Initial Environmental Examination (IEE)

50 MW Solar PV Power Project, Kuchlak- III

ENGRO ENERGY LIMITED

IEE- December, 2018

PROJECT CONSULTANT:

Hope Environmental Consultancy Services, Balochistan

engro energy

Initial Environmental Examination (IEE)

50 MW Solar PV Power Project Kuchlak-I, Quetta Balochistan

Engro Energy Limited
16th Floor, Harbor Front Building, Marine Drive,
Block 4, Clifton, Karachi.
Tel #: +92(21) 35297875-84
+92(21) 35293665
Website: engroenergy.com

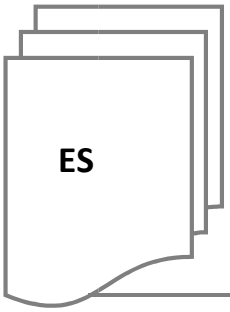
Contents

List of Figures:

List of tables:

Glossary:

ADB	Asian Development Bank
BEPA	Balochistan Environmental Protection Agency
BEPA	Balochistan Environmental Protection Act
BHw	Hot desert climate
CSR	Corporate Social Responsibility
DA	District Administration
EIA	Environmental Impact Assessment
EEL	Engro Energy Limited
EM	Environmental Monitoring
ESMC	Environmental and Social Management Cell
EMP	Environmental Management Plan
EP	Equator Principle
FGD	Focus Group Discussion
GoB	Government of Balochistan
IEE	Initial Environmental Examination
IFC	International Financial Corporation
KWAC	Killo Watts Alternating Current
MWAC	Mega Watts Alternating Current
M/S	Meter Per Sec
MJ	Mega Joules
MPPT	Maximum Power Point Tracking
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
PEPA	Pakistan Environmental Protection Act
WAC	Watts Alternating Current



Engro Energy Limited, 50 MW solar PV power Project, Kuchlak- III

EXECUTIVE SUMMARY

According to the report of NEPRA- National Electric Power Regulatory Authority "Pakistan is facing chronic electricity shortages due to demand growth, high system losses, seasonal reductions in the availability of hydropower and circular debt etc. Rotating power outages ("load shedding") are common and many villages are not yet electrified. The power sector of Pakistan is a mix of thermal, hydro, nuclear and renewable energy power plants. Originally the ratio of hydel to thermal installed generation capacity, in the country was about 67% to 33% (1985) but with the passage of time, due to different reasons more of thermal generation was added thereby reducing the share of hydel generation. At present, ratio of hydel to thermal installed generation capacity is about 30% to 65%. The dilemma for Pakistan is that its power production is dominated by thermal power plants running on oil and gas." (State of industry report 2017).

In above scenario solar power generation appears to be a viable and environmental friendly alternative for meeting Pakistan's urgent electricity demands. Solar energy source is widely distributed and abundantly available in the country. The total energy through solar has been recorded at 635 GWh for an increase of 410 GWh over the energy generated through solar during the FY 2015-16. (State of industry report 2017).

The mean global irradiation falling on horizontal surface is about 200-250 watt per sq.m in a day. This amounts to about 2500-3000 sun shine hours and 1.9 - 2.3 MWh per sq.met in a year. It has an average daily global insolation of 19 to 20 MJ/sq.met per day with annual mean sunshine duration of 8 to 8.5 hours (6-7hrs in cold and 10-12 hrs in hot season). To summarize, the sun shines for 250-300 days per years in Pakistan with average sun shine hours of 8-10 per day. This gives huge amount of energy to be used for electricity generation by solar power plants. (Electricity mix of Pakistan (2013-2014)

Engro Energy was incorporated in 2008 as a (100%) wholly-owned subsidiary of Engro Corporation to develop power projects in Pakistan and abroad. Currently, Engro Corporation's portfolio consists of varied businesses, which include fertilizers, foods, chemical storage & handling, commodity trading, energy and petrochemicals. EEL has recently been awarded the development rights, in the form of an LoI from the provincial government of Balochistan, to develop a 50 MWp solar PV power plant in Kuchlak, on approximately 250 acres of land. The power from the plant will be evacuated into the national grid (Shaikmanda).

Hope Environmental Consultancy Services herein after referred as 'HECS' was engaged by the EEL to develop the Initial Environmental Examination (IEE) study for 50 MW Solar PV project at Kuchlak.

Detailed analysis of major environmental and social impacts was performed, their corresponding mitigation measures were identified for the viability of the project.

For the effective implementation and management of the mitigation measures and monitoring requirements, an Environmental Managements Plan (EMP) has been prepared. The EMP is based on the requirements of the Pakistan Initial Environmental Examination, Environmental Impacts Assessment Review Procedures, 2000 and Balochistan Environmental Protection Act 2012. The relevant standard of Asian Development Bank (ADB) guidelines, equator principles and International Finance Corporation (IFC) were also considered during the preparation of the IEE study.

The management of the project shall supervise and monitor all the mitigation measures and their effectiveness. It explains and assigns the roles and responsibilities of work to the individuals of management and makes it easy to handle the issues with care. Procedures to work on EMP shall further develop by project proponent. The main aspects covered in the EMP include processes, management approach, organizational structure, roles, responsibilities, implementation levels and timelines. EMP encourages mitigation plans during installation, operation and needs of training.

Project Owner and their subsequent contractor(s) are required to follow the EMP. It is recommended that where necessary, proponent shall amend this EMP as per unaddressed matters and same must be shared with EPA-Balochistan for endorsement.

Based on the findings of the environmental assessment, and the suggested mitigation measures it is reasonable to suggest that the environmental impacts of construction and operation of proposed project are minor and can be mitigated by implementing the environmental management plan (EMP), which forms an integral part of the IEE.

Based on the conclusions of the IEE Study and on the assessment made with professional judgment, it is safe to recommend approval of the findings since the proposed development meets the provisions of sustainability principles in providing the benefits of economic gains while sustainably modifying the social and physical environment.

Chapter 1

CHAPTER:1 INTRODUCTION

1. Project Proponent:

Engro Energy Limited (EEL) previously Engro Powergen Limited (EPL), intends to install 50 MWp solar PV power project in union council Kuchlak, district Quetta of Balochistan. Engro Energy was incorporated in 2008 as a (100%) wholly-owned subsidiary of Engro Corporation to invest and develop power projects in Pakistan and abroad. Currently, Engro Corporation's portfolio consists of varied businesses, which include fertilizers, foods, chemical storage & handling, commodity trading, energy and petrochemicals. EEL has recently been awarded the development rights, in the form of an LoI from the provincial government of Balochistan, to develop a 50 MWp solar PV power plant in Kuchlak, on approximately 250 acres of land. The power from the plant will be evacuated into the national grid.

Engro engagement in CSR: Among other corporate responsibilities engro strongly believe in social sector reforms in nearby communities of project area. In this regard Engro give prime focus to education, health, livelihood, and other social sector development. In the proposed project Engro intends to work in surrounding communities of target area, by establishing schools, rehabilitation and coping with other school needs.

1.1 Project Consultant:

HECS is registered with Security & Exchange Commission of Pakistan (SECP). HECS has conducted several Environmental Assessment reports for diversified clientele. The company has a qualified and experienced team of Environmental Experts having more than 20 years of experience in the field of environmental management and monitoring. The company has all the capabilities and expertise to carry out the activities and prepare the documents related to EIA & IEE.

Name	Title
Mr. Kaleem Ullah Khan	Environmentalist/Sociologist
Dr. Zahoor Ahmad Bazai	Environmentalist & Biodiversity Expert
Mr. Asad Agha	Geologist
Miss Humaira Shah	Community Development Expert
Eng. Meer Ahmad	Project Engineer
Mr. Haji Muhammad Ali	Field Surveyor
Mr. AmanUllah Khan	Monitoring Specialist

Table 1 HECS's IEE Team

1.2 Project Background and Justification:

According to NEPRA report (2017) The Government of Pakistan has been pursuing broad objectives for the power generation development including, renewable energy, moving to environmental friendly fuels and reduced dependence on imported fuels. Also, diversification of fuel resources and security of fuel supply were among its priorities. The addition of different new generation technologies shown above will change the power mix of the sector from Furnace Oil-based to Coal, RLNG and Renewables as no major addition has been planned on Furnace Oil. The following fig-1 shows installed capacity mix 2016-17 of NEPRA.

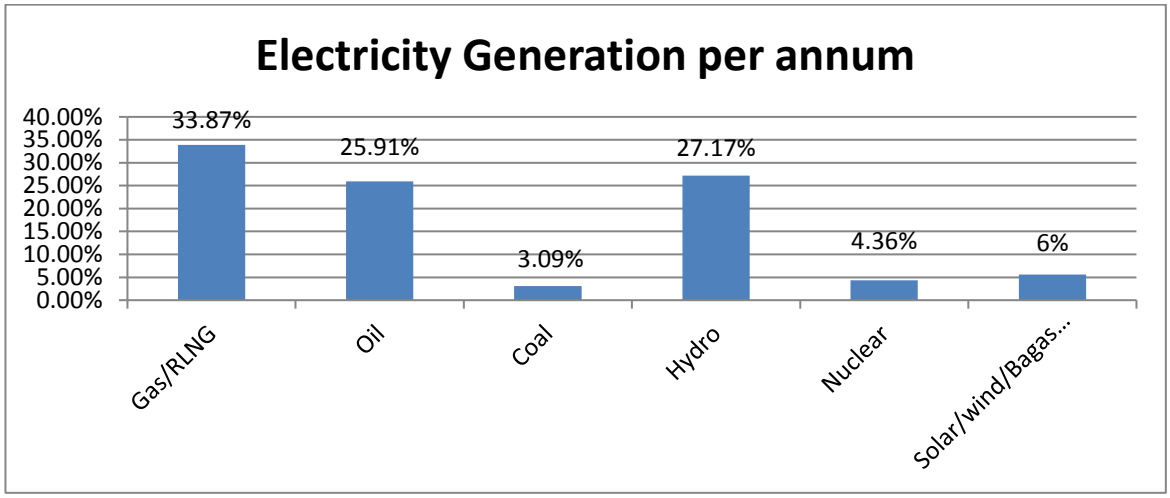


Figure 1: Installed Capacity Mix of Pakistan

Import of gas is a feasible option to overcome the reducing domestic reserves. However, gas import has significant issues, mainly the need for considerable capital investment in infrastructure, security difficulties and physical terrain concerns. Moreover, it would increase Pakistan's reliance on imported fuels with associated foreign exchange burdens. This must be considered in the context of rising fuel costs for gas and oil-based fuels as a result of uncertainty over future supply. In addition to this further fuel imports for electricity generation are the production of domestic coal, generation from hydro-electric power, or other renewable sources, such as wind and solar power. These options will assist in reducing Pakistan's reliance on imported oil and protect against resulting vulnerability to changes in global oil prices, which will in turn also have a positive effect on the current trade deficit and inflating import bill.

Regarding gas, safeguarding prospect provisions of domestic coal and hydro-electric power would require significant spending on infrastructure. While Pakistan has domestic reserves of coal, it currently makes up a very small proportion of the country's total power generation. This is due, in part, to the fact that most of the reserves are located in the remote Thar Desert region. Exploiting the coal reserves would require significant upfront investment in local infrastructure (including provision of water supplies), development of mines, housing and related infrastructure, and investment in transmission lines, as a pre-requisite to any power plant development. Thar coal power project by Engro Energy and Sindh Government (JV) is under completion with the capacity of 660 MW. In this regard 1st unit of 330 MW will be completed by December 2018 and the 2nd unit of same capacity will be completed by June 2019. (Source: NEPRA).

Hydroelectric power already supplies almost 27.17% of the domestic electricity that is generated, and numerous sites for future investment exist. However, due to their locations, this would also require significant investment in transmission and other infrastructure.

In above scenario solar power generation appears to be a viable and environmental friendly alternative for meeting Pakistan's urgent electricity demands. The development of solar power generation projects could reduce dependence on oil based thermal power generation, increase diversity in Pakistan's electricity generation mix, and reduce greenhouse gas emissions, all of which will contribute towards projecting a positive image of Pakistan within the international community. Also, the per kWh tariff for solar power projects globally are now comparatively lower than that of thermal projects; particularly the rental power projects, which were previously inducted to meet the urgent needs of electricity shortfalls.

1.3 Solar Resource Analysis of Pakistan:

Solar energy has excellent potential in areas of Pakistan that receive high levels of solar radiation throughout the year. Every day, for example, the country receives an average of about 19 Mega Joules per square meter of solar energy. Pakistan being in the Sun Belt is ideally located to take advantage of solar energy technologies. This energy source is widely distributed and abundantly available in the country. The mean global irradiation falling on horizontal surface is about 200-250 watt per sq.m in a day. This amounts to about 2500-3000 sun shine hours and 1.9 - 2.3 MWh per sq.met in a year. It has an average daily global insolation of 19 to 20 MJ/sq.met per day with annual mean sunshine duration of 8 to 8.5 hours (6-7 hrs in cold and 10-12 hrs in hot season) and these values are among the highest in the world. For daily global radiation up to 23MJ/m2, 24 (80%) consecutive days are available in this area for solar energy.

To summarize, the sun shines for 250-300 days per years in Pakistan with average sun shine hours of 8-10 per day. This gives huge amount of energy to be used for electricity generation by solar power plants. A quick idea for the potential of solar energy in Pakistan can be obtained from the satellite map of solar radiation released by Solar GIS and World Bank, shown in Figure 1 as below

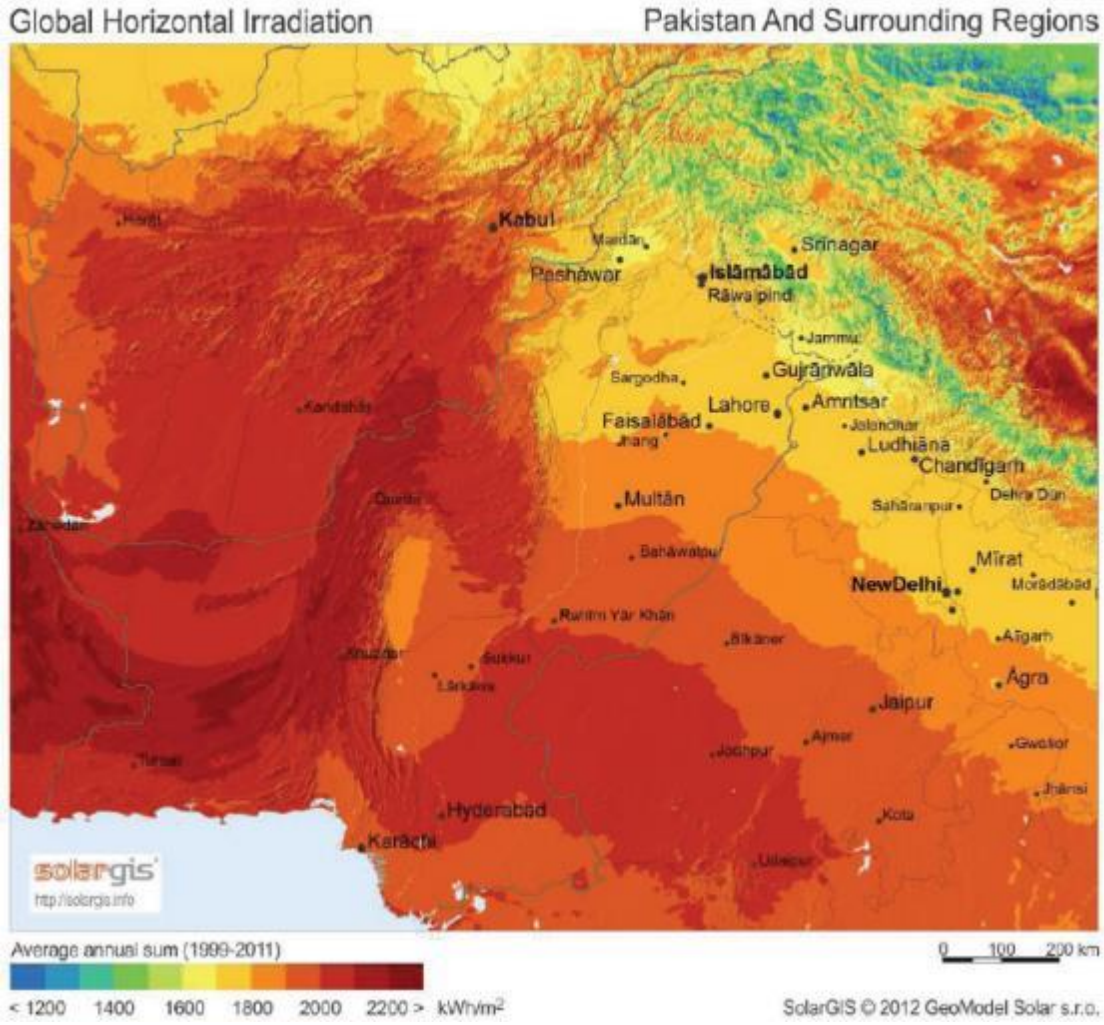


Figure 2: Global Horizontal Irradiation

1.4 Nature and Location of Project:

The proposed solar pv project of 50 MW will be installed in UC Kuchlak at District Quetta. The solar energy is radiant light and heat from sun which has been harnessed since generation for cooking, heating, lightening and power generation. The key features of the project location include 'Hot and Dry' climatic zone of the area comprises extreme weather conditions of the hot desert. There are no shading elements like high mountains, large sand dunes, trees available on the site. The entire area is shadow free. NHA (N 25) road is located on 100 to 150m from project area. Whereas construction of bypass near project area is underway connecting Quetta and Kuchlak. The Airport of Quetta (nearest to project area) is about 25 km from location. Kuchlak bazar is the nearest market at a distance of 06 km. Kuchlak station is the nearest railway station from the location. The available health facility in Yaro- BHU which is at a distance of 3km from the project site and the catchment areas comprise population of around 18,000 individuals. (Data collected from staff of BHU Yaro). Sheikhmanda and Yaro are the main grids for power evacuation.

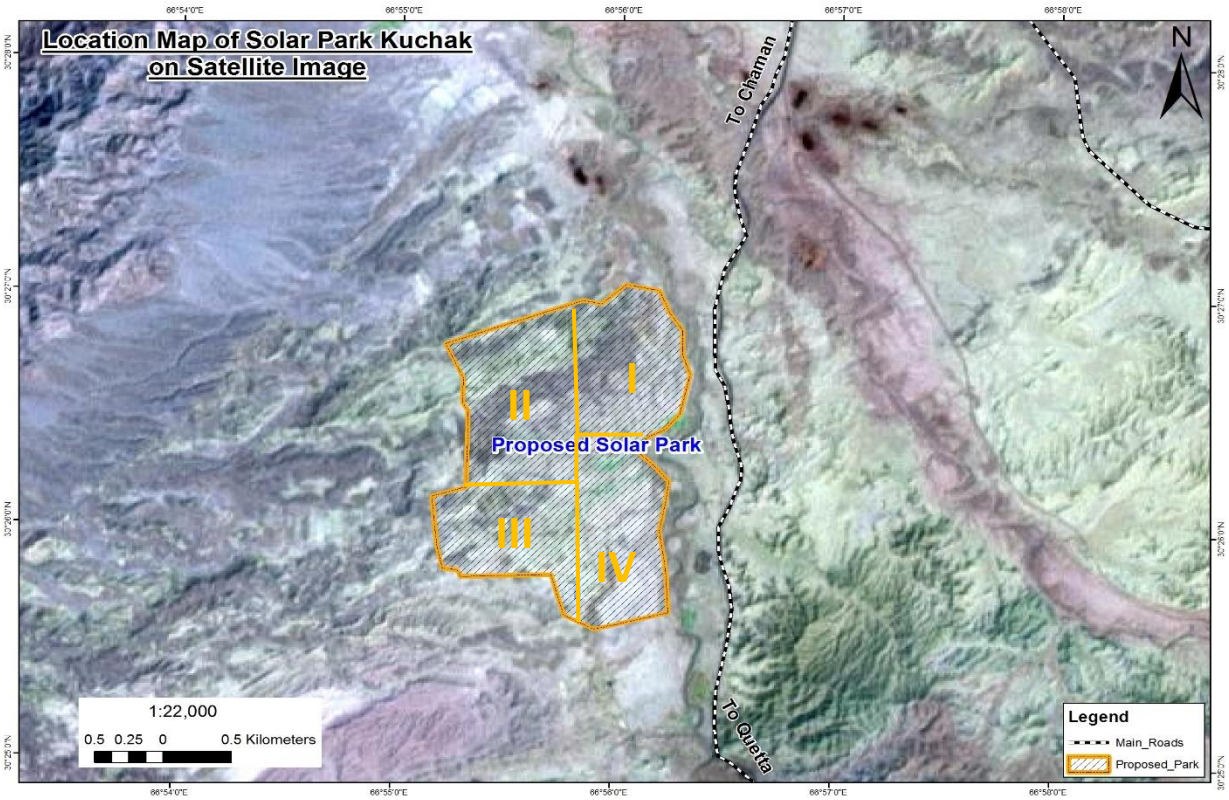


Figure 3: Satellite image of project area

Figure 4 -Tehsil Map of Project area

1.5 Category of the Project:

The section 12 of Balochsitan Environmental Protection Act 2012 states that "No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof". Since Balochistan government is in process of development of own regulations therefore EIA/IEE regulation 2000 is practiced/implemented in the province for identifying the project categories under schedule I & II. The present IEE report has identified the significant environmental and social aspects and screened the potential aspects to ensure that the likely impacts due to proposed activities during construction, installation of Solar PV and operation of the proposed project, and the residual impact on adoption of mitigation measures have been critically assessed with respect to compliance with the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000, Punjab Environment Protection Act 1997 (Amended 2012) and Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014.

The document has also been made to comply with the requirements of ADB's safeguard policy statement, 2009 as well as local and national standards. To comply with other lender's requirement, the IEE report also addresses equator principles, IFC's and World Bank group performance standards which will be met by the project.

1.6 Approach and Methodology of IEE:

A team of experts was involved in the study conducted by HECS. EEL sponsored 10 students (as interns) from three different universities of Balochistan to be the part of the study under the guidance and supervision of HECS team. The study team along with students made walk through and meandering survey of the project site to identify the environment structure and potential aspects which need to be taken into account. The consultants have addressed environmental aspects by furnishing information on physical, biological and socio-economic environments. The methods followed for each are given under the respective heading below.

1.6.1 Orientation Session:

Meetings and discussions were held with the relevant key officials of project and students to achieve a common ground of understanding on the IEE study of solar PV 50MW power project. The consultants followed best practices and standards to complete this assignment within the agreed scope of work. Environmental checklist was developed to collect all the concerned environmental data relevant to the project. Documentation check was carried out in detail during meeting session with proponent. The team physically and visually observed the project site. Photographic evidence was taken to verify the information gathered through, observation, interviews with the community and other stakeholders.

1.6.2 Data Analysis:

Based on the information collected through primary and secondary sources, various actions or activities having potential to cause damage to environment were listed. The aspects were identified for all various process of the project. For evaluation and prediction of various

environmental impacts, quantitative and qualitative descriptions of the anticipated project impacts were made. The identified impacts were further evaluated for their significance level.

Based on the significance of the impacts, mitigation measures for each negative impact were suggested. Approach for suggesting mitigation measure was as follows, in the descending order of preference:

Avoiding the impact altogether by not taking a certain action or parts of an action i.e. evaluation of project alternatives;

Minimizing impacts by limiting the degree or magnitude of the action and its implementation;

Rectify the impact by repairing, rehabilitating, or restoring the affected environment;

Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action; and compensate for the impact by replacing or providing substitute resources or environments.

A conceptual environmental management plan (EMP) for smooth and effective implementation of all recommended mitigation measures was developed and included in the report.

1.6.3 Legislative Review:

Information on relevant legislation, regulations, guidelines, and standards reviewed and compiled.

1.6.4 Reporting:

This IEE report has been prepared under the guidelines of BEPA and shared with the proponent for their comments/feedback. The draft report is finalized, after review and comments by the proponent. The consultants discussed the comments with proponent before incorporating them in the final report. After the comments are incorporated, the final report is submitted to the proponent, for onwards submission to BEPA.

1.6.5 Limitations:

This document has been prepared drawing inferences from site visits, primary data and secondary information. The study has been conducted by the consultants in a manner consistent with the level of care and skill exercised by members of environmental experts and consulting profession. The consultants have tried to cover all important aspects and relevant impacts of the proposed project. It should be recognized that the passage of time affects the information given in this report, environmental conditions of a site can change. Opinions relating to the specific conditions are based upon information that existed at the time the conclusions were formulated.

Chapter 2

CHAPTER:2 PROJECT DESCRIPTION

2. The Project Overview:

Engro Energy Limited (EEL) previously Engro Powergen Limited (EPL), intends to install 50 MWp solar PV power project in union council Kuchlak, district Quetta of Balochistan. Engro Energy was incorporated in 2008 as a (100%) wholly-owned subsidiary of Engro Corporation to develop power projects in Pakistan and abroad. Currently, Engro Corporation's portfolio consists of varied businesses, which include fertilizers, foods, chemical storage & handling, commodity trading, energy and petrochemicals. EEL has recently been awarded the development rights, in the form of an LoI from the provincial government, to develop a 50 MWp solar PV power plant in Kuchlak, on approximately 250 acres of land. The power from the plant will be evacuated into the national grid.

2.1 Project Area & Location:

The proposed project of 50 MW solar pv will be installed in UC Kuchlak at District Quetta. The solar energy is radiant light and heat from sun which has been harnessed since generation for cooking, heating, lightening and power generation. The key features of the project location include 'Hot and Dry' climatic zone of the area comprises extreme weather conditions of the hot desert. There are no shading elements like high mountains, large sand dunes, trees available on the site. The entire area is shadow free. NHA (N 25) road is located on 100m to 150m from project area. Whereas construction of bypass near project area is underway connecting Quetta and Kuchlak. The Airport of Quetta (nearest to project area) is about 25 km from location. The available health facility in Yaro- BHU which is at a distance of 3km from the project site and the catchment areas comprise population of around 18,000 individuals. (Data collected from staff of BHU Yaro). Kuchlak bazar is the nearest market at a distance of 06 km. Kuchlak station is the nearest railway station from the location. Sheikhmanda and Yaro are the main grids for power evacuation.

2.2 Project Description:

S. No.	Particulars	Details
A.	Nature of project	50 MW Solar PV Power Project
B.	Size of project:	
1.	Total land required	250 Acres

2.	Proposed Production capacity	50 MW
C.	Project Location	
3.	UC	Kuchlak
4.	Tehsil	Quetta
5.	District	Quetta
6.	Province	Balochistan
7.	Latitude	30^0 25' 66.54" N
8.	Longitude	66^0 55'10.46" E
D.	Environmental Settings Details	
10.	Nearest Famous Location	Kuchlak Bazar
11.	Nearest Highway	Main Quetta Chaman Road
12.	Nearest Airport	Quetta International Airport
13.	Ecological Sensitive Areas (National Park, Wild Life Sanctuaries, Biosphere Reserves etc.)	Nil
15.	Seismic Zone	Most Active Seismic Zone of Pakistan
16	Type of System	Solar PV Technology
17	Type of PV module	Mono Perc
18	Proposed Capacity	50 MW
19	Proposed capacity of each Module	370 watts
20	Model of Solar PV Module	JA Solar 370 Mono Perc
21	Total Number of PV Module	135,184
22	Inverter Model	SG2500HV
23	Annual Electricity Supply to Grid	112,759 MWh

Table 2 Project Description summary

2.3 General:

Quetta is the provincial capital and largest city of Pakistan with population of 2 2 , 0 0 0 , 0 0 individuals (2017 census). The city has been known as the fruit garden of Pakistan, due to the numerous fruit orchards in and around it, and the large variety of fruits and dry fruits produced there. The immediate area has long been one of pastures and mountains, with varied plants and animals relative to the dry plains to the west. Quetta is at an average elevation of 1,680 meters (5,510 feet) above sea level, making it Pakistan's only high-altitude major city. Located in northwestern Baluchistan near the Pakistan-Afghanistan border, Quetta is a trade and communication center between the two countries. The city lies on the Bolan Pass route which was once one of the major gateways from Central Asia to South Asia.

