Sustainable Energy for All

Investment Prospectus

DECEMBER 2019

Ministry of Planning, Development & Reform
Government of Pakistan

United Nations Development Programme
Pakistan

Sustainable Energy for All

Investment Prospectus

DECEMBER 2019

Ministry of Planning,
Development & Reform,
Government of Pakistan

United Nations
Development
Programme
Pakistan

Contents

List of Tables

Executive Summary

This document presents the Sustainable Energy for All (SEforALL) Investment Prospectus (IP) for Pakistan. The Investment Prospectus is designed to provide an approach for operationalizing the Pakistan SEforALL National Action Plan /Action Agenda, identifying and developing a set of implementable programs and projects to enunciate the investments potential. These projects and programs reflects the investment opportunities for private and public investors. Therefore, the Investment Prospectus proposes to operationalize the Pakistan SEforALL National Action Plan by combining the different investment opportunities in one package. Considering the projected rate of GDP growth and sectoral growth under a high growth rate scenario; the overall investment potential for SEforALL targets from 2018-2030 is estimated around USD 66.56 billion.

Overall, there is investment potential to meet the SEforALL objectives:
a) Universal Energy Access;
b) Doubling the share of renewable energy; and
c) Doubling the rate for energy efficiency.

Energy Access projects for rural electrification and supply of piped gas connections to households provides an investment opportunity of USD 30.56 billion by 2030. The investment potential for renewable energy projects is USD 18 billion. The energy efficiency projects investment opportunitiesare estimated around USD 18 billion with energy saving potential of 15-20%.

Investment Prospectus covers all the operational and planned projects to streamline the existing initiatives under the umbrella of SEforALL targets at national level by 2030. This document is divided into two main sections. First section gives holistic view of energy supply and demand scenarios and key investment areas to meet the set targets of universal energy access, doubling the share of renewable energy and energy efficiency. The set targets are:

Table 1: SEforALL Pakistan's Targets

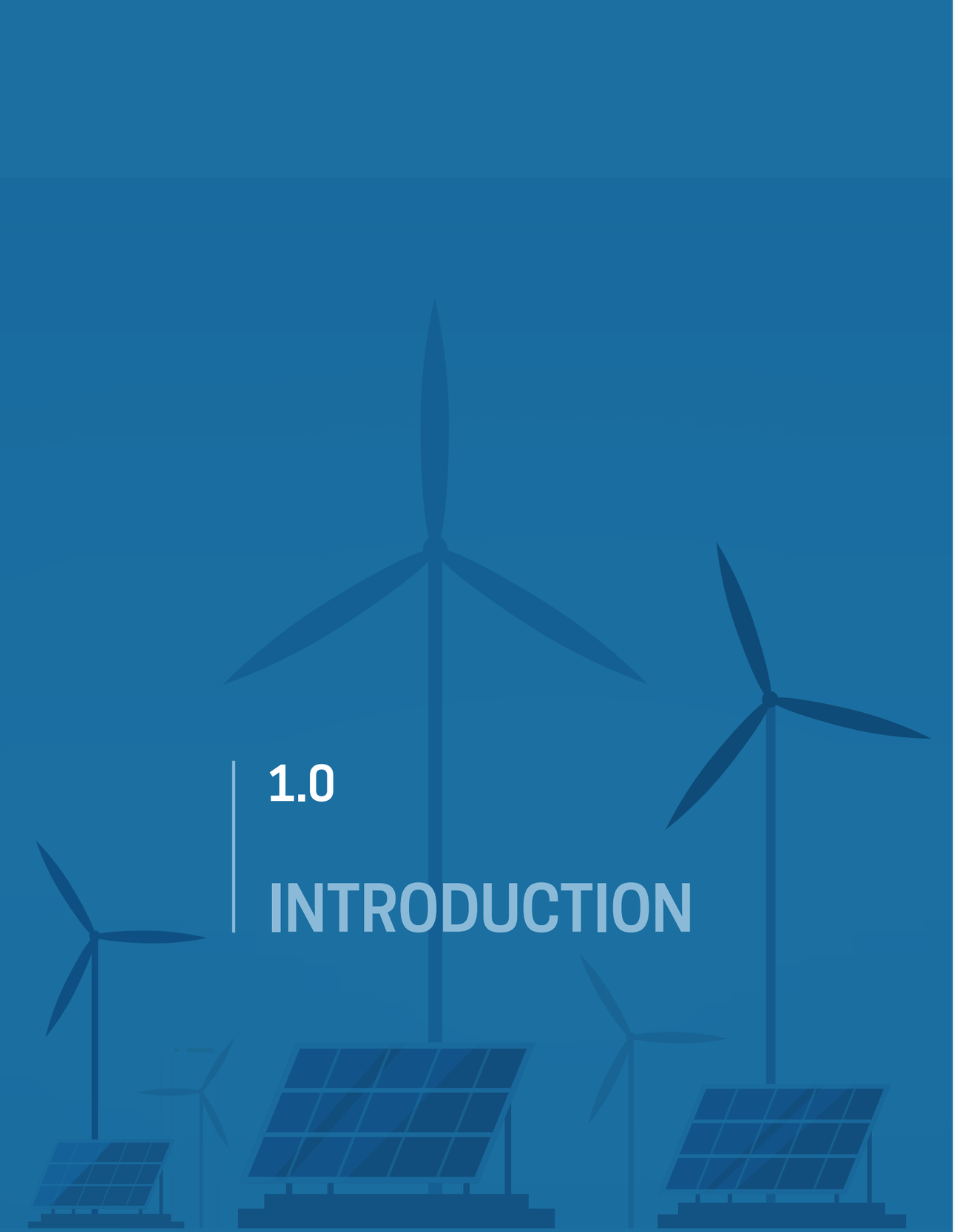
SEforALL Pakistan's Target 2030	Status 2017	Target 2030	Difference	Remarks
Energy Universal Access	73%	100%	27%	Regional Matrix
Energy Efficiency[1]	1.5 %	18 %	16.5%	NEECA Established
Renewable Energy[2]	4.3%	15%	-	Projected 15% in NAP

Secondly, the Investment Prospectus presents three scenarios for operationalization of SEforALL in Pakistan:

- First, the short-term Programs and Projects (2018-2023),
- Medium-terms Programs and Projects (2023-2028) aligned with public sector annual and 12th five years plans,
- Lastly long-terms Programs and Projects in accordance with global commitment of NDCs

This investment prospectus categorizes the projects to attract foreign direct investment in the energy sector with major participation of private sector. Similarly, the international donors' agencies will be synergized through the list of the projects to execute projects as per their resource availability, field of expertise and technical capacity. The Vision 2025, energy policies promulgated by Government from the time to time, and initiation of China-Pakistan Economic Corridor with the portfolio of USD 36 billion in energy sector shows strong commitment of Government of Pakistan to ensure universal access to energy, doubling renewable energy share and doubling energy efficiency.
In addition to that, Pakistan is also signatory of Paris Agreement and submitted it Nationally Determined Contributions (NDCs) which provides impetus to international community to support Pakistan in its Climate Change Adaptation and Mitigation efforts. It is worth mentioning that most of these mitigation and adaptation measures will be implemented through investment in energy sector of Pakistan.

