

1 INTRODUCTION

1.1- Background of Project

Combination of rising oil consumption and limited indigenous growth in oil production has compelled Pakistan to increasing its oil imports from Middle East exporters. Additionally, the lack of refining capacity has left the country with no choice but to depend heavily on import of refined petroleum products.

Among all those energy alternatives, natural gas is the cheapest and most environmental friendly source of energy. Natural gas is the only face saving indigenous resource that accounts for the largest share of Pakistan's energy usage, amounting to about 50 percent of total primary energy consumption.

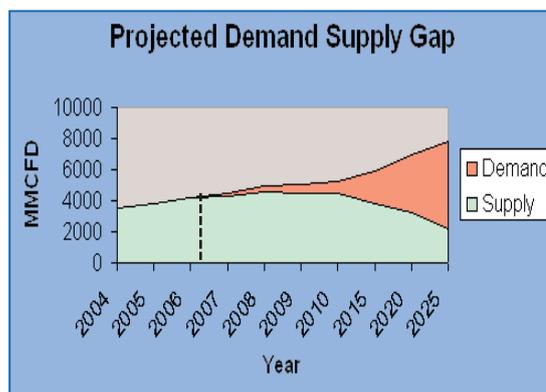
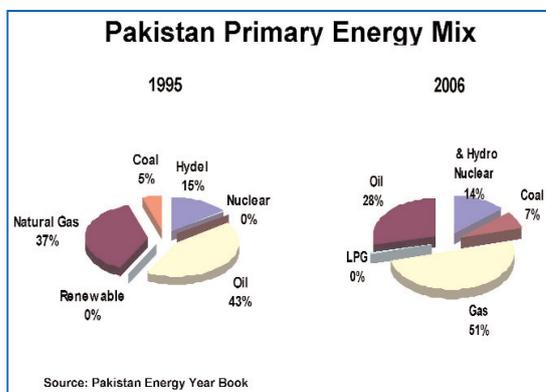
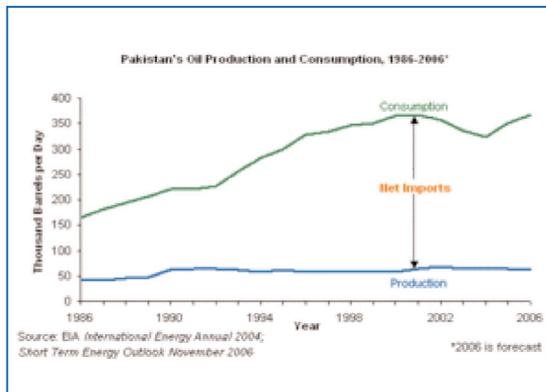
This entails consumption of its entire domestic natural gas production, and with no substantial addition in sight the country is set to become a natural gas importer.

The actual demand and supply gap was 650 mmscfd in 2007 which is increasing every year to reach 762 mmscfd in 2010, 2,169 mmscfd in 2015 and 3,709 mmscfd in 2020. Pakistan is exploring all possible avenues for cheap, abundant and environmental friendly sources of energy in order to continue with rapid economic growth in the coming years. This includes the pipeline and liquefied natural gas (LNG) import options to meet the expected growth in natural gas demand.

Government of Pakistan (GOP) has, in order to bridge the gap between supply and demand in energy allowed the import of LNG from countries, which have extensive gas reserves and have planned liquefaction plant for its export. GOP has therefore invited private entrepreneurs in energy sector to establish LNG Terminal.

Associated Group (AG), the proponent is actively engaged in the Energy Sector, particularly LPG business in Pakistan. Pakistan Gasport Limited (PGPL), a subsidiary of AG has recently secured a NOC from the GOP for LNG import and establishment of LNG terminal. This is in line with the recently introduced LNG import policy, announced by GOP after detailed studies.

After examining alternative sites, PGPL has opted to establish LNG terminal at a location in Kadiro creek, linking main Navigation Channel with Korangi Creek in Port Qasim waters. PGPL has an Implementation Agreement with PQA on BOT basis with a lease for 30



years and renewable for another 30 years. Port Qasim Authority has, after discussion and completion of necessary formalities, agreed to the proposed location.