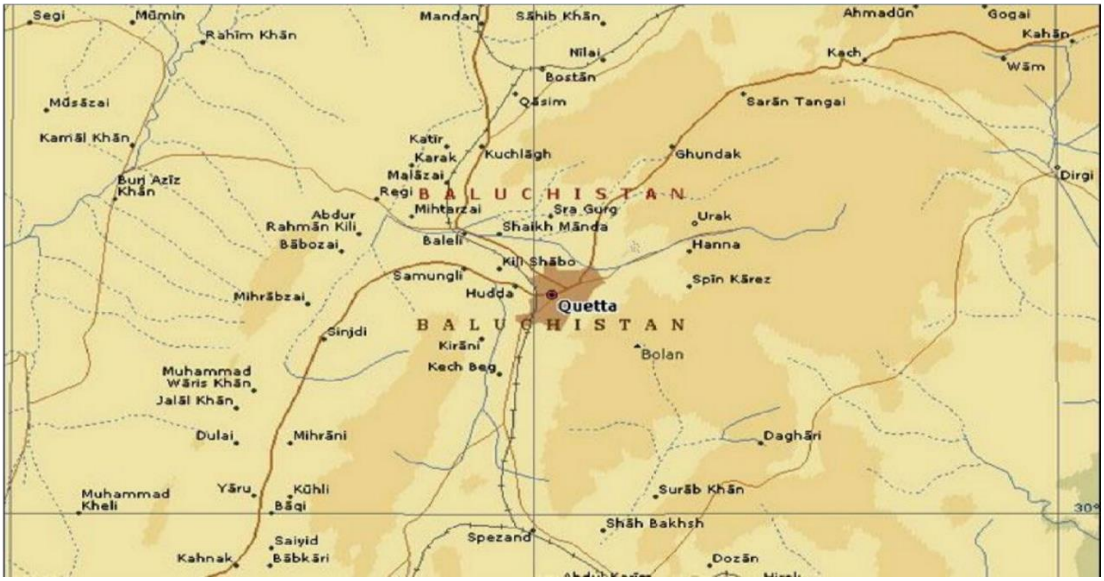


Figure 5- Target district Location

2.4 Accessibility to project area:

For transportation of material, the proponent may consider direct road from Karachi to Quetta and then Kuchlak. Subsequently, the second route may be from Gwadar to Quetta and project site. It's worth mentioning that Quetta-Karachi National Highway is already in use for heavy transportation of material. This is metal road and have no security issue with total distance of 715 km. Whereas the route from Gawadar to Quetta is 915 km with time of 16-18 hours. Heavy material can also be transported through train from Karachi to Quetta with estimated time of 20-24 hours. Other two communication routes are Quetta DG khan and Quetta DI khan connecting Punjab and KPK respectively.

Figure 6 - Quetta to Karachi road access map

Figure 7 Quetta to Gwadar access map

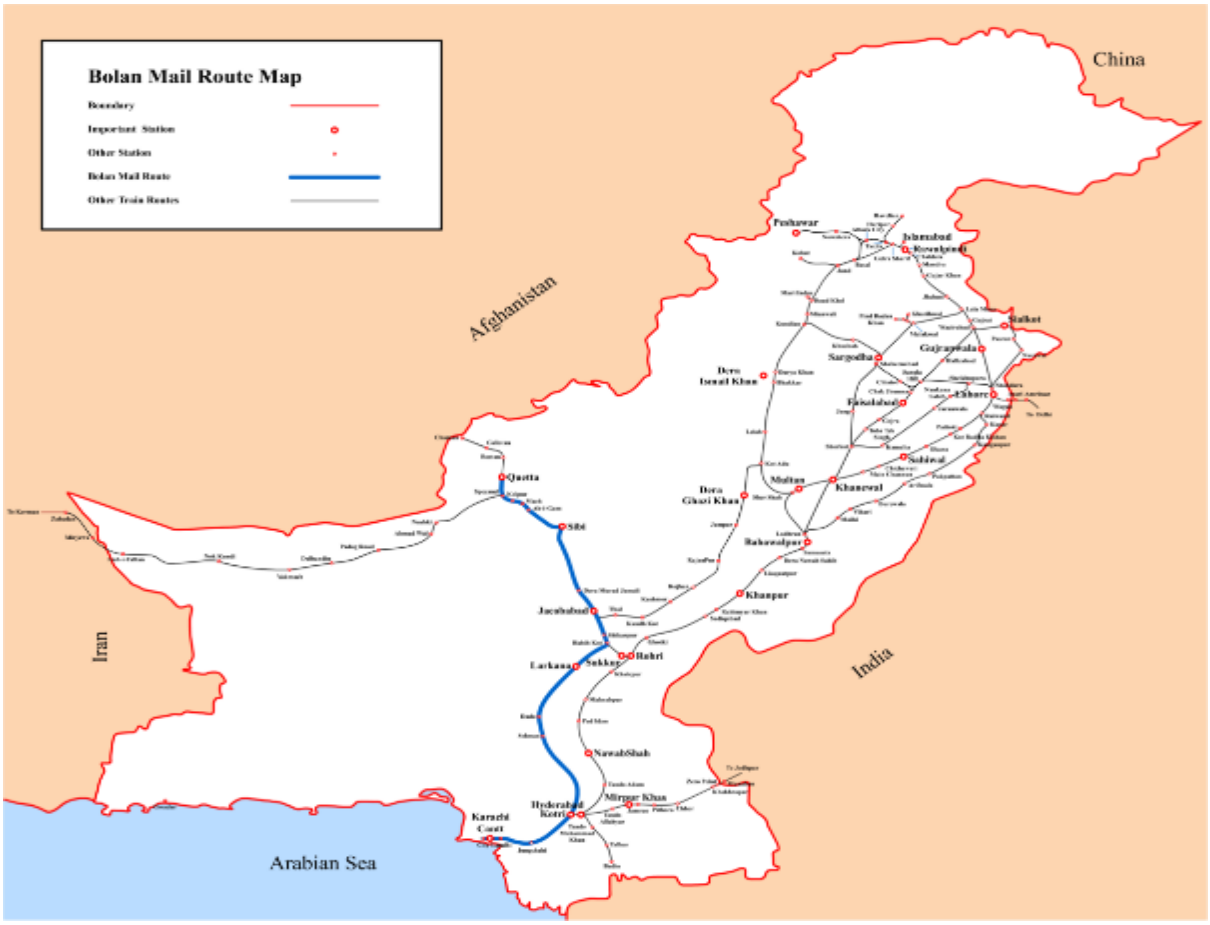


Figure 8 Train route from Karachi to Quetta

2.5 Baseline Condition:

2.5.1 Site Description:

The project site is located at a distance of 29 km in north of Quetta at Kuchlak on main Quetta Chaman highway at Balochistan, Pakistan. Based on the site visit information, publicly available information and past experience in conducting similar projects, HECS and EEL have prepared this study report on Initial Environment Examination. This report describes the various features of Initial Environment Examination of the project site in line with local and international standards.

2.5.2 Geology:

Quetta district lies between 300 - 03' and 300 -27' N and 660 - 44' and 670 - 18' E. The total geographical area of Quetta district is 2653 Km2. The general character of the district is mountainous. The hill ranges are fairly uniform in character consisting of long central ridges from which frequent spurs descend. These spurs are intersected by innumerable gorges and torrent beds. They vary in elevation from about 1,254 to 3,500 meters. The Mashlakh, the Chiltan, the Murdar and Zarghoon are the important mountain ranges in the district. Quetta lies in the active seismic region; therefore, earthquakes occur from time to time. The worst earthquake occurred in May 1935. There is no perennial river in the district. Whereas Quetta Lora (non-perennial channel) comes out near Sariab and traverses the western side of the Quetta valley.

Lora carries rain and waste water near Baleli and continues northward through the Kuchlak valley. Water of Quetta Lora is used for irrigation in villages like Khazi Samungli and Nohsar.

The proposed location and surrounding areas are a part of the Sulaiman Fold-Thrust Belt in western Pakistan and northern Balochistan. The Sulaiman Fold-Thrust Belt is a curved range of mountains on the western margin of Indian Plate. The belt was uplifted due to the oblique convergence of northwestern margin of Indian Plate with Afghan Block (Asia). The uplifting and folding has given rise to tight folds and thrusts. The rocks surrounding the area are mostly of limestone composition and they are forming appreciable peaks in the area. The beds generally strike in northeast and southwest direction and dips towards northwest. The age of rocks exposed range from Triassic to Holocene age. According to Geological Survey of Pakistan following formations are exposed in the area:

Sibi Group (Miocene) Sandstone, shale, clays, siltstone and occasional conglutinate beds intercalated.
Spintangi limestone (U. Eocene) Foraminiferal limestone with beds of shale. The limestone is cream, yellow to light grey, pinkish white or chalky white. It is medium to thick bedded.
Ghazij Shale (Mid Eocene) it contains olive colored, soft, fissile, in places having soft, cleared, grey limestone layers with abundant foraminifera.
Dunghan limestone (Paleocene) Medium- to thick-bedded, grey, dark grey. Sometimes marly limestone.
Parh limestone: The parh limestone is grey or chalky white and It is lithographic to porceilaneous
In addition to above chiltan limestone (mid jurrasic and shirinab formation are also found in Quetta.

2.5.3 Site Condition

Project site is located 6k in the north direction of Kucklack Bazar. Dry weather with severe cold in winter and hot in summer. The project site is flat barren land and topographically the general character of the surrounding area is mountainous and consists of long central ridges with numerous spurs.

2.5.4 Grid connection

Two main grids are available near the project area. In this regard the first one is Yaro Grid which is at a distance of 3km in the north towards Pishin. The other connectivity option is Sheikhmanda Grid Station, which is at a distance of 15-17 km from Kuchlfak in south east toward Quetta. Connectivity options from both the grid will be decided after technical review.

2.5.5 Weather Condition:

The climate in the Quetta district is "desert." There is virtually no rainfall during the year. This climate is considered to be BWh(B classification refer to hot desert climate) according to the Köppen-Geiger climate classification. The average annual temperature in Quetta is 24.5 °C. (Due to climate change and global warning phenomenon the temperature in summer from last three years ranges upto 38°C). The average annual rainfall is 249 mm. The driest month is November, with 3 mm of rain. In July, the precipitation reaches its peak, with an average of 63 mm. June is the warmest month of the year. The temperature in June averages 34.4 °C. At 12.1 °C on average,

January is the coldest month of the year. There is a difference of 60 mm of precipitation between the driest and wettest months. The variation in annual temperature is around 22.3 °C.

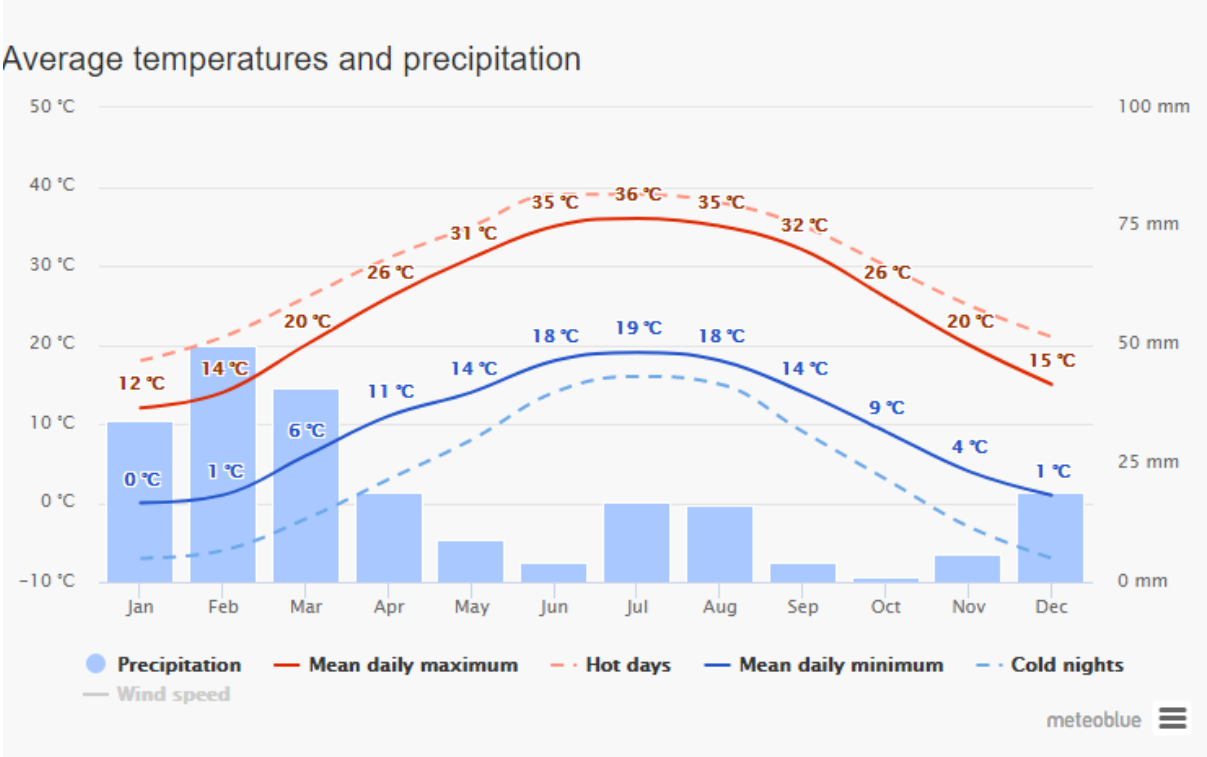


Figure 9- Average weather data for Quetta district

2.5.6 Micro Climate:

The project area is located in the 'Hot and Dry' Climatic Zone-1 of the country. According to Surface Meteorology and Solar Energy (SMSE) of NASA, site location receives daily global solar radiation from 3.31 kWh/m2 (in December) to 6.78 kWh/m2 (in June) over the year. The annual global solar radiation over the horizontal surface has been estimated as 1883 kWh/m2. The annual global solar radiation over the inclined surface (i.e. at the latitude of the location) has been estimated as 1995 kWh/m2. The microclimatic parameters namely ambient temperature, relative humidity, and prevailing wind speed of the project area are given in figure 10 for each month of the year. Month wise rain fall data of the region has also been presented in the figure 11.

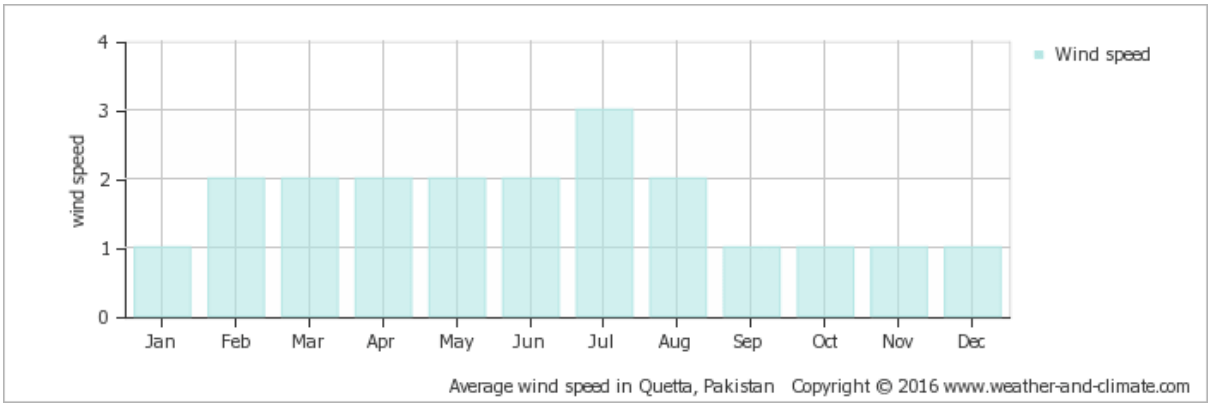


Figure 10 Average Wind speed Quetta (meter/sec)

Analysis of hourly wind speed shows that the winds are generally light to moderate in this area. The annual mean wind speed varies from 1.30 to 6.30 Km/hr.

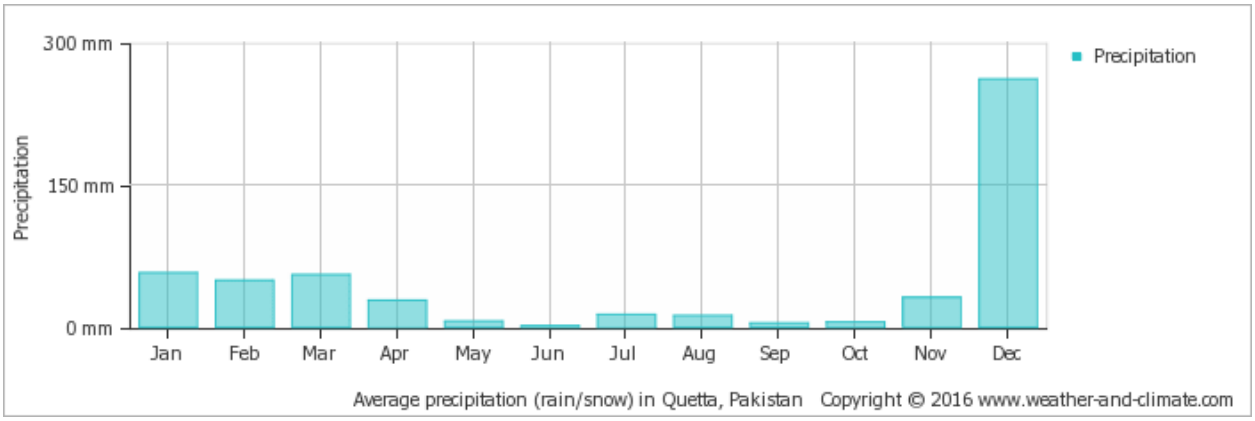


Figure 11 Average Precipitation in Quetta

WIND PATTERN: The wind rose diagram for seasonal has been drawn on the basis of hourly wind speed and direction data. South West and east west wind is dominant throughout the season.

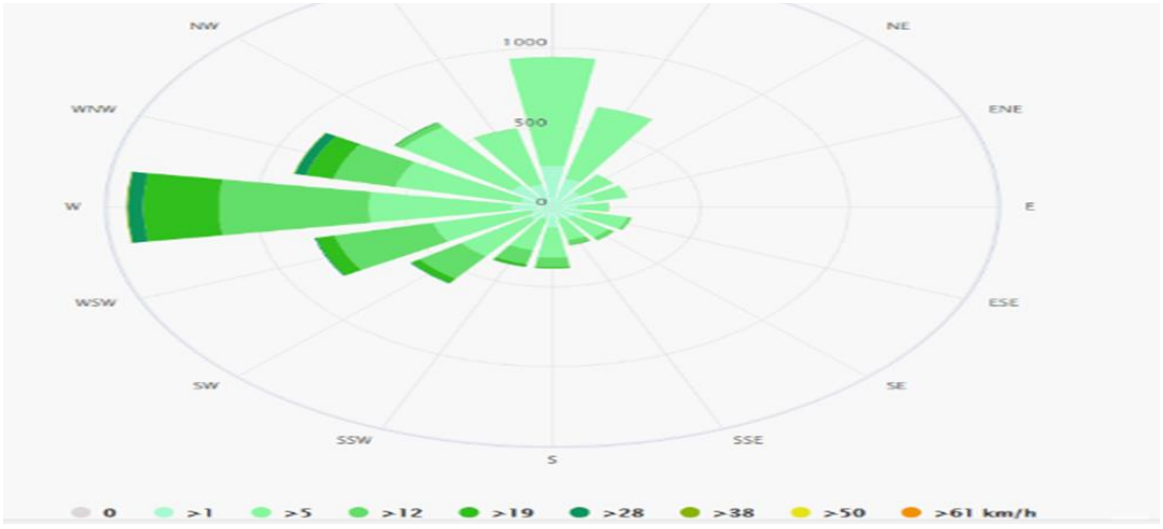


Figure 12 Wind Pattern in Quetta

2.6 Description about Process of PowerGeneration:

2.6.1 Selection of PV Mounting Structure:

There are simple fixed supports and complex tracking systems for PV system array bracket. The tracking system can move accurately so that the incident angle of the incident rays on the surface of the solar array will be minimized and the radiation intensity of the sun will be the largest.

In the design of Photovoltaic power generation system, the installation form of PV modules has a great influence on the total solar radiation received by the system, which affects the power generation capacity of the photovoltaic power supply system. The installation of PV modules consists of two types: fixed installation and automatic tracking. The automatic tracking system includes single axis tracking system and two axis tracking system. The system of single axis tracking (East and West angle tracking and polar axis tracking) tracks the trajectory of the sun from east to west with a fixed angle. The dual axis tracking system can change azimuth and inclination with the change of the seasonal position of the solar trajectory.

Fixed Bracket:

Considering the installation and safety, the most mature technology of the installation of photovoltaic modules is fixed installation. And the fixed installation is relatively lowest cost and most widely used method. Relative to the ground by the sun in the northern hemisphere midday Angle is equal to the local latitude during the vernal equinox and autumnal equinox, minus the sun in the winter solstice is equal to the local latitude declination Angle, when the summer solstice is equal to the local latitude and solar declination Angle. If the condition allows, can take two times throughout the year to adjust Angle, that is to say, in the spring - summer solstice - equinox using small Angle, the autumnal equinox, winter solstice - the vernal equinox with large dip Angle.

Figure 13 Fixed Bracket

Single axis tracker:

The single axis tracker is used to carry the traditional PV modules, and the average daily power generation can be increased by 20~35%. If the angle of the single axis and the ground is 0 degrees, it is a horizontal single axis tracker. If the axis of the single axis has a certain angle with the ground

and the azimuth angle of the photovoltaic module is not 0, it is called the uniaxial tracking of the polar axis. In The area of 30~40 degree in the north latitude, the horizontal single axis tracker can increase the generating capacity by about 15-20%, And the single shaft tracking with polar axis can increase the generating capacity by about 25-30%. However, compared with the horizontal single axis tracker, the cost of the single axis tracker of the polar axis is higher and the wind resistance is relatively poor, and the single axis tracker system usually adopts the horizontal single axis tracker method.

Figure 14 The horizontal single axis tracker

Figure 15 The polar axis tracker

Two-axis Tracker:

Two axis tracking is a tracking method that can be moved in two directions of azimuth and inclination. The dual axis tracking system can maximize the utilization of solar cells to sunlight. In different places and different weather conditions, the degree of improvement of the solar power

generation is also different: In a very cloudy and foggy place, Two-axis Tracker can increase the solar power generation by 30~35%.

Figure 16 Two-axis Tracker

The total amount of solar radiation that can be received from the inclined plane to the maximum extent for tracking systems, thus increasing the power generation.

For tracking system, the amount of total solar radiation that can be received from the inclined plane to the maximum extent increases the power generation. By theoretical calculation, the theoretical power generation of the system can be increased by 15-20% by horizontal single-axis tracking, the theoretical power generation of the system can be increased by 25-30% if the polar axis tracking method is adopted, the theoretical power generation of the system can be increased by 30%-35% If the two-axis tracking method is adopted. The actual working efficiency of the system is usually less than the theoretical value. The reason of this phenomenon is Solar panels project shadows on each other, and tracking mounts are difficult to synchronize. According to the survey data of the built project, If the inclined single-axis tracking -method is adopted, the actual power generation of the system can be increased by about 18%. If the two-axis tracking method is adopted, the actual power generation of the system can be increased by about 25%.

Considering the reliability, economy and maintenance of the system, combined with the geological and topographic features, and in order to improve the efficiency of the system, the advanced photovoltaic technology is introduced, and the horizontal single axis tracking support scheme is adopted in this project.

2.6.2 Selection of Inverter:

Introduction to String Inverter and Central Inverter

In the recent years, new design methods have been employed in utility scale solar photovoltaic (PV) systems to allow developers to continue decreasing installation cost and operating cost. The selection of string inverters versus central inverters can has a measurable impact on the capital cost, operating cost, and potentially the energy yield of nowadays PV systems. As the PV industry

continues to search for opportunities to reduce the costs associated with capital and operating expenses the choice between the two designs will become more important.

In the end, inverter component, balance of system, commissioning, operating and maintenance, and replacement/refurbishments costs all must be evaluated when choosing the system design for a specific project. Today, central inverters are the most widely used and tested type of inverters when it comes to development of large scale power plants.

Chapter 3

CHAPTER 3: LEGAL POLICIES AND INSTITUTIONAL FRAMEWORK

3. Introduction:

This portion of report encapsulates the findings, analysis, conclusions and recommendations of the review of Environmental legislation and policy analysis focusing on solar energy power.

EEL has commissioned an IEE study and report to EPA, Balochistan as part of its initiatives to promote renewable energy sector for clean environment. The aim of this chapter is to evaluate the potential for localizing solar energy interventions and its targets for preparing IEE report. The main purpose is to understand, assess and overcome the legal challenges hindering the achievement of project in the Kuchlak and support relevant provincial line agencies to understand existing legislative and policy framework relevant to renewable energy.

This section presents key findings and analysis on the existing legislative provisions and policy framework in Balochistan pertaining to IEE of Solar/Renewable Energy. The key findings are drawn from secondary and primary sources. The secondary sources include reviewing available literature review on the subject matter as well as legislation provisions currently in place or at formulation stage i.e. available in draft form. The primary sources include Focus Group Discussions (FGDs) and Corner Meetings with relevant stakeholders and sector actors, Key Informant Interviews (KIIs) with officials in key government departments.

Policy and a legislative framework for protection of the environment has been in place in Pakistan since the late 1970s. For the implementation of the policies and enforcement of legislation, necessary amendments have been made periodically to environmental policy, regulations and guidelines. The requirement of these policies, legislations have been duly considered in the preparation of this Initial Environmental Examination (IEE) of the Kuchlak- III Solar Power Plant Project.

Findings and Gap Analysis:There exist a number of legislative and policy provisions in Balochistan province and Pakistan relevant to the Environmental Protection.

Relevant Legislations	Relevant Policies/Plans
Pakistan Environment Protection Act (PEPA), 1997 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations 2000 Balochistan Environmental Protection Act (BEPA), 2012 Forest Act, 1927 The Balochistan Wildlife Protection Act, 1974	National Policy Framework, 1970 Pakistan National Conservation Strategy (NCS), 1992 National Environmental Policy, 2005 National Environmental Quality Standards (NEQS)

Antiquity Act, 1975 Mines, Oil Field and Minerals Development Act, 1948	National Forest Policy Pakistan, 2001 National Resettlement Policy (DRAFT), 2002 The Biodiversity Action Plan, 2000

Table 3 Policies relevant to Environmental protection

3.1 Pakistan Environment Protection Act (PEPA) 1997:

Pakistan Environment Protection Act (PEPA) 1997 is the basic legislative tool empowering the Government of Pakistan to frame regulations for protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as to the handling of hazardous waste. Penalties have been prescribed for those contravening the provisions of the Act. Key features of the law applicable to the Kuchlak Solar PV Power Plant Project are:

KEY FEATURES

Section 12(1) requires that: "No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof." The PakEPA has delegated the power of review and approval of environmental assessments to the provincial environmental protection agencies. As the proposed project will be located in the Kuchlak, Quetta District Balochistan province, it falls under the jurisdiction of the EPA-Balochistan.

3.1.1 Other Relevant section of PEPA can be:

Section 11(1) states that "subject to the provisions of this Act and the rules and regulations made there under, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, air pollutants or noise pollutants in an amount, concentration or level which is in excess of the National Environmental Quality Standards'' The Pakistan Environmental Protection Agency (PAK-EPA), the body mainly responsible for enforcing the PEPA 1997, has published National Environmental Quality Standards (NEQS).

Section12(2)(b) requires that the federal agency shall review the environment impact assessment report and accord its approval subject to such conditions as it may deem fit to impose or require that the environmental impact assessment be resubmitted after such modifications as may be stipulated, or reject the project as built up contrary to environmental objectives. For the current solar project in Kuchlak it is required that an IEE report be submitted to the Concerned EPA (Balochistan EPA) and approval attained before undertaking any construction activity.

Section 14 states that: "subject to provision of this Act no person shall generate, collect, consign, transport, treat, dispose of, store, handle, or import any hazardous substance except (a) under a license issued by the government agency and in other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party".

In order to accomplish effective implementation of the provisions of PEPA 1997, the PAK-EPA was constituted, headed by the Director General, with its head office located in Islamabad. On the same lines, EPAs/EPD have been created in all the four provinces of the country as well as Azad Jammu & Kashmir (AJK).

3.2 Pakistan Environmental Protection Agency (review of IEDD/EIA) Regulations 2000:

The Pakistan Environmental Protection Agency (PAK-EPA), under the process conferred upon it by the Pakistan Environmental Protection Act (PEPA 1997), provides the necessary details on the preparation, submission, and review of the Initial Environmental Examination (IEE) and the Environmental Impact Assessment (EIA).

Categorization of projects for IEE and EIA is one of the main topics of the Regulations.