1 UNDP, SEforALL "Pakistan: Rapid Assessment Gap Analysis, 2014", "Pakistan's total energy savings potential at 11.16 million tons of oil equivalent (MTOE), (inclusive of savings in end uses as well as energy transformation), or 18% of primary energy use (FY2008)". Another indicator for energy efficiency thorough rate of decrease in energy intensity from 2000 onward which is 1.7% and it should be doubled 3.4%.
2 Alternative Energy Development Board, "The Government of Pakistan has tasked the AEDB to ensure 5% of total national power generation capacity to be generated through renewable energy technologies by the year 2030. In addition, under the remote village electrification program, AEDB has been directed to electrify 7,874 remote villages in Sindh and Baluchistan provinces through ARE technologies". http://www.aedb.org/index.php/ae- technologies/biomass-waste-to-energy/53-about-aedb



1.0

INTRODUCTION

The implementation of SEforALL National Action Plan largely depends on the resource availability which is linked to the Investment Prospectus (IP). Adaption of viable financial mechanism are dependent and integrated with the business models. The execution of the planned projects and sustainability depends largely on the selection of projects having potential to repay the capital investment through its own cash generation. In addition, the prioritization of projects is needed to make the Action Agenda financially viable and pragmatic.

Investment Prospectus categorizes the projects to attract foreign direct investment in the energy sector based on net present value and positive returns on these investments. It also pertinent to mention that delays in portfolio management may cause high equity to debt ratio and expected payback period may not be able to provide rate of return in given timeframe. Therefore, the IP is developed considering the timeframe and goals set by Sustainable Development Goals. Similarly, the international donors' agencies collaboration is sought through the listing of the projects to execute projects as per their resource availability and field of expertise. The Public Private Partnership is one of the key areas which will be promoted for the development of medium and long-term power projects. Additionally, Government to Government (G2G) mechanisms such as – China-Pakistan Economic Corridors (CPEC) serves as example for investments in the infrastructure and energy sector of Pakistan.

SEforALL goals and targets for the year 2030 are based on the accelerated growth scenario, adjusted to the average GDP growth rate as estimated by the government. Overall, a high demand energy sector growth scenario is envisaged, which would result in substantial increase in total energy capacity by the year 2030. From Oil, gas, renewable, coal, nuclear, LNG, biomass and hydel is likely to significantly increase in future. Keeping in view the projected rate of GDP growth and sectoral growth; and taking into consideration the proposed implementation of power generation investment plans, the overall investment potential for SEforALL goals are estimated around USD 66.56 billion.

An overall, investment potential of USD 66.56 billion in the energy sector has been developed on the three objectives i.e. energy access, enhanced share of renewable energy and adopting mechanisms for energy efficiency. Energy access projects include both rural electrification and supply of piped gas connections for households as well as the provision of off-grid advance energy solutions where grid and piped gas infrastructure is unreachable. The overall investment potential under access objective is USD 30.56 billion by 2030. The share of renewable energy projects investment is near to USD18 billion subject to portfolio management in agreed targeted time period with marginal interest rate. The investment opportunities for energy projects is estimated to USD 18 billion with efficiency in energy saving potential of 20-25%.

The Investment Prospectus presents three scenarios for operationalization of SEforALL in the country.

- First and foremost, Short Term Projects,
- Medium-Term Projects and
- Long-Terms Project.

With these scenarios and projections, SEforALL initiative's two main components i.e. National Action Plan and Investment Prospectus reinforces each other to achieve these projections. The investment prospectus is based on the SEforALL Action Plan to financially operationalizes the "Priority Action Areas".SEforALL goals are tangible; trackable and implementable. These goals through high-impact opportunity areas are made more focused. Overall, Sustainable Development Goal # 7 which is SEforALL.

The SEforALL initiative aims to ensures universal access to energy. The energy access can be divided into two major categories a) access to fuel for lighting b) access to fuel for cooking and space heating. For the first component i.e. access to fuel for lighting the electricity access in the country (through on grid connections) is 73 percent. To meet the target of providing 100 percent access to modern energy system, the first quantifiable goal is providing over 15 million domestic connections in the next 15 years – an average of 1 million connections per year. This will be achieved not only with extending grid but also in areas where grid extension is not possible, solar home solutions will be provided.

The target for access to fuel for cooking and space and water heating is a daunting challenge particularly those in far flung areas is going to prove economically and financially challenging. Currently only 25 percent households have access to modern fuel for cooking, space and water heating. In order to provide access to piped gas to 100 percent of population will not be possible by 2030. Therefore, the target for providing modern fuel for cooking and space-heating through laying gas pipeline will remain around 44% across the country.

The households without access to piped gas network are planned to be provided energy for cooking, space and water heating through alternate means including improved cook stoves, solar cookers, biogas digesters, LPG air mix plants and solar heaters. To achieve these targets the action plan envisages increase in overall final energy consumption from present level of 2015-16 (50 MTOE) to (88 MTOE) during the plan period (2029-30) representing an overall increase of 76 %.

The universal energy access goal will not achievable without the renewable energy,especially inareas where grid will not reach in foreseeable future. The distributed energy systemswill be the most practical and sustainable solution. The share of renewables (solar, wind and bagasse) is 7%. Additionally, the large hydro projects development till 2020 is projected to be 6,494 MW which will almost double the share of hydel in the energy mix. One of the caveats for the share of renewables growth is extension and up gradation of the national grid for evacuation of intermittent variable renewable share by NTDC (National Transmission and Dispatch Company).