1.2- Existing Scenario

LNG jetty will be the first of its kind in Pakistan. EVTL and PRO-GAS are the two jetties of LPG already established in Port Qasim. The designated area is a potential facility for hydrocarbon import business and is supplementing local energy supply system. The project will therefore be integrated into the infrastructure of Oil & Gas supply sector.

1.3- Purpose of this ESIA Study

The main purpose of this ESIA Study is to respond to provision of Environmental Protection Act 1997, to provide information on the nature and extent of environmental impacts arising from the construction and operation of the project and related activities that take place concurrently. The information provided by this study will contribute to decision making by the Director General of the Sindh Environmental Protection Agency (SEPA) on:

- The overall acceptability of adverse environmental consequences that may arise as a result of the project and its associated activities;
- The conditions and requirements for detailed design, and particulars about activities during construction and operations of the project, besides measures necessary to mitigate the adverse environmental consequences; and
- Assessment of impact of major LNG escape and consequential hazards
- The adequacy of proposed mitigation measures to deal with residual impacts after their implementation.

The ESIA study has been conducted with the following specific objectives:

- To describe the existing environmental setting of the project area;

- To summarise the project activities in relation to the environment;
- To ascertain relevant rules and regulations that are applicable to the project;
- To undertake the ESIA from the perspective of environmental and social parameters in the project area, and propose measures for sustainable development and mitigation of adverse impact.

1.4- Justification for ESIA Study

Section 12 of Pakistan Environmental Protection Act 1997 and Pakistan Environmental Protection Agency (PEPA) Review of IEE/EIA Regulations 2000 require that every new development project in Pakistan has to be preceded by an Initial Environmental Examination (IEE) or Environmental & Social Impact Assessment (ESIA) depending upon the size and severity of impacts anticipated on commissioning of the project.

PEPA Review of IEE/EIA Regulations 2000 categorises projects in two separate Schedules, which require either an IEE or an EIA. The LNG jetty comes under both Schedules which have port and harbour development projects listed. Schedule-I projects require an IEE and concerns ports and harbours having ship displacement of less than gross 500 tons. Schedule-II is applicable if the gross displacement exceeds 500 tons and requires an EIA. The LNG Jetty project falls under Schedule-II as it involves shipping activity having gross displacement above 500 tons and will thus require an EIA.

A copy of relevant sections of PEPA Review of IEE and EIA Regulations 2000 is attached as Annexure-I for ready reference.

1.5- Adopted Methodologies for ESIA

EMC adopted the following procedures for making assessment of impact of different activities during the construction, commissioning and operational phases on microenvironment and macroenvironment of the project activity areas:

1.5.1- Scoping Exercise

Holding meetings with PGPL Project Officials and other stakeholders to:

- Discuss and define the magnitude of study in the light of scope of work
- Programme a work schedule for collecting baseline data needed for Rapid Assessment of status of microenvironment at PGPL project site, and its surrounding i.e. macroenvironment, and
- Obtain information on location/technology alternatives and LNG/LPG import options.
- Incorporating views and comments of various stakeholders concerning the project so as to prepare a well-reviewed document for the presentation of impacts and suggested mitigation measures to the decision makers.

1.5.2- Literature Reviews

Preparation of this study has input from field data collected by Environmental experts during their visits to the site, meeting with PGPL Officials, EPA Sindh, Port Qasim Authority, stakeholders and the archives of the consultants. EMC contacted PGPL for the collection of project specific data such as design, site specification, soil survey, construction activities and operations as well as HSE and environmental management and emergency response plans which PGPL has for the management of LNG Jetty. The information so obtained was reviewed for better understanding of project by experts prior to conducting detailed site visits of project area.

In addition to that latest authenticated published data on the physical and social environment of the project area was reviewed to rationalize the information from the surveys and field data.

1.5.3- Surveys

EMC organised collection of information on settlements around project specific location within 5 km radius through socio-economic surveys conducted by socio-economic experts. Issues related

to project were discussed with the local inhabitants in meetings and their concerns were noted to assess in the impact study.

Surveys were also organised by marine biologist to investigate the aquatic habitat of the respective project area and to generate baseline for impact assessment.