Projects have been classified on the basis of the expected degree and magnitude of environmental impacts and included in different schedules contained in the Regulations. The projects listed in Schedule-II are generally major projects likely to have adverse environmental effects; they also include projects in environmentally sensitive areas. Projects not included in Schedule-II require an IEE for the issuance of NOC by the concerned agency prior to the construction of the project. The proposed Kuchlak Bypass Project requires an IEE.

The Regulations stipulate that within ten (10) working days of the IEE or EIA having been submitted, the federal/provincial agency will confirm that the document is complete for the purpose of review. During this time, should the agency require the proponent to submit additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further attention.

3.3 Guidelines for Environmental Assessment:

The Federal EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are applicable to the proposed Solar PV Energy Project, Kuchlak are listed below:

Guidelines for Preparation and Review of Environmental Reports

These guidelines describe the format and content of IEE/EIA reports to be submitted to the Federal and Provincial EPA's/EPD for obtaining the necessary environmental approval/ No Objection Certificate (NOC). The major topics, which are covered by these guidelines include:

The Environmental Assessment Report format (e.g. scope, type and category of the project, description of the project, alternatives, site selection and baseline data); Assessing impacts (identification, analysis and significance);

Mitigation and impact management and preparing an environmental management plan;

Reporting (format, main features, shortcomings, other forms of presentation);

Review and decision making (role, steps, remedial options, checks and balances);

Monitoring and auditing (systematic follow up, effective data management); and

3.3.1 Guidelines for Public Consultation:

The Federal EPA provides guidelines to deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures the incorporation of their concerns in any impact assessment study.

3.3.2 Consultation, involvement and participation of stakeholders:

Effective public consultation (planning, stages of EIA where consultation is appropriate) Facilitation involvement (including the poor, women and NGOs).

3.4 Balochistan Environmental Protection Act 2012:

After the 18th Constitutional amendments, to regulate and effectively address the peculiar environmental issues of the province of Balochistan this act namely "Balochistan Environmental Protection Act 2012" is submitted as per provisions of the Article 270-A, Sub-Article (6) of 18th Constitutional amendments.

The Act defines IEE and its implementation status is capsulated in section-15 of Act.

No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination with the Government Agency designated by Balochistan Environmental Protection Agency, as the case may be, or, where the project is likely to cause an adverse environmental effect an environmental impact assessment and has obtained from the Government Agency approval in respect thereof.

The Government Agency shall subject to standards fixed by the Balochistan Environmental Protection Agency—

A. Review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or
B. Review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or reject the project as being contrary to environmental objectives.

C. International relations, national security or maintenance of law and order, except with the consent of the Government of Balochistan; or
D. Matters covered by legal professional privilege.

The Government Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations.

Subject to sub-section (4) the appropriate Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

The Government Agency shall maintain separate registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such registers shall be subject to the restrictions specified in sub-section (3).

No concession areas for any developmental activities shall be awarded to any International/National groups or firms without consultation and concurrence of the Government of Balochistan/Environmental Protection Agency. (9) The prospect licenses for mining, quarrying, crushing etc. shall only be awarded/ granted in compliance with the sub section (1), (2), (3), (4) and (5).

The proponent of the project shall remit fifty thousand rupees as review fee of an Initial Environmental Examination (IEE) and one hundred thousand as review fee for Environmental Impact Assessment (EIA).

The Act also recommends the establishment of the Balochistan Environmental Protection Council for the approval of comprehensive environmental policies, provide guidelines for the conservation, rehabilitation and improvement of the environment and the sustainable development of resources or to undertake research in any aspect of environment. The Act also recommends the establishment of Balochistan Environmental Protection Agency and defines the function and powers of the Balochistan EPA.

The Act clearly describes the requirement of Initial Environmental Examination and Environmental Impact Assessment. The Act states that “No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination with the Government Agency designated by Balochistan Environmental Protection Agency, as the case may be, or, where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment, and has obtained from the Government Agency approval in respect thereof”.

3.5 Balochistan Environmental Protection Agency:

The Govt. has also established the Balochistan Environmental Protection Agency (EPA), to exercise the powers and perform the functions assigned to it under the provisions of the Act and rules and regulations made accordingly.

3.5.1 The major functions of Balochistan EPA are:

Administer and implement the provisions of Environmental Protection Act 2012 and the rules and regulations made there under.

- Prepare environmental policies for approval by the Council in coordination with the relevant Govt. agency and in consultation with the concerned sectors Advisory Committees.
- Take all necessary measures for the implementation of the national environmental policies approved by the Council.
- Prepare and establish an annual environmental report on the state of the environment.
- Prepare or revise and establish the environmental quality standards with the approval of the council.
- Ensure enforcement of the environmental quality standards.
- Establish standards for the quality of the ambient air, water and land by notification in the official gazette.
- Coordinate environmental policies and programs nationally and internationally.
- Establish systems and procedures for different working.
- Take measures to promote research and the development.
- Certify and approve laboratories for conducting test and analysis as environmental research.
- Identify the needs for and initiate legislation in various sectors of environment.
- Render advice and assistance in environmental matters.
- Assist the local Govt. /agencies to implement environmental laws and regulations.

3.5.2 The Balochistan-EPA has the authority to:

- Lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both movable and immovable.
- Fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations made there under.
- Enter into contracts, execute instruments subject to approval of the Provincial Government, necessary for proper management and conduct of its business made thereunder.
- Enter and inspect and under the authority of a search warrant issued by the Environmental Tribunal or Environmental Magistrate.
- Take samples of any materials, products, articles or substances or of the effluents, wastes or air pollutants.

3.6 National Environmental Quality Standards (NEQS):

The Government of Pakistan developed the National Environment Quality Standards (NEQS) for municipal and industrial liquid effluents, industrial gaseous emissions, motor vehicles exhaust and noise. The NEQS were first developed in 1993 and have been amended in 1995, 2000 and 2010. The standards specify the following;

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluent discharged to inland waters, sewage treatment facilities and the sea.
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emission from

industrial resources.

- Maximum allowable concentration of pollutants (2 parameters) in gaseous emission from vehicle exhaust and noise emission from vehicles.

3.7 Forest Act, 1927:

This Act provides rules and regulations for the protection of forests, control of timber and other forest-produce transit, village forest and social forestry. The Act is being revised as the law was framed for regulating forests all over undivided India before independence in 1947. It was adopted as it is, after the creation of Pakistan and it continues to remain in force till date.

This act has been comprehensively formed and allocates power to the concerned agency to declare protected and reserved forests through government notification and specifies powers allocated to the forest officers. It also contains the description of power to acquire land and the powers to stop ways and water-courses in reserved forests, dealing of claims relating to shifting of cultivation, power to issue and publish notification to reserve trees, power to make rules for protected forests, power to declare forest no longer reserved, order on rights of pasture or transit forest-produce, record keeping by the forest officer(s), commutation of right to appeal, time limit for resolution of claims and appeals, notification of acts prohibited in such forests (unlawful cutting of trees), awarding penalties on violations etc.

3.8 The Balochistan Wildlife Protection Act, 1974:

The Balochistan Wildlife Protection Act, 1974 was passed by the Provincial Assembly of Balochistan in 1974. This Act is applicable to the whole of the Balochistan Province except the tribal areas for protection, conservation, preservation and management of wildlife. The Act accommodates the issuance and validity of licenses and permits, empowering the government officers to issue such permits to public or V.I.Ps, prohibition of cooking of wild animals/birds meat in any public place, trapping or shooting near Game Reserves or Sanctuaries, warranting seizure or inspection of any person or hunting equipment at any given time by the park rangers, as well as providing a set of fee structure for various permits including hunting, trapping, possession or import and export of wild animals/birds.

3.9 Antiquities Act, 1975:

The Antiquities Act relates to the protection, preservation and conservation of archaeological/historical sites and monuments.

The Antiquities Act 1975 ensures the production of cultural resources of Pakistan. This act is designed to protect antiquities, from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the act as ancient product of human activity, historical sites, or sites of anthropological or cultural interest; national monuments etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area which may contain details of archeological significance. The guideline procedure for environmental assessment recommended by Pakistan EPA reacts as follows;

"If the proponent or consultant identifies an archeological site that appears to be of importance, but the site is not listed they should discuss the site with the relevant conservation authority,"

The relevant conservation authority should inform the responsible authority of their assessment of the significance of likely impact of the proposed development early in the process in order for the responsible authority to determine the level of documentation required. The EPA will then be in a position to review the level of reporting required in the light of advice from the archaeology department.

Land Acquisition Act (LAA), 1894:

The only available national legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA provides for the acquisition of private properties for public purposes, including development projects, in Pakistan. It comprises of fifty-five sections dealing with area notifications, survey, acquisition, compensation, apportionment awards, disputes resolutions, penalties and exemptions. The LAA is, however, limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of their livelihoods.

3.10 Asian Development Bank (ADB) Policies & Standards:

Following ADB policies and standards to manage social and environmental risks and impacts are considered;

- Safeguard Policy Statement 2009
- Policy on Gender and Development
- Social Protection Strategy
- Public Communications Policy 2011
- Core Labor Standards

The brief description of above policies and standards are as given:

ADB Safeguard Policy Statement 2009:

This safeguard policy statement applies to all ADB-financed and/or ADB-administered sovereign and non-sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees (hereafter broadly referred to as projects):

ADB operational policies include basic safeguard policies mentioned below.

- Involuntary Resettlement Safeguards (elaborates ADB's involuntary resettlement safeguards aim to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring projects and effective planning and implementation)
- Indigenous Peoples Safeguards ADB's indigenous peoples' safeguards aim to ensure that the design and implementation of projects foster full respect for indigenous peoples' identity and dignity.
- Environmental Policy provides an overarching framework for addressing the environmental

issues particularly contamination of clean water bodies and coastal waters, air contamination, lack of proper waste management, deforestation, loss of biodiversity, desertification and natural resource management among others.

- Gender sensitivity, analysis and main streaming: This defines ADB's gender categorization system that assesses the extent to which projects integrate gender issues.
- 2011 Public Communications Policy the Public Communications Policy aims to enhance stakeholders' trust in and ability to engage with ADB, and thereby increase the development impact of ADB operations. The policy promotes transparency, accountability, and participatory development. It establishes the disclosure requirements for documents ADB produces or requires to be produced.
- 2001 Social Protection Strategy The 2001 Social Protection Strategy defines social protection as a set of policies and programs designed to reduce poverty and vulnerability by promoting efficient labor markets, diminishing people's exposure to risks, and enhancing their capacity to protect themselves against hazards and interruption/loss of income.
- Labor Law: ADB also has a memorandum of understanding with the International Labour Organization (ILO) to facilitate collaboration in matters of common interest, including international labor standards. The core labor standards endorsed by all ILO members include (1) freedom of association and collective bargaining, (2) elimination of forced and compulsory labor, (3) elimination of discrimination in employment and occupation, and (4) abolition of child labor.

3.11 World Bank Guidelines on Environment:

The principal World Bank publications that contain environmental guidelines are listed below.

Environmental Assessment Operational Policy 4.01. Washington, DC, USA. World Bank 1999. Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross Sectorial Issues. World Bank Technical Paper Number 139, Environment Department, the World Bank, 1991, Pollution Prevention and Abatement Handbook: Towards Cleaner Production, Environment Department, the World Bank, United Nations Industrial Development Organization and the United Nations Environment Program, 1998.Environmental Health and Safety (EHS) guidelines, International Finance Corporation (IFC) World Bank Group, 2007.

The first two publications listed here provide general guidelines for the conduct of an IEE and address the IEE practitioners themselves as well as project designers. While the Sourcebook in particular has been designed with Bank projects in mind and is especially relevant for the impact assessment of large-scale infrastructure projects, contains a wealth of information which is useful to environmentalists and project proponents.

The Sourcebook identifies a number of areas of concern, which should be addressed during impact assessment. It sets out guidelines for the determination of impacts, provides a checklist of tools to identify possible biodiversity issues and suggests possible mitigation measures. Possible development project impacts on wild lands, wetlands, forests etc. are also identified and mitigation measures suggested. The Sourcebook also highlights concerns in social impact assessment and emphasizes the need to incorporate socio-economic issues in IEE exercises.

3.12 Equator Principles:

The Equator Principles are a set of guidelines, promoted by the International Finance Corporation (IFC) that address the environmental and social issues associated with major development projects worldwide. They provide a common baseline and framework for the implementation of internal environmental and social procedures and standards for project financing activities across all industries.

Principles;

1. Review and Categorization (of projects) Principle
2. Social and Environmental Assessment Principle
3. Applicable Social and Environmental Standards Principle
4. Action Plan and Management System Principle
5. Consultation and Disclosure Principle
6. Grievance Mechanism Principle
7. Independent Review Principle
8. Covenants Principle
9. Independent Monitoring and Reporting Principle
10. EPFI Reporting

3.13 IFC Performance Standards on Social and Environmental Sustainability:

International Finance Corporation (IFC) applies the Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in its member countries eligible for financing. The Performance Standards are also applied to the projects in emerging markets. Together, the eight Performance Standards establish standards that the Proponent is to meet throughout the project.

The objectives of Performance standards are given below:

To identify and assess social and environment impacts, both adverse and beneficial, in the project's area of influence

- To avoid, or where avoidance is not possible, minimize, mitigate or compensate for adverse impacts on workers, affected communities and the environment
- To promote improved social and environment performance of companies through the effective use of management systems.

Total, the eight Performance Standards establish standards that the Proponent is to meet throughout the project which are named as:

- Performance Standard-1: Social & Environmental Assessment and Management System
- Performance Standard-2: Labor and Working Conditions
- Performance Standard-3: Pollution Prevention and Abatement
- Performance Standard-4: Community Health, Safety and Security
- Performance Standard-5: Land Acquisition and Involuntary Resettlement
- Performance Standard-6: Biodiversity Conservation and Sustainable Natural Resource Management
- Performance Standard-7: Indigenous Peoples
- Performance Standard-8: Cultural Heritage objectives have been set in the IFC performance

standards to achieve sustainable development.

3.14 Institutional Setup for Environmental Management:

The apex environmental body in the country is the Pakistan Environmental Protection Council (PEPC), which is presided by the Chief Executive of the Country. Other bodies include the Pakistan Environmental Protection Agency (Pak-EPA), provincial EPAs (for four provinces, AJK and Northern Areas), and environmental tribunals. The EPAs were first established under the 1983 Environmental Protection

Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (IEEs and EIAs) of the proposed projects and provide their approval (or otherwise). The proposed project of solar PV would be located in Balochistan Province, hence this IEE report will be sent to the EPA Balochistan for review.

OBLIGATION UNDER INTERNATIONAL LEGAL ENTITIES/TREATIES

There are also International obligations relevant to the Environmental Protection like World Bank Guidelines on Environment, Equator Principles promoted by International Finance Corporation (IFC), IFC Performance Standards on Social and Environmental Sustainability.

Pakistan is signatory of several Multilateral Environmental Agreements (MEAs), including:

- Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal,
- Convention on Biological Diversity (CBD),
- Convention on Wetlands (Ramsar)
- Convention on International Trade in Endangered Species (CITES),
- UN Framework Convention on Climate Change (UNFCCC),
- Kyoto Protocol,
- Montreal Protocol on substances that deplete the ozone layer,
- UN Convention to Combat Desertification.
- Convention for the Prevention of Pollution from Ships (MARPOL),
- UN Convention on the Law of Seas (LOS),
- Stockholm Convention on Persistent Organic Pollutants (POPs),
- Cartina Protocol.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup nonexistent. Although almost all of the above MEAs would apply to the projects in one way or the other, the ones which have direct relevance for the proposed project include the Basel Convention Montreal Protocol, Stockholm Convention, UNFCCC and Kyoto Protocol. Kyoto protocol applies for the proposed project because it's used in CDM (Clean Development Mechanism). A CDM project activity might involve, for example, a rural electrification project using solar panels or the installation of more energy-efficient supply system. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction or limitation targets.

Chapter 4

CHAPTER 4: ENVIRONMENTAL & SOCIAL BASELINE

4. Portrayal of Baseline Environment:

4.1 General:

This section pronounces the baseline conditions, covering the existing physical, ecological, and socio-economic environment of the Project Area. The provided data on these features has been derived from both the desk review of available secondary information and collection of primary data through field visits to the study area and meeting with nearby community and relevant line departments.

4.2 Physical Environment:

4.2.1 Geology and Soil:

The Kuchlak town is also known as Kuchlagh near Quetta, in the province of Balochistan, Pakistan. It is governed by a union council in Chiltan Town, Quetta. The province Balochistan is indeed a piece of geological wonderland on Earth. Very few segments of the globe may have so many geological marvels congregated in a piece of land equal in area to that of Balochistan.

Project Area lies in Balochistan Basin, which consists of unconsolidated surficial and older alluvial deposits of Holocene age followed by poorly consolidated assemblage of sandstone, conglomerates and shale of Pleistocene rocks mainly of Lacustrine or fluvial origin. The surrounding mountains comprises mainly of slate, shale at some locations, conglomerate, dolomite, lime stone, sand stone, gypsum, glacial till and hard rock. The scarcity of water in the area and the semi-desert climatic conditions has limited trees and shrubs to grow. Geotechnical investigation reflects mainly the very stiff lean clay in the subsurface up to 30-meter depth. There are no mines and minerals found in the project site.

4.2.2 Topography:

The project site is flat barren land and topographically the general character of the surrounding area is mountainous and consists of long central ridges with numerous spurs. These spurs vary in elevation from 1,500 to 3,300 meters but will have no impact reduction on receipt of solar radiations due to its sufficient distance from project site.

4.2.3 Seismology:

The Project Area is considered as seismically active. Frequent small to moderate earthquakes have been recorded along the tectonic features located within and around the Project Area. The Project

Area falls in Seismic Zone 4 of the Seismic Zoning Map of Pakistan. Zone 4 falls in very high-risk areas with peak horizontal ground acceleration greater than 0.32g.

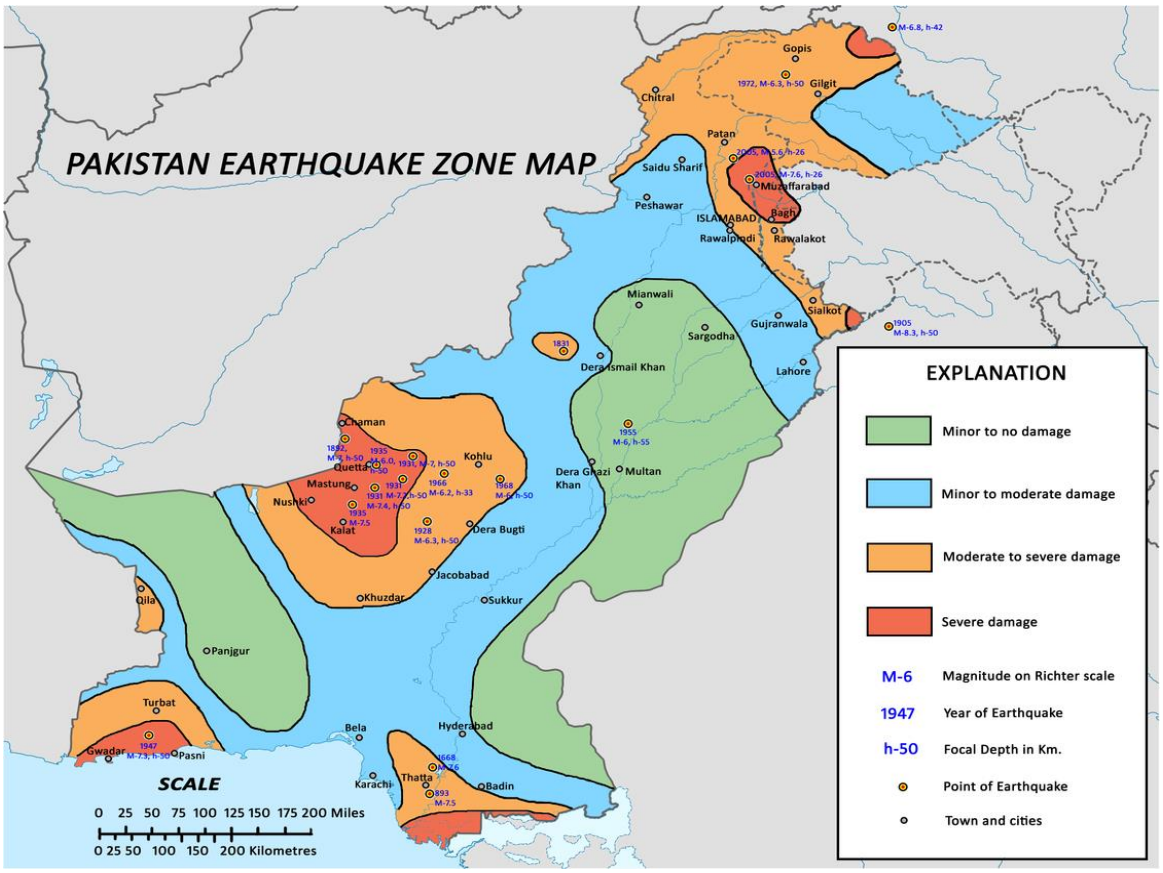


Figure 17 Seismic Map Showing Location of the Project Area

4.3 Geographical Features:

Kuchlak is geographilly located in bordering area between Quetta and Pishīn districts as one of the major towns of District Quetta. Quetta district is bounded north by Pishīn district, in the west by Afghanistan, in the east by Sibi district and in the south by Kalāt and Chāgai districts. Physically it comprises a series of long valleys which are 4,500–5,500 ft above sea level enclosed by the Central Brāhui range in the south and drained by the Pishīn Lora River and its tributaries. Area-wise district Quetta ranks 4th smallest district in Balochistan and has an area of 2,653 square kilometers, Quetta District lies between 66°41'40"-67°17'25" East longitudes and 30°01'29"-30°28'25" North latitudes consisting of 2Tehsils and 67 Union councils. Location of Quetta is at 690 km (aerial distance) south-west (237degrees bearing) of Pakistan's capital city, Islamabad.

Climatic and weather features:

Kuchlak has a continental arid climate with great variation between summer and winter temperatures. Summer highs can reach 40 °C (104 °F) while winter temperatures can drop to −16 °C (−2 °F). Summer begins in late May and continues until early September, with average temperatures ranging from 24–26 °C (75–79 °F). Autumn runs from late September to mid-November, with average temperatures in the 12–18 °C (54–64 °F) range. Winter starts in late

November and ends in late March, with average temperatures near 4– 5 °C (39–41 °F) and snow during the months of January and February. Spring starts in early April and ends in late May, with average temperatures close to 15 °C (59 °F). Unlike most of Pakistan, Kuchlak does not have a monsoon with sustained, heavy rainfall; snowfall during the winter months is the principal mode of precipitation. The climate of Balochistan has a wide variation. The coastal belt of Makran is hot and humid. The hilly areas in the north have bracing cool dry climate. Kachhi Plain and Kharan Desert are the hottest places in the Province. Most of the area is arid with very low precipitation. Except for the juniper forest around Ziarat and some Pinus forests in Shinghar and Shirani areas, the rest of the hills are barren. The winters are very severe and are affected by Siberian winds. Balochistan has the four climatic regions i.e. Tropical Coastal Area, Sub-Tropical Continental Low Lands, Sub-Tropical Continental High Lands and Sub-Tropical Continental Plateau. The meteorological data of the Quetta District is discussed here in terms of temperature, relative humidity and rainfall as the most relevant and nearest weather station to the Project Area.

4.3.1 Temperature:

The temperature in the Quetta District varies greatly. January is the coldest month with the average temperature of 4.7°C temperature from 1980 to 2010. The daily temperature at Quetta District seldom drops below 0°C in December and January. The highest temperatures are observed in the months of June and July, which is 28.7°C on average basis.

4.3.2 Rainfall:

Rainfall data was collected for Quetta District from 1980 to 2010. The analysis was carried out for monthly basis and graph shows that there is wide variation in the rainfall. Maximum rainfall occurs in the month of January with the value of 55.3 mm and minimum occurs in the month of September with the value of 2.3 mm.

4.4 Water Source:

4.4.1 Water Quality:

In order to determine the existing water quality of ground water, samples were collected from Jaloger (Nearby Village) of project site and Kuchlak for laboratory analysis. Groundwater samples were tested and for Air, Noise parameters as per NEQS for physical, chemical analysis. A copy of NEQS is attached as Annex- II for ready reference. The laboratory test results of groundwater samples are listed in the table below;

4.5 Air and Noise Quality Monitoring Results:

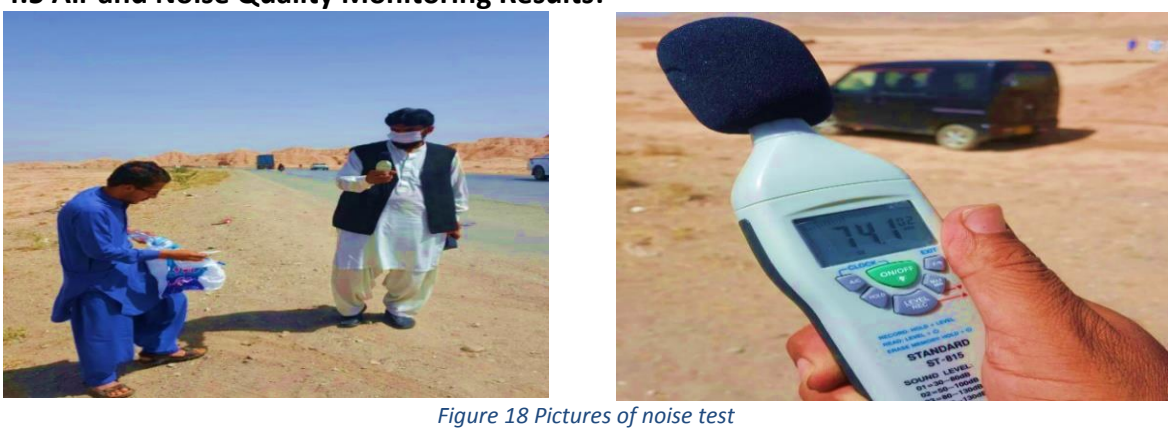


Figure 18 Pictures of noise test

S.NO	Parameters	Units	NEQS Limits	Concentration				
				Location-1	Location-2	Location-3	Location-4	Location-5
1	Ozone (O_3)	ug/m^3	130	4	3	3	4	3
2	Oxides of Nitrogen (NOx)	ug/m^3	120	2.2	3.53	3.48	3.23	2.12
3	Oxides of Sulphur (SOx)	ug/m^3	120	4.32	6.51	5.33	4.32	5.12
5	Particulate Matter (PM_{10})	ug/m^3	150	71	67	84	61	57
6	Particulate Matter ($PM_{2.5}$)	µg/m^3	35	24	28	27	27	25
7	Noise	dB	75	64	52	74	56	51

Table 4 Parameters

S.No	Parameters	Units	Concentration	Method
1.	Temperature	0C	29	Thermometer
2.	pH Value	….	6.89	pH meter
3.	Manganese	mg/l	0.12	AAS
4.	Zinc	mg/l	0.14	AAS
7.	Total Dissolved Solids	mg/l	2143	APHA 2540 C
8.	Chloride	mg/l	644.9	APHA 4500 Cl B
9.	Lead	mg/l	0.27	AAS
10.	Fluoride	mg/l	2.38	Hach Method 8029
11.	Sulphate	mg/l	530	Hach Method 8051
12.	Ammonia	mg/l	0.09	Hach Method8038
13.	Boron	mg/l	1.32	Merck Test 1.00826

Table 5 Laboratory analysis report of PCSIR and Labs of University for Air, Noise & Ground Water quality Chemical Analysis of Sample 01 (Tubewell Water, Kuchlak)

S.No	Parameters	Units	Concentration	Method
1.	Temperature	0C	27	Thermometer
2.	pH Value	….	6.81	pH meter
3.	Manganese	mg/l	0.14	AAS
4.	Zinc	mg/l	0.18	AAS
5.	Cadmium	mg/l	0.03	AAS
6.	Total Dissolved Solids	mg/l	1989	APHA 2540 C
7.	Chloride	mg/l	578.1	APHA 4500 Cl B
8.	Lead	mg/l	0.21	AAS
9.	Fluoride	mg/l	2.38	Hach Method 8029
10.	Sulphate	mg/l	580	Hach Method 8051
11.	Ammonia	mg/l	0.07	Hach Method8038
12.	Boron	mg/l	1.56	Merck Test 1.00826

Table 6 Chemical Analysis of Sample 02 (Tap Water, Killi Jalogeer). Chemical Analysis of Sample 02 (Tap Water, Killi Jalogeer)

The laboratory test report reveals that all the above ground water parameters are within the allowable limit of NEQS. A laboratory analysis report of PCSIR and Labs of University for Air, Noise & Ground Water quality is as given with comparative analysis with NEQS (Attached as Annex III).