The NTDC will implement a comprehensive power evacuation plan during the plan period, at total estimated cost of USD 9 billion to evacuate new generation capacity, including renewables. Nonetheless, the off-grid solar is expanding at a much faster rate with small and medium size companies providing a solar home solution to the houses in urban and rural areas. However, the penetration rate of distributed solar is not very well reported (author estimated through imports of solar equipment other than large scale on-grid solar show that it is more than 1000 MW).

NEPRA (National Electric Power Regulatory Authority) recent policy regulation of Net-Metering is already proving disruptive. It will increase the RE share exponentially in foreseeable future surpassing the renewable targets mentioned in the SEforALL targets. Nonetheless, the renewable energy share in electricity is projected to increase from present level of 2015-16 (0.8 MTOE) to (4.8 MTOE) during the plan period (2029-30).

2.0

DESCRIPTION OF INVESTMENT PROSPECTUS

2.1 Country Profile

Pakistan is strategically located to become Asia's premier trade, energy and transport corridor. It is the gateway to the energy rich Central Asian States, the financially liquid Gulf States and the economically advanced Far Eastern tigers. This strategic advantage alone makes Pakistan a marketplace full of economic possibilities.

Pakistan is world's sixth most populous country (2017) – a population of 207.07 million.Pakistan is the most urbanized country in South Asia, with 35% of its population living in urban areas, compared to the regional average of 29%. The country's annual urbanization rate of 3.5% is well above the regional urban growth rate of 2.4%. Fifty five percent of country's population is below the age of 19, which bodes well for long- term sustainable economic growth. Pakistan has a strong middle class. The consumer market in Pakistan is growing at a very fast pace as reflected by tele-density which has now reached more than 150 million.

The rural population is 62.3% of the total population which is employed by the agriculture sector. Traditionally, Pakistan has been an agrarian economy. However, over the years the economy has shifted towards industry and service sector, contributing approximately 80.47% in GDP[4].
Pakistan's economic history is characterized by recurring cycles of high growth and subsequent stagnations. This volatility of economic growth has serious implications for the social and economic well-being of people at large. However, the recent performance of the economy has largely been positive. The economy has maintained growth in real GDP over 4 percent consecutively in last four years.

Rigorous macroeconomic reforms have been pursued over the last couple of decades making Pakistan a dynamic, open and private sector friendly economy. The policy has been designed to provide a comprehensive framework for creating a conducive business environment for the attraction of FDI. Pakistan's policy trends have been consistent, with liberalization, de-regulation, privatization, and facilitation being its foremost cornerstones. The foreign investments are encouraged and the share of international trade in the GDP has also increased significantly.

China-Pakistan Economic Corridor (CPEC) is a recent economic development initiative, poised to bring economic, social and regional benefits for the people of Pakistan. Under this initiative, USD 52 billion will be invested on country's infrastructure – the share of energy sector out of this amount is USD 36 billion.

The Law of Special Economic Zones (SEZs) has been made to meet the global challenges of co-

National Censuses, 2017.
4 Economic Survey of Pakistan 2016-17

mpetitiveness to attract FDI. The law allows to create industrial cluster with liberal incentives, infrastructure, investor facilitation services to enhance productivity and reduce cost of doing business for economic development and poverty reduction. The Law further envisages to reduce processes through SEZ in Pakistan.

Institutional mechanism for energy sector comprises of Ministry of Energy and its constituted departments, boards, wings and divisions. The 18th Constitutional has further changed the resource allocation and development of energy projects between federal and provincial governments.

- Ministry of Planning, Development and Reforms
  - Energy Wing
- Ministry of Energy
  - Power Division
    - National Transmission and Despatch Company
    - Alternative Energy Development Board
    - National Energy Efficiency and Conservation Authority
    - National Electric Power Regulatory Authority
    - Central Power Purchasing Agency
    - Distribution Companies
  - Petroleum Division
    - Sui Northern Gas Pipelines Limited
    - Sui Southern Gas Pipelines Limited
    - Oil and Gas Regulatory Authority
  - Ministry of Finance / Economic Reform Unit
  - Ministry of Housing and Works
  - Ministry of Communication / National Transportation Research Center
  - Capital Development Authority / Planning and Design Wing

Policy Framework:

- National Policy for Power Co-Generation by Sugar Industry
- Guidelines for Setting up Private Power Projects
- Guidelines for Determination of Tariff for IPPs
- NEPRA Mechanism for Determination of Tariff for Hydro Power Projects
- Power Policy 2015
- Transmission Line Policy 2015
- Renewable Energy Policy for Development of Power 2006
- Policy for Use of Biodiesel as an Alternative Fuel

2.2 Pakistan's Energy Sector

Pakistan's existing energy mix is highly dependent on oil and gas which together provide over 72.3 percent of the country's primary energy supplies, followed by 12.7 percent from hydroelectricity and 8.1% percent from coal. This disproportionate reliance on imported oil has impacted strain on the national exchequer. The power supply of a country is dominated by thermal power, as it constitutes over 60% of the total installed capacity. On the other hand, renewable energy (including hydroelectricity) constitutes 34% of the entire power generation mix of the country. Without the inclusion of hydroelectricity, the share of renewables (solar, wind, biomass) is (7%), as it has only been a couple of years since investment by private and public sectors has opened-up in the renewable energy market in Pakistan.

According to estimates, 55 million people do not have access to modern sources of energy, which is 27 percent of the total population of the country. The projected population growth rate of 2.4%; this number is expected to increase to 65 million by 2025 and 73 million by 2030. In the year 2014, Pakistan's per capita oil equivalent use was reported 482 kg (including traditional biomass fuels) which is one of the lowest ranked across the world. Similarly, Pakistan greenhouse gas emissions are very low; between 0.1-2.5 tons CO2-equibvalent per capita/year.

Considering the gravity of the current energy sector problems, both long-term and short-term measures are being taken. Ministry of Energy (Former Ministry of Water and Power) addressing the electricity sector of Pakistan has focused on increasing electricity supply from a diverse source such as gas, oil, coal, hydro, nuclear and RE. The National Power Policy of 2013 and later policy of 2015 have been launched to set some clear standards and resolve the electricity problem through tariff rationalization to arrest circular debt, energy conservation, changing energy mix, and strict punishment for electricity pilferages.

