the potential to open vital domestic and global market opportunities for advancing national economic interests. Currently, Sri Lanka depends exclusively on imports of petroleum to meet the demand for energy from power, transport, industrial and household sectors. The country spends a substantial share of its foreign exchange earnings for fossil fuel imports. NG and condensate deposits discovered in the Mannar Basin provide the opportunity for Sri Lanka to reduce the dependency on fossil fuel imports with the potential prospects for saving foreign exchange by import substitution, and eventually scale up to export NG and derivatives in the future. Hence, the optimal use of indigenous resources to maximize the benefits to national economy through establishing a viable domestic natural gas industry is a major underlying principle that guided the NPNG.

3.5. Enhanced private sector participation under effective regulatory regime

The private sector plays a leading role in global energy markets, including the natural gas industry. There are profitably run natural gas-based private ventures all over the world that generate sufficient returns to re-invest and grow the industry. In contrast, Sri Lanka's energy sector is dominated by state owned enterprises. Introduction of the natural gas industry to Sri Lanka opens the opportunity for engaging the private sector on mutually beneficial terms, sharing both investment and market risk with the State. To achieve maximum gains from private sector involvement, an effective regulatory and monitoring regime is required. The NPNG aims to capture this opportunity by enhancing private sector participation under a well-designed regulatory regime to optimize the gains for the national economy and public.

3.6. Adaptive development and optimization of market structure for inclusive benefits

Gas value chains involve complex market structures that determine the overall scheme of benefits enjoyed by different stakeholders. Studies on natural gas markets have established that gas industry could operate under varied market structures ranging from highly concentrated vertically integrated structures to industries having unbundled supply chains with open competition among business firms. It has generally been observed that market structures open for competition are likely to generate more efficient and equitable outcomes than concentrated market structures. The current market structure of petroleum in Sri Lanka is oriented more towards a concentrated structure dominated by state-owned enterprises. Departing from the existing tendency towards state monopolies, the NPNG would take a balanced approach regarding the structure of the future natural gas industry in Sri Lanka. It looks forward to exploring optimal market structures applicable to different stages of the development of industry under changing local and international conditions through an adaptive approach. In doing so, the NPNG would invariably strive to enhance market competition with the active participation of the private sector.

4. Policy Statements

This section is the main body of the NPNG. It presents the policy statements formulated to achieve the vision, goals, and objectives of the NPNG, addressing issues involved with the introduction of NG as an alternative source of energy and industrial feedstock. Natural gas can be used in multiple economic sectors. Introducing NG into multiple sectors involves cross-cutting needs as well as sector specific issues to be addressed through well-designed policies.

Accordingly, the policy statements are presented here under two broad sections:

- Policies to address cross-cutting needs in the use of natural gas in multiple economic sectors, and
- Policies to address sector-specific issues in the use of natural gas in main economic sectors (i.e. power sector, transport sector, industrial sector, household and commercial sector and bunkering).

4.1. Policies to address cross-cutting needs in use of natural gas in multiple economic sectors

Addressing cross-cutting needs of multiple sectors is an essential pre-condition for promoting natural gas in individual sectors that have potential for making gains from switching to NG. Therefore, policies aimed at addressing cross-cutting needs will provide the backbone of the natural gas industry in the country. Policy statements on cross-cutting needs are presented under eight broad areas, namely: sourcing and distribution of natural gas; infrastructure development; environmental sustainability; pricing; institutional, regulatory and policy framework; operational safety; capacity and local content development, and; consumption and market development.

4.1.1. Sourcing and distribution of natural gas

4.1.1.1. The Government will facilitate the access to natural gas from indigenous resource deposits as well as through imports by means of implementing development and regulatory measures applicable to up-, mid- and down-stream operations involved in natural gas value chains. These would include fiscal stability mechanisms to protect investors from future tax regime changes or use-specific subsidies, flexible cost – revenue allocation, equitable distribution of defined local demand between multiple producers, and appropriate market share mechanisms between produced domestic gas and re-gasified imported LNG.

4.1.1.2. Up-stream operations pertinent to sourcing of natural gas from indigenous sources will be achieved through adopting a transparent process of selecting prospective developers, adhering to licensing procedures conforming to international standards, and entering into contractual arrangements on mutually agreeable terms. These terms will encourage increased petroleum activity in Sri Lanka and facilitate secondary market transactions.

4.1.1.3. The Public Utilities Commission of Sri Lanka will facilitate the injection of biomethane or any form of biomethane, produced in commercial scale, into the natural gas storage and distribution networks subject to quality, safety and interconnection standards set out in specific codes of operations.

4.1.1.4. Supplies from indigenous sources, when available, will be channelled to meet the local demand and cater to export markets on a commercial basis, rationalizing the supplies to each group of users so that maximum gains to the national economy can be achieved whilst protecting investor returns.