4.6 Wetlands:

There is no wetland of national or international importance located in the district; however, Hanna Lake and Spin Karez support migratory bird population during their seasonal migration. The solar project will have no significant effect on birds and other mammals of the area.

4.7 Ecological Environment:

4.7.1 Flora:

The Project Area has a scanty vegetation cover as it falls in arid zone, characterized by low rainfall, scarcity of moisture and long dry spells. These factors resulted in lack of natural vegetation except for very few, likewise the area mostly consist of xerophytes species. Overall natural vegetation, including shrubs, bushes and grasses cannot be seen. In general, the province Balochistan is aptly termed as encompassing potential rangelands which support a good number of livestock. These rangelands are also substantially contributing to the ecological stability of important ecosystems in the area. The rangelands have degraded due to overgrazing and fuel wood collection, and the only remnants are less palatable and poisonous plants like Ghuzera (*Sophora grifithii*). Degradation has been further aggravated by traditional nomadic migrants and Afghan refugees.

Kuchlak valley, where the project is located, is comprising of barren wasteland, except the areas, close to settlements or villages, where people have installed tube wells and brought the area irrigation to grow crops, vegetables and fruit orchards. But these human settlements are away from the exact location of project area. Trees Natural tree cover, in the Kuchlak valley, has been extensively reduced, due to cutting by both local inhabitants and traditional nomads for fuel wood and thatching of roofs.

In Quetta District, major tree species, which once existed and are still sparsely found in the remote hills are Bought Apurs or (Juniperous excelsa polycarpos), Wild Ash (Fraxinus anthoxyloides), Shinay or Wild pistachio (Pistatio khinjjak), Surai (Rosa beggeriana), Anjir (Ficus johannis), etc. In the valleys, Ghaz (Tamarix spp) is found in stream beds. Mesquit (Prosopis juliflora) is common in graveyards and barren areas. It appears that people have no tendency to raise trees in their houses or lawns, however in some houses eucalyptus (Eucalyptus camaldulensis) and Ber (Zizyphus jujuba) trees were seen. Roadside plantations, mostly of mulberry, eucalyptus and tamarix, were raised, along almost all major roads in Quetta district including Quetta Chaman Road.

Figure 19 Project areas

The project area has no plantation except some scanty shrubs and hurbs and most of the land has been levelized by the project company so there is no or minor impact on the species. There is no such threatening or endangers species exist as indicated by IUCN red list of the species. There is

not any environmentally sensitive area located in or near to the buffer zone of the project. There is no impact of project activity on environmental sensitive area.

4.7.1.1 Shrubs:

Some of the shrubs found in the area include: Gung (*Vertex agnus-castus*), Ghureza (*Sophora lopcuroides*), Tharkha (*Artemisia maritime*), Zawal (*Achillea santolina*), Zoz (*Alhagi camalorum*), Spanda (*Peganum harmala*), Washta (*Stipa pennata*) etc. Shrubs and bushes like Delako (*Convolvulus spinosus*), Makhi (*Caragana ambigua*), Mateto (*Salvia cabulica*), Mazhmunk (*Amygdalus brahuica*), Oman (*Ephedra nebrodensis*), Wild almond (*Prunus ebernea*), Zralg (*Berberis lyceum*), etc. also exist, especially in the hilly areas. Picture below shows the shrubs in the Project Area.

Figure 20 Shurbs in target site

4.7.1.2 Grasses and Herbs:

The ground cover is constituted rarely by grasses like Weezh (*Pennisetum orientale*), Sargarai (*Cymbopogon jawarancusa*), Margha (*Pennisetum annulatum*) Kaj (*Chrysopogon aucheri*), Holambae (*Avena sterilis*), Lashabae (*Poa bulbosa*), Sarandu (*Biossiera squarrosa*), Gasht (*Stipa trichoides*) etc. The drought has affected these herb, and these are now available in small quantity. Most of these are used by animals. Some of herb like sargarai and sparkai were previously used in medicines but due to course of time and shortage of these herbs people are going to medicine options. Since animals are also affected by drought therefore people are now dependent on feed of market and some food arranged from rain feed agriculture like sorghum or sun flower. The solar project will not affect any of the above herb because these are not available due to drought in project area.

4.7.1.3 Agriculture:

The Project Area falls in the tropical agro-ecological zone. Agriculture in the Project Area and its vicinity is only marginal and is dependent on rainfall (Barani). However, in the areas where irrigation is possible from tube wells or other sources the mainstay of the population is characterized by its commercial temperate fruit orchards and vegetables for marketing. As mentioned above lack of rain and drought has badly affected agriculture. Rain water is major source of agriculture for around 20-25% houses. But this agriculture is at very minimal level. A small

quantity of sorghum, barley, sun flower and melon are produced from rain water. The project area is barren with very few wild grass. Whereas rain fed water harvesting is away from project area.

4.7.1.4 Crops:
Areas where irrigation through tube wells or other sources is available have two cropping seasons. Rabi Crops; Wheat, Barley, Cumin, Vegetables and Fodder. These crops are sown in winter or during the early summer and harvested in the late summer. Kharif Crops; Melons, Fruits, Vegetables, Potato, Fodder and Onion, come under cash crops; they are sown in the summer and harvested in the late summer or early winter. The project area is barren with very few wild grass. Whereas rain fed water harvesting is done at a distance of 3-5 km from project area.

4.7.1.5 Horticulture:
Fruit production is very important and dominant in district Quetta as 48.7% of the irrigated area is under fruit production. Apple, apricot, grapes, peach, plum, pear and cherry are the leading fruits of district Quetta. However, in Project no horticulture land may come along the proposed site.

4.7.1.6 Rare or Endangered Species of Flora:
No rare or endangered species was observed and neither reported by the locals as well as officials of the Forest Department.

4.7.2 National Parks, Reserves and Protected Areas:
There are no national parks, reserves or protected areas in the vicinity of the Project Area.

4.7.3 Fauna:
There are different birds and mammal species are present in the area. Like; Caracal, Chinkra, Houbara Bustard, Great Indian Bustard, Sand, Groud, Desert Costal, Grey Baridrige, Doves, Raptors, Vultures, Diversified Lizards and snakes, Diversified song birds, different types of shrikes, Jackal and Jungle cat. As for the birds, there is no impact on the birds due to the solar panels; the panels that are used in the project are lined with anti-reflection coting which helps to reduce the reflection of the panels to almost zero. The fences will be made at the project boundary to control the movement of animals in the area.

4.7.3.1 Livestock:
Kuchlak is the area has enormous potential for livestock, which provides livelihood to many poor families. Mostly the nomadic population which resides in this area depends on livestock. Livestock farming is a traditional activity here and comprises mostly goats, sheep, cows, cattle, camels and asses. Goat constitutes the major portion of the livestock population in Quetta district. Livestock Department in Quetta manages and controls all the activities pertaining to livestock including animal health coverage and husbandry. Vaccination is being carried out free of cost, whereas, the treatment is provided at 50% subsidized rates. In the Kuchlak area, people prefer to keep and grow sheep, as compared to any other livestock species probably due to the suitable weather conditions and the ease of keeping it. The project area due to drought and overgrazed has become barren land and cannot be considered as rangeland currently.

4.7.3.2 Wildlife:
Wildlife here consists of mammals, reptiles and birds, as detailed below;

Mammals:
In Kuchlak, mammals such as markhor (wild sheep), wolves, hyena, which were common in the past are now a rarity and are only occasionally seen in the hilly areas. Mammals, which are still common in the area are rabbits, wild cats and porcupines, fox, jackal, hedgehog, migratory hedgehog, grey hamster, Persian jird etc. As a preventive measure project can prevent these mammals from any possible risk by constructing fens around project site.

Reptiles:
Reptiles include Lizards (Agama, Monitor), Afghan Tortoise (Agrionemys horsfieldii), Saw-scale viper (Echis carinatus), Levantine viper (Macrovipera lebetina) etc. These reptiles are not endangered because they are not found in project areas.

Birds:
Local birds' species include, sparrows, crows, partridges, warblers, shikra, the blue rock pigeon, rock nuthatch, hawks, accentor, bulbul, bunting, chat, chough, chukar, eagle, falcon, lark, magpie, owl, vulture etc. Most of the mentioned birds are now extinct except for crow, sparrow, shikra and pigeon. The project has no significant effect on the lives of these birds.

Wildlife Sanctuaries and Game Reserves:

No wildlife sanctuary or Game Reserve is located within 10 km on either side of the proposed alignment for the bypass.

Critical Habitats:

No critical habitats exist within the project area and therefore it can be stated that this Project does not affect any critical habitat as, no critical habitat is located close to it.

4.8 Socio Economic Environment:

The socio-economic situation is a significant part of the environmental baseline conditions. The Project Area is located in District Quetta, so the socio-economic environment of Quetta is explained here for the proposed Kuchlak Solar Energy Project.

4.8.1 Population and Ethnic Clans:

Population of the Quetta district, is 1,001,205 as of 2017 census while the Quetta District has a population of 2,275,699. According to 1998 Census report was 760 thousand persons which has increased to 1452 thousand persons in 2014, by applying a growth factor of 4.13 percent for Quetta district. The number of males and females works out to be 787 thousand and 665 thousand, respectively. The male to female ratio works out as 1:1.18. The average household size is 8.5 persons.

Quetta district is a multicultural and multi-linguist area. The principal ethnic groups in the district are Pashtoon, Baloch, Brahvi, Hazara and Punjabi. The Kasi, Bazai, Mashwani and Syed are sub-tribes residing in the area. The predominant religion in Quetta is Islam, with about 99% of the people referring to themselves as Muslim. A negligible proportion of the population belongs to other religions, including Christianity, Hinduism, Qadiani/Ahmadi, etc.

4.8.2 Administrative and Socio–Political Setup:

Quetta is the provincial capital and largest city of Baluchistan Province, Pakistan. It is also known as the Fruit Garden of Pakistan, due to the numerous fruit orchards in and around it. The district is located in northern Balochistan near the Pak Afghan border. District Quetta has two Tehsils i.e. Quetta and Panjpai. Quetta tehsil is further subdivided into two towns, namely Chiltan Town and Zargoon Town. The Kuchlak falls in Chiltan Town. The people's participation in the political process is ensured through the elected institutions of District Council, Tehsil Councils and Union Councils, with elected Chairman at each level. Local government of district Quetta consists of the Municipal Corporation. It is headed by a Mayor and consists of 66 ward members. In the rural areas of, there are 8 Union Councils. They constitute a District Council; each union Council is represented by a member in the District Council. In addition, there is special representation of 2 women, 1 peasant, 1 non-muslim and 1 worker. Thus, District Council is composed of 13 members; the Deputy Commissioner and Assistant Directors of various Departments are Ex-Official members of this Council.

The administrative set up consists of Deputy Commissioner (DC), Executive Development Officer (Revenue) and District Officer (Revenue). The DO (Revenue) directly looks after the matters of the DDO (Revenue) offices at tehsil level. Each tehsil (sub–division) has a revenue setup consisting of Tehsildar and Naib Tehsildar, who have a number of Quanugos. Each Qanugo looks after the work of several Patwaries of his Patwar Circle. The Patwaries stay in their villages and maintain an updated land record of their 'Mouzas'.

4.8.3 Community Organization:

By far the biggest uniting force of in Quetta society for individuals as well as groups is ethnic or tribal identity. The society being patriarchal the decision making is solely vested in elderly males of the family/ tribe which becomes binding for females under their charge. Society in general is structured on kinship basis. Even on petty issues the ethnic groups can get polarized. Each ethnic group tends to stick to its culture and traditions, a blending of culture and customs amongst various groups takes place inevitably. The society is modelled on the authoritarian system linking the relationship between father and his sons. The head of the family is called "Sardar" whose authority flows to the lowest tier of the tribe or family through an authoritarian hierarchy of males.

The Sardari System is well entrenched in Baloch, Barahvi and Pakhtun tribes while others also try to have it with laxity and variation. However, life of people of Quetta, particularly of Project Area, is built on two principles; hereditary authority and personal bond of allegiance in which protection is exchanged with loyalty. Most of the tribal chiefs get elected to the parliament. Quetta experiences different ethnic socio-cultures. Among the Brahvis, the element of central authority exists. The hierarchical system of authority is vertical, with downward flow from the Sardar (head of tribe) to Takkari (head of sub clan) following the younger men in the clan and family. Sardar's position is supreme. Pushtoons lack central authority while religious leaders are the influential ones. Tribes have an almost equal social position, with the exception of the occupational groups, who enjoy higher status.

Occasions like births, deaths, illness, marriage; serve as socializing accessions for women and common people who can, when they meet exchange information and ideas and reinforce social

ties and alliances. With some modifications and re–adjustment the Sardari System will continue to be a corner stone of society in Quetta for a long time to come.

4.8.4 Language:

The Quetta district is multi-linguistic. Balochi/ Barahivi and Pashto are the main languages spoken in the district. Urdu, Punjabi, Sindhi, Siraki, Hindko and Persian are also spoken in the district. Urdu and English are widely used among the more educated segment of the local population.

Settlement Pattern:

The total geographical area of Quetta district comes to 2653 km2. The population density works out as 547 persons per km2. As far as their settlement pattern is concerned, 26 percent of the population resides in rural areas while the remaining 74 percent reside in urban areas of the district. The figures indicate that overwhelming majority of the people live in urban areas.

Family System:

People in vicinity of the project live in joint families and extended families. Usually people live with parents and brothers. Women usually take care of the household matters and external matters are in the hands of the head of the household i.e. a man. Major caste of the area is Kakar, Syed, Tareen and mulazai.

People get married within the family as first choice. Girls are rarely brought from outside the family but not given to others. Women are not given inheritance by parents and usually the in–laws pay an amount for the girl as dowry before marriage. Polygamy is common among the males; there is no restriction for marrying a second woman if the couple does not have male children. Similarly, there is no restriction to marry a second woman if it is a widow of a brother.

Fuel and Energy:

In rural areas 90% of the population uses fuel wood, agricultural waste or dried cow dung of the cattle. Eight percent of village inhabitants use gas cylinders while 2% use kerosene oil stoves. Petrol pumps exist along the road to fulfill the energy requirements of the area.

4.8.5 Conflicts Resolution Mechanism and Laws:

The conflicts in Quetta District are resolved through two systems, official and un-official. The official system involves formal judicial system and the unofficial system is based on the traditional laws. The Qazi court is not functional in the district.

Statutory Laws: The Project Area is “settled area” where provincial and federal statutory laws apply. The judicial system functions through civil and criminal courts. People file suits in courts to resolve their disputes. Under the statutory law, the cases are registered at police stations, in case of violation of the country laws. Once a case is registered the legal course takes place through normal courts starting from civil court, District and Session court, High Court and ultimately the Supreme Court of Pakistan. Sometimes, the Court appoints an arbitrator with the consent of the concerned parties, who resolves their disputes.

Un-official (Customary Laws): Unofficial system is based on the traditional Markka or Mairh (among Balochs and Brahvis) or Nanawati (among Pashtoons) system. This system is effective in the area especially in the matters of disputes among the tribes. People prefer the Biradri (brotherhood), or Mairh or Nanawati system, where they take their issues to a senior and influential person of the community, and after a lengthy discussion and debate, their disputes are settled.

4.9 Economy of the Area:

4.9.1 Trade and Industry:

The city of Quetta is the center of commercial activities of the province. It lies on the main trading routes to Afghanistan and Iran. Moreover, it is a gateway to the Central Asian states. Trade also involves the inflow and outflow of goods and services from other provinces. The value of legal inflow and outflow of goods is recorded at the borders. Illegal trading activities do take place. There is a general belief that the magnitude of illegal trade (smuggling) is far greater than the legal one. The last two decades have witnessed substantial industrial growth in Quetta. Now Quetta is not only a commercial and trading centre, but also is becoming an industrial city.

There are two industrial estates in Quetta. The first one is located at Sirki road, it is considered as Mini Industrial Estate. The other is located at Sariab Bypass, 13 km away from Quetta, which was established in 1986-87. All the utility requirements are available.

4.9.2 Irrigation:

There is no prominent irrigation water source in the entire Quetta district. However, the main sources of irrigation in the district are streams, dug-wells and tube wells. In the recent past, the Karezes (man-made underground water channels to fetch groundwater from the foot of hills) were a major source of irrigation but with the over-extraction of groundwater through tube wells, this unique source has abandoned.

4.10 Health Facilities:

The availability of healthcare facilities such as Hospitals, Rural Health Centers, Basic Health Units and Rural Dispensaries is, although encouraging, but these are not sufficient to provide a satisfactory health care to the people. Moreover, the level of services provided at these centers is not to the expectations of the peoples. In addition, a number of private clinics and hospitals are also working in the district. Information relating to health facilities in public sector in Quetta district is provided in Table 9.

Hospitals	6
RHCs	3
BHUs	34
CDs	9
MCH centers	13
TBC	1
Other	1
Total	67

Table 7 Health facilities in Quetta

4.11 Transportation and Accessibility:

Quetta lies on the western side of Pakistan but is connected to the rest of the country by a network of roads, railways and its international airport close to its centre. PIA and private airlines operate regular flights to and from the other major cities of Pakistan including Islamabad, Gwadar, Karachi, Lahore and Peshawar. Quetta Railway Station is one of the highest railway stations in Pakistan at 1,676 meters (5,499 feet) above sea level. The railway track was laid in the 1890s during the British era to link Quetta with rest of the country. The extensive network connects Quetta to Karachi in the south, Lahore in the northeast and Peshawar further northeast. A track from the Iranian city of Zahedan links to Quetta via Taftan, Balochistan. Quetta is connected by metaled roads to the rest of the country. A road connects it with Karachi through Mastung, Kalat, Khuzdar and Lasbela. Other major roads are Quetta to Karachi following the Sibi, Jacobabad, Sukkur and Hyderabad route and two roads from Quetta to Lahore one (the older) via Sibi, Sukkur, Rahim Yar Khan, and Multan the other route via Khanozai, Muslimbagh Loralai, Fort Mondro, Dera Ghazi Khan and Multan. Quetta is connected with Afghanistan through Chaman and to Iran through Mastung, Nushki, Dalbandin and Taftan. Land line and mobile phone facilities are available in the district. Access to the project area is through metallic road with multiple transportations means availability.

4.12 Land Requirements:

The proposed Kuchlak Solar Energy Project of 50 MW will require approximately 1000 acres of public (Government) owned land. The land will be acquired by EEL according to the provisions of lease basis. The Land Acquisition Act, 1894 is the only governing legislation relating to the lands and other land related assets. Letter of Land Acquisition is attached in this report.

Chapter 5

CHAPTER 5: INTENDED IMPACTS AND MITIGATION MEASURES

5. Intended Impacts and Mitigation Measures:

Screening process is an integral part of the environmental assessment for identifying all significant environmental and social aspects during construction, installation, and operation phases. Environmental aspects identified during the stakeholder's meetings and using the screening process were assessed for their severity and mitigation measures have been proposed as a result of the assessment. The mitigation measures proposed here will be adopted by the Proponent to reduce, minimize and compensate for the negative impact as far as possible. However, the proposed project has overall positive impacts due to its competitiveness, efficiency, effectiveness in terms of pollution free reliable Solar energy source, contributing to the power need and to bridge the Gap between Demand and Supply of Power.

The main aspects associated with potential impacts are as follow:

- Soil;
- Water resources (aquifer and surface water quality);
- Air quality;
- Waste discharges;
- Noise pollution;
- Ecology of the area, including flora and fauna
- Vehicle movement;
- Socio-economic conditions;

5.1 Impacts Associated with Project Phases:

A Screening Process of project activities reflects that there are following two phases where environmental and social impacts may be witnessed:

1. Construction and installation phase
2. Operation phase

The project overall has positive impacts by providing a competitive, cost-effective, pollution free reliable mode of Solar power. However, during the construction phase, the impacts may be observed for a short term; while long term impacts may be observed during the operation stage.

5.2 Nature of Activities Causing Impacts:

Both the cited phases i.e. construction and operation phase include different activities that may cause impact on environmental parameters. Here are details of different activities that may have impacts on environment:

- Sub structural work like site preparation, excavation, leveling, trenches etc. (minor level)
- Mobilization to project site /traffic
- Transportation of waste material
- Drilling through mechanical means
- Use of mechanical equipment's for erection of concrete and steel structures
- Road work/ construction (access to site)
- Cleaning/ finishing work
- Sewage waste from residence of labor and staff

Work at sub structural phase may cause dust pollution to the environment but this will be at minor level. Whereas super structural work may cause some noise pollution and or burned gases of machines.

In the first step, potential impacts of the project are identified by desktop screening exercise, professional judgment, published literature on environmental impact of similar projects and standard environmental guidelines. Another critical step in identifying potential impacts is discussion with project proponent, consultation with stakeholders and communities to identify their concern. Public consultation was carried out to identify the concerns of primary and secondary stakeholders.

5.3 Impact Assessment Methodology:

The impacts have been assessed following standard international guidelines and best available practices. The method defines different levels of consequence (or severity to project and surrounding environment- High, Medium or Low, no impact- of an impact as illustrated below:

Level	Consequence (Severity of Impact)
High	Serious damage to local and regional environment. Direct legislative requirements of EPA and other standards. threat to the ability to do business
Medium	Measurable damage to the environment. Subject to potential future legislation. Potential to affect reputation / cost. Implication / reduced efficiency
Low	Minimal damage to the environment
No Impact	No risk to business

Table 8 Categorical consequences (Severity of Impact)

5.4 Impact & Proposed mitigation during construction & operation phase:

Adverse environment impacts associated with project have been avoided or minimized through careful site selection and route selection. The alignment is sited away from major settlements in design of the proposed project. Adverse impact during construction phase is confined and of short term magnitude. Since the project land is vacant land, the change in land use will be minimum. Impact is mainly related to the civil works and some intensive impact due to erection of the equipment. There are no major impacts from dust emission on workers during construction phase.

Activities	Classification	Impact
Land Acquisition	Land Socio-Economics.	No significant impact on land-use is expected. There is no resettlement and compensation related issues as land for the project is leased by Government of Balochistan.
Site levelling, excavation cleaning	Air Water Land Ecology	Dust pollution Gas emission from machinery Run-off water from storage area Soil erosion, removal of top soil contamination, spillage Diversity loss (Impacts on flora, fauna, birds)
Material transportation	Air Public utility	Dust Road usage continuously
Civil Work	Air	Air emission of machinery
Labor infiltration for employment Temporary houses by labor	Socio Economics WASH Land	Positive change through employment Water, Sanitation and Hygiene issues Change in land use pattern
Transportation of debris and cleaning	Air	Air emission due to transport vehicles Dust

Table 9 Proposed mitigation during construction & operation phase

A suitable space will be required for equipment, materials, vehicles, material, disposal sites, and labor camps resource to avoid environmental impact and public inconvenience. This space can be arranged in boundaries of project site.

5.4.1 Impact on Land & Environmental Resources:

There is no threat to the existing land use or degradation, and there is no net impact on the land use. The construction activities attract a sizeable population and the influx of population is likely to be associated with construction of temporary huts for construction work force, having a minor effect on land use pattern.

Impact	Severity
Extent of displacement of existing land use or other environmental resources	No impact ☐ Low ☒ Medium ☐ High ☐

Table 10 Impact level on land and environment

5.4.2 Impact on Surface Soil:

There will be low impact on soil cover because the construction activities for the main plant units of project would be confined in the land, the impact on soil will be minimal and confined. Only cutting and filling is required during construction. No adverse impact on soil in the surrounding area is anticipated as the area. Clearing, leveling and improving access tracks, storage of chemicals, oil, fuel or waste; Physical disturbance may create impacts like,

- Physical scarring of the landscape;
- Increased risk of land slippage;
- Accelerated soil erosion;
- Alteration of soil quality by loss of topsoil;
- Blockage and contamination of natural water channel;
- Soil and water contamination resulting from spillage, leakage or improper waste disposal;

Construction of solar power plant, access roads, and other project facilities could cause topographic changes, soil erosion and contamination.

Impact	Severity
Impact on top soil cover	No impact ☐ Low ☒ Medium ☐ High ☐

Table 11 Impact level soil

Mitigation Measures:

Paved working areas will be constructed to accumulate surface run-off into retention ditches to minimize soil erosion. A spill prevention and response plan shall be prepared by the contractor in order to control any inadvertent leakage or spillage. Spill response measures shall be implemented (as necessary) to contain and clean up any contaminated soil. Construction of bunds around relevant work and storage areas. In the preliminary design of the project it was found that there will be no use of chemicals in project area, however in case detailed engineering yields use of chemical than Bunds will be constructed in areas of hazardous chemical storage to contain accidental spillage and minimize the potential for migration to the underlying soil. (Note: in the preliminary design there is no use of chemicals but in case detailed engineering yields use of chemical than this shall be followed.) Any spilled chemical shall be immediately collected and disposed of in accordance with Spill Prevention and Response Plan. Contractor shall ensure that accumulated surface soil or other material from cleaning and leveling should not be deposited in the natural water channels/Nala.

5.4.3 Water Sources:

Water is a scarce resource within the project area and its surroundings. There is no tube well and perennial natural surface water resource in the project area. The only source is rain and run-off water that is used for small agriculture purposes. Jalogir Lohra (water channel for run-off water) is located at 50-100 m near to the proposed project area.

For project implementation water will be transported to site through water tankers from nearby tube wells. A number of functional tube wells available in Kuchlak and Yaro Bazar close to the project site. In the construction phase limited use of water will be required whereas in operations 20000-25000 gallons of water will be required per day.

5.4.4 Impact on Solid Waste:

Solid waste disposal shall be followed by maintaining waste inventory with set frequency of time. It will be ensured that excavated materiel is reused unless otherwise non-useable will be stored and sold in Kuchlack recyclers. (this will also include food waste). Apart from this hazardous waste likewise waste oil etc. will be collected and stored in paved and bounded area and subsequently sold to authorized recyclers through contractor. The project will ensure that scrap metal waste generated from erection of structures and related construction activities will be collected and stored separately in a stack yard and sold to local recyclers as per to manage the solid waste handling team. This will be ensured that the wastes which are recyclable are sold to the external contractors and the non-hazardous waste will be dumped through waste collection system and services. The solid waste will be dumped away from the project site and where nearby no settlements or any other affected environment is present. There are some solid wastes in the project site, including the packing material for the equipment, like the wooden pallets and carton boxes. Solid waste management plan will be followed third party EPA certified contractor will be hired for disposal of solid waste. Likely impacts of improper waste management generated from project activities can include;

- Soil contamination
- Odour
- Health hazards
- Aesthetic issues

Impact	Severity	
Impact of Solid Waste	No impact	☐
	Low	☐
	Medium	☒
	High	☐

Table 12 Impact on solid waste

Mitigation Measures

- The proponent may develop proper solid waste management plan before the commencement of project activities.
- Soak pits should be constructed for collection of waste water generated from domestic, maintenance and cleaning activities.
- At the time of restoration, septic tanks and soak pits should be dismantled and backfilled with at least 1m of topsoil cover above the surrounding surface level;

- Solid residue from the septic tanks should be disposed of through waste contractor;
- All chemicals and fuels will be stored in confined buffered areas;
- Pill response kit should be available at chemical and fuel storage areas. In addition to this, ensure the availability of shovels, plastic bags, and absorbent material for the spill management;
- Solid waste disposal should be through waste contractor. The contractor shall establish regular intervals for waste collection and disposal as per contractor's waste management procedures.
- The recyclable waste should be sent to waste contractors/ vender or any other recycling facility for reuse;
- Medical waste should be sent to an approved incineration facility.

5.4.5 Impact on Air Quality:

The impact during construction phase is expected to be minimal. Particulate matter in the form of dust would be the predominant pollutant affecting the air quality during the construction phase. Dust will be generated mainly during excavation, back filling and hauling operations along with transportation activities. However, a high boundary wall of green dust control cloth will prevent the dust generated due to construction activities going outside the project area. The main source of gaseous emission during the construction phase is movement of equipment and vehicles at site. Equipment deployed during the construction phase is also likely to result in marginal increase in the levels of sulfur dioxide and particulate matter. The impact is reversible, marginal and temporary in nature. Also, the project company may conduct regular ambient Air Monitory before the construction work and during operation phase. Some brick kilns were observed near project area that may create impact in operation phase in long run of project.

Environmental aspects of proposed project activities related to air quality are:

- Excavation, clearing and levelling work during construction and installation phase
- Use of generators and vehicles during the whole project lifetime

Likely impacts of these aspects / activities include dust emissions and gaseous emissions from the generators and vehicles.