To meet the energy demands of the country, Ministry of Energy (Former Ministry of Petroleum and Natural Resource) imports LNG as a medium-term solution. Whereas, coal and hydropower plants development are envisioned as long-term strategy.

Country's energy sector is being redefined. With the given reform agenda, it is expected that in future the energy sector will transform and evolve with privatizations, mergers, and consolidations as well as disaggregation of vertically integrated utilities. Resultantly, the sector will see new opportunities and challenges at all levels of the unbundled energy market. This will demand the more proactive role of sector's regulators (NEPRA & OGRA).

2.2.1 Power Sector of Pakistan

Pakistan power sector supply-demand gap peaked between 5000-7000 MW by 2014-15. The capacity shortfall was finally overcome by 2018 due to significant new capacity additions. A sizable population in the country is still deprived of clean and affordable electricity and other energy sources. Off-grid renewable energy solutions can play important role in bridging this gap in access to clean and affordable energy. Various plans and reforms to enhance access to energy, improve energy conservation, and increase the share of renewable energy. However,

substantive efforts are needed to achieve SEforALL goals.

The governance and structural reforms of the sector has been initiated with a special emphasis on the performance of Distribution Companies (DISCOS) and government owned Generation Companies (GENCOS). Similarly, National Transmission and Dispatch Company (NTDC) have been reformed with the creation of CPPA (G) and efforts are being made for the least cost generation plan. NEPRA capacity building has been developed and plans are underway to unfold multi-year tariff regime for all DISCOs to avoid delays in tariff determination. However, the privatization of the DISCOs is one of the big challenges for the government, as it is a politically charged agenda item.

Financially, Pakistan's power sector is still struggling to address the persistent problem of circular debt which stands at PKR. 566 billion and additionally 533 billion is parked in Pakistan Power Holding Company. In absence of the comprehensive governance reforms, the circular debt will be a major burden on Pakistan's overall economy and more specifically power sector viable operations. Another factor which distorts the power sector operations is the power sector subsidy – "Tariff Differential Subsidy" which was PKR. 136 billion in FY 2015 -16. Though, GOP has planned to phase out the power sector subsidy by 2017. However, given the nature of political-economy of the power sector, institutional dynamics and population living under the poverty line; the total phase out of power sector subsidies will be not a practical option.

However, the recent investment of USD 36 billion for power sector under the China-Pakistan Economic Corridor (CPEC) will increase the energy access, with shifting the energy mix from thermal to hydro, nuclear and other renewable energy sources.

2.2.2 Capacity Addition in Last Five Years

812 MW in 2012/13. It means there has been a 30 percent growth in installed power generation capacity during the last five years. Power generation increased 22 percent to 117,326 gigawatt hours (GWh) in 2016/17 as compared to 2012/13. It is reported that around 7,882 MW of has been added in the installed generation capacity during the last five years (Planning Commission of Pakistan, 2018).

This corresponds the allocation of Public Sector Development Projects and Provincial development projects. The share has increased consistently over the last year for energy projects.

Public Sector Development Program- Last Five Years Allocations for Energy Sector

Year	2013-14	2014-15	2015-16	2016-17	2017-18	Total
National Development Program	153,210	164,390	197,907	267,095	345,620	1,128,222
Provincial Development Program	106,110	115,600	142,227	205,020	270,000	838,957

2.2.3 New Targets for Energy Access

The SEforALL action plan provides a framework for high-priority initiatives that can help achieve the SEforALL objectives. Current strategies that aim to support energy supply and to meet access targets in the medium and long term, include:

- The short-term (2015-2020),
- Medium-term (2020-2025) and
- Long term (2025-2030) plan

For the development of the electricity supply, the focus is on providing access to electricity through grid extension and increase in generation. The Action plan aims at increasing the overall electrification rate to 73% by 2015 to100% by 2030; electricity supply to 2,7800 MW by 2016 and more than 102425 MW by 2030. However, it will not rely only on grid electricity, but also solar home solutions will be also utilized to ensure access.

For piped gas, Government's planned gas access will increase gradually. Assuming a 5% annual increase in connections, the total domestic connections are going to increase to 9.75 million by 2020, 12.38 million in 2025 and 15.81 million by 2030. Thus, by the end of the planned period, 44% of the population will be provided access through piped gas network. The criterion for sanctioning gas connection varies from one region to another based on the population density, geography, and the socio-political context. In Punjab, a new housing scheme will be given gas connection if the cost of providing the connection is less than PKR. 54,000 per customer. On the other hand, in KP and Sindh, the cost threshold is PKR. 108,000 while in Baluchistan it is PKR. 200,000 per customer. Even with these differences in cost, it will not be financially or economically viable to extend piped gas network to several remote locations. Therefore, LPG cylinders and LPG Air Mix plants will be provided to regions where piped gas network is not feasible. Moreover, a mechanism will be developed to address the Un-accounted for Gas (UFG) losses by providing gas by alternate means such as provision of gas cylinders.

2.3

Investment and Regulatory Framework in Pakistan

2.3.1 CPEC and Existing Trends in Energy Sector Investment

Pakistan has embarked on a massive investment program in energy and infrastructure sectors to mitigate chronic energy shortages, diversify the country's fuel mix and improve trade connectivity. Part of this investment is implemented in the context of the China Pakistan Economic Corridor (CPEC)—a package of investment projects, potentially totaling about $55 billion (19 percent of FY 2015/16 GDP) over the next decade. The analysis below is based on realization of 19 CPEC projects ($17.7 billion in energy sector and $5.9 billion in infrastructure) and several non-CPEC energy sector projects ($25.4 billion), which are either in advanced planning stages or already in the process of implementation.