4.1.1.5. The Government will also facilitate the establishment of mid- and down-stream operations pertinent to the importation of natural gas or any form of NG (LNG, CNG etc.) to meet the demand from power, transport, industry, commercial, household sectors as well as bunkering operations in order to supplement supplies from indigenous sources.

4.1.1.6. Importation of NG will be facilitated mainly as an ancillary source of supply:

- To fulfil the demand from local users before commercial supplies from indigenous sources are made available,
- To ensure uninterrupted supplies by buffering the fluctuations in supply from local sources, and
- To create healthy competition for local gas industry so that affordable prices for users can be maintained.

4.1.1.7. All stages of value chain related activities that include procurement, terminal operations, storage, distribution and consumption of natural gas in Sri Lanka either by public sector agencies or private parties will be conducted in a manner that captures maximum long-term economic value addition, strengthens Sri Lanka's energy security, and enhances her strategic position in regional and global energy markets.

4.1.1.8. The GoSL, through the Ministry, shall, subject to 4.1.1.7 above, facilitate and manage the sourcing of supplies of LNG from import markets either by state-owned enterprises or private parties by undertaking;

- Direct negotiations with one or more potential LNG suppliers (Govt. to Govt. or otherwise)
- International competitive bidding from LNG suppliers for mid-term or long- term supplies[1] (i.e. Term Supplies)
- Direct purchase from the LNG spot market after calling competitive bids for short term supply.

4.1.1.9. LNG is a global commodity available in increasing quantities, with a growing spot market. The Government will therefore adopt transparent and competitive procurement procedures in all natural gas sourcing transactions, as with any commodity. Sourcing will be conducted taking into consideration key factors such as price, time of purchase, tenure of contract, quantity and quality requirements to give Sri Lanka a competitive advantage.

4.1.1.10 Preference will be given for locally produced natural gas within Sri Lankan territory since the country is pursuing the ambitious goal of monetizing its hydrocarbon reserves as a priority. Hence, the procurement processes for importation of any form of NG as well as contracts between Sri Lanka and third parties shall be designed to reflect Sri Lanka's desire to prioritize domestic gas exploration and monetizing activities. To ensure a market for locally produced NG when available in commercial scale, on competitive terms, flexible contracts for importation of any form of NG will be negotiated in terms of volume, price and period of supply with the option for periodic re-negotiation.

4.1.1.11 The Government shall approve only import supply offers that comply with quality standards specified with respect to heat content and chemical composition by the Ministry and certified by recognized classification societies and meeting the environmental requirements of the country, regardless of whether they are undertaken by public sector agencies or private sector parties.

4.1.2. Infrastructure development

4.1.2.1. The Government will encourage, actively promote, and seek investments in natural gas infrastructure as a national development priority by public, private and/or public-private ventures, while ensuring a level playing field for healthy competition.

4.1.2.2. The Government will authorize, supervise and monitor construction, development and operation of all infrastructure pertaining to processing, regasification, liquefaction, storage, compression, transportation and distribution and consumption of NG/LNG/CNG giving due consideration to the existing Sri Lankan policies, laws and regulations, international standards and best practices. Large- scale facilities must be certified by an independent classification society before commencing operations.

4.1.2.3. The Ministry will be responsible for undertaking these functions on behalf of the Government. Both public as well as private sector developers are required to comply with policies, laws, regulations, standards and best practices adopted by the Government.

[1] Mid-term means between 2 and 5 years; short term means less than 2 years and long term means more than 5 years (International Gas Union Report 2017)

4.1.2.4. The Public Utilities Commission of Sri Lanka will establish a transparent and non- discriminatory regime by which third parties (common users) can gain access to essential infrastructure facilities, including pipelines, storage tanks, receiving terminals and regasification units etc., in order to provide workable competition in the midstream and downstream segments of the natural gas market.

4.1.2.5. In establishing such facilities, detailed feasibility studies including environmental and social impacts assessments (ESIA) shall be conducted to determine the best options with respect to the location, type and capacity of facilities giving due consideration to demand projections and financial and economic viability of ventures. Different options and alternatives will be evaluated by full-cycle commercial modeling to compare different technology, infrastructure and funding structure options, to identify the project with the highest national benefit in terms of economic value.

4.1.3. Environmental sustainability

4.1.3.1. The Government will ensure that the all construction, development and operational activities pertaining to using natural gas in power generation, transportation, industrial, household and bunkering operations undertaken by public and private sector parties shall comply with the prevailing environmental laws, regulations and standards in Sri Lanka. Learnings from international experience shall also be taken note of, even if they are not statutory requirements yet in Sri Lanka, particularly in the fields of climate and GHG control.

4.1.3.2. The Ministry will consult and coordinate with relevant regulatory bodies such as Central Environmental Authority (CEA), Marine Environmental Protection Authority, Coast Conservation Department etc. where applicable to ensure the compliance of safeguard measures by developers to minimize the environmental damages associated with such development activities. Adequate public consultation will also be done and incorporated into the relevant feasibility report.