Impact	Severity
Impact on Air Quality	No impact ☐ Low ☒ Medium ☐ High ☐

Table 13 Impact on air quality

Mitigation Measures:

- Dust emissions during construction activities will be minimized by good management practices such as locating stock piles of construction sand out of the wind direction, keeping the height of the stock piles to a minimum, keeping earthwork areas damp etc.
- Unnecessary handling of dusty materials will be avoided such as minimizing drop heights when loaders dump soils into trucks.
- All generators, and vehicles used during the whole project life cycle will be properly tuned and maintained in good working condition to minimize exhaust emissions.

- All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.
- Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic
- Staff will use protective measures by covering mouth in dust.

5.4.6 Noise Impact:

There was no major source of noise detected during site visit of project area. However, sporadic sources of noise such as main Quetta, Chaman road traffic was observed. Other noise generating sources during the construction phase are vehicles like tractor, trucks dumper, construction equipment like dozer, scrapers, concrete mixers, cranes, generators, pumps, compressors, rock drills, pneumatic tools, vibrators etc. The operation of this equipment will generate noise ranging between 75 — 90 dB (A).

Since there is no population nearby project site therefore the impact of generated noise on the environment during construction period is insignificant, reversible and localized in nature. The noise monitoring has been conducted for the baseline studies as per the guidelines of IFC standards in different points with different time durations.

Impact	Severity
Impact on Noise	No impact ☒ Low ☐ Medium ☐ High ☐

Table 14 Impact on noise

Mitigation Measures:

- Proponent must ensure that generators, vehicles and other potentially noisy equipment used are in good condition.
- Appropriate engineering control will be applied to noise producing sources like generator, vehicles and other equipment and machinery will be kept to the minimum through regular maintenance.
- The use of horns by project vehicles will be minimized. The use of pressure horns will not be allowed. All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.
- The contractor shall limit idling of engines when not in use to reduce its contribution to noise emissions.

5.4.7 Impact on Ecosystem:

The project site is barren land for the installation of solar power project and there is no settlement or agriculture in the project area, therefore negligible impact is predicted on ecosystem of the area.

Impact	Severity
Extent of displacement of existing land use or other environmental resources	No impact ☐ Low ☒ Medium ☐ High ☐

Table 15 Impact on ecosystem

Mitigation Measures:

The small bushes on the site may be cleared during the project construction activity, but it will be ensured that as soon as the project is operational, plantation is re-grown in and around the plant. Also, the project company shall make a plantation plan for the project after completion of the construction. Thus, the site development works would not lead to any significant loss of important species or ecosystems.

5.4.8 Socio-Economic Impact:

The proposed intervention will bring certain socio-economic changes in the project surrounding area. Some of the impacts would be directly beneficial to the socio-economic environment due to employment potential, improvement in infrastructural facilities, resource utilization from nearby markets by the employees, whereas some of them would be of adverse nature. Local employment during project period will increase socio-economic standards. Positive benefits of the project may arise either from short-term job opportunities during construction, or long-term job opportunities. It is important that during construction and operation phases local community should be given due preference in jobs. As a result, the impact significance can be considered Positive. The adverse impacts on community due to proposed project activities include invasion of privacy; changes in demography; sharing of local resources such as water sources (water tanker mafia may increase rate of water); loss of standing crops in areas where agriculture is being practiced form rain water, excessive dust emissions, improper disposal of waste, damage to community infrastructure, noise pollution and restriction of mobility of local people and livestock etc.

Impact	Severity	
Socio Economic Impact	No impact	☐
	Low	☒
	Medium	☐
	High	☐

Table 16 Social economic Impact

5.4.9 Cultural Sites:

There are no archaeological, historical or cultural sites along the route alignment;

Impact	Severity	
Cultural site	No impact	☒
	Low	☐
	Medium	☐
	High	☐

Table 17 Impact on cultural site

5.4.10 Sanitation and waste removal at construction site and labor camp:

Before commencement of construction activity sanitation, water and drain facilities will be made integral component in the planning stage. Human excreta management with the help of temporary toilet (with hygienic measures) and water facility will be provided on project site. There shall be proper solid waste disposal procedure to enhance sanitation of workers who stay in camps. Septic tank will be used for sanitation purpose. Risks of water borne diseases will be eliminated by adopting improved sanitation procedures. Unacceptable solid waste disposal practices such as open dumping of solid waste and poor sanitation facilities will lead to pollution of surrounding

environment, contamination of water bodies and increase adverse impact to the aquatic; terrestrial lives (if present) and general public inhabited in the area. Surrounding of labor camps, garbage disposal sites and material storage yards provide favorable habitats for vectors of diseases such as mosquitoes, rats and flies. Apart from above a main waste water channel whose catchment area passes through different districts and leads to Afghanistan also lies near the project site at a distance of two kilometers. According to local elders the overflow occurred some 100 years ago but since the depth increased with passage of time because people take sand from the bed of Nalla therefore overflow never occurred in their life. However, it is recommended that a safety wall should be constructed to avoid this risk.

Impact	Severity	
Sanitation and waste removal at construction site and labor camp	No impact	☐
	Low	☒
	Medium	☐
	High	☐

Table 18 Impact on sanitation and waste removal

5.4.11 Impact on ecological resources:

Since there is no inhabited area along the route of transmission line, there will be no disturbance to the life of people, local animals and birds' movement. In transmission there is no dynamic equipment and moving machinery causing noise pollution, water and air pollution. There is no national wildlife park, bird sanctuary, wetland in the route alignment of the proposed transmission line. None of the declared environmentally sensitive areas is located within the route alignment. It is not expected that any flora and fauna that are rare, endangered, endemic or threatened will be affected. Migratory paths of small mammals and reptiles may be affected due to construction activities. However, noise, vibration and emission from construction vehicles, equipment will occur during construction and pre-construction stages in temporary manner.

Impact	Severity	
Impact on ecological resources	No impact	☐
	Low	☒
	Medium	☐
	High	☐

Table 19 Impact on ecological resources

5.4.12 Biodiversity:

Project site is a low rainfall area with high temperatures in summer, apart from this there is high velocity winds, poor soil and low diversity of plant species. This type of climatic conditions hardly supports any considerable vegetation. During the construction and installation activities of solar power plant vegetation clearing can occur along project site area, and access tracks. The potential effects on vegetation will include:

- Loss of vegetation due to land clearing for camp sites (if any) and access roads
- Effects of dust emissions on road side vegetation; and
- Effects on vegetation due to obstruction of natural drainage

The access roads and other project facilities may obstruct natural drainage within the project area. This can affect the survival and or composition and characteristics of vegetation.

Impact	Severity
Impact on biodiversity	No impact ☐ Low ☒ Medium ☐ High ☐

Table 20 Impact on biodiversity

Mitigation Measures:

- Plant installation in surroundings should be give due consideration to contribute to environment of the area.
- The access track to project site will be selected to utilize existing tracks as much as possible
- The construction camp will preferably be located in existing clearing and leveled land
- The access track will be properly compacted (with water sprinkling on daily basis) at the time of construction and thereafter properly maintained throughout the entire construction and operation.
- During construction movement of construction equipment will be minimized only to avoid unnecessary disturbance to soils in the project area.
- Clearing of vegetation and the cutting of trees will be minimized as much as possible
- Off-road travel will be strictly prohibited and observance of this will be monitored during the operation
- Vehicle speeds will be regulated and monitored to avoid excessive dust emissions.
- Use of local vegetation as fuel by crew personnel will be prohibited.
- Construction work near areas which show reptile populations will commence after a soft start up and will be randomly monitored
- Hunting or trapping of wildlife will not be allowed
- Feeding or harassment of wildlife will not be allowed
- Vehicle speeds on access road will be controlled to avoid incidental mortalities of reptiles

5.4.13 Community Grievances:

Community grievances redressal strategy should be developed by proponent. Local complaints on dust, elevated noise, waste from different project activities, spilled oil and chemicals, hiring issues etc may provide basis for conflict between the locals and project proponent.

Impact	Severity
Community grievances	No impact ☐ Low ☒ Medium ☐ High ☐

Table 21 Impact on Community grievances

Mitigation Measures:

Grievance handling system must be established by EEL. A social complaint register should be maintained on site. All complaints received from local communities should be well recorded. Community complaints shall be duly addressed and appropriately resolved. The measures taken to mitigate these concerns shall also be recorded in the social complaint register.

5.4.14 Health and Safety:

There is no any medical facility available in the project area. The closest health care facility to the project area is at Kuchlak bazar where doctors are available. In addition, there are private clinics also present in Kuchlak. Community also uses different local herbs and plants for common diseases like fever. In the case of emergency, patients are taken to Quetta.

Impact	Severity	
Health and safety	No impact	☐
	Low	☒
	Medium	☐
	High	☐

Table 22 Impact on Health safety

Mitigation Measures:

EEL is HSE certified firm and hence HSE policy of EEL will be strictly implemented during construction and operation phases of the project. Safe speed limits for vehicles will be followed to avoid effects of dust emissions. Regular noise exposure assessments and noise level surveys of noisy areas, processes and equipment shall be carried out in order to form basis for remedial actions when necessary. All steps to decrease noise contact levels of employees by means other than that of personal protective equipment shall be taken, such as reducing exposure times, enclosures, silencers, machine covers…etc. Awareness training sessions should be established and delivered to all personnel involved during the construction and operation phase in order to highlight the heat related illnesses of working in hot conditions such as heat cramps, heat exhaustion, heat stroke, dehydration. Proponent must arrange medical camp for all project personnel to screen each staff for communicable diseases prior to induction.

CHAPTER 6: STAKEHOLDER CONSULTATION

6. Stakeholder Consultation:

Stakeholder Consultation and Participation (Information collection from community regarding socio economic, environmental and risk factors). A detailed consultation was carried out with the respective communities, environmental, forest and wildlife experts of the project site. The aim of these consultations was to assess the socio economic, environmental and risk factors, related to the target community.

Figure 21 Glimpse of community meeting

6.1 Below is the detail for different aspects of consultation and outcome:

Point of discussion	**Finding**
Community information	
Number of villages in surroundings of project site	There were only two villages i.e. Jalogir and Sheikhan. The nearest village in the north is Sheikhan and Jalogir in the south. 95% of the homes are Kacha with only 5% semi Kacha. The total population of these villages were 1200.
Current living standard and livelihood	
Is the standard of living for most people satisfactory? Who are the	People are living in very poor condition. Most of the people are involved with daily wages i.e. non skill labor make 85% whereas

most vulnerable people in the community?	13% are dependent on rain fed agriculture while 2% are involved in private sector like transportation and shops. 90% youth of the village is unemployed.
What employment opportunities in non-agriculture sector (both in skilled and unskilled) labor Where are skilled and unskilled labor working What % is linked with skilled labor and unskilled labor	Agriculture sector is dependent on rain water, while there is no tube well for this purpose because of shortage of water. People grow melon, water melon, sorghum and wheat. The production is very low because of low precipitation rate. Government has constructed dam for storage of rain water, and a small number of families are involved with this production. There is no skilled person in the community because of no opportunity for this sector. most of the people are involved with daily wage labor.
Drinking water sources	
What is water depth in the area. What are the main sources of drinking water in the community area? How good is the quality of drinking water? How good is the water quality in the project area? Are there any tube wells in the project area?	Water depth is around 700-1000 feet but due to hard shale and brackish in project area people get their water from water tankers from tube wells of Kuchlak. The price of one tanker 1500 gallon is 1500 PKR. There is no tube well in project area.
Waste Disposal (solid and waste water)	
Are there any solid waste disposal services in the area? Where is waste disposed/dump? Are there any proper sanitation facilities available in the area? Where is waste water and sewerage water disposed of/dump?	No proper sewerage and drainage system exist in the villages. Waste are dumped in open place. Community also use open space for disposal of waste water. Traditional latrines are used and common. Only 5% use direct pit latrine. Male practice open defecation in the fields.
Access Electricity	
What of % households access to electricity? From what sources (e.g. community generator, public/government electricity, solar panels, private generators, other)? Is the supply reliable? (ask for details) Do you know which grid you are connected	All the houses are connected to WAPDA grid. 25% of the houses are use solar lightning units for lightning purpose. Load shading hours are 8 hours out of 24 hours. People are also familiar that they are connected to Sheikhmanda grid.
Infrastructure (Road and pathway)	
How would you describe the quality of the road network in and around the Project communities? Type of roads used while walking to school or to a local market?	There is no metaled road inside the villages. However, the linked road from main road to village was in good condition. Public Transport is available at a distance of 500 meters from the village.
Health Facility	

Where do most people go to access health care services? How far away is this? What is the quality of health care services like?	There is no health facility in the villages. People use main hospital of Kuchlak Bazar. Common disease is malaria, water borne disease, skin and gestor infections
Education Facility	
Where do children go to primary school? Secondary school? How far away are these? What is the quality of education like?	There is one mix school with 35 boys and 15 girls in primary school. The boundary wall was broken, and other repair and renovation work was also needed. Drop out of children was high due to lack of sanitation facility.
Other Questions	
Name fauna flora and reptile in the area (list all of them)	Fauna Jackal, Fox, lizard, goh and small insects, Red wattled lapwing, pigeon, sparrow, peacock, bulbul, chokkor Flora Ghaz, Zoz, Spalani, Sparikai, bushkee
Are there any brick clines in the area, what is the distance from project site?	There are several brick lines near the project site in its south at a distance of 3-5 km. People were of the view that the smoke of the brick clines is injurious to their health especially chest infection. This smoke emits towards their village when there is north to south wind.
Is there any Nala/Sewage in the surrounding? What is over flow frequency/max height/and damages	Apart from above a main waste water channel whose catchment area passes through different districts and leads to Afghanistan also lies near the project site at a distance of two kilometers. According to local elders the overflow occurred some 100 years ago but since the depth increased with passage of time because people take sand from the bed of Nalla therefore overflow never occurred in their life.
Please discuss security situation of the area	There is one tanna (police station) which is jalogir tanna. Apart from this FC post near the project area. Community were satisfied with the security situation of the area.

Table 23 Stakeholder consultation outcome

6.2 Consultation with experts from wildlife and forest departments:

Team also visited the mentioned offices and met with experts of these departments. Mr. Aslam Buzdar from forest (Conservator Forest) and Mr. Shareef Balochistan (Conservator Wildlife) from wildlife provided information. HECS team provided information about the proposed project site and the solar scheme.

Wild life representative provided information about his department which is separated across Balochistan however He shared that wildlife sanctuary is not existing in the area. The sanctuaries are outside of Quetta District. Fox and Jackal are common in areas of mountains which are also common in whole Balochistan. The department has no concern about this project. Representative of forest department told that there is no forest in the area. However, there are few local herb and

shrubs in the area. The project may cause some risks to these herbs and sherbs but the overall risk factor to local fauna is negligible. Mr. Aslam mentioned that this solar project is very useful to the province. There is no such species regarding trees which are at risk due to this project. Mr Aslam discussed that the proposed project has no such effect on species.

Meeting participants:

Sr.no.	Name of Participant	Age
1	Bashir Ahmed	40
2	Shakoor Ahmed	65
3	Jan Mohammad	67
4	Dawood Khan	36
5	Akhtar Mohammad	66
6	Lal Muhammad	38
7	Abdul Kareem	23
8	Muhammad Noor	27
9	Salahudin	42
10	Bakht Muhammad	55

Table 24 FGD participants

Chapter 7

CHAPTER 7: ENVIRONMENTAL MANAGEMENT PLAN

7: Environmental Management Plan:

7.1 Environmental Management Plan:

This section of the IEE report describes the Environmental Management Plan (EMP) to assist the proponent to ensure sound environmental and health safety management during various phases of the project such as development/designing, construction and operation. All environmental aspects relevant to the project were studied in detailed by environmental experts. This IEE report has inspected all negative and positive impacts at each stage of the project covering construction, installation and operations phase of Solar PV power generation plant. To minimize the effects of adverse impacts, the IEE has recommended mitigation measures. The proposed mitigation measures have been based on the understanding of the sensitivity and behavior of environmental receptors in the project area, the legislative controls that apply to the project and a review of good industrial practices while operating in similar environments. For residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the IEE stage, monitoring measures have been recommended to ascertain these impacts during the course of the project. For effective implementation and management of the mitigation measures an Environmental Management Plan (EMP) has been prepared. This EMP satisfies the requirement of the Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000 and BEPA Act 2012. The EMP is a tool that serves as to manage environmental impacts and specifically focuses on implementation of mitigation measures in its true sense against likely environmental impacts.

7.1.1 Purpose and Objectives of the EMP:

- Define the implementation mechanism for the mitigation measures identified during the present study.
- Identify environmental as well as social (if applicable) training requirements at various levels
- Provide the mechanism for taking timely action in the face of unanticipated environmental situations,
- Facilitate the implementation of the mitigation measures identified in the IEE.
- Define legislative requirements, guidelines and best practices that apply to the project.
- Define the roles and responsibilities of the project proponent.
- Define a monitoring mechanism and identify monitoring parameters
- Ensure the complete implementation of all mitigation measures. o Ensure the effectiveness of the mitigation measures.
- Define requirements for environmental monitoring and auditing.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.

- Identify training requirements at various levels.

7.1.2 Components of the EMP:

- Organizational structure and responsibilities
- Environmental management matrix
- Environmental monitoring plan
- Communication and documentation
- Change management Plan
- Training program

7.2 INSTITUTIONAL ARRANGMENTS AND STRUCTURE:

EEL will undertake overall responsibility for compliance with the EMP. EHS team of EEL will ensure that all the activities that the management executes comply with environmental sensitivities as well as they will cooperate with the concerned regulatory agencies such as Balochistan Environmental Protection Agency (BEPA).

EEL will establish an Environment & Social Management Cell (ESMC) at Corporate and Site level, headed by a Project Director to be responsible for day-to-day implementation of the Project. EEL will be responsible for undertaking the project in accordance with the Initial Environment Examination (IEE) and implementing the Environmental and Social Management Plan as per ADB's Safeguard Policy Statement (2009) which will be consistent with the standards set by IFC and World Bank Group.

The ESMC will be responsible for coordinating and implementing all environmental and social activities. During project implementation, the ESMC will be responsible for reflecting the occurrence of new and significant impacts resulting from project activities and integrating sound mitigation measures into the EMP. The ESMC includes a safeguard specialist and supporting staff, together forming the Environmental and Social Unit, appointed by EEL to look after environmental, social and safety issues. The ESMC will be empowered to implement safeguards planning and monitor implementation. The safeguards specialist will give guidance to the Project Manager and his staff to adopt the environmental good practice while implementing the project. The safeguard specialist is responsible for implementing safeguard issues associated with the project through a site team of staff and contractor's, to be assigned by the ESMC as necessary.

7.2.1 Roles and Responsibilities:

Roles and Responsibilities of Project Proponent:

As project proponent, EEL will be ultimately responsible for ensuring complete implementation of the EMP. Manager of the project proponent will be responsible for the overall environmental performance of the project in the guidance of Project Director. Project proponent will monitor the environmental performance of the project to ensure that the project is carried out in accordance with set standards of EEL and recommendations of this IEE. The ESMC includes a safeguard specialist and supporting staff, together forming the Environmental and Social Unit, appointed by EEL to look after environmental, social and safety issues. As mentioned above ESMC will be in the lead role in execution of the project management with below roles:

- Social Unit of the ESMC at corporate level will be responsible to Monitor the implementation of mitigation measures during construction and operation phases of the project.
- Social Unit of the ESMC at corporate level will Prepare suitable environmental management reports at various sites. Advise and coordinate field unit's activity towards effective environment management.
- Social Unit of the ESMC at corporate level will prepare environment health and safety manual for the operation of transmission lines/substations. ESMC will also advice during project planning/design cells on environmental and social issues while route selection of the alignment at the planning/design stage to avoid negative environmental impact. Proponent will also provide training and awareness rising on environmental and social issues related to power transmission projects to the project/contract staff.
- The social unit will make the contractor staff aware of the social issues so that EMP could be managed effectively.
- The duties of the Environmental unit at site level is to:
- Implement the environment policy guidelines and environmental good practices at the sites.
- Advise and coordinate the contractor(s) activity towards effective environment management. Implement environment health and safety manual.
- Carry out environmental in conjunction with project planning cell while route selection of the alignment at the planning stage to avoid negative environmental impact. Also, the cell will make the contractor staff aware of environmental so that EMP could be managed effectively.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction.
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor shall employ an Environmental Officer to monitor and report on the daily activities on-site during the construction period.
- Ensuring that safe, environmentally acceptable working methods and best practices are implemented, and that sufficient plant and equipment is made available properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the Environmental Officer prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this Environmental Management Plan and their responsibilities in relation to the plan; Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the Environmental Management Plan, to the satisfaction of the Environmental Officer.

Roles and Responsibilities - Supervision by Consultant:

The supervision consultant / Project Monitoring Consultant (PMC) has qualified environment health and safety staff on board which will be responsible for overseeing the implementation of the EMP during the construction. Project proponent will appoint construction contractor(s) for the civil construction and installation contractor(s) for the plant installation of the proposed project.

The contractors will be responsible for implementation of, or adherence to, all provisions of the EMP and with any environmental and other codes of conduct required by project proponent. Overall responsibility for environmental performance of the operation will rest with the senior management of the contractors in Pakistan. Site managers of the contractors will be responsible for the effective implementation of the EMP.

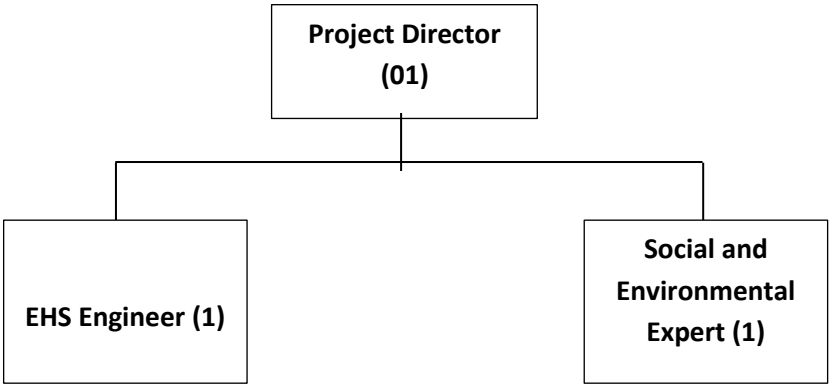


Figure 22 Proposed Framework of ESMC

7.2.3 Responsibilities of ESMC Major actors:

Project Director:

- Development and implementation of environment and social policy and directions.

EHS Engineer:

- Overall in-charge of operation of environment & social management facilities
- Ensuring legal compliance by properly undertaking activities as laid down by regulatory agencies from time to time and interacting with the same

Social and Environment Expert (From contractor Side):

- Secondary responsibility for environment & social management and decision making for all environmental issues including Safety and Occupational Health.
- Ensure environmental monitoring and social issues related to project as per appropriate procedures

7.3 Communication and documentation:

An effective mechanism for storing and communicating environmental information during the project is an essential requirement of an EMP. The key features of such a mechanism are:

- Precise recording and maintenance of all information generated during the monitoring.
- Communicating the information to a central location
- Processing the information to produce periodic reports
- Providing information and answering queries on monitoring originating from various researchers and stakeholders.

7.3.1 Social complaints register for redressal of grievance:

The project proponent Field Community Representative will maintain a register of complaints received from local communities regarding environment and measures taken to mitigate these concerns. All community complaints received will be sent to the HSE Manager for further action.

7.3.2 Training:

Project proponent and its contractors and suppliers will be responsible for the selection and training of their staff which are capable of completing the project activities in an environmentally safe manner. Project proponent and its contractors and suppliers will be responsible for providing orientation to their staff members on the IED, the EMP and their implementation provided in the EMP. The contractors will be responsible for providing awareness training on potential environmental issues of the project to all personnel at site.

7.4 Mitigation and Monitoring Plan:

The mitigation plan is a key component of the EMP. It lists all the potential effects of each activity of the project and their associated mitigation measures identified in the IEE. It should be emphasized that the mitigation measures will have to be translated into environmental as well as social requirements and specifications to be made part of the contracts for the construction activities, with legal binding

- For each project activity, the following information is presented in the plan:
- A listing of the potential impact associated with that project activity
- A comprehensive listing of mitigation measures (actions)
- The person(s) responsible for ensuring the full implementation of the action
- The person(s) responsible for monitoring the action
- The timing of the implementation of the action to ensure that the objectives of mitigation are fully met.

7.4.1 Monitoring:

The aim of environmental and social monitoring during the various phases of the proposed project will be as follows:

- Project proponent and its contractors will be responsible for effective monitoring for efficient operations of the proposed project. Proposed project and its auxiliary systems will be monitored for their performance within the acceptable limits.
- Project proponent will ensure that the restoration of the site after the end of construction and installation activities and after the useful life of proposed project is carried out according to the requirements of the EIA and EMP.
- Ensuring that the mitigation measures included in the IEE are being implemented completely.
- Ensuring the effectiveness of the mitigation measures in minimizing the project's impacts on social and environmental resources
- Systematically observe the activities undertaken by the contractors or any other person associated with the project.
- Verify that the activities are undertaken in compliance with the EIA and other conditions identified by project proponent.

Table below provides the Environmental Management Plan to address and handle issues related to physical, biological, socio-economic issues during civil construction, installation and operation activities respectively.

Environmental Management Plan for Construction and operational phase:

S.No	Aspect	Key Potential Impact	Mitigation Methods	Monitoring needs	Frequency	Reporting	Performance Indicator	Responsibility
Physical Environment								
1	Soil	Soil disturbance due to removal of soil cover	A spill prevention and response plan shall be prepared in order to control any inadvertent leakage or spillage. Spill response measures contain and clean up any contaminated soil. Spill control. Small protection structures in areas of hazardous chemical storage (including temporary storage) should be lined to contain accidental spillage and minimize its migration to the underlying soil. Any spilled chemical shall be immediately collected and	Regular monitoring of on- site activities and incident Reporting forms. Availability of spill kit at each hazardous and Chemical storage area must be ensured.	weekly	All unplanned incident/ accidents must be recorded by the contractor	Number spills or incidents controlled and recorded . Number of spill kit available Number of personnel trained in spill response	Contractor

			disposed of in accordance with spill prevention and response plan.				procedures	
			Contractor shall ensure that a spill kit is available at the site for emergency cleanup activities in case of chemical/ oil spillage.					
			To control soil erosion surface run-off should be collected from all paved working areas into retention ditches to restrict concentration of flows.					
2	Water Resource	Depletion in available water resources	A complete record of water consumption during construction and installation will be maintained	Check demand and water abstraction	During construction	Contractor shall prepare and submit	N/A	Contractor in collaboration

			Water required for construction may be obtained from the local existing wells in the project area or new wells installed The quantity of water used will be kept to the minimum required by taking prudent water conservation measures on site	rate		report to project Proponent.		with project developer
3	Air Quality	Dust generation due to construction activities	Setting an appropriate site speed limit to reduce dust generation from vehicles travelling over unmade surfaces. During construction dust generated on unpaved roadways and work areas should be controlled by the application of water on “as needs” basis.	Visual monitoring of dust emissions during, construction and installation activities	Daily	Contractor shall prepare and submit a report to the project Proponent in the case of complaints	No visible dust trails originating from construction sites	Contractor

			Unnecessary handling of dusty materials will be avoided such as minimizing drop heights when loaders dump soils into trucks.					
			Train workers to handle construction materials and debris during construction to reduce emissions.					
			Cover trucks when transferring fine and dusty materials outside the project location					
		Exhaust emissions due to operation of generators, vehicles and machinery	Ensure adequate maintenance and inspection of vehicles to minimize exhaust emissions. Machines and vehicles which are out of order should be removed from site.	Visual monitoring of exhaust emissions during construction & installation activities	Daily	N/A	Regular vehicle maintenance records	Contractor

4	Noise	Increased noise levels due to construction activities and machinery	The contractor shall use heavy equipment, machinery, and fuels which are in compliance with national regulations. The contractor shall perform regular maintenance on all equipment, vehicle and machinery to prevent noise emissions. Noise canopy / silencer should be used to reduce noise levels	Noise measurements to be undertaken during construction activities, at the site in order to demonstrate compliance with the SEQS guidelines	Daily	Contractor shall prepare and submit a report to project Proponent in case of any exceeding.	Compliance with National guideline limits for environmental noise at sensitive receptors	Contractor
5	Waste Generation	Improper management and handling of hazardous and non-hazardous waste during	The contractor shall segregate storage for different types of wastes such as hazardous, nonhazardous recyclable construction material, plastic, paper, etc. to facilitate proper disposal.	Visual monitoring of site cleanliness and proper storage and handling of	Daily	Contractor shall prepare & submit monthly report to project Proponent.	Compliance with waste management procedures.	Contractor

		construction	The contractor shall provide a separate storage area for hazardous material. The hazardous materials / products must be labelled with proper identification of its hazardous properties.	hazardous waste and sewage.				
			Chemical waste shall be stored in accordance with the provisions of Material Safety Data Sheets (MSDS). The contractor shall keep MSDS onsite.	Inspect that segregated waste disposal or storage areas are clearly marked				
			Contractor shall provide trash bins within construction site so as to prevent littering in the project area and surrounding areas.				Current and complete records of regular waste pickup and disposal	
			The contractor shall establish regular intervals for waste collection and disposal as per					

			contractor's waste management procedure.					
			The sanitary and organic wastes shall be collected in a septic tank to be installed on site and disposed off regularly.					
		Improper waste effluent management practices will favor waste accumulation in nearby environment	Sewage will be disposed off through a system comprising of septic tanks and soak pits. At the end of operation, the residual wastewater will be evaporated / transported offsite for disposal at the nearest municipal drains	Check provision of septic tank and sumps	During construction & Installation activities	Report to project Proponent in case of any mismanagement	Compliance with waste management procedures.	Contractor
6	Visual Amenity	Visual impacts from construction & installation activities such as materials lay down, excavation,	The contractor shall ensure general cleanliness and good housekeeping practice at the project site at all.	Visual inspection of general housekeeping and cleanliness at	Daily	N/A	Good housekeeping and tidiness of work areas within the project site.	Contractor

		backfilling, mounting structure and panels installation		site				
7	Effects on Vegetation	loss in vegetation	Clearing of thick vegetation patches will be minimized as much as possible. Clearing of trees will be avoided as much as possible	Visual inspection within the project site	During construction	N/A	N/A	Contractor
8	Effects on wildlife	Potential disturbance to wildlife	Minimize human and vehicular contact with fauna, including their burrows/nests and feeding grounds.	Visual inspection within the project site	During construction &	N/A	N/A	Contractor
			Waste shall be stored on site within closed container, especially food remnants to avoid attracting birds on site.		installation			

			All work operations should be limited to day time only. Night time travelling or working should be avoided					
			No-hunting and no-trapping policy should be strictly enforced, unless human life is under threat					
9	Local Employment	Avoiding merit for locals may affect working environment	It should be ensured that workers must have adequate experience so that smooth working practice would be achieved.	Inspect that the hiring process is on person capability basis.	Before hiring of staff (local employs)	-	-	Project Proponent
			At the time of hiring the staff must consider impacts due to workers behavior					
10	Health & Safety	Exposure to health events during construction activities	Strict compliance should be observed with HSE guidelines	Environmental monitoring of noise and emissions during construction	During construction & installation	-	Compliance with HSE Guidelines	Project Proponent
			Ensure that all workers exposed to a risk are aware of the possible dangers. They should be given thorough training in how to protect themselves and there should be effective supervision to ensure that the correct methods are being used.					