Name of the Project	MW
1. 2×660MW Coal-fired Power Plants at Port Qasim Karachi	1320
2. Suki Kinari Hydropower Station, Naran, Khyber Pukhtunkhwa	870
3. Sahiwal 2x660MW Coal-fired Power Plant, Punjab	1320
4. Engro Thar Block II 2×330MW Coal fired Power Plant	660
TEL 1×330MW Mine Mouth Lignite Fired Power Project at Thar Block-II, Sindh, Pakistan	330
ThalNova 1×330MW Mine Mouth Lignite Fired Power Project at Thar Block-II, Sindh, Pakistan	330
Surface mine in block II of Thar Coal field, 3.8 million tons/year	-
5. Hydro China Dawood 50MW Wind Farm(Gharo, Thatta)	50
6. 300MW Imported Coal Based Power Project at Gwadar, Pakistan	300
7. Quaid-e-Azam 1000MW Solar Park (Bahawalpur) Quaid-e-Azam	1000
8. UEP 100MW Wind Farm (Jhimpir, Thatta)	100
9. Sachal 50MW Wind Farm (Jhimpir, Thatta)	50
10. SSRL Thar Coal Block-I 6.8 mtpa&SEC Mine Mouth Power Plant(2×660MW)	1320
11. Karot Hydropower Station	720
12. Three Gorges Second Wind Power Project	50
Three Gorges Third Wind Power Project	50
13. CPHGC 1,320MW Coal-fired Power Plant, Hub, Balochistan	1320
14. Matiari to Lahore ±660kV HVDC Transmission Line Project	-
Matiari (Port Qasim) —Faisalabad Transmission Line Project	-
15. Thar Mine Mouth Oracle Power Plant (1320MW) & surface mine	1320
16. Total	10,070

CPEC projects in the energy sector involve foreign direct investment and commercial borrowing from Chinese financial institutions, either by majority foreign-owned joint ventures or Chinese investors. Financing of non-CPEC energy projects ranges from private domestic financing to private commercial as well as government concessional borrowing from international financial institutions.

The planned expansion of energy sector capacity could eliminate Pakistan's generation capacity gap as early as 2018. In the process, Pakistan's excessive reliance on furnace oil would be significantly reduced. Impact on GDP will likely come in three stages: construction, power generation, and—over time— second-round effects on broader economic activity due to increased productivity, lower costs, and improved trade connectivity. The first two stages (direct contribution) could add about $13 billion to Pakistan's GDP in the next seven years (4.7 percent of FY 2015/16 GDP). Second-round effects will likely accrue gradually and could lead to a significant contribution in the long run, depending on various other supportive factors.

This strategy will support large public-sector hydropower projects, while IFC (International Finance Cooperation) will engage with domestic and international sponsors (from China and the Republic of Korea) to finance large private hydropower and renewable power projects over the next three to five years. It will support the development of small, predominantly renewables-based, electrification schemes to bring affordable electricity to those not served by the grid, particularly in Balochistan. IFC will also invest in developing a storage and regasification terminal to facilitate liquefied natural gas imports.

The WBG (World Bank Group) is supporting enhancing the supply of natural gas through the Natural Gas Efficiency Project. The Power Sector Reform DPC (Development Policy Credit) will support the government in putting in place a policy framework mandating expansion in generation through a least-cost plan, for all new future power generation.

Table 2: Foreign Investment Inflows in Pakistan ($Millions)

Country	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 (July-Sept)**
USA	869.9	468.3	238.1	227.7	227.1	212.1	223.9	13.2	71.1	22.4
UK	263.4	294.6	207.1	205.8	633.0	157.0	169.6	151.6	68.9	12.2
U.A.E	178.1	242.7	284.2	36.6	22.5	(47.1)	213.6	109.7	55.8	22.1
Japan	74.3	26.8	3.2	29.7	30.1	30.1	71.1	35.4	45.2	13.3
Hong Kong	156.1	9.9	125.6	80.3	242.6	228.5	136.2	93.3	25.0	0.0
Switzerland	227.3	170.6	110.5	127.1	149.0	209.8	(6.5)	58.0	16.9	0.6
Saudi Arabia	(92.3)	(133.8)	6.5	(79.9)	3.2	(40.1)	(64.8)	24.0	1.9	0.2
Germany	76.9	53.0	21.2	27.2	5.5	(5.7)	(18.2)	(10.6)	(5.2)	5.6
Korea (South)	2.3	2.3	7.7	25.4	25.8	24.4	14.3	4.0	7.8	0.0
Norway	101.1	0.4	(48.0)	(275.0)	(258.4)	(21.6)	2.7	172.5	(12.6)	(50.2)
China	(101.4)	(3.6)	47.4	126.1	90.6	695.8	319.1	1,063.6	1,185.6	429.8
Others	1,964.2	1,019.6	631.3	289.7	285.5	255.4	(73.1)	590.6	950.5	205.9
Total including Pvt. Proceeds	3,719.9	2,150.8	1,634.8	820.7	1,456.5	1,698.6	987.9	2,305.3	2,410.9	661.9
Privatization Proceeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FDI Excluding Pvt. Proceeds	3,719.9	2,150.8	1634.8	820.7	1,456.5	1698.6	987.9	2,305.3	2,410.9	661.9

Source: Board of Investment, Pakistan

Note: 56.4% increase in Net FDI in July-Sep, 2017-18 as compared to July-Sep, 2016-17.

Note: Pakistan's Fiscal Year runs from 1st July till 30th June. The figures in brackets are in negative.

Table 3: Sector Wise Foreign Direct Investment Inflows ($Millions)

Country	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 (July-Sept)**
Oil & Gas	775.0	740.6	512.2	629.4	559.6	502.0	300.5	248.9	157.6	48.7
Power	130.6	(120.6)	155.8	(84.9)	28.4	71.4	282.2	1,159.2	795.4	268.2
Transport	93.2	132.0	104.6	18.7	44.1	2.7	6.2	70.2	53.5	9.6
Others	763.4	586.3	416.3	282.2	765.5	375.2	(105.7)	109.2	784.5	46.4
Total Including Pvt. Proceeds	3,719.9	2,150.8	1,634.8	820.7	1,456.5	1,698.6	987.9	2,305.3	2,410.9	661.9
Privatization Proceeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FDI Excluding Pvt. Proceeds	3719.9	2,150.8	1,634.8	820.7	1,456.5	1,698.6	987.9	2,305.3	2,410.9	661.9

Note: 56.4% increase in Net FDI in July-Sept, 2017-18 as compared to July-Sept, 2016-17.

Note: Pakistan's Fiscal Year runs from 1st July till 30th June. The figures in brackets are in negative.

The list of FDI inflows in Pakistan clearly depicts major donors' preferences for investment in energy sectors. It clearly reflects that FDI inflows in energy sector are higher than any other sector of Pakistan. Only inflows from China include $ 36 Billion for energy projects by 2030. Similarly, investment inflows in oil, gas, power sector and transport are in the top priority list of all major donor agencies as the inflow suggests.