4.1.3.3. In the case that prevailing safeguard measures (e.g. regulations, standards) are inadequate to address the potential environmental issues associated with construction, development and operational activities, the Ministry with the consultation and cooperation of relevant regulatory bodies will initiate necessary actions to introduce new safeguard measures.

4.1.3.4. The Government will encourage and direct to undertake Strategic Environmental Assessments (SEA) in case of large-scale ventures on natural gas development that are having complex involvements with marine, coastal and terrestrial eco-systems and their services covering the entire value chain involved.

4.1.4. Pricing

The Government will adopt a pricing policy for NG covering both supplies from indigenous sources as well as imported LNG that is aimed at ensuring affordable prices for consumers while guaranteeing sufficient returns on investments for suppliers to sustain and attract investment in the growth of the industry.

4.1.4.1. Pricing policy will be based on, but not limited to, the following key determinants:

- Cost of supply: Gas is priced to reflect the cost of production, transmission, storage, distribution, and fair rate of return on investment
- Bench marking indices: Gas price locally is compared to, and rationalized with, prices prevailing in the region[2]
- Taxes, royalties and levies due to trade related transactions along the supply chain
- Any other strategic value the GoSL may place upon an LNG supply agreement

[2] Sri Lanka is a small, emerging market, and our pricing cannot be compared with larger mature importers

4.1.4.2. The above statements outline the general directions for structuring the price of domestically produced or imported natural gas available for different uses before reaching the final consumers. Gas can be used in different ways in different sectors: e.g. motive energy (power generation, transport, and industry), thermal energy (households, industry) and feed stock (industry). Depending on the final use, the price of natural gas would vary and specific directions for pricing of gas for specific uses will be determined by reviewing sector specific parameters relating to supply and distribution of gas for respective uses.

4.1.4.3. The Public Utilities Commission of Sri Lanka will establish a transparent and fair regime for pricing of NG and of essential infrastructure services in the midstream and downstream segments of the natural gas market. The form of regulation to be applied across the natural gas supply chain will be chosen to ensure that the objectives of regulation are met and may vary from monitoring of prices to controlling of prices.

4.1.4.4. The Government will establish a feed-in-tariff for injection of Biomethane or any form of biomethane into the natural gas network and a 'guarantee of origin' system that certify whether the gas has been produced from renewable sources.

4.1.5. Institutional, legal and regulatory framework

4.1.5.1. The Ministry will review the existing legal and regulatory framework along with the institutional structure covering all operations pertaining to the entire NG value chain. Based on the gaps identified in the review, amendments to current laws and regulations, as well as new legal provisions will be introduced, that are necessary to incorporate domestically produced and imported forms of NG that will facilitate satisfactory operation of all activities connected to supply, storage, distribution and consumption of gas,.

4.1.5.2. In the amendment of existing laws and formulation of new legal provisions, special attention will be given to:

- Authorization of access: Licensing, approvals and permits to engage in up-, mid- and down-stream activities of natural gas industry
- Award of land leases and equipment
- Dispute resolution through arbitration as per international procedures and subject to Sri Lankan law covering areas of but not limited to: sovereign boundary disputes; state investment disputes; commercial disputes; human rights and environment disputes; pricing disputes, and; infrastructure and construction disputes, and
- Damages arising from arbitration awards and the respective valuation methods and compensation standards under the Sri Lankan Law.

4.1.5.3. The Ministry, in consultation with the relevant regulators, will establish a robust framework for regulation of up-, mid-, and down- stream activities of the natural gas industry. The scope of regulation will include, amongst others, regulating all upstream petroleum operations, access to NG and any form of NG, granting licenses, setting standards, determining and/or approving prices, monitoring service quality, supervising and enforcing operator commitments, regulating access to essential infrastructure and operations, regulating competition, monitoring performance, handling consumer complaints, settling industry disputes, and providing advice to the government.

4.1.5.4. The regulation of midstream and downstream segments of the natural gas market will be vested in or assigned to the Public Utilities Commission of Sri Lanka and the PUCSL will, through a set of rules, codes and guidelines etc. developed after consultation, set in detail how the regulatory regime in the midstream and downstream segments of the natural gas market would work.

4.1.5.5. Licensing and permitting shall be implemented for managing the establishment of natural gas related business in Sri Lanka, construction of LNG/CNG facilities and associated infrastructure, operations of the LNG/CNG installations, shutdown of operations and the decommissioning of LNG/CNG facilities within the territory of Sri Lanka.

4.1.5.6. The Government shall establish a separate corporate body named 'National Gas Company (NGC)' as the Single Credible Creditworthy Entity (SCE) to handle all economic transactions pertaining to NG on behalf of the Government, either as its own business operations or by entering into public-private partnership ventures, enabling the Government as well as Sri Lankan business community to participate in commercially viable upstream, midstream and downstream projects including exploration and production of indigenous natural gas, development, ownership and operation of the LNG facilities and/or internal natural gas storage, pipeline transportation and distribution infrastructure facilities as appropriate.