11	Infrastructure Development	Development of access road may cause disturbance to community, vegetation and wildlife	Access roads construction should be made at safe distance from wildlife and community to minimize the disturbance due to noise and air emissions.	Environmental monitoring of noise and emissions during access road construction	During construction	-	Compliance with NEQS	Project Proponent
12	Community Grievances/ Complaints	Conflicts between community and proponent during construction and installation activity	Grievance handling system must be established to address community grievance/complaints. A social complaint register should be maintained on site by project Proponent. All complaints received from local communities should be well recorded. Community complaints shall be duly addressed and appropriately resolved. The measures taken to mitigate these concerns shall also be recorded in the social complaint register.	Record complaints received from locals or authorities	Daily	-	-	Project Proponent

13	Archaeological Resources and Cultural Heritage	Only potential concern can be impacts on possible unseen archaeological sites/ remains (chance finds)	All construction works shall be ceased if any historical or archaeological sites are found during construction.	Minimum of one site inspection immediately after chance find.	-	In case any discovery of archaeological sites, the same shall be immediately reported to Project Proponent and Archaeological Dept.	-	Project Proponent
			In the event potential archaeological and /or cultural resources are discovered during construction activities, the department of Antiquities shall be invited for consultations and assessment of finding.	Informing personnel present on site in case any archaeological or cultural resources were encountered.				

Table 25 Environmental Management Plan for Construction and operational phase

Environmental Management Plan for Operational Activities

S. No.	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
Physical Environment								
1	Soil	Potential spillage of oil or chemicals.	Specific procedures shall be developed for the removal of waste or spilled fuel, oil and contaminated soil at approved disposal facilities.	Inspect the presence of any disturbed areas in and around the project site for erosion.	Post rainfall event	To proponent's top management	Maintain readily available records of all workers training on spill response procedures	Proponent's O&M Team
			Proper storage for chemicals and fuel with in confined areas on site and adopting proper safety measures when handling those chemicals to prevent their leakage and infiltration into the soil.	Visual inspection of oil storage tanks, waste storage area and fuel storage area for spills and leaks.	Weekly			
2	Waste	Improper management and handling of	Proponent shall provide trash bins within site so as to prevent	Inspect that segregated waste disposal or storage	Weekly	Maintenance Team shall prepare and		Proponent's O&M Team

	Generation	hazardous and non-hazardous waste during operation	littering in the project area and surrounding areas. The Proponent shall establish regular intervals for waste collection and disposal as per waste management procedure.	areas are clearly marked		submit monthly report to management	Compliance with waste management procedures	
3	Visual Amenity	Potential glare from PV panels	The used technology has anti-reflective coating	N/A	N/A	N/A	N/A	Proponent
		Improper effluent (domestic and wastewater generated from solar panels cleaning) management practices will favour waste accumulation in nearby environment	Domestic Sewage and wastewater generated form maintenance activities will be disposed off through a system comprising of septic tanks and soak pits. At the end of operation, the residual wastewater will be evaporated / transported offsite for disposal at the nearest municipal drains	Check provision of septic tank and sumps	Weekly	Compliance met .		Proponent's O & M Team

4	Local Employment	Avoiding merit for locals may affect working environment	It should be ensured that workers must have adequate experience so that smooth working practice would be achieved.	Inspect that the hiring process is on person capability basis.	Before hiring of staff (local employs)	-	-	Project Proponent
6	Community Grievances/ Complaints	Potential disturbance to human community and wildlife due to vehicular movement	A social complaint register should be maintained on site by project Proponent. All complaints received from local communities should be well recorded.	Record complaints received from locals or authorities	Daily	All incidents reported to the proper authority	Number of traffic incidents due to vehicle movement	Proponent's O & M Team
			Implementation of a regulated entrance and exit into the facility	Monitoring of access roads around site.			Number of complaints from road users.	

Table 26 Environmental Management Plan for Operational Activities

Environmental Monitoring Requirements for Construction, Installation & Operation Phase

S. No.	Monitoring Parameters	Monitoring Tests	Responsibility	Timeline/ Frequency (Recommended in guideline)		Guidelines	Facility Provider
				Construction & Installation	Operation		
1	Ambient air quality	SOx, NOx, O3, COx Lead & CO Concentration	EEL	Quarterly	NA	SEQS	Consultant
2	Ambient noise monitoring	Noise	EEL	Quarterly	NA	SEQS	Consultant
3	Drinking Water	Bacterial Count (Total Coli form Count)	EEL	Microbiology: Quarterly Chemical: Quarterly	Microbiology: Quarterly Chemical: Quarterly	SEQS	Consultant
4	Solid Waste	HG	EEL	Daily Record Keeping	Weekly Record Keeping	SEQS	Proponent
5	Gaseous Emission	CO, SOx, NOx, Smoke & PM	EEL	Monthly	NA	SEQS	Consultant

6	Vehicular Emissions	Smoke & CO Concentration, Noise	EEL	Quarterly	Quarterly	SEQS	Consultant
7	Wastewater	Effluent Flow, Temperature, PH@ 25C, TDS, TSS, Grease & Oil, Chloride	EEL	Quarterly	Quarterly	SEQS	Consultant

Table 27 Environmental Monitoring Requirements for Construction

CONCLUSION

The study is based on baseline environmental and socioeconomic information which was collected from a variety of sources, including reports of previous studies, desktop studies, census report etc. Pakistan is facing severe energy crisis and looking for various options to meet the growing energy demand. In order to do so, the Government of Pakistan has intended to diversify its energy mix so as to ensure Energy Sustainability. In this regard, alternative and renewable energies are a strong contributor in the envisaged diversified energy mix.

With the same objective as of Government of Pakistan; EEL Pakistan Limited intends to play a significant role by installing a Photovoltaic (PV) power generation plant with renewable energy resource. This PV power plant will provide clean and environmental friendly alternative energy. In comparison to coal or oil-fired power generation plant, this plant will reduce the greenhouse gas emissions. It will not cause any significant, lasting environmental and social impacts during its construction, installation and operation phases. Only minor and transient environmental disturbances would be experienced at the project site during construction, Installation and operation, and they will be minimized through implementation of the EMP.

This IEE study was based on baseline environmental and socioeconomic information which was collected from a variety of sources, including reports of previous studies, desktop studies, census report etc. A field survey was also carried out in the project area for the collection of primary data. All adequate requirements have been addressed in this report i.e. proposed project activities, environmental conditions of the proposed site and its surroundings Legislative requirements related to the project, environmental impacts of the proposed project activities on the physical and biological and socio-economic receptors. Last but not the least mitigation measures in order to reduce any impact on physical, biological and socio-economic receptors an EMP has been provided that will help in effective implementation of the mitigation measures.

This environmental study has fully examined the potential environmental impacts due to proposed project activities. Mitigation measures for minimizing or obviating these impacts are also suggested. It is concluded that “Proposed installation of Photovoltaic PV Power Plant has low intensity adverse impacts, likely to be of short term duration, minor and of local consequence and are insignificant. A vigilant implementation of mitigation measures and Environmental Management Plan (EMP) will ensure that environmental impacts are managed and minimized and are within acceptable limits.”

ANNEXURE

BALOCHISTAN ENVIRONMENTAL PROTECTION ACT 2012

BALOCHISTAN PROVINCIAL ASSEMBLY SECRETARIAT

BALOCHISTAN ENVIRONMENTAL PROTECTION BILL 2012 BILL NO. ___

OF 2012.

A

BILL

Balochistan Environmental Protection Bill 2012.

to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development

Preamble

Whereas, it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto;

Short title, extent and commencement

1. It is enacted as follows:-
(1) *This Act, shall be called the Balochistan Environmental Protection Act, 2012.*
(2) *It extends to the whole Province of Balochistan except Tribal Areas.*
(3) It shall come into force at once.

Definitions

2. In this Act, unless there is anything repugnant in the subject or context,—

(a) adverse environmental effect" means impairment of, or damage to, the environment and includes—

(i) human health and property or biodiversity, coast, beaches and ecosystem;

(ii) pollution; and

(iii) any adverse environmental effect on Land, Air and Water;

(b) "Agricultural waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry residues from the use of fertilizers, pesticides and other farm . chemicals;

(c) "Air pollutant" means any substance that causes pollution of air and includes soot, smoke, dust particles, odour, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(d) *"Alien species" means a species that does not occur naturally in Balochistan.*

(e) *"Balochistan coastline or coastal zone" means the territorial jurisdiction of the coastline of the Province of Balochistan.*

(f) *"Best practicable environmental option" means the best method for preventing or minimizing adverse effects on the environment, having regard to, among other things:*
(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects;
(ii) the financial implications, and the effect on the environment, of that option when compared with other options; and

(iii) the current state of technical knowledge and the likelihood that the option can be successfully applied.

(g) "Biodiversity" or "biological diversity" means the variability among living organisms from all sources, including inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems;

(h) *"Clinical waste" means any waste produced by hospitals, clinics, nursing homes, doctor's offices, medical laboratories, medical research facilities and veterinarians which is infectious or potentially infectious.*

(i) "Council" means the Balochistan Environmental Protection Council established under section 3;

(j) "Discharge" includes spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(k) "Ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non- living environment interacting as a functional unit;

(l) "Effluent" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor;

(m) "Electronic waste" means discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets, Cathode ray tubes (CRT) and refrigerator, VCRs, stereos, copiers, and fax machines. It also includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal and electronic products nearing the end of their "useful life."

(n) "Emission standards" means the permissible standards established by the Provincial Agency for emission of air pollutants and noise and for discharge of effluent and waste;

(o) "Endemic and indigenous species" means a species which occurs naturally in the wild only in Balochistan, or a species which only breeds in the wild in Balochistan.

(p) "Environment" means—

(i) air, water and land;

(ii) all layers of the atmosphere;

(iii) all organic and inorganic matter and living organisms;

(iv) the ecosystem and ecological relationships;

(v) buildings, structures, roads, facilities and works;

(vi) all social and economic conditions affecting community life; and

(vii) the inter-relationships between any of the factors specified in sub-clauses (i) to (vi);

(q) "Environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigation and

compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

(r) "Environmental Magistrate" means the Magistrate of the First Class appointed under Section 32 ;

(s) "Environmental Tribunal" means the Balochistan Environmental Protection Tribunal constituted under section 28;

(t) "Exclusive Economic Zone" shall have the same meaning as in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(u) "Factory" means any premises in which industrial activity is being undertaken;

(v) "Genetic Resource" means any material of plant, animal, microbial or other origin containing functional units of heredity of actual or potential value.

(w)"Government" means the Government of Balochistan.

(x) "Government Agency" includes—

(i) a department, attached department, bureau, section, commission, board, office or unit of the Provincial Government;

(ii) a developmental or a local authority, company or corporation established or controlled by the Provincial Government; and

(iii) the Balochistan Environmental Protection Agency. ; and

(iv) any other body defined and listed in the Rules of Business of the Provincial Government.

(y) "Handling", in relation to any substance, means the manufacture, processing, treatment, package, storage, transportation, collection, destruction, conversion, offering for sale, transfer or the like of such substance;

(z) "Hazardous substance" means—

(i) a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics, causes, or is likely to cause, directly or in combination with other matters an adverse environmental effect; and

(ii) any substance which may be prescribed as a hazardous substance;

(aa) "Hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste and includes hospital waste and nuclear waste;

(bb) "Historic waters" means such limits of the waters adjacent to the land territory of Pakistan as may be specified by notification under section 7 of the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(cc) "Hospital waste" includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;

(dd) "Industrial activity" means any operation or process for manufacturing, making, formulating, synthesizing, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;

(ee) "Industrial waste" means waste resulting from an industrial activity;

(ff) "Initial Environmental Examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;

(gg) "Integrated pollution control" means the holistic system aimed at pollution prevention and minimization at source, managing the impact of pollution and waste on the receiving environment and remediation of damaged and polluted environments.

(hh) "Living modified organism" means any living organism that possesses a novel combination of genetic material obtained through the use of modern technology.

(ii) "local authority" means regional or district set up of EPA or any Agency designated by the Provincial Government, by notification in the official Gazette, to be a local authority for the purposes of this Act;

(jj) "Local council" means a local council constituted or established under a law relating to local Government;

(kk) "Motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(ll) "Municipal waste" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;

(mm) "Environmental Quality Standards" means standards established by the Federal/Provincial Agencies under clause (e) of sub-section (1) of section 6 and approved by the Council under clause (c) of sub - section (1) of section 4;

(nn) "Noise" means the intensity, duration and character of sounds from all sources, and includes vibration;

(oo) "Nuclear waste" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;

(pp) "Person" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(qq) "Pollution" means the contamination of air, land or water by the discharge or emission of effluent or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or

substances alters unfavorably the chemical, physical, biological, radiation, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

(rr) "Prescribed" means prescribed by rules made under this Act;

(ss) "Project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes—

(i) construction or use of buildings or other works;

(ii) construction or use of roads or other transport systems;

(iii) construction or operation of factories or other installations;

(iv) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;

(v) any change of land use or water use; and

(vi) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;

(tt) "Protection of environment" means the qualitative and quantitative improvement of the different components of the environment and prevention of the deterioration of qualitative and quantitative standards;

(uu) "Proponent" means the person who proposes or intends to undertake a project;

(vv)"Provincial Agency" means the Balochistan Environmental Protection Agency established under section 5, or any Government Agency, local council or local authority exercising the powers and functions of the Provincial Agency;

(ww) "Rules &Regulations" means rules and regulation made under this Act;

(xx) "Sewage" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(yy) "Ship breaking" means breaking up of various types of ship for recycling.

(zz) "Standards" means qualitative and quantitative standards for discharge of effluent and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations;

(aaa) "Strategic Environmental Assessment" Strategic environmental assessment (SEA) is a system of incorporating environmental considerations into policies, plans, programmes and strategies. It is sometimes referred to as strategic environmental impact assessment.

(bbb) "Sustainable Development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

(ccc) "Sustainable Management" means management of the use of natural resources to provide for the health, safety and social, cultural and economic well-being of people and communities taking into account the following:

(i) safeguarding the life-supporting capacity of natural resources and ecosystems;

(ii) ensuring the maintenance of the life-supporting capacity and quality of natural resources and ecosystems to meet the reasonably foreseeable

needs of future generations;
(iii) avoiding the creation of adverse effects and, where adverse effects cannot be avoided, mitigates and remedies adverse effects.

(ddd) *"Territorial waters" shall have the same meaning as in the Territorial Waters and Maritime Zones Act, l 976 (LXXXII of 1976);*

(eee) "Vessel" includes anything made for the conveyance by water of human beings or of goods; and

(fff) "Waste" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

(ggg) "Water resource" includes surface water, an aquifer or ground water , a river or spring, a natural channel in which water flows regularly or intermittently, and a wetland, lake or dam into which, or from which, water flows.

Establishment of the Balochistan Environmental Protection Council.—

3. (1) The Provincial Government shall, by notification in the official Gazette, establish a Council to be known as the Balochistan Environmental Protection Council consisting of—

(a) Chief Minister or such other person as the Chief Minister may nominate in this behalf.	Chairperson
(b) Minister for Environment	Vice chairperson
(c) Chief Secretary Balochistan	Member
(d) Secretary Environment	Member/Secretary
(e) Secretary Finance	Member
(f) Secretary Industries	Member
(g) Secretary Agriculture	Member
(h) Secretary Forest	Member
(i) Secretary P&D	Member
(j) Secretary S&GAD	Member
(k) Director General EPA	Member

(l) Such other persons not exceeding six (6) as the Provincial Government may appoint, with the following representation:

One from the Balochistan Chamber of Commerce & Industries and one from the Balochistan Chamber of Agriculture, Two Environment experts/Scientist, One Educationist and One from Non Governmental Organization.

(2) The Members of the Council, other than ex-officio members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of two years.

(3) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the

committees shall be submitted to the Council for approval. The council or any of such committee may seek assistance from any Government Department or expert in the relevant environmental field in performance of its functions.

Functions and powers of the Council.—

4. (1) The Council shall:-

(a) co-ordinate and supervise enforcement of the provisions of this Act; and

(b) approve comprehensive environmental policies and ensure their implementation within the framework of a National /Balochistan conservation strategy as may be approved by the Federal/Provincial Government from time to time;

(c) approve the Environmental Quality Standards;

(d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources.

(e) co-ordinate integration of the principles and concerns of sustainable development into development plans and policies;

(f) The Council shall frame its own rules of procedure.

(g) The Council shall hold meetings, as and when necessary, but not less than two meetings, shall be held in a year.

(2) The Council may direct the Provincial Agency or any Government Agency to prepare, submit or implement projects for the protection, conservation, rehabilitation and improvement of the environment and the sustainable development of resources or to undertake research in any aspect of environment.

Establishment of the Balochistan Environmental Protection Agency.

5. (1) The Government of Balochistan shall by a notification in the official Gazette established Balochistan Environmental Protection Agency to exercise the powers and perform the functions assigned to it under this Act and the rules and regulations made there under.

(2) The Balochistan Environmental Protection Agency shall be headed by a Director-General who shall be appointed by the Government of Balochistan on such terms and conditions as it may determine.

(3) The Balochistan Environmental Protection Agency shall have such administrative, technical and legal staff, as the Government of Balochistan may specify, to be appointed in accordance with Balochistan Civil Servant Act 1974.

(4) The powers and functions of the Balochistan Environmental Protection Agency shall be exercised and performed by the Director-General.

(5) The Director-General may, by general or special order, delegate any of the powers and functions to staff appointed under sub-section (3).

(6) For assisting the Balochistan Environmental Protection Agency in the discharge of its functions the Government of Balochistan shall establish Advisory Committees for various sectors and appoint as members thereof representatives of the relevant sector, educational institutions and non- governmental organizations.

Functions of the Balochistan Environmental Protection Agency

6. (1) The Balochistan Environmental Protection Agency shall—

(a) administer and implement this Act and the rules and regulations made;

thereunder;

(b) prepare, in co-ordination with the relevant Government Agency and in consultation with the concerned sectors Advisory Committees, environmental policies for approval by the Council;

(c) take all necessary measures for the implementation of the national environmental policies approved by the Council;

(d) prepare and publish an Annual Environment Report on the state of the environment;

(e) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette in consultation with the other relevant Government Departments/ Agencies.

(f) Revise the Environmental Quality Standards with approval of the Council:

Provided that

(i) before seeking approval of the Council, the Balochistan Environmental Protection Agency shall publish the proposed Environmental Quality Standards for public opinion in accordance with the prescribed procedure; and

(ii) different standards for discharge or emission from different sources and for different areas and conditions may be specified; where standards are less stringent than the Environmental Quality Standards prior approval of the Council shall be obtained;

(iii) certain areas, with the approval of the Council, may exclude from carrying out specific activities, projects from the application of such standards;

(g) co-ordinate environmental policies and programmes;

(h) establish systems and procedures for surveys, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;

(i) take measures to promote research and the development of science and technology which may contribute to the protection of the environment, and sustainable development;

(j) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation for the purposes of this Act.

(k) initiate legislation in various sectors of the environment;

(l) render advice and assistance in environmental matters including such information and data available with it as may be required for carrying out the purposes of this Act:

Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 15;

(m) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;

(n) provide information and guidance to the public on environmental matters;

(o) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;

(p) promote public education and awareness of environmental issues through mass media and other means including seminars and workshops;

(q) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

(r) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;

(s) perform any function which the Council may assign to it.

(2) The Balochistan Environmental Protection Agency may—

(a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;

(b) request any person to furnish any information or data relevant to its functions;

(c) initiate with the approval of the ***Provincial/Federal Government,*** requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;

(d) recommend to the Government of Balochistan the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including—

(i) incentives, prizes awards, subsidies, tax exemptions, rebates and depreciation allowances; and

(ii) taxes, duties and other levies;

(e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector;

(f) provide or arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

Powers of the Balochistan Environmental Protection Agency

7. Subject to the provisions of this Act, *the Balochistan Environmental Protection Agency may*

(a) lease, purchase, acquire property both moveable and immovable;

(b) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations;

(c) enter into contracts, execute instruments subject to approval of the Provincial Government, necessary for proper management and conduct of its business made thereunder;

(d) subject to approval of the Provincial Government appoint in accordance with prescribed procedures such experts and consultants as it considers necessary for the efficient performance of its functions on appropriate terms and conditions;

(e) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;

(f) The Director General Balochistan EPA or any other Regional officer specifically authorized in this behalf by the Director General shall have the power to impose fine/administrative penalty up to rupees one hundred thousand from case to case basis.

(i) the fine/administrative penalty shall be recovered as per land revenue act.

(ii) the fine/administrative penalty initially or for an interim period shall be placed with the Balochistan EPA till the decision of the Environmental Tribunal or Magistrate; and

(iii) the fine/administrative penalty after the final decision shall be deposited in the public exchequer.

(g) enter and inspect and under the authority of a search warrant issued by the Environmental Court or Environmental Magistrate, search at any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which. there are reasonable grounds to believe that an offence under this Act has been, or is being, committed;

(i) Subject to the provisions of this Act, any person generally or specifically authorized in this behalf by the Director General shall be entitled to enter, at all reasonable times, with such assistance as he considers necessary, any building or place for the following purposes, namely:-

a) to perform duties conferred on him under this Act or rules;

b) to inspect any activity in such building or place in accordance with this Act, the rules or any notice, order or direction issued thereunder;

c) to examine or test any equipment, industrial plant, record, register or any other important matter relating thereto;

d) to conduct a search of any building or place which the said person has reason to believe to have been the place of occurrence of any offence in contravention of any notice, order or direction issued under this Act or the

rules;

e) to seize/close any equipment, industrial plant, record, register, document or other matter which may serve as evidence of the commission of any offence punishable under this Act or the rules.

(ii) The provisions of the Code of Criminal Procedure shall be applicable in respect of any search or seizure under this Act.

(a) take samples of any materials, products, articles or substances or of the effluent, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;

(b) arrange for test and analysis of the samples at a certified laboratory;

(i) Every person authorized in this behalf by the Director General may, in such manner as may be prescribed by rules, collect from any factory, premises or place samples of air, water, soil or of any other substance for the purpose of analysis.

(ii) The results of the analysis of samples collected under clause (i) shall not be admissible in evidence in any legal proceeding unless the provisions of the clauses (iii) and (iv) have been complied with.

(iii) Subject to the provisions of sub-section (4), the officer collecting a sample under clause (i) shall-

(a) serve notice on the owner or proponent or agent of the said place, in such manner as may be prescribed by rules, of his intention to collect such sample;

(b) collect the sample in the presence of the said occupier or agent;

(c) put the sample into a container and affix on it a seal bearing the signatures of himself and of the occupier or agent;

(d) prepare a report of the sample collected and sign it himself and take the signature of the occupier or agent;

(e) send without any delay, the said container to the laboratory specified by the Director General EPA.

(iv) Where a sample is collected under clause (i) and a notice is served by the collecting officer under sub clause a) of clause (iii), the collecting officer shall, if the occupier or agent willfully absents himself at the time of the collection of the sample or, though being present, refuses to sign the sample or report, in the presence of two witnesses, give his signature and attest and seal it and shall send it without any delay to the laboratory specified by the Director General, mentioning that the occupier or agent had not been present or, as the case may be, refused to give his signature.

(i) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:

Provided that the power under clauses (f), (h), (I) and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898). or the rules made under this Act and under the direction of the Environmental

Tribunal or Environmental Magistrate; and

(j) establish an Environmental Co-ordination Committee comprising the Director-General as its chairman and the heads of relevant Government Agencies and such other persons as the Government of Balochistan may appoint as its members to exercise such powers and perform such functions as may be delegated or assigned to it by the Government of Balochistan for carrying out the purposes of this Act and for ensuring inter departmental co-ordination in environmental policies.

Establishment, powers and functions of the Regional or District Environmental Protection Agencies.—

8. (1) Government of Balochistan shall, by notification in the official Gazette, establish the Regional or District Environmental Protection Agency, to exercise such powers and perform such functions as may be delegated to it by the Government of Balochistan under sub-section (2) of section 34.

(2) The Regional or District Environmental Protection Agency shall be headed by an officer at least of the rank of regional Director or Deputy Director who shall be appointed by the Provincial Government on such terms and conditions as prescribed in the Balochistan Civil Servant Act 1974.

(3) The Regional or District Environmental Protection Agency shall have such administrative, technical and legal staff as the Government of Balochistan may specify, to be appointed in accordance with the Balochistan Civil Servants Appointment, Promotion and Transfers Rules 2009 such procedure as may be prescribed.

(4) The powers and functions of the Regional or District Environmental Protection Agency shall be exercised and performed by an Officer of the rank of regional Director or Deputy Director appointed as head.

(5) The Director General may, by general or special order, delegate any of the powers and functions to staff appointed under sub-section (3).

Establishment of the Balochistan Sustainable Development Funds.—

9. (1) There shall be established in the Province a Balochistan Sustainable Development Fund.

(2) The Balochistan Sustainable Development Fund shall be derived from the following sources, namely:—

(a) grants made or loans advanced by the Federal Government or the Provincial Government;

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and non-governmental organizations; and

(c) contributions from private organizations and other persons.

(3) The Balochistan Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for—

(a) providing financial assistance to the projects in the public/private sector designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any aspect of environment; and

(b) any other purpose which in the opinion of the Board shall help to achieve environmental objectives and the purposes of this Act.