2.3.2 Energy Sector Investment Potential in Pakistan

Pakistan energy sector potential offers a wide range of investment opportunities, such as hydro, solar, wind, biomass and coal.

- The total generation of electricity projected by 2030 is estimated around 102425 MW. By 2030, the generation mix will be dominated by hydel and renewable with share 49 percent (Hydel 34500 MW and Renewable 15000 MW). It will also help to achieve the targets of low GHG emissions.

- The share of coal, gas, and oil with overall share will be 34 percent (Domestic Coal 13,225 MW, Gas 11300, and Oil 10000 MW). The share of nuclear will increase to 8 percent (8000 MW). The imported Coal share is estimated around 3 percent (3000 MW) whereas, Imported LNG share will be 4 percent (4800 MW) and Imported Electricity share will be more than 1 percent (1500 MW).

- Investment in energy sector over the next 15 years have potential to attract foreign investor and local investors.

2.3.3
Policy Environment for Investment in Pakistan

The investment in energy sector are designed by the Government to provide attractive incentives to investors. Following is the list of investment policy framework and incentives regime in place:

- **Investment Liberalization Policy:** Liberal and transparent policy for investors to set up Independent Power Projects (IPPs). Guaranteed power purchase produced by IPPs, backed by sovereign guarantee of GoP provides a very secure investment climate for investors.

- I**nvestment Policy 2013:** The goal of Investment Policy 2013 is to address and adjust economic priorities in the face of changing global scenario of economic slowdown coupled with domestic difficulties of power outages and continued pressure on economy due to war on terror. It is an endeavor to address the changed economic realities and to achieve the targets given in National Policy Document and Vision 2025.

- **Special Economic Zones, Rules 2013.** GoP has set up Special Economic Zones parks at various locations where the Government will develop the site with water, power-evacuation and access provided. The investors only have to set up projects at these locations with the entire support infrastructure in place.

- **Foreign Direct Investment Strategy 2013-17:** The Ordinance 2001 (Clause -9) mandates Board of Investment to promote, encourage and facilitate local and foreign investment inflow in Pakistan.

- **National Power Generation Policy 2015:** Generation Policy 2015 and Policy Framework for Private Sector Transmission Line Projects 2015 have been launched to attract new investments for development of new power generation projects and augmentation of transmission network in the country. These two policy frameworks received overwhelming market response and has successfully attracted many renowned local and international players to participate in the development of Pakistan's Power Sector.

- **Strategic Trade Policy Framework (STPF) 2015-18:** This strategic trade policy is designed to achieve the national trade targets, through key enablers like:

a) Competitiveness (quality infrastructure, labor productivity, access to utilities, and level of technological development)

b) Compliance to standards (convergence of local & international standards, protection of intellectual property, and effective and efficient disputes resolution mechanism)

c) Policy environment (monetary policy, tariff & tax regime, and synergic industrial & investment policies)

- **Domestic Resource Mobilization Strategy:** Increasing the flow of taxes and other income into government treasuries – is key to achieving the ambitious Sustainable Development Goals (SDGs). ... Fair, efficient tax systems are necessary for poverty alleviation and equitable growth.

- **CPEC and National Financial Inclusion Strategy:** Pakistan's financial sector has undergone considerable reforms that have significantly strengthened its soundness, profitability, efficiency and diversity. Until that time, it had been dominated by a handful of nationalized banks that suffered from poor performance and asset quality. CPEC investment will give new arena to financial inclusion.

2.3.4
Progress in Energy Sector (2013-18)

A list of recently commissioned major power projects includes:

- Three LNG power plants (Bhikki, Haveli-Bahadur, Baloki (3600 MW),
- Chashma 3 & 4 Nuclear (340) MW each,
- Guddu Gas (400) + MW,
- Nandipur Gas 100 + MW,
- Sahiwal Coal (1320 MW),
- Wind (1326 MW) /Bagasse (712 MW),
- Patrind HPP Hydel (147 MW),
- Faisalabad Gas (250 MW),
- Neelum Jhelum (969 MW)
- Tarbella 4 Extension (1410 MW)
- Port Qasim Power Plant (1320 MW)

2.3.5 Incentive Regime of Investment in Pakistan

Table 4: Incentive Regime of Investment in Pakistan

Investment Incentives	Brief Description
Investment Incentives	**Foreign Private Investment (Promotion & Protection) Act 1976** **Tax Concession and Avoidance of Double Taxation** The Federal Government may allow such concessions to industrial undertaking having foreign private investment as may be admissible under any law for the time being in force. Foreign private investment shall not be subject to other or more burdensome taxes on income than those applicable to investments made in similar circumstances by the citizens of Pakistan. Foreign private investment shall be allowed, all the tax concessions admissible on the basis of any agreement (for avoidance of double taxation which the Government of Pakistan may have entered into with the Government of the country of origin of such investment. **Protection of Economic Reforms Act, 1992** **Immunities to Foreign Currency Accounts** • All citizens of Pakistan resident in Pakistan or outside Pakistan who hold foreign currency accounts in Pakistan, and all other persons who hold such accounts, shall continue to enjoy immunity against any inquiry from the Income Tax Department or any other taxation authority as to the source of financing of the foreign currency accounts. • The balances in the foreign currency accounts and income there from shall continue to remain exempted from the levy of wealth-tax and income tax and compulsory deduction of Zakat at source. • The banks shall maintain complete secrecy in respect of transactions in the foreign currency accounts. • The State Bank of Pakistan or other banks shall not impose any restrictions on deposits in and withdrawals from the foreign currency accounts and restrictions if any shall stand withdrawn forthwith. **Protection of Fiscal Incentives for Setting-up of Industries** The fiscal incentives for investment provided by the Government through the statutory orders listed in the Schedule or otherwise notified shall continue inforce for the terms specified therein and shall not be altered to the disadvantage of the investors. **Protection of Transfer of Ownership to Private Sector** The ownership, management and control of any banking, commercial, manufacturing or other company, establishment or enterprise transferred by the Government to any person under any law shall not again be compulsorily acquired or taken over by the Government for any reason whatsoever. **Protection of Foreign and Pakistan Investment** No foreign, industrial or commercial enterprise established or owned in any form by a foreign or Pakistani investor for private gain in accordance with law, and no investment in share or equity of any company, firm, or enterprise, and no commercial bank or financial institution established, owned or acquired by any foreign or Pakistani investor, shall be compulsorily acquired or taken over by the Government. **Secrecy of Banking** Transaction Secrecy of bona-fide banking transactions shall be strictly observed by all banks and financial institutions, by whosoever owned, controlled or managed. **Protection of Financial Obligation** All financial obligations incurred, including those under any instrument, or any financial and contractual commitment made by or on behalf of the Government shall continue to remain in force, and shall not be altered to the disadvantage of the beneficiaries.
Investment Guarantees'	**According to BOI Investment Policy 2013** The BOI has instituted an online registration procedure for foreign companies entering and operating in Pakistan. Registration serves as a notification to the Government of Pakistan of the presence of the investor and guarantees the investor to entitlements specified in the Investment Policy but is not an approval mechanism. For rendering efficient services, BOI charges a nominal fee as well.