4.1.5.7. The Government, in compliance with applicable financial and other regulatory criteria, will decide and prescribe minimum threshold limits on liquidity, revenues, net income, net worth and other relevant corporate parameters that are indicative of operational capacity of the relevant local and international PPP partners involved in ventures relating to section 4.1.5.6.

4.1.5.8. The Government will establish an effective and efficient institutional framework with clear identification of roles and responsibilities of key institutions directed towards the successful implementation of the NPNG to achieve desired outcomes through efficient operationalizing, enforcing, monitoring and evaluation. The institutional framework will mainly focus on:

- Identifying and assigning the roles and responsibilities of institutions for smooth functioning, avoiding duplication or conflict with each other
- Developing smart tools/mechanisms and indicators for monitoring and evaluation within the institutional framework
- Reviewing regularly additional information requirements necessitated by new developments
- Enforcing transparency and accountability among all stakeholders involved in the gas value chain

4.1.5.9. To ensure efficient and timely implementation of the proposed interventions in the NPNG, a Gas Utilization Master Plan (GUMP) will be prepared and updated periodically by the Ministry covering actions in all main sectors; power, transport, industry, household and commercial sectors.

4.1.6. Operational Safety

4.1.6.1. The Government will make necessary arrangements to ensure that all operations involving exploration, processing, liquefaction, refining, transmission, importing of LNG, regasification of LNG, compression, storage, distribution and consumption of NG are carried out according to the highest safety standards published by relevant local and international bodies and classification societies while complying with the laws of Sri Lanka, to cause the least inconvenience to the public with minimum risk of hazardous events. The safety of the upstream segment is currently being regulated by the PRDC as assisted by PRDS. Safety regulation of midstream and downstream segments of the natural gas market will be vested in or assigned to the Public Utilities Commission of Sri Lanka.

4.1.6.2. This would require relevant parties to comply with the following.

- Conduct comprehensive Health, Environmental and Safety Impact Assessment (HESIA) of the activities relevant to the supply chain of projects inclusive of risk-modeled feasibility study; front-end engineering and design (FEED); engineering, procurement and construction (EPC); commissioning; operation and maintenance, and decommissioning;

- Undertake Quantitative Risk Assessment (QRA) to identify, evaluate and assess the hazards, credible accident scenarios, consequences and the corresponding probabilities
- Carry out risk assessment studies to ensure the protection of the public, property and environment in the neighboring areas and the marine traffic in Sri Lankan waters
- Provide training to all operators of plant and machinery, pipeline networks, consumer installations connected with the transmission, storage, distribution and utilization
- Arrange the issuance of permits to operators of domestically produced and imported forms of natural gas
- Establish and declare safety zones at every natural gas installation as per international requirements and maritime standards
- Install disaster management systems to prevent and mitigate adverse impact during natural gas operations
- Acquire appropriate schemes of insurance policy to cover vulnerable parties including employees, users as well as affected third parties in case of hazardous events

4.1.6.3. The Government, wherever found necessary, will take measures to introduce standard specifications with respect to the quality of domestically produced and imported forms of natural gas in the country, storage terminals, pipelines laid for transporting natural gas, and pipeline networks laid to distribute natural gas to consumers for mandatory compliance to be implemented through the Sri Lanka Standards Institution.

4.1.6.4. The Government will introduce necessary legal provisions and regulations with regard to safety aspects, making it an offence for a person to operate any domestically produced and imported forms of natural gas systems without complying valid safety measures accepted and prescribed by the GOSL.

4.1.6.5. The Government will also take necessary measures to strengthen the infrastructure and common safety facilities such as fire protection facilities at municipal or other local areas where domestically produced and imported forms of natural gas facilities are located.

4.1.7. Promotion of Consumption and Market Development

4.1.7.1. The Government will encourage and actively promote the use of NG in various economic uses such as electric power generation, thermal applications in industry, transportation, households and commercial establishments and as a raw material for industrial products (*e.g*. fertilizer, methanol, ethanol and formaldehyde).

4.1.7.2. To achieve this, strategic measures will be taken to facilitate establishing competitive and efficient domestic and export markets for natural gas, enabling Sri Lankan entities to participate effectively in the natural gas business. Accordingly, the following measures will be taken to promote the use of NG in different sectors :

- Grant duty and other tax concessions as relevant for industries that use natural gas for importing items of plant and machinery which operate with gas including vehicles, enabling rapid shifting to NG
- Provide technical and financial assistance to industrialists willing to convert their thermal energy generation units from oil to NG
- Expedite the acquisition of technology for converting into natural gas by offering technical assistance through relevant government agencies

- Build up necessary legal and institutional support, safety guidelines and common physical infrastructure facilities for the supply of domestically produced and imported forms of NG to consumers interested in shifting from other fossil fuels
- Encourage the participation of the private sector in the distribution and retail of NG under the purview of the PUCSL

4.1.7.3. The Government will always encourage the development of open and competitive market structures along the supply chain of NG as well as natural gas markets in different economic sectors in Sri Lanka through formulation and implementation of appropriate policies and strategies that promote competition and private sector participation.