Management of the Balochistan Sustainable Development Fund.—

10. (1) The Balochistan Sustainable Development Fund shall be managed by a Board known as the Sustainable Development Fund Board consisting of:-

(i) Secretary Environment Department Chairperson

(ii) Secretary Industries Department Member

(iii) Secretary Social welfare Department Member

(iv) Secretary Finance Department Member

(v) Secretary Forest Department Member

(vi) Secretary Agriculture Department Member

(vii) such non-official persons not exceeding six (6) as the Members Government of Balochistan may appoint including two (2)representatives of the Balochistan Chamber of Commerce and Industry, two (2) representatives of the Balochistan Chamber of Agriculture and two (2) representative of leading non-governmental organizations/donors.

(viii) Director General, Balochistan Environmental Protection Agency Member/Secretary

(2) the Board shall have the power to—

(a) sanction financial assistance for eligible projects; as specified in section 9(3) of this Act

(b) invest moneys held in the Balochistan Sustainable Development Fund in such profit - bearing Government bonds, savings schemes and securities as it may deem suitable; and

(3) The Board shall constitute committees of its members to undertake regular monitoring of projects financed from the Balochistan Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts and performance evaluation based on the progress reports.

(4) Audit of the fund shall be conducted on annual basis.

Inter-Provincial Environmental issues:-

11. (1) The project falling within the geographical jurisdiction of two or more Provinces, the IEE or EIA may be submitted by the proponent to each Provincial Environmental Agencies for review and approval.
(2) In case of any dispute or concerns the matter shall be settled through mutual consultation of the Provinces to avoid any inconveniences or future litigation.
(3) The concerned Provinces may constitute a joint technical or review committee including a representative of the concerned Federal Ministry dealing with Environment and coordination.

Multilateral Environmental Agreements:-

12. (1) The obligation of the International Conventions, Treaties and Protocols shall be observed as before devolution of the subject of Environment to the Province on Environment or climate change. In case of any international/ bilateral cooperation, the matter shall be proceeded with consultation with the concerned Federal Ministries.

(2) The Government of Balochistan/ Environmental Protection Agency shall extend support to those obligation of the International Conventions, Treaties and Protocols where adequate assistance provided by the Federal Government.

Strategic Environment Assessment (SEA):-

13. (1) This section regulates the conditions, methods and procedure according to which the assessment of impact of certain plans and programmes on the environment (hereinafter referred to as: strategic assessment) shall be carried out in order to provide for the environmental protection and improvement of sustainable development through integration of basic principles of environmental protection into the procedure of preparation and adoption of plans and programmes.
(2) The Government at all levels of administration and in every sector shall incorporate environmental considerations into policies, plans, programmes and strategies.

Prohibition of certain discharges or emissions and potential harmful items or materials .—

14. (1) Subject to the provisions of this Act and the rules and regulations no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level or is likely to cause, a significant adverse effect on the environment or human health which is in excess of the Environmental Quality Standards or, where applicable, the standards established under sub -clause (ii) of clause (f) of section 6.
(2) The Government of Balochistan shall not allow any imported or locally made commodities or items or materials or equipment or instruments or automobile or pesticides etc, into its provincial jurisdiction which may have any potential of causing Environmental problems.
(3) No person or company related to public and private sector shall introduce any of the imported or locally made items or materials or equipment or instruments or automobile or pesticides etc as per subsection (2) for any purpose unless it has filed an application to the Balochistan Environmental Protection Agency, as the case may be, and has obtained approval from the Government Agency in respect thereof.

(4) The Government of Balochistan may levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(5) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(6) The approved license in terms of section 15 of this Act does not affect the applicant's duty to obtain any other authorization required in order to undertake the activity or implement the project concerned, whether in terms of this Act or any other legislation

(7) A person /firm causing discharge of pollutants shall take all reasonable measures to ensure that the best practicable environmental option is adopted in relation to the discharge of emission and conservation of the environment.

Initial Environmental Examination and Environmental Impact Assessment.—

15. (1) No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination with the Government Agency designated by Balochistan Environmental Protection Agency, as the case may be, or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof.

(2) The Government Agency shall subject to standards fixed by the Balochistan

Environmental Protection Agency—

(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subje to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated c reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to—

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director General of the Balochistan Environmental Protection Agency is of the opinion that the request for confidentiality is not well- founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) international relations, national security or maintenance of law and order, except with the consent of the Government of Balochistan; or

(iii) matters covered by legal professional privilege.

(4) The Government Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations.

(5) Subject to sub-section (4) the appropriate Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The Government Agency shall maintain separate registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such registers shall be subject to the restrictions specified in sub-section (3).

(8) No concession areas for any developmental activities shall be awarded to any International/National groups or firms without consultation and concurrence of the Government of Balochistan/Environmental Protection Agency.
(9) The prospect licenses for mining, quarrying, crushing etc. shall only be awarded/ granted in compliance with the sub section (1), (2), (3), (4) and (5) .

(10) The cellular companies shall obtain environmental approval from the Balochistan EPA before installing Base Transceivers Station (BTS).

(11) BTS Stations should be required to undergo routine evaluation for Compliance. Whenever an application is submitted to the Balochistan EPA for construction or modification of a transmitting facility. EPA shall have the authority to take action if a cellular base station antenna does not comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines and recommendations of the report titled `Environmental and Health Related Effects of the Cellular Base Station Antennas' carried out by IT and Telecom Division, Ministry of Information Technology.

(12) No person or company related to public and private sector shall commence construction or operation unless the concerned building authority accord approval under the provisions of the in vogue Building Code.

(13) after fulfilling the sub section (12) an action plan shall be submitted to the concerned municipal/town/union council to carry out the activities for a specific time period as to provide the general public or road users an alternative corridor.

(14) the waste generated during the construction or maintenance or repair of any building shall be appropriately disposed of or transported or collected to a designated place allocated for the purpose like any land fill site to avoid public nuisance.

(15) the construction or repair activities especially in the main city area shall be carried out in a manner to minimize the road congestion or blockage.

(16) the proponent of the project shall remit fifty thousand rupees as review fee of an Initial Environmental Examination (IEE) and one hundred thousand as review fee for Environmental Impact Assessment (EIA).

(17) the person or company in public or private sector intend to commence any scheme or project do not falling under schedule I and II of this Act shall remit twenty five thousand rupees as an Environmental approval fee to the Balochistan Environmental Protection Agency.

Prohibition of import of hazardous waste.—

16. No person shall import hazardous waste into Balochistan and its jurisdiction limits.

Handling of hazardous substances and License:-

17. (1) Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except—

(a) under a license issued by the Government of Balochistan and in such manner as may be prescribed; or

(b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

(2) Every owner or proponent of any land or premises on which hazardous waste is kept, treated or disposed of shall make a written application to the Balochistan Environmental Protection Agency for a hazardous waste management license, which shall at least include details of:

a) the chemical composition, nature and volume of the waste which is being, or will be, produced;

b) the industrial process, trade or activity giving rise to the waste;

c) the way in which the applicant proposes to keep, treat or dispose of the hazardous waste, including storage and handling procedures;

d) the precautions which will be taken to avoid any adverse effects on the environment being caused by the hazardous waste.

(3). the Balochistan Environmental Protection Agency shall evaluate each application for a license under this Article in the following manner:

a) grant a hazardous waste management license, with or without conditions, if satisfied that the proposed method of keeping, treating and disposing of the hazardous waste will not cause any adverse effects; or

b) refuse to grant a license giving reasons for the refusal in writing to the applicant.

(4). the Balochistan Environmental Protection Agency would take a decision in regard to subsection 2 within thirty (30) days of the date of lodging of the application for a license.

(5) The license shall be granted for a reasonable period not exceeding five years. On expiry of the license for renewal same procedure shall be followed.

Electronic Wastes:-

18. (1) Every producer, distributer, collection centre, refurbisher, dismantler or recyclers shall store the electronic waste for a period not exceeding six months and shall maintain a record of collection, sale, transfer, storage and segregation of wastes and make these records available for inspection:

Provided that the Balochistan Environmental Protection Agency may extend the said period in following cases, namely:

(a) Dismantlers and Recyclers up to six months of their annual storage capacity of the owner; or

(b) Collection centers who do not have access to any registered dismantling or recycling facility; or

(c). the waste which needs to be specifically stored for development of a process for its recycling, reuse.

(2) Every producer, distributer, collection centre, refurbisher, dismantler or recyclers shall make arrangements for the environmentally sound management and disposal of electronic waste.

(3) the 'environmentally sound management of electronic waste' as "taking all steps required to ensure that electronic waste are managed in a manner which shall protect health and environment against any adverse effects, which may result from hazardous substance contained in such wastes."

(4) the provisions of this section shall apply to every producer, consumer and bulk consumer involved in manufacture, sale, purchase and processing of electronic equipment or components.

(5) information dissemination on electronic waste and the environmentally sound management of electronic waste is also mandated from producers.

(6) to regulate the provisions of this section all the relevant international conventions, protocols and treaties collectively called as multilateral environmental agreements (MEAs) shall be applicable where Pakistan is signatory or ratified the MEAs.

(7) any person or company or unit who contravenes or fails to comply with the provisions of the above subsections shall be imposed penalty under section 25 of this act.

General Prohibition in relation to Solid and Hospital Waste management and Waste Management License:-

19. (1) No person may collect, transport, sort, recover, store, dispose of or otherwise manage waste in a manner that results in a significant adverse effect.

(2) Every person who imports, produces, collects, recovers, transports, keeps, treats or disposes of waste shall take all reasonable measures to prevent a significant adverse effect on the environment from occurring.

(3) The owner or proponent of every premises upon which solid and hazardous hospital waste is produced shall ensure that all hazardous waste whether solid or hospital waste is separated from other waste, and is stored in separate containers pending disposal, in accordance with the requirements of the Balochistan Environmental Protection Agency as set out in regulations, published guidelines or license conditions.

(4) A person shall not dispose of solid and hazardous hospital waste in such a manner that it becomes litter or is likely to become litter.

(5) Unless in possession of a valid waste management license issued by the Balochistan Environmental Protection Agency, no person may construct, own or operate a landfill site, incinerator or other facility at which waste is permanently disposed of or is stored indefinitely.

(6). The Balochistan Environmental Protection Agency shall evaluate each application for a license and shall do the following:

a) grant a license if the Balochistan Environmental Protection Agency is satisfied that the applicant has sufficient expertise to undertake the activity in question in accordance with the law and in a manner that will not have significant adverse effects; or

b) refuse to grant a license giving reasons for the refusal in writing to the applicant.

(7). The Balochistan Environmental Protection Agency shall reach a decision in regard to subsection 2 within thirty (30) days of the date of lodging of the application for a license with the Balochistan Environmental Protection Agency.

(8). If there are reasonable grounds to grant license, and those grounds are communicated to the license holder in writing, the Balochistan Environmental Protection Agency may amend, revoke or impose new conditions in an existing waste management license.

(9). The license granted under subsection (6) shall be subject to review if condition of license granted are not fulfilled.

Management of Water Resources:-

20. (1) All persons, for the purpose of protection, conservation, development, use, control and management of water resources, would take into account the following measures:

a) protecting aquatic and associated ecosystems and their biological diversity;

b) reducing and preventing pollution and degradation of water resources.

(2) When preparing water resource management plans, Departments and other relevant institutions shall at least take the following into account:

a) provisions for integrated watershed management;

b) regulation of sustainable abstraction of groundwater;

c) regulation of the use of ground or surface water for agricultural, industrial, mining, and urban purposes;

d) measures to protect human health and ecosystems;

e) measures to protect wetlands and their associated ecosystems;

f) any other provision necessary for the sustainable use and management of water resources.

(3) An owner of land or a person who uses the land on which any activity or process is performed or undertaken which causes or is likely to cause significant pollution of a water resource must take measures to prevent any such pollution.

Regulation of motor vehicles.

21. (1) Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Environmental Quality Standards, or where applicable the standards established under clause (e) of section 6 (1).

(2) For ensuring compliance with the standards mentioned in sub-section (1), the Balochistan Environmental Protection Agency may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

(3) Where a direction has been issued by the Government Agency under subsection (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

(4) To regulate the provision of this Act a green squad comprising of representative of Traffic Police, Motor Vehicle Examiner, Excise & Taxation and EPA Balochistan shall be in place to monitor and inspect the automobiles running on the road as per the Environment Quality Standard.

(5) The inspection or monitoring shall be carried out at least once in a month wherein a mechanism be chalked out for issuance of warning tickets (red: Highly polluted, Blue: less polluted) on a prominent on the vehicle, as the case may be for specific period of time not exceeding 30 days to maintain the vehicle in order .

(6) Whoever contravenes or fails to comply with the provision of subsection (5) such vehicle should be made off road or punishable with fine at least twenty thousand rupees which may be extended to one hundred thousand rupees. In the case of continuing contravention or failure the vehicle shall be impounded.

Alien Species and Living Modified Organisms:-

22. (1) The import into Balochistan of alien species and of living modified organisms is prohibited without a permit issued by the relevant authority under any law enforce in Balochistan. The Balochistan Environmental Protection Agency in consultation with the Departments of Agriculture, Livestock and Animal Husbandry and Food shall monitor the matter.

(2) No permit for the introduction of an alien species or of a living modified organism shall be issued unless the environmental impact indicates that there is a reasonable certainty that no harm to indigenous natural resources or human health will result from the proposed introduction.

(3) Subsection 1 and 2 of this Section shall apply equally to introductions of alien species and living modified organisms into the Province of Balochistan and to introductions from one ecosystem to another within the province.

(4) The introduction of alien species and living modified organisms into protected areas shall not be allowed.

Coastal Zone:-

23. (1) Subject to the provisions of this Act the activities or concentration or level of discharges of the following units established on onshore and offshore shall be monitored strictly to prevent the pollution and environmental degradation caused by the following multi-magnitude and multidisciplinary units.

a) Ports and shipping
b) Fisheries
c) Ship dismantling
d) Shipping Traffic (Oil Tankers & Vessels) & dredging.
e) Oil and gas mineral exploration.
f) Coastal power plants and Energy sector.
g) Oil refineries and Industries

(2) The ship breaking at Gaddani or anywhere else in the coastal belt/zone of this province shall be subject to fulfilling all the relevant obligations under the Basel Convention "on the Control of Trans-boundary Movements of Hazardous Waste and their Disposal", Rotterdam Convention "on the prior Informed Consent(PIC) Procedure for certain Hazardous Chemicals and Pesticides in International Trade" and other relevant Treaties/Protocols and provisions of this Act.

(3) During the process of ship breaking/dismantling the waste, hazardous waste or sludge or Polychlorinated biphenyls or asbestos etc, shall be disposed of in a manner to ensure Protection of Terrestrial and Marine environment.

(4) The activities of ship breaking/dismantling activities on shore or offshore within territorial limit of Balochistan shall be monitored at least biannually to ensure environmental protection and prevent degradation and pollution.

(5) The disposal of untreated sewage and domestic wastes and untreated disposal of industrial effluents into the sea is an offence any person or company or unit who contravenes or fails to comply with the provisions of this Act shall face to penalty under section 25.

Environmental protection order.

24. (1) Where the Balochistan Environmental Protection Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of the provisions of this Act, rules or regulations or of the conditions of a license, and is likely to cause, or is causing or has caused an adverse environmental effect, the Balochistan Environmental Protection Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Balochistan Environmental Protection Agency may consider necessary within such period as may be specified in the order.

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include—

(a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate, control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;

(c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such condition as may be reasonable in the circumstances, to the satisfaction of the Balochistan Environmental Protection Agency.

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the Balochistan Environmental Protection Agency may, in addition to the proceedings initiated against him under this Act, the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deem necessary and may recover the reasonable costs of taking such measures from such person as arrears of land revenue.

Penalties

25. (1) Whoever contravenes or fails to comply with the provisions of sections 14, 15, 16, 18 or section 24 or any order issued there-under shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues:

Provided that if contravention of the provisions of section 14 also constitutes contravention of the provisions of section 21, such contravention shall be punishable under sub-section (2) only.

(2) Whoever contravenes or fails to comply with the provisions of section 17, 19, 21, 22 or 23 or any rule or regulation or conditions of any license, any order or direction, issued by the Council or the Balochistan Environmental Protection Agency, shall be punishable with fine which may extend to one hundred thousand rupees, and in case of continuing contravention or failure

with an additional fine which extend to one thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-sections (1) and (2), the Environmental Court and Environmental Magistrate, as the case may be, shall, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Court is satisfied that as a result of the commission of the offence monetary benefits have accrued to the offender, the Environmental Court may order the offender to pay, in addition to the fines under sub-section (1), further additional fine commensurate with the amount of the monetary benefits.

(5) Where a person convicted under sub-sections (1) or sub-section (2) had been previously convicted for any contravention under this Act, the Environmental Court or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder—

(a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of Commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry;

(b) sentence him to imprisonment for a term which may extend to two years;

(c) order the closure of the factory;

(d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act:

Provided that for a period of three years from the date of commencement of this Act the sentence of imprisonment shall be passed only in respect of persons who have been previously convicted for more than once for any contravention of sections 14, 16, 17, 18,19 or 24 involving hazardous waste;

(e) order such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Balochistan Environmental Protection Agency; and

(f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.

(6) The Director-General of the Balochistan Environmental Protection Agency or an officer generally or specially authorized by him in this behalf may, on the application of the accused compound an offence under this Act with the permission of the Environmental Tribunals or Environmental Magistrate in accordance with such procedure as may be prescribed.

(7) Where the Director-General of the Balochistan Environmental Protection Agency is of the opinion that a person has contravened any provision of Act he may, subject to the rules, by notice in writing to that person require him to pay to the Balochistan Environmental Protection Agency an

administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act who has paid an administrative penalty for a contravention of any provision of this Act.

Offences by bodies corporate

26. Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance of, or is attributed to any negligence on the part of, any director, partner, manager, secretary or other Officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation.— For the purposes of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

Offences by Government Agencies, local authorities or local councils.

27. Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of, the Head or any other officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

Balochistan Environmental Tribunals.—

28. (1) The Government of Balochistan may, by notification in the official gazette establish Balochistan Environmental Protection Tribunals which shall exercise jurisdiction under this Act.

(2) The Balochistan Environmental Protection Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the Government of Balochistan which at least one shall be a technical member with suitable professional qualifications and experience; in the environmental field as may be prescribed. For every sitting of the Balochistan Environmental Protection Tribunal the presence of the Chairperson and not less than one Member shall be necessary.

(3) A decision of Balochistan Environmental Protection Tribunal shall be expressed in terms of the opinion of the majority or if the case has been decided by the Chairperson and only one of the members and a there is a difference of opinion between them, the ;decision of the Balochistan Environmental Protection Tribunal shall be expressed in terms of the opinion of the Chairperson.

(4) Balochistan Environmental Protection Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who has given evidence, and

may act on the evidence already ;recorded by, or produced, before it.

(5) Balochistan Environmental Protection Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(6) No act or proceeding of Balochistan Environmental Protection Tribunal shall be invalid by reason only of the existence of a vacancy in, or defect in the constitution, of, the Balochistan Environmental Protection Tribunal.

(7) The terms and conditions of service of the Chairperson and members of the Balochistan Environmental Protection Tribunal shall be such as may be prescribed.

Jurisdiction and powers of Balochistan Environmental Tribunals.

29. (1) Balochistan Environmental Protection Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act or the rules and regulations made there under.

(2) All contravention punishable under sub-section (1) of section 25 shall exclusively be triable by Balochistan Environmental Protection Tribunal.

(3) Balochistan Environmental Protection Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by- -

(a) the Government Agency or local council; and

(b) any aggrieved person, who has given notice of not less than thirty days to the Provincial Agency concerned, of the alleged contravention and of his intention to make a complaint to the Environment Tribunal.

(4) In exercise of its criminal jurisdiction, the Balochistan Environmental Protection Tribunal shall have the same powers as are vested in Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 the Balochistan Environmental Protection Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the Balochistan Environmental Protection Tribunal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) Balochistan Environmental Protection Tribunal may, on application filed by any officer duly authorized in this behalf by the Director-General of the Balochistan Environmental Protection Agency, issue bail able warrant for the arrest of any person against whom reasonable suspicion exist, of his having been involved in contravention punishable under sub-section (1) of Section 25:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant he

shall be released from custody, failing which he shall be taken or sent without delay to the officer in-charge of the nearest police station.

(8) All proceedings before the Balochistan Environmental Protection Tribunal shall be deemed to be judicial proceedings within the meaning of section 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Balochistan Environmental Protection Tribunal shall be deemed to be a court for the purpose of section 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than Balochistan Environmental Protection Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of Balochistan Environmental Protection Tribunal extends under this Act, the rules and regulations made thereunder.

(10) Where the Balochistan Environmental Protection Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to five hundred thousand rupees.

Appeals to the Environmental Tribunal.—

30. (1) Any person aggrieved by any order or direction of the Balochistan Environmental Protection Agency under any provision of this Act, and rules or regulations may prefer an appeal with the Balochistan Environmental Protection Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

(2) An appeal to the Balochistan Environmental Protection Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

Appeals from orders of the Environmental Tribunal

31. (1) Any person aggrieved by any final order or by any sentence of the Balochistan Environmental Protection Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (I) shall be heard by a Bench of not less than two Judges.

Jurisdiction of Environmental Magistrates.

32. (1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contravention punishable under sub-section (2) of section 25 shall exclusively be trial-able by Environmental Magistrate especially empowered in this behalf under section 14 of the Code of Criminal Procedure, 185(Act No. V of 1898).

(2) An Environmental Magistrate shall be competent to impose any punishment specified in sub-sections (2) and (4) of section 25.

(3) An Environmental Magistrate shall not take cognizance of an offence trial able under sub-section (I) except on a complaint in writing by—

(a) the Balochistan Environmental Protection Agency, or Government Agency or a local council; and

(b) any aggrieved person.

Appeals from orders of Environmental Magistrates.

33. Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions whose decision thereon shall be final.

Power to delegate.

34. *(1)* The Government of Balochistan may, by notification in the official Gazette, delegate any of its or of the Balochistan Environmental Protection Agency powers and functions under this Act and the rules and regulations to any Government Agency, local council or local authority.

(2) The Balochistan Environmental Protection Agency may also by notification in the official Gazette, delegate any of its powers or functions under this Act and the rules and regulations to EPA Regional or sub-offices. In case of nonexistence of its Regional/Sub-offices may delegate its powers or functions to any local council or local authority in the Province.

Power to give directions.

35. In the performance of its functions the Provincial Agency shall be bound by the direction given to it in writing by the Government.

Indemnity.

36. No suit, prosecution or other legal proceedings shall lie against the Government , the Council, the Balochistan Environmental Protection Agency, the Director-Generals of the Balochistan Environmental Protection Agency, members, officers, employees, experts, advisers, committees or consultants of the Balochistan Environmental Protection Agency or the Environmental Tribunal or Environmental Magistrates or any other person for anything which is in good faith done or intended to be done under this Act or the rules or regulations made thereunder.

Dues recoverable as arrears of land revenue.

37. Any dues recoverable by the Balochistan Environmental Protection Agency under this Act, or the rules or regulations shall be recoverable as arrears of land revenue.

Act to override other laws.

38. The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

Power to make rules.

39. The Government of Balochistan may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules for implementing the provisions of the international environmental Agreements, specified in the Schedule to this Act.

Power to amend the Schedule

40. The Government of Balochistan may, by notification in the official Gazette, amend the Schedule so as to add any entry thereato or modify or omit any entry therein.

Power to make regulations.

41. (1) For carrying out the purposes of this Act, the Balochistan Environmental Protection Agency may, by notification in the official Gazette and with the approval of the Government of Balochistan, make regulations not inconsistent with the provisions of this Act or the rules made thereunder.

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for

(a) submission of periodical reports, data or information by any Government agency, local authority or local council in respect of environmental matters;

(b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and

calamities;

(c) appointment of officers, advisers, experts, consultants and employees;

(d) levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented;

(e) monitoring and measurement of discharges and emissions;

(f) categorization of projects to which, and the manner in which, section 15 applies;

(g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and Development of procedures for their filing, review and approval;

(h) providing procedures for handling hazardous substances; and

(i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

Repeal, savings and succession.

42. (1) The provision of Pakistan Environmental Protection Act 1997 (Act No.XXXIV of 1997) applicable to the Province of Balochistan are hereby repealed.

(2) Notwithstanding the repeal of the Pakistan Environmental Protection Act 1997 hereinafter called the repealed Act, any rules or regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entered into, proceedings commenced, rights acquired liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of the repealed Act shall, so far as they are not inconsistent with the provisions of this Act be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act, until they are repealed, rescind, withdrawn, cancelled, replaced or modified in accordance with the provisions of this Act.

(3) On the establishment of the Balochistan Environmental Protection Agency under this Act, all properties, assets and liabilities pertaining to the Balochistan Environmental Protection Agency established under repealed Act shall vest in and be the properties, assets and liabilities, as the case may be, of the Balochistan Environmental Protection Agency established under this Act.

(4) The Balochistan Environmental Protection Agency constituted under the repealed Act and existing immediately before the commencement of this Act shall be deemed to have been constituted under section 5 and the Director General and other officers and employees appointed in the said Agency shall be deemed to be Director General, officers and employees appointed under the Balochistan Civil Servant Act 1974.

(5) Notwithstanding the repeal of the Pakistan Environmental Protection Act 1997(Act No.XXXIV of 1997), all proceeding pending immediately before commencement of this Act, against any person under the repealed Act and rules, regulation or order made thereunder, or any other Law or rules shall continue under that Law and rules, in the manner proceeded thereunder.

SCHEDULE
(See section 39)

1. International Plant Protection Convention, Rome, 1951.

2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome, 1956.

3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.

4. Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.

5. London Convention on Ocean Dumping 1972.

6. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), 1972.

7. MARPOL Convention on Prevention of Pollution from Ship, 1973/78

8. Convention on International Trade in Endangered Species of Wild Funa and Flora (CITES), Washington, 1973.

9. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.

10. Convention on the Law of the Sea, Montego Bay, 1982.

11. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.

12. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.

13. Agreement on the Network of Agriculture Centres in Asia and the Pacific, Bangkok, 1988.

14. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.

15. Convention on Biological Diversity, Rio de Janeiro, 1992.

16. United Nations Framework Convention on Climate Change, Rio De Janeiro, 1992.

17. Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 17 March 1992.

18. The Rio Declaration on Environment and Development, 13 June 1992

19. London Amendment to Montreal Protocol on Substances that deplete the ozone layer, 10 Aug 1992

20. United Nations Convention on the Law of the Sea, 16 Nov 1994

21. Washington Declaration on Land Based Marine Pollution 1995.

22. UN Convention on Non-Navigational Uses of International Watercourses, 1995

23. Ban Amendment to the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, 22 Sept 1995.

24. The Kyoto Protocol, 11 Dec 1997

25. The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 11 Sept 1998.

26. The Beijing Amendment to the Montreal Protocol on Substances that deplete the ozone layer, 1 Jan 2000

27. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, 29 Jan 2000.

28. Stockholm Convention on Persistent Organic Pollutants (POPs), 23 May 2001.

29. International Treaty on Plant Genetic Resources for Food and Agriculture, 3 Nov 2001.

30. Hong Kong International Convention For The Safe And Environmentally Sound Recycling Of Ships, 2009

STATEMENT OF OBJECTS AND REASONS.

After the 18th Constitutional amendments the subject of environment vide Notification No.4-9/2011-Min dated 29th June, 2011 stand devolved to the provinces with effect from 1st July, 2011. Even after the deletion of the subject of environment from the concurrent list the Pakistan Environmental Protection Act 1997 remained intact as per Article 270-AA, Sub-Article(6). However, there is provision that the province through an appropriate legislature/competent authority may alter, repeal and amend the laws related to the subject.

To regulate and effectively address the peculiar environmental issues of the province of Balochistan this act namely "Balochistan Environmental Protection Act 2012" is submitted as per provisions of the Article 270-AA, Sub-Article(6) of 18th Constitutional amendments.

(Mir Asghar Rind)

Minister for Environment Department

SECRETARY

Balochistan Provincial Assembly

Dated _____ November, 2012.