In view of the technology and know-how that foreign investors can bring to Alternative and Renewable Energy (ARE) projects, the BOI shall strengthen its cooperation with Ministry of Energy, Alternative Energy Development Board (AEDB) and other line ministries in respect to promoting and facilitating projects with foreign investors.

Foreign Private Investment (Promotion & Protection) Act 1976/Protection of Agreement

The Federal Government considers it necessary in the public interest to take over the management of an industrial undertaking having foreign private investment or to acquire the ownership of the shares of citizen of Pakistan in the capital of such industrial undertaking, any agreement approved by the Federal Government relating to such undertakings entered into between a foreign investor or creditor and any person in Pakistan shall not be affected by such taking over or acquisition. Foreign capital or foreign private investment in an industrial undertaking shall not be acquired except under the due process of law which provides for adequate compensation therefore to be settled in the currency of the country of origin of the capital or investment and specifies the principles on and the manner in which compensation is to be determined and given.

Repatriation Facilities

Subject to the provision of the Foreign Exchange Regulation Act, 1947:
A foreign investor in an industrial undertaking established after the 1st day of September 1954, and approved by the Federal Government may at any time repatriate in the currency of the country from which the investment was originated; Foreign private investment to the extent of original investment;

Profits earned on such investment; and any additional amount resulting from the reinvested profits or appreciation of capital investment; and a creditor of an industrial undertaking referred to in clause (a) may repatriate foreign currency loans approved by the Federal Government and interest thereon in accordance with the terms and conditions of the said loan; and provided that nothing in this section shall affect the terms of the permission to make such investment granted to a foreign investor before the commencement of this Act.

CPEC Potential	More than 20 Projects of energy sector are in planning phase or being implemented. Generating New opportunities for investment and efficiency regime in energy sector.
Public-Private Partnership	PPIB is solely working to deal with IPPs to ensure demand driven energy requirements of the National Grid.
Growth Potential	Average growth rate of some 7 – 8 % per year (supported by the Framework for Economic Growth). Employment for an increasing and increasingly urbanized population (230 – 260 million by 2030). Building a knowledge-based economy and prioritizing the development of human capital Enhancing the global competitiveness of the Pakistani economy from the 2011- 12 rank (118 out of 142 benchmarked countries) to rank 50 by 2030
Renewable Energy Resources	• Hydro Power Potential • Solar Potential • Wind Potential • Geothermal Potential • Biomass and others

2.4 Investing in Energy Sector of Pakistan

Pakistan is endowed with diverse energy sources of energy including natural gas, biomass, hydro, solar, wind, geothermal. Pakistan has potential of more than 100,000 MW of hydro, Solar, and wind. Commercial energy sources such as petroleum and electricity account for more than 80% and 90 % of primary energy used, respectively, while coal, solar and wind account for less than 10 % present energy mix.

To increase electricity access, the GoP is encouraging investment in generation capacity, distribution systems and in developing indigenous sources of energy. Moreover, scope exists to accelerate electrification to meet growing demand, especially in the rural areas through off-grid solutions and expansion of Gas Network for households heating and cooking purpose. In addition to this, there is potential for LPG cylinders for far furlong areas, Solar electrification and installation of wind energy units in plain areas.

Investment environment is very conducive. One of the major investments in energy sector of Pakistan is CPEC, consisting of $36 billion for energy projects up-to 2030. Similarly, private sector is already contributing to more than 50% in total installed capacity of electricity sector of Pakistan. It constitutes 31 independent private power projects totaling about 9071 MW. The current demand and supply gap in a very small amount and demand growing at 6% per annum ensures guaranteed uptake of power produced by IPP projects at market competitive prices.

The following investment opportunities in the energy sector exist in Pakistan:

- Generation, transportation and distribution of energy from various sources;
- Power infrastructure development, rehabilitation and expansion;
- Extraction of biofuels, such as ethanol from sugar and biodiesel etc.
- Construction of Gas pipelines and petroleum products offloading terminals, and development of upcountry storage and distribution facilities;
- Rural electrification through distributed energy sources;
- Exploration of new and renewable energy resources;
- Energy efficiency appliances and development of labs.

2.5 Investment Priorities Identified in NAP for SEforALL

2.5.1 Investment Potential in Enhance Energy Access Projects

#	Project Title	Investment Potential	Description of the Project	Responsibility
1.	Off- Grid Lightening in far off Districts	$2.5 Billion	Prioritize underserved districts in all provinces for off-gird lightening programs are already assessed in NAP. The numbers of these districts are given as: Punjab (10 districts), Sindh (07 Districts), KPK (10 districts), Baluchistan (08 District), AJk (03 district), Gilgit Baltistan (04 districts)	Provincial and Federal Governments and International Agencies
2.	New Gas Connection	$4.5 Billion	Provision of new gas connections through piped network to 8205002 households to meet the set targets of 2030.	SNGPL & SSGPL
3.	Solarization of Schools and Basic Health Units	$3 Billion	Solarization of government schools and colleges (the number of institutions without access to electricity in each province has been documented. Solarization of basic health units which do not have access to the electricity at the moment. The total number goes to 22898 for schools and basic health units.	Provincial Governments
4.	Access to Clean Energy	$4.146 Billion	Improve access to clean cooking by extending provision of LPG to the regions without access to gas connections. Subsidy for one cylinder per month using BISP mechanism. Total Targeted households as stated in National Action Plan	Provincial Governments and International Agencies