4.1.7.4. The Ministry, with the assistance of regulators involved with up-, mid- and downstream segments of natural gas supply chain and active operational support of existing and proposed state-owned industry operators, will take appropriate measures to prevent the accumulation and concentration of market power in the hands of few powerful players or creation of monopolies in a manner unfavourable to consumers, other market operators and the public, whenever it perceives necessary.

4.1.8. Capacity and Local Content Development

4.1.8.1. A progressive development of the national capacity in the up-, mid- and down- stream operations of the natural gas industry is anticipated from implementing the NPNG. This will be achieved through enhanced collaboration with key stakeholders of the industry such as investors, developers, contractors/ sub-contractors, technical experts etc. so that opportunities are made available for Sri Lankans by way of employment, technical know-how, managerial skills and productive capital assets.

4.1.8.2. The Government will take measures to enhance the local content of the natural gas industry through encouraging industries that use gas as a feed stock and/or energy source by offering appropriate incentive schemes as proposed in the policy statement 4.1.7.2. Such schemes will aim at generating direct and indirect employment opportunities, enhancing productive skills of local communities, creating business opportunities for local entrepreneurs, increasing the competitiveness of local enterprises, developing local infrastructure facilities and improving the efficiency of local institutions.

4.1.8.3. Development of a viable natural gas industry in the country requires the support of specialized ancillary services/industries dealing with functions such as shipping, logistics, energy, machinery, and transportation. The Government will introduce necessary supportive measures to facilitate the establishment and development of a cluster of ancillary services/industries as an essential part of local content development.

4.1.8.4. Industry stakeholders will be encouraged to undertake prioritized local community development programmes to share benefits with local communities and enhance the social standing and acceptability of ventures.

4.1.8.5. In addition, the national capacity will be increased through targeted government interventions in the following areas :

- Strengthen local universities, technical colleges, vocational training centres and relevant accreditation bodies for imparting requisite technical and management skills involved in natural gas industry to Sri Lankans
- Facilitate international collaboration in education, research and exchange of data and information on the gas industry
- Engage investors and developers to provide internship opportunities for undergraduates, postgraduates, postdoctoral and vocational trainees.

- Establish a Centre of Excellence (COE) for natural gas technology with public private partnerships to promote knowledge, skills and innovations in technology and management. This will engage personnel presently employed overseas in the petroleum industry including Sri Lankans with sufficient experience regarding technical, financial, legal and health and safety and environmental aspects of the natural gas industry
- Establish and develop a comprehensive Information and Communication Technology based (ICT-based) natural gas information system that gathers information from multiple stakeholders of the industry involved in different stages of the value chain from well to end-user. The information system will be updated regularly and be used for planning, policy development and management improvement
- Develop local competencies in ancillary services such as repair and maintenance activities
- Develop effective communication strategies and programmes to inform the public on the development of Sri Lanka's natural gas industry to inculcate a sense of commitment and purpose
- Levy a nominal fee or impose a nominal duty on the LNG imported to or exported from the country to be used for the sustainable development of the upstream, midstream and downstream petroleum industry
- Strengthen the National Gas Company (NGC) to participate strategically in developing local capacity and competency

4.2. Policies to address sector specific issues of use of Natural Gas in main economic sectors

Sri Lanka can anticipate progressive penetration of natural gas in several sectors of the economy through the implementation of National Policy in years to come. The power sector is expected to make the shift first by displacing higher-cost fuels, to be followed gradually by industry (both as a fuel and feedstock), transport and household and commercial sectors. The use of NG in individual sectors involves different technical and management issues that cannot be addressed by general cross-cutting policy. The NPNG recognizes the necessity of formulating policy to address sector-specific issues. Accordingly, policy statements applicable to the use of NG in power generation, transportation, industry, households, and bunkering are presented in this section.

4.2.1. Use of Natural Gas in Power, Transport, Industry and Household Sectors

4.2.1.1. The Ministry along with the relevant agencies will take measures to systematically assess the feasibility of introducing and promoting the use of natural gas in power, transport, industry and household and commercial sectors focusing on the following areas :

- The current profile of energy use in respective sectors, their adaptability to, and advantages of, shifting to NG
- Sector-specific infrastructure development needs, technology, and training needs to introduce NG as a source of energy and/or industrial feedstock
- Specific roles, relevant areas of involvement and scale of investment demanded from public and private sector stakeholders to make the shift
- Willingness and capacity of public and private sector stakeholders in respective sectors to make necessary investments to switch from the current source of energy to NG
- Key environmental and socio-economic impacts associated with the conversion to natural gas in different sectors
- Health and safety standards applicable to different forms of NG use (*e.g.* motive energy, thermal energy, industrial inputs) in respective sectors
- Comparative assessment of switching costs and potential benefits due to shifting from the current source of energy to natural gas.