1.5.4- Monitoring & Analysis

EMC acquired the services of SUPARCO (a well known government organisation) who deputed their personnel to conduct air quality monitoring for 24 hours to examine and establish air quality profile of the site and to assess the possible impact of round the clock operations at the LNG terminal. The monitoring results were analysed by SUPARCO experts to assess the trend in case of accidental release of LNG through non-point sources.

1.5.5- Identification of Aspects

The aspects identification and significance determination process is fundamentally important to investigate all concerned impacts and its assessment. This step gives a comprehensive inventory of the aspects. The aspects identified during this step cover all activities performed during construction/operations, products and services in order to determine those which have or can have significant impact on the environment.

1.5.6- Assessment of Anticipated Impacts

Environmental experts at EMC analysed and assessed the anticipated impacts that are likely to arise due to the identified aspects. This step was followed by the use of collected data for identification of impacts on human health and the environment and risks involved in different activities during construction, commissioning and operation phases of the project.

1.5.7- Preventive Measures & EMP

Based on the impacts identified, mitigation and control measures were proposed by the experts in

order to minimise the adverse impacts of construction of LNG jetty, pipeline and jetty operations on the environment. All mitigation measures were discussed in detail and an environmental management plan (EMP) has been developed to implement the mitigation measures in true sense. A monitoring plan has also been incorporated in the EMP to monitor all activities/mitigation measures and to identify positive/negative changes in the environment.

1.5.8- Documentation & Review

This is the final step that completes the ESIA study. The data generated during and for the study are compiled and examined by experts of the respective field. Sections of this report were prepared as the study progressed, by EMC office staff in coordination with experts. The report was finally reviewed by team leader, to assess its credibility in accordance with Pakistan's Environmental Regulations & Laws.

1.6- Organisation of this Report

Present report is organised in following manner:

Chapter-1 provides an introduction and background of the project and justification of ESIA.

Chapter-2 describes the LNG Jetty Project, its objective; its type and category; the alternative sites considered and reasons for selection of the preferred alternative; location of the facilities and project details while in operation along with proposed schedule for implementation.

Chapter-3 gives an overview of Policy and Legislation along with International Guidelines relevant to jetty operations and LNG to this ESIA.

Chapter-4 provides a description of the microenvironment and macroenvironment of the proposed LNG Import terminal site including the details on marine and terrestrial ecology.

Chapter- 5 presents the Social Environment of the proposed LNG terminal project area.

Chapter- 6 presents Stakeholder consultation meetings and public consultation and disclosure plan.

Chapter-7 describes the potential environmental and social aspects and impacts of LNG jetty, its pipeline and land based terminal on the different features of the micro and macroenvironment, and using the general guidelines presents a screening of potential environmental impacts at the designing, construction and operation stages. The screening includes the residual impact as a result of adoption of mitigation measures that may be needed for minimising the impact. Cumulative impacts of project are also presented in comprehensive manner.

Chapter-8 presents the environmental management that has been incorporated in the design and operation of LNG terminal.

Chapter-9 summarises the Report and presents its conclusions.

The eight chapters are followed by a series of Annexure that provide supporting information, including:

- Air quality monitoring
- Air dispersion modelling at different scenarios
- Soil investigation report
- World Bank Group's Pollution Prevention & Abatement Handbook, effective July 1998
- National Environmental Quality Standards, NEQS.

1.7- ESIA Study Team

This ESIA Report has been prepared by Environmental Management Consultants (EMC). EMC organised the following team for the purpose of conducting the environmental assessment and preparing the report:

S.No.	Name	Position
01	Syed Nadeem Arif	Project Manager
02	Mr. Saquib Ejaz Hussain	Deputy Team Leader/ESIA Specialist
03	Dr. Mirza Arshad Ali Beg	Team Leader & Principal Environmental Expert
04	Dr. Iqbal Ali	Expert in Hydrology
05	Dr. Badar Munir Ghauri	Expert in Air quality Management
06	Dr. Mansoor Imam	Expert in Solid Waste Management
07	Dr. Shaukat Hayat Khan	Expert of Marine Ecology
08	Dr. Shahid Alam	Expert in Jetty Structure & Design
09	Mr. Shahid Ali Lutfi	Environmental Engineer
10	Mr. Faiz Kakar	Expert in Social
11	Mr. Sarfraz Hussain	Archaeological issue
12	Mr. Sultan Mehmood Zaman	Geotechnical Expert