NEQS

REGISTERED No. M-302
L. 7646

The Gazette *of Pakistan*

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABD, THURSDAY, AUGUST 10, 2000

PART-II

Statutory Notification (S.R.O)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT, LOCAL GOVERNMENT AND RURAL DEVELOPMENT

NOTIFICATION

Islamabad, the 8th August 2000

S.R.O. 549 (I)/2000.___ In exercise of the powers conferred under clause (c) of sub-section (1) of section of 6 of the Pakistan environmental Protection Act. 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to direct that the following further amendments shall be made in its Notification No. S.R.O. 742(I)/93. dated the 24th August, 1993, namely: ___

In the aforesaid Notification, in paragraph 2._____

[4138(2000)/Ex.GAZ]

Price : Rs. 5.00

(1) for Annex, I the following shall be substituted, namely:_____

Annex-I

"NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND LIQUID INDUSTRIAL EFFLUENTS (mg/l, UNLESS OTHERWISE DEFINED)

S. No.	Parameter	Existing Standards	Revised Standards Into Inland Waters	Into Sewage Treatment [5]	Into Sea [6]
1	2	3	4	5	6
1.	Temperature or Temperature Increase *	40°C	≤3°C	≤3°C	≤3°C
2.	pH value (H^+)	6-10	6-9	6-9	6-9
3.	Biochemical Oxygen Demand $(BOD)_5$ at 20°C [1]	80	80	250	80**
4.	Chemical Oxygen Demand (COD) [2]	150	150	400	400
5.	Total Suspended Solids (TSS)	150	200	400	200
6.	Total Dissolved Solids (TDS)	3500	3500	3500	3500
7.	Oil and Grease	10	10	10	10
8.	Phenolic compounds (as phenol)	0.1	0.1	0.3	0.3
9.	Chloride (as Cl^-)	1000	1000	1000	SC***
10.	Fluoride (as F^-)	20	10	10	10
11.	Cyanide (as CN^-) total	2	1.0	1.0	1.0
12.	An-ionic detergents (as MBAS) [12]	20	20	20	20
13.	Sulphate (SO_4^{2-})	600	600	1000	SC***
14.	Sulphide (S^{2-})	1.0	1.0	1.0	1.0
15.	Ammonia (NH_3)	40	40	40	40
16.	Pesticides [3]	0.15	0.15	0.15	0.15

1	2	3	4	5	6
17.	Cadmium [4]	0.1	0.1	0.1	0.1
18.	Chromium (trivalent and hexavalent [4] ..	1.0	1.0	1.0	1.0
19.	Cooper [4]	1.0	1.0	1.0	1.0
20.	Lead [4]	0.5	0.5	0.5	0.5
21.	Mercury [4]	0.01	0.01	0.01	0.01
22.	Selenium [4]	0.5	0.5	0.5	0.5
23.	Nickel [4] ..	1.0	1.0	1.0	1.0
24.	Silver [4]	1.0	1.0	1.0	1.0
25.	Total toxic metals	2.0	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0	5.0
27.	Arsenic [4] ..	1.0	1.0	1.0	1.0
28.	Barium [4]	1.5	1.5	1.5	1.5
29.	Iron	2.0	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5	1.5
31.	Boron [4]	6.0	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0	1.0

Explanations:

1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.

2. Methylene Blue Active Substances; assuming surfactant as biodegradable.

3. Pesticides include herbicides, fungicides, and insecticides.

4. Subject to total toxic metals discharge should not exceed level given at S. N. 25.

5. Applicable only when and where sewage treatment is operational and BOD_5=80mg/l is achieved by the sewage treatment system.

6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries

* The effluent should not result in temperature increase of more than 3°C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l

*** Discharge concentration at or below sea concentration (SC).

Note:_____ 1. Dilution of liquid effluents to bring them to the NEQS limiting values is not permissible through fresh water mixing with the effluent before discharging into the environment.

2. The concentration of pollutants in water being used will be substracted from the effluent for calculating the NEQS limits" and

(2) for Annex-II the following shall be substituted, namely:____

Annex-II

"NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm^3, UNLESS OTHERWISE DEFINED)."

S. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate matter	(a) Boilers and Furnaces		
	(i)	(i) Oil fired	300	300
		(ii) Coal fired	500	500
		(iii) Cement Kilns	200	300
		(b) Grinding, crushing, Clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	500	500
3.	Hydrogen Chloride	Any	400	400

1	2	3	4	5
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxides [2][3]	Sulfuric acid/Sulphonic acid plants		
		Other Plants except power Plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen	Nitric acid manufacturing unit.	400	3000
	(3)	Other plants except power plants operating on oil or coal:		
		Gas fired	400	400
		Oil fired	-	600
		Coal fired	-	1200

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.

2. Based on 1 percent Sulphur content in fuel oil. Higher content of Sulphur will case standards to be pro-rated.

3. In respect of emissions of Sulphur dioxide and Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards:-

A. Sulphur Dioxide

Sulphur Dioxide Background levels Micro-gram per cubic meter (ug/m^3) Standards.

Background Air Quality (SO_2 Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. SO_2 Emission (Tons per Day Per Plant)	Criterion II Max. Allowable ground level increment to ambient (ug/m^3) (One year Average)
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100 ug/m^3 linear interpolations should be used.

** No projects with Sulphur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen oxides, expressed as NO_2 should not be exceed the following:-

Annual Arithmetic Mean	$100ug/m^3$ (0.05 ppm)

Emission level for stationary source discharge before missing with the atmosphere, should be maintained as follows:-

For fuel fired steam generators as Nanogram (10^9-gram) per joule of heat input:

Liquid fossil fuel	130
Solid fossil fuel	300
Lignite fossil fuel	260

Note:- Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

[File No. 14(3)/98-TO-PEPC.]

HAFIZ ABDULAH AWAN
DEPUTY SECRETARY (ADMN)

PRINTED BY THE MANAGER, PRINTING CORPORATION OF PAKISTAN, PRESS ISLAMABAD. PUBLISHED BY THE MANAGER OF PUBLICATIONS, KARACHI.

REGISTERED No. M - 302
L.-7646

The Gazette of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABAD, FRIDAY, NOVEMBER 26, 2010

PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT

NOTIFICATIONS

Islamabad, the 18th October, 2010

S. R. O. 1062(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (I) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Ambient Air.

National Environmental Quality Standards for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO_2)	Annual Average*	80 µg/m³	80 µg/m³	-Ultraviolet Fluorescence method
	24 hours**	120 µg/m³	120 µg/m³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m³	40 µg/m³	- Gas Phase Chemiluminescence
	24 hours**	40 µg/m³	40 µg/m³	

[2944(2010)/Ex. Gaz.] *Price: Rs. 5.00*

Pollutants	Time-weighted average	Concentration in Ambient Air: Effective from 1st July, 2010	Concentration in Ambient Air: Effective from 1st January 2013	Method of measurement
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m³	40 µg/m³	- Gas Phase Chemiluminescence
	24 hours**	80 µg/m³	80 µg/m³	
O_3	1 hour	180 µg/m³	130 µg/m³	-Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m³	360 µg/m³	- High Volume Sampling, (Average flow rate not less than 1.1 m3/minute).
	24 hours**	550 µg/m³	500 µg/m³	
Respirable Particulate Matter, PM_{10}	Annual Average*	200 µg/m³	120 µg/m³	-β Ray absorption method
	24 hours**	250 µg/m³	150 µg/m³	
Respirable Particulate Matter, $PM_{2.5}$	Annual Average*	25 µg/m³	15 µg/m³	-β Ray absorption method
	24 hours**	40 µg/m³	35 µg/m³	
	1 hour	25 µg/m³	15 µg/m³	
Lead Pb	Annual Average*	1.5 µg/m³	1 µg/m³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m³	1.5 µg/m³	
Carbon Monoxide (CO)	8 hours**	5 mg/m³	5 mg/m³	- Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m³	10 mg/m³	

*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

S. R. O. 1063(I)/2010.— In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Standards for Drinking Water Quality.

National Standards for Drinking Water Quality

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Bacterial			
All water intended for drinking (e.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period.	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non objectionable/Acceptable	Non objectionable/Acceptable	
Turbidity	⟨ 5 NTU	⟨ 5 NTU	
Total hardness as $CaCO_3$	< 500 mg/l	—	
TDS	⟨ 1000	⟨ 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
Essential Inorganic	***mg/Litre***	***mg/Litre***	
Aluminium (Al) mg/l	≤ 0.2	0.2	

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Antimony (Sb)	≤ 0.005 (P)	0.02	
Arsenic (As)	≤ 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	< 250	250	
Chromium (Cr)	≤ 0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	***mg/Litre***	***mg/Litre***	
Cyanide (CN)	≤ 0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤ 1.5	1.5	
Lead (Pb)	≤ 0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤ 0.001	0.001	
Nickel (Ni)	≤ 0.02	0.02	
Nitrate (NO_3)*	≤ 50	50	
Nitrite (NO_2)*	≤ 3 (P)	3	
Selenium (Se)	0.01(P)	0.01	
Residual chlorine	0.2-0.5 at consumer-end 0.5-1.5 at source	—	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries

* indicates priority health related inorganic constituents which need regular monitoring.

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20- 58 may be consulted.***	Annex II
Phenolic compounds (as Phenols) mg/L		≤ 0.002	
Polynuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority.

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in South Punjab and in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centres are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

S. R. O. 1064(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Noise.

National Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from 1st July, 2010		Effective from 1st July, 2012	
		Limit in dB(A) Leq *			
		Day Time	Night Time	Day Time	Night Time
1.	Residential area (A)	65	50	55	45
2.	Commercial area (B)	70	60	65	55
3.	Industrial area (C)	80	75	75	65
4.	Silence Zone (D)	55	45	50	45

Note 1. Day time hours: 6.00 a. m to 10.00 p. m.

2. Night time hours: 10.00 p. m. to 6.00 a.m.

3. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.

4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

*dB(A) Leq: Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

[No. F. I(12)/2010-11-General.]

MUHAMMAD KHALIL AWAN,
Section Officer (PEPC).

PRINTED BY THE MANAGER, PRINTING CORPORATION OF PAKISTAN PRESS, ISLAMABAD.
PUBLISHED BY THE DEPUTY CONTROLLER, STATIONERY AND FORMS, UNIVERSITY ROAD, KARACHI.

LETTER OF LOI

No.BPDP/Energy(Co)/2018/107-26

BALOCHISTAN POWER DEVELOPMENT BOARD
GOVERNMENT OF BALOCHISTAN
[redacted]

0819203716

Dated Quetta the 23rd February, 2018

To,

Mr. Shamsuddin A. Shaikh,
Chief Executive Officer,
Engro Energy (Pvt.) Limited,
16th Floor, The Harbor front Building ,
H-C, Marine Drive Block 4, Clifton Karachi.
Tel:-021-35297875-211, Fax:- 021-35293665.

Subject: **LETTER OF INTEREST FOR INSTALLATION OF 50 MW SOLAR POWER PLANT-III AT KUCHLAK.**

Reference. Your Statement of Qualification (SOQ) for Development of **50 MW Solar Energy Project-III** in Balochistan at **Kuchlak** whereby your firm has been considered eligible in the Balochistan Power Development Board (BPDB) meeting held on 10th January, 2018 after fulfilling criteria as set in Balochistan Power Generation Policy 2007, herein after referred as "Policy".

Bank Guarantee amounting to **Rs. Rs.5,530,000/- Pak Rupees equal to (US Dollar Fifty Thousand)** issued from Allied Bank Limited, Head Office New Garden Lahore and accepted by this office on 9th February, 2018.

2. Now this letter of Letter of Interest (LOI) is being issued on behalf of Government of Balochistan in terms of the provisions of the Policy. The Government of Balochistan hereby confirms its interest in your proposals for conducting feasibility study for establishing an approximately **50 MW Solar Power project-III** to be located at **Kuchlak** subject to following:

a. You are required to complete your Feasibility study for the subject project at no risk and cost to, and without any obligation on the part of Government of Balochistan and its agencies within Twelve month from the date of issuance of this LOI. Further it is clarified that the Government of Balochistan will facilitate Land for the project. There would be no liabilities on the event if project is declared non feasible. You are further required to submit monthly progress report of the feasibility study to BPDB failing which BPDB may proceed action against your firm/company by declaring this LOI as void.

b. You are required to carry out feasibility study complete at internationally accepted standards and in accordance with provision as contained in the Policy. The feasibility study must include environmental impact assessment study, detail design of power House, load blow and stability studies, design of inter connection/transmission lines, detail pertaining to infrastructure, project cost, financing and financing terms, tariff calculations and assumption of financial calculations including economic/financial analysis. You are advised to liase with the power purchaser while determining your plant size and site, project lay out, transmission line, and inter connection arrangements.

c. You will carry out feasibility study according to specific milestones appended herewith at Annex-A, and submit monthly progress report showing progress against these milestones.

d. Engro Energy (Pvt.) Limited shall require to establish the special purpose vehicle company and shall maintain the shares in this company as provided in Balochistan Power Generation Policy 2007 and submit

a copy of Memorandum of Articles & Associations as well the form 29 duly attested by the Security and exchange commission of Pakistan (SECP).

e. BPDB will appoint Panel of Expert with the mandate to oversee and monitor feasibility study conducted by the firm also verify attainment of aforesaid milestones also ensure implementation of the project consistent with national and provincial needs.

f. The main sponsor will be liable for all obligations and liabilities of and on behalf of other sponsors. Further processing of the feasibility study subject to Government of the Balochistan acceptance in accordance with the policy.

g. The viability of the LOI is **(12) Twelve Months** from the date of issuance, where after or before it, if found otherwise violating policy will automatically lapse immediately. Issuance of this LOI or lapsing of its validity on your conducting feasibility study there under shall not form the basis of any claim for compensation or otherwise by the sponsor or the project company or any party claiming through them against Government of Balochistan/BPBD or any of its agencies, employees or consultants on any grounds whatsoever during or after the expiration of its validity

h. You are therefore required to complete the feasibility study for the subject project within the validity of this LOI. In case there is delay in completion of feasibility study within the stipulate time period, a one time extension by the BPDB committee referred in section 4.2 para 40 may be granted up to a maximum 180 days provided the panel of experts is satisfied that the feasibility study is being conducted in a satisfactory manner. Further more extension in validity of LOI will only be provided upon submission of a Bank Guarantee in double the original amount and valid beyond 180 days of the extended LOI period.

i. In case of failure to meet the relevant milestone and standards. BPDB will terminate this LOI and encash the Bank Guarantee.

j. This LOI has been issued in Triplicate on the date hereof, and it shall come into effect when one copy hereof received by the BPBD after having been duly countersigned by you. Nevertheless, this LOI shall lapse if the countersigned copy is not received at BPDB within thirty days of its issuance.

Chairman
Balochistan Power Development Board

Accepted and Agreed
For & on behalf of
Date 23rd Feb, 18
Enclose as above.

Copy forwarded for Information to:-

1. The Secretary, Government of Pakistan, Ministry Water and Power, Islamabad.
2. The Chairman NEPRA Islamabad.
3. The Principal Secretary to Chief Minister Balochistan.
4. The Secretary Energy Government of Balochistan.
5. The Chairman WAPDA Lahore.
6. The Chief Executive Officer QESCO Quetta.
7. The Chief Executive Officer AEDB, Islamabad.
8. The Additional Secretary (Staff) to Chief Secretary Balochistan.
9. Master File.

EEL Safety Certifications


SGS
Engro Powergen Qadirpur Limited
OHSAS 18001:2007
Operation and Maintenance of Combined Cycle Power Plant.

NPO PAKISTAN

Certificate of Approval

Awarded to

Engro Powergen Qadirpur Limited

Ghotki, Pakistan

National Productivity Organization, Ministry of Industries & Production certify that the 5S system of the above organization has been assessed and found to be in accordance with the requirements of

5S Good House Keeping Japanese Standard

NPO PAKISTAN 5S

Scope

Warehouse & Related Offices

Original Approval Date: October 17, 2014

Subject to the continued satisfactory performance of the organization's 5S Good House Keeping system,
this certificate is valid until October 16, 2015

Sher Ayub Khan
Chief Executive Officer
National Productivity Organization

DV: NPO/5S CERT/1014/504

REGISTERED No. M - 302
L.-7646

The Gazette of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABAD, FRIDAY, NOVEMBER 26, 2010

PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT

NOTIFICATIONS

Islamabad, the 18th October, 2010

S. R. O. 1062(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (I) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Ambient Air.

National Environmental Quality Standards for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO_2)	Annual Average*	80 $\mu g/m^3$	80 $\mu g/m^3$	-Ultraviolet Fluorescence method
	24 hours**	120 $\mu g/m^3$	120 $\mu g/m^3$	
Oxides of Nitrogen as (NO)	Annual Average*	40 $\mu g/m^3$	40 $\mu g/m^3$	- Gas Phase Chemiluminescence
	24 hours**	40 $\mu g/m^3$	40 $\mu g/m^3$	

(3205)

[2944(2010)/Ex. Gaz.] *Price: Rs. 5.00*

Pollutants	Time-weighted average	Concentration in Ambient Air: Effective from 1st July, 2010	Concentration in Ambient Air: Effective from 1st January 2013	Method of measurement
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m³	40 µg/m³	- Gas Phase Chemiluminescence
	24 hours**	80 µg/m³	80 µg/m³	
O^3	1 hour	180 µg/m³	130 µg/m³	-Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m³	360 µg/m³	- High Volume Sampling, (Average flow rate not less than 1.1 m3/minute).
	24 hours**	550 µg/m³	500 µg/m³	
Respirable Particulate Matter, PM_{10}	Annual Average*	200 µg/m³	120 µg/m³	-β Ray absorption method
	24 hours**	250 µg/m³	150 µg/rn³	
Respirable Particulate Matter, $PM_{2.5}$	Annual Average*	25 µg/m³	15 µg/m³	-β Ray absorption method
	24 hours**	40 µg/m³	35 µg/m³	
	1 hour	25 µg/rn³	15 µg/m³	
Lead Pb	Annual Average*	1.5 µg/m³	1 µg/m³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m³	1.5 µg/m³	
Carbon Monoxide (CO)	8 hours**	5 mg/m³	5 mg/m³	- Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m³	10 mg/m³	

*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

S. R. O. 1063(I)/2010.— In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Standards for Drinking Water Quality.

National Standards for Drinking Water Quality

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Bacterial			
All water intended for drinking (e.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies. where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period.	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non objectionable/Acceptable	Non objectionable/Acceptable	
Turbidity	⟨ 5 NTU	⟨ 5 NTU	
Total hardness as $CaCO_3$	< 500 mg/l	---	
TDS	⟨ 1000	⟨ 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
Essential Inorganic	***mg/Litre***	***mg/Litre***	

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20- 58 may be consulted.***	Annex II
Phenolic compounds (as Phenols) mg/L		≤ 0.002	
Polynuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority.

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in South Punjab and in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centres are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

S. R. O. 1064(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Noise.

National Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from Ist July, 2010		Effective from Ist July, 2012	
		Limit in dB(A) Leq *			
		Day Time	Night Time	Day Time	Night Time
1.	Residential area (A)	65	50	55	45
2.	Commercial area (B)	70	60	65	55
3.	Industrial area (C)	80	75	75	65
4.	Silence Zone (D)	55	45	50	45

Note: 1. Day time hours: 6.00 a. m to 10.00 p. m.

2. Night time hours: 10.00 p. m. to 6.00 a.m.

3. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.

4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

*dB(A) Leq: Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

[No. F. I(12)/2010-11-General.]

MUHAMMAD KHALIL AWAN,
Section Officer (PEPC).

PRINTED BY THE MANAGER, PRINTING CORPORATION OF PAKISTAN PRESS, ISLAMABAD.
PUBLISHED BY THE DEPUTY CONTROLLER, STATIONERY AND FORMS, UNIVERSITY ROAD, KARACHI.

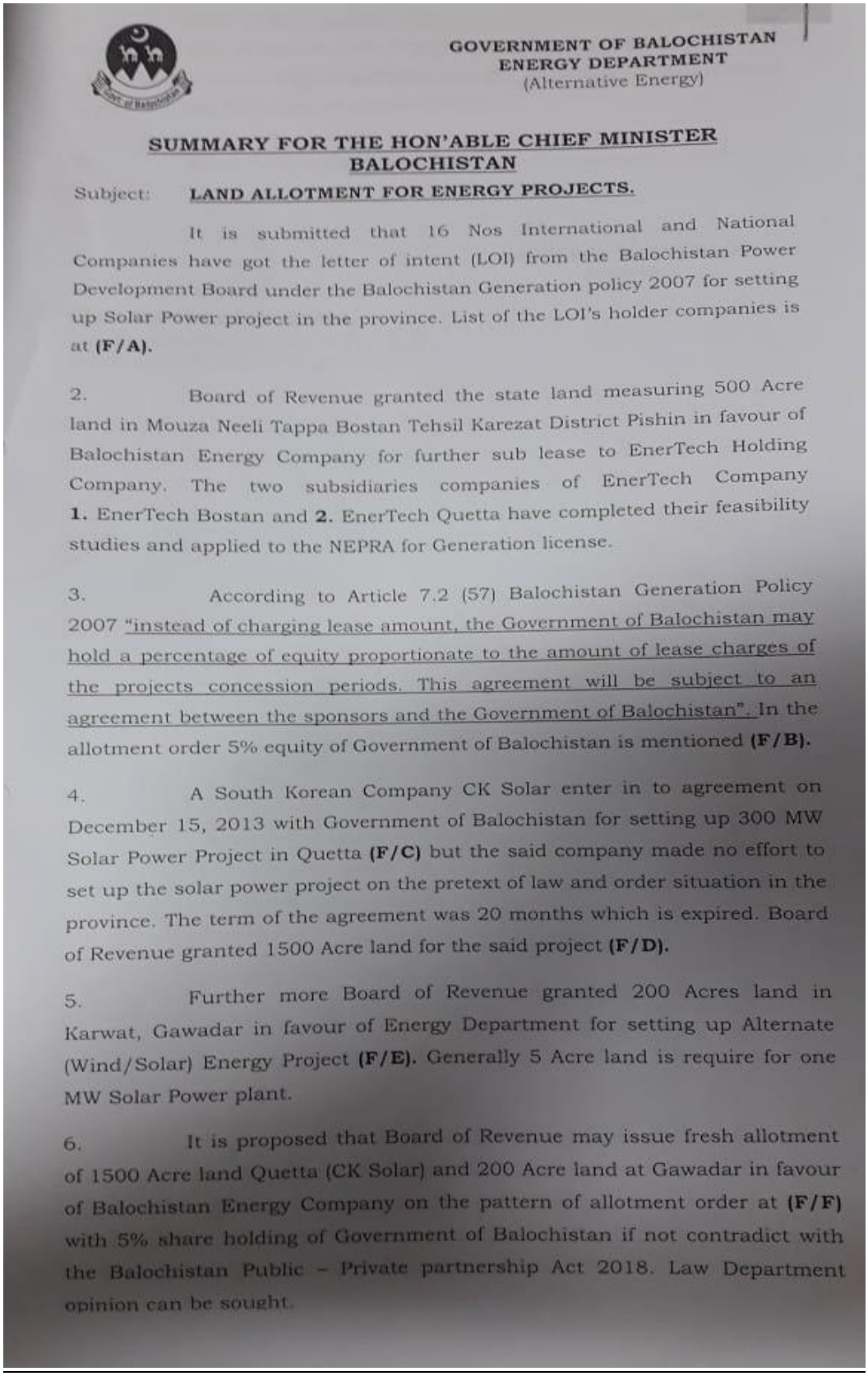
LABORATORY REPORTS

S.No	Parameters	Units	Concentration	Method
1.	Temperature	0C	29	Thermometer
2.	pH Value	….	6.89	pH meter
3.	Manganese	mg/l	0.12	AAS
4.	Zinc	mg/l	0.14	AAS
7.	Total Dissolved Solids	mg/l	2143	APHA 2540 C
8.	Chloride	mg/l	644.9	APHA 4500 Cl B
9.	Lead	mg/l	0.27	AAS
10.	Fluoride	mg/l	2.38	Hach Method 8029
11.	Sulphate	mg/l	530	Hach Method 8051
12.	Ammonia	mg/l	0.09	Hach Method8038
13.	Boron	mg/l	1.32	Merck Test 1.00826

S.No	Parameters	Units	Concentration	Method
1.	Temperature	0C	27	Thermometer
2.	pH Value	….	6.81	pH meter
3.	Manganese	mg/l	0.14	AAS
4.	Zinc	mg/l	0.18	AAS
5.	Cadmium	mg/l	0.03	AAS
6.	Total Dissolved Solids	mg/l	1989	APHA 2540 C

7.	Chloride	mg/l	578.1	APHA 4500 Cl B
8.	Lead	mg/l	0.21	AAS
9.	Fluoride	mg/l	2.38	Hach Method 8029
10.	Sulphate	mg/l	580	Hach Method 8051
11.	Ammonia	mg/l	0.07	Hach Method8038
12.	Boron	mg/l	1.56	Merck Test 1.00826

Summary for Land Allotment:



GOVERNMENT OF BALOCHISTAN
ENERGY DEPARTMENT
(Alternative Energy)

SUMMARY FOR THE HON'ABLE CHIEF MINISTER BALOCHISTAN

Subject: **LAND ALLOTMENT FOR ENERGY PROJECTS.**

It is submitted that 16 Nos International and National Companies have got the letter of intent (LOI) from the Balochistan Power Development Board under the Balochistan Generation policy 2007 for setting up Solar Power project in the province. List of the LOI's holder companies is at **(F/A).**

2. Board of Revenue granted the state land measuring 500 Acre land in Mouza Neeli Tappa Bostan Tehsil Karezat District Pishin in favour of Balochistan Energy Company for further sub lease to EnerTech Holding Company. The two subsidiaries companies of EnerTech Company **1.** EnerTech Bostan and **2.** EnerTech Quetta have completed their feasibility studies and applied to the NEPRA for Generation license.

3. According to Article 7.2 (57) Balochistan Generation Policy 2007 "instead of charging lease amount, the Government of Balochistan may hold a percentage of equity proportionate to the amount of lease charges of the projects concession periods. This agreement will be subject to an agreement between the sponsors and the Government of Balochistan". In the allotment order 5% equity of Government of Balochistan is mentioned **(F/B).**

4. A South Korean Company CK Solar enter in to agreement on December 15, 2013 with Government of Balochistan for setting up 300 MW Solar Power Project in Quetta **(F/C)** but the said company made no effort to set up the solar power project on the pretext of law and order situation in the province. The term of the agreement was 20 months which is expired. Board of Revenue granted 1500 Acre land for the said project **(F/D).**

5. Further more Board of Revenue granted 200 Acres land in Karwat, Gawadar in favour of Energy Department for setting up Alternate (Wind/Solar) Energy Project **(F/E).** Generally 5 Acre land is require for one MW Solar Power plant.

6. It is proposed that Board of Revenue may issue fresh allotment of 1500 Acre land Quetta (CK Solar) and 200 Acre land at Gawadar in favour of Balochistan Energy Company on the pattern of allotment order at **(F/F)** with 5% share holding of Government of Balochistan if not contradict with the Balochistan Public – Private partnership Act 2018. Law Department opinion can be sought.

7. Merit order of the LOI holding companies have been prepared on the basis of date of issuance of LOI **(F/G).** Seven companies can be granted land available with Energy Department. For the remaining companies Board of Revenue may be requested to allot the land.

8. Approval is solicited **para-6** and **para-7** for approval, please.

(KHALEEQ NAZAR KIANI)
Secretary

Chief Secretary Balochistan.

U.O No.ED/SO(A/E)5-20/2017/ 89.
Dated, Quetta the 10th August, 2018.

STATEMENT OF MoU and LOI's

S.No.	Company Name	Project Name	LOI Issued Date	Remarks
1.	CK Solar, Korea	300 MW Solar Power Plant at Quetta Kuchlak.		Land allotted 9-1-2013
2.	EnerTech Holding Company	50 MW Solar Project Quetta.	26-10-2016	Land Allotted
		50 MW Solar Project Quetta.		
3.	Nizam & Sons	50 MW Solar Project Quetta.	28-10-2016	Land not Allotted
		Extension of LoI 50 MW Solar Project Quetta.	4-1-2018 Expired 3-7-2018	
4.	Canadian Commercial Company	1 x 50 MW solar Power Plant at Anjeera.	MoU Signed 29-6-2016	
5.	EL-Passo Technology	50 MW Solar Project-I at Kuchlak.	26-12-2017	Land not Allotted case under Process in SMBR
		50 MW Solar Project-II at Kuchlak.		
6.	Engro Energy	50 MW Solar Project-I at Kuchlak.	23-2-2018	Land not Allotted case under Process in SMBR
		50 MW Solar Project-II at Kuchlak.		
		50 MW Solar Project-III at Kuchlak.		
		50 MW Solar Project-IV at Kuchlak.		
		50 MW Solar Project-I at Khuzdar.		
		50 MW Solar Project-II at Khuzdar.		
		50 MW Solar Project at Panjgoor.		
7.	Ib Voght GmBh	50 MW SolarProject Khuzdar.	23-2-2018	Land not Allotted Yet
		50 MW SolarProject Gawadar.		
		50 MW SolarProject Lasbella.		

No of MOU Signed with Companies = **2 Nos.**

No of LoI's issued to the Companies = **16 Nos.**