4.2.1.2. Depending on the outcome of such assessments, the use of NG will be promoted in strategically selected sectors and activities by offering appropriate incentive schemes as proposed in the policy statement 4.1.7.2.

4.2.1.3. The Gas Utilization Master Plan (GUMP) proposed in the policy statement 4.1.5.9 will cover practical near term (five years) sector-specific actions and strategic interventions for promoting the use of NG in the power, transport, industry and household and commercial sectors, as well as long-term projections for the utilization or promotion of natural gas based on future development projects in alignment with National Energy Policy. The GUMP will be reviewed every five years.

4.2.1.4. Special attention will be directed at the reticulation (distribution) systems of natural gas for different uses/sectors to identify areas where specific policy interventions are needed. The proposed National Gas Company (NGC) and the CPC, under the direction and guidance of the Ministry, will look into the matters relating to the distribution of NG within the country, providing technical assistance and institutional support to prospective public and private sector investors involved.

4.2.1.5. The supportive arrangements proposed in section 4.2.1.4 will focus on the following areas of NG distribution :

- Ensure timely and uninterrupted supply to users/sectors that require NG, causing least damage to the environment and least inconvenience to the public with minimum risk of hazards
- Provide technical assistance and guidance as required for the construction of distribution facilities including pipelines, gas compression stations, CNG filling stations, remote LNG storage and re-gasifying stations, Gas-To-Liquid (GTL) processing plants and eventually liquefaction export terminals
- Assist in getting the necessary approvals and licenses from relevant authorities for undertaking distribution activities
- Authorize and oversee the establishment of Regional Centres (RCs) for the distribution and storage of any form of NG (CNG, LNG) by road, rail or pipeline
- Facilitate the distribution of NG from RCs to major consumer points such as industrial zones, housing schemes and condominiums and fuel dispensing outlets and development of local city-gas pipeline networks to individual homes
- Conduct public awareness campaigns to consumers supplied by pipelines through local networks about the risks involved and precautionary measures necessary to minimize hazards
- Ensure mandatory training of personnel that handle distribution of gas either by specialized trucks or by pipelines on safety standards, and formulate guidelines and protocols to be followed by the operators
- Authorize and oversee the establishment of natural gas and any form of NG (CNG, LNG, *etc*.) at fuel outlets along major roads including expressways to feed vehicles running on natural gas

4.2.2. Bunkering and exports

4.2.2.1. Operation of ocean-going vessels with LNG is an emerging trend in the shipping industry mainly driven by environmental concerns and requirements to reduce emissions, as evidenced by the IMO 2020 Low Sulphur Rule. The Government will take necessary measures to capture the market opportunities that open up as a result of this trend, in the form of LNG bunkering facilities to serve vessels operating on LNG.

4.2.2.2. The Government will encourage and facilitate the establishment of bunkering facilities in relevant ports using either domestically produced and liquefied or imported LNG under the most economically

viable commercial structure, which may be public, private, or public-private partnership arrangements.

4.2.2.3. In the case of selling LNG to other countries as an export product or to vessels calling for bunkering services, prices will be determined based on enhancing Sri Lanka's competitive position in the industry, taking into account regional and other relevant benchmarks.

5. Applicability and Scope

The scope of the NPNG, in principle, covers the entire range of activities involved in up-, mid- and down-stream segments of the natural gas value chain, taking the supplies from both domestic production (from indigenous resources) and imports of any form of natural gas into account. However, up-stream activities, being involved with exploration and development of indigenous resources, will be guided in more detail by policy documents formulated under the upstream segment. Hence, this National Policy focusses more on mid-stream and down-stream linkages in natural gas value chain that involve gas demand creation, supply, processing, liquefaction, transportation, storage, regasification, distribution, and other ancillary services.

6. Policy Implementation

The success of achieving the policy goals of NPNG will be determined by the level of efficiency and effectiveness of implementing proposed policy interventions. Therefore, the NPNG outlines a broad implementation strategy, with overall responsibility and authority for monitoring and evaluating progress resting with the NGC. More detailed strategies with specific activities that are necessary for the implementation of each policy intervention in the NPNG will be designed and allocated to relevant stakeholders by the Ministry, if necessary with the approval of the Cabinet of Ministers, during the course of implementation. The Gas Utilization Master Plan (GUMP) proposed in the policy statement 4.1.5.9 will provide the means for consolidating the efforts of multiple stakeholders for successful implementation of the NPNG.

6.1. Implementation Strategy

Given the complexity of gas value chains and the challenges involved in introducing a natural gas industry from the ground up, the Government intends to adopt a phased implementation strategy. This will be comprised of the following major steps.