#	Project Title	Investment Potential	Description of the Project	Responsibility
			450,000. The total estimated value per households per month is 1500.	
5.	Powering Schools and Colleges through Solar PV Technology	$4.5 Billion	Schools, colleges and universities should be powered using Solar PV technology through either standalone system with a battery backup or through installation of micro grids of 5kW-115kW.	Provincial Govts. / Federal Govt. and International Agencies
6.	Increasing the Share of Renewable Energy Sources to Curb Power shortage	$4.44 Billion	Increase the utilization of renewable energy to alleviate the power shortage problems as renewable (wind and PV energy). These projects will have lower costs fluctuations as compared to Oil, Coal and LNG (14% of 65 MTOE in 2030)	Provincial Governments and International Agencies
7.	Installation of LPG Plants	$2 Billion	Installation of 60 LPG Air Mix plants in areas un served by piped network, out of which 28 will be in Baluchistan, 2 in Sindh and the remaining 30 will be set up in Punjab, KPK, AJK and Gilgit-Baltistan. Size of these plants is going to be between 0.5 and 1 mmcfd.Assuming an average size of 0.75 mmcfd, one LPG air mix plant will serve gas to 7,500 households. 60 such plants will serve 450,000 households by 2018.	Federal Governments

#	Project Title	Investment Potential	Description of the Project	Responsibility
8.	The SEforALL Small Grants Program	$20 Million	The SEforALL Small Grants Programme will be established to offer grants up to USD 100,000/- for any initiatives that accelerate the adoption of any of the proposed actions within the SEforALL plan. A trust fund of USD 20 million should be set aside, and only the investment income be utilized for grant making. It is suggested that at least 40% of this USD 20 million is contributed from the government's own funds, and the rest can be through donor contributions facilitated by UNDP. The SEforALL Trust Fund should be established as a Section 42 non-profit company with an independent Board	SEforALL Secretariat / Governments and International Agencies
9.	Provision of Improved Cook Stoves	$5.22 Billion	Improved Cooking Stoves for around 40 percent of population by giving alternate source of cooking (biomass)	Provincial Governments and International Agencies
A	**Sub-Total**	**$30.56 Billion**		

2.5.2 Investment Potential in Renewable Energy Projects

#	Project Title	Investment Potential	Description of the Project	Responsibility
1.	Municipal Solid Waste to Energy	$240 Million	Exploit potential of Municipal Solid Waste (MSW) to generate around 360 MW of gross power capacity in the anaerobic digester-based power plants by utilizing 16 landfill sites	Provincial Governments through Public Private Partnership
2.	Promotion of Biomass Energy in the Rural Areas	$1 Billion	Promotion of biomass energy in the rural areas where no gas connections are available. Materials that can be fed into a biogas digester are mostly readily and locally available and it can be used for households (cooking/ lighting) and industry, transportation and to generate electricity helping to reduce the dependency on fossil fuel imports.	Provincial Governments
3.	Biomass Fuel Generation	$100 Million	Biomass fuel of 1.86 million tonnes/year, 1062 GWh (potential capacity of 162 MW) can be annually generated through Rice mills.	Provincial Governments
4.	Installation of Cogeneration Plants in Sugar Mills	$400 Million	Replace low-pressure steam boilers in 84 Sugar Mills with high-pressure cogeneration plants. This can double the total current capacity 830 MW.	National Energy Efficiency Conservation Authority
5.	Solar Water Heater at Provincial Level	$2 Billion	Promote solar water-heating for areas, like Gilgit Baltistan and/or villages in AJK, KPK and Punjab, with no access to traditional gas network where otherwise it would require billions of rupees in capital expenditure to lay down the pipeline network. Moreover, utilizing solar water heating technology instead of natural gas or conventional sources has significant advantages on economic, environmental, and social sustainability	Provincial Governments
6.	Distribution of basic solar products to low-income households	$1.5 Billion	Promotion of Solarization in the country through Distribution of basic solar products to low-income households (40% population)	NGOs and Provincial Governments
7.	Solar Powered Water Pumps	$2 Billion	Need to provide solar powered water pumps, (180,000) to reduce the cost of fuel consumption to farmers on subsidized rates. (With a fuel consumption of around 3 to 5 liters per hour, the average daily expense per pump is approximately PKR 700 per day ($7/day) in fuel costs every day)	Federal and Provincial Governments
8.	Heating Pipeline Network	$50 Million	Promote water heating pipelines for areas, like Gilgit Baltistan and/or villages in AJK, KPK and other regions with geothermal energy. Instead of natural gas or conventional sources has significant advantages on economic, environmental, and social sustainability. Initially it be on experimental basis	Provincial Government and NGOs

#	Project Title	Investment Potential	Description of the Project	Responsibility
9.	Local Manufacturing of Renewable Technologies	$2.03 Billion	Promote job creation through fostering renewable energy technologies. Developing indigenous capacity for manufacturing renewable energy in SEZs (Special Economic Zones).	Federal and Provincial Governments Policy – Board of Investment and Private Sector
10.	Hydropower Generation (Small, and medium)	$5 Billion	Exploit Pakistan's hydropower potential of 60,000 MW (Khyber Pakhtunkhwa (24,736 MW), Gilgit-Baltistan (21,125 MW), Azad Jammu & Kashmir (6,450MW) and Punjab (7,291MW)).	Federal and Provincial Governments
11.	Wind Energy Projects	$2 Billion	Promote Wind energy projects in Hyderabad to Gharo region and coastal areas south of Karachi in southeastern Pakistan, hills and ridges in northern Punjab and near Mardan and Islamabad in northern Indus valley, and near Nokkundi and hills and ridges in the Chagai area and Makran in the southwestern part of the country. (upto 10,000 MW)	Federal and Provincial Governments / AEDB
12.	Production of Biodiesel	$120 Million	Produce biodiesel in Pakistan to strengthen agricultural sector and empower the farmers	Provincial Governments
13.	Conversion of Gas Geyser to Solar Water Heater	$1.5 Billion	Convert 2 million gas geyser consumers to solar water heater in the SNGPL network can save 15 BCF annually or 41 MMCFD which is about 9% of total natural gas consumption in Punjab.	Federal Government-SNGPL/SSGCL
B	**Sub-