- **Preliminary coordinating and cooperation building measures**: This will involve undertaking essential coordinating activities by the Ministry such as initiating inter- agency communications, nominating focal points at agency level, appointing multi- agency coordinating committees, identification of specific roles and responsibilities of existing agencies and preliminary review of activities, stocktaking and preliminary planning.

- **Initiating interventions feasible within the existing legal and institutional framework**: Making use of the coordinating mechanism developed in the preliminary stage, stakeholders will jointly identify interventions that can be initiated within the existing legal and institutional framework and take necessary measures to implement them.

- **Incorporation of structural changes in legal, institutional and regulatory frameworks**: While implementing the interventions that are feasible with the existing framework, the Ministry will coordinate with relevant stakeholders to identify and incorporate the necessary structural changes in their respective legal, institutional and regulatory frameworks that are required for implementation of specific policy interventions.

- **Preparation and launching of the GUMP**: This will involve carrying out stakeholder consultations, identification of goals and targets within a five-year planning horizon, preparation of the GUMP by compiling specific strategies and activities with timelines, identification of responsible agencies for specific actions, developing Monitoring & Evaluation framework and launching of planned activities within the prescribed timeframe.

The tentative time plan of the implementation strategy will be:

Step of Implementation	*Tentative Timeline*
Preliminary coordinating and cooperation building measures	Within 3 months of the Cabinet Approval of this Policy
Initiating the interventions feasible within the existing legal and institutional framework	Within 8 months of the Cabinet Approval of this Policy
Preparation and launching of the GUMP	Within one year of the Cabinet Approval of this Policy
Incorporation of structural changes in legal, institutional, and regulatory frameworks	Within 18 months of the Cabinet Approval for this policy

6.2. Responsibility and Authority

The main responsibility of implementation of the NPNG lies with the Ministry. The Ministry is vested with the decision-making responsibility of exploring, producing, importing, storing and distribution of natural gas in collaboration with relevant stakeholders and institutions so that natural gas is made available to potential consumers at affordable prices. The Ministry will take the leadership of implementing the NPNG fulfilling necessary management and coordination functions to achieve the goals and objectives of the Policy.

In this connection, the Ministry will be assisted by the line agencies coming under its own purview as well as other ministries and line agencies, depending on the area of policy interventions concerned. The Ministry will be directly assisted by the Petroleum Resources Development Secretariat (PRDS) in the implementation of policy interventions that are concerned with the commercial development of indigenous resources of natural gas. The responsibility of regulating the exploration and production of NG from indigenous sources up to the point of title transfer is vested with the PRDS, and will be legislated accordingly. The Ministry will also draw upon expertise and technical knowledge that exists within existing agencies such as Ceylon Petroleum Corporation (CPC) which has a mandate relevant to importing and distribution of petroleum in the country, and the Ceylon Petroleum Storage Terminals Limited (CPSTL).

The Ministry will also establish new institutional arrangements to implement the proposed policy interventions, as proposed in the policy statement 4.1.5. To handle all government economic transactions relating to the natural gas industry in the country, the Ministry will establish the 'National Gas Company' as proposed by the policy statement 4.1.5.6, with necessary powers, resources and operational independence. As proposed in the policy statements 4.1.5.2 and 4.1.5.3, smooth functioning of these institutional arrangements may require introducing appropriate provisions and regulatory mechanisms in law. As laid down by the different policy statements, the institutions with key implementation responsibilities include the following.

Agency	*Major Role/Responsibility*
Ministry in charge of the subject of petroleum resources development	Policy direction, guidance, inter-agency coordination and overall supervision of implementation of NPNG
Petroleum Resources Development Secretariat (PRDS)	Up-stream natural gas industry regulator
National Gas Company (Proposed by the NPNG)	Single Credible Entity (SCE) for handling all government economic transactions pertaining to natural gas, including private public partnership (PPP) ventures; technical and institutional assistance for implementation of NPNG
Public Utilities Commission of Sri Lanka	Mid- and down-stream gas market regulator
Ceylon Petroleum Corporation (CPC)	Technical and institutional assistance for implementation of NPNG

The Ministry will also have to work with several regulatory bodies to achieve the goals and objectives of the NPNG. These will include national government agencies such as the Public Utilities Commission of Sri Lanka (PUCSL), Central Environment Authority (CEA), Marine Environmental Protection Authority (MEPA), Directorate of Merchant Shipping (DMS), Coast Conservation and Coastal Resource Management Department (CCCRMD) and the Motor Traffic Department (MTD). The Ministry will initiate appropriate coordination mechanisms such as appointing 'Inter-ministerial Working Groups' to enlist the cooperation of such agencies whenever necessary.

The NPNG may be comprised of interventions that need the support of sub national agencies such as Local Government Authorities too. Ministry will accordingly take steps to coordinate with sub national agencies when their assistance is required for implementation of the NPNG.

In addition, successful implementation of the NPNG will require close communication, cooperation and coordination with the private sector and other non-state actors. As suggested in the policy principle 3.5 and the policy statement 4.1.5.6, the foundation for effective engagement of non-state actors is establishing a robust regulatory framework. The Ministry will initiate actions to establish a regulatory mechanism for governance of natural gas industry as an urgent priority for implementation of the NPNG.

6.3. Monitoring and Evaluation

For successful implementation of proposed policy interventions, a well-defined Monitoring and Evaluation (M & E) Framework will be introduced by the Ministry with the following key elements.

- Organizational set-up for implementation of the NPNG and GUMP with specific roles and responsibilities of each stakeholder agencies
- Actions identified for each agency with well-defined timelines
- Protocols and procedures for collection of baseline data, coordinating actions of key stakeholders and reporting the progress
- Indicators for:
  defining benchmarks, measuring goals and targets, establish key performance indicators for each stakeholder
- Timeframes for periodic evaluation
- Guidelines for undertaking monitoring and evaluation functions

The M & E framework will assess the effectiveness, efficiency, sustainability, and the impact of the policy interventions with timely inputs for necessary corrective actions. The proposed ICT- based natural gas information system in section 4.1.8.5 will facilitate and enhance the implementation of the M & E framework.

Glossary

Fossil fuels	Naturally occurring organic fuel compounds found in the earth's crust, E.g. petroleum, coal or natural gas.
Hydrocarbons	Organic compounds comprised of hydrogen and carbon. Hydrocarbons may exist in gaseous, liquid, or solid forms.
Petroleum	A generic name for hydrocarbons that include crude oil, natural gas and their products.
Petroleum oils	Liquid hydrocarbons of different molecular weights that are resulted as outputs of the process of refining naturally occurring crude oil. Examples are petrol, diesel, kerosene and furnace oil.
Natural gas	A naturally occurring mixtures of hydrocarbon compounds found in the gaseous phase often in association with crude petroleum in natural underground reservoirs at reservoir conditions. The principal hydrocarbons usually contained in natural gas are methane, ethane, propane, butanes, and pentanes. Natural gas may be associated with small quantities of various non-hydrocarbons too such as carbon dioxide, helium, hydrogen sulphide, and nitrogen.
Biomethane	Biomethane, also known as renewable natural gas or Sustainable Natural Gas (SNG), is a biogas obtained from biomass which has been upgraded to a quality similar to fossil natural gas and having a methane concentration greater than 90%. .
Liquefied Natural Gas (LNG)	Natural gas cooled to extreme low temperatures (<-160°C) so that it becomes liquid, making it more convenient and less risky to store and transport. It is made through process known as liquefaction undertaken in liquefaction plants.
Compressed Natural Gas (CNG)	Natural gas compressed into cylinders/ tanks, mainly to be used as an alternative liquid fuel in road vehicles. CNG relies on applying pressure as the mechanism to reduce the volume.
Liquefied Petroleum Gas (LPG)	Light hydrocarbons that are held in the liquid state by applying pressure at normal temperatures and pressures to facilitate storage, transport and handling. Commercial LPG comprised mainly of either propane or butane, or their mixtures.
Feedstock Gas	Dry gas used as raw material for industrial processes involving production of petrochemicals and other industrial outputs
Liquefaction	Process that converts natural gas into LNG. It requires removal of latent heat over a wide temperature range using a refrigerant.

Compression	Process of contracting a volume of gas into a smaller space resulting in CNG
Regasification	Process that converts LNG back to its gaseous form by applying heat so that the gas can be delivered into a pipeline system.
Upstream Gas Industry	Term usually used to describe exploration and production activities in the gas industry up to the point of piping or shipping.
Downstream Gas Industry	Commercial gas operations closer to the end-user involving selling and distribution of natural gas.
Midstream Activities	The activities that lie between the *Upstream* and *Downstream* sections of the gas supply chain mostly involving pipeline transportation of raw natural gas to a processing facility.
Storage	Maintaining a reserve of natural gas supplies to meet seasonal demands by storing them in tanks.
Pipeline	Pipe-based system for the transportation natural gas between two points, either offshore or onshore including other facilities located in stations such as valves and/or pig barrels required for isolating, measurement, gathering, transportation, and distribution of gas.
Price Indexation	The practice in which a contract price is linked to price of another, product (usually less complex) or economic indicator allowing the resulting price to vary according to another factor. Gas contract prices are often linked to major crude oil indices, certain fuel oil prices, or, less frequently, energy or economic growth indicators.
Spot price	Price offered in short-term buying and selling of natural gas
Classification Societies	Private organisations that arrange inspections and advise on the condition of ships (including the vessels that transport gas), supervise vessels during and after their construction to assess their seaworthiness, and place vessels in grades or classes. The major classification societies have included the International Maritime Organisation (IMO) LNG Gas Codes in their rules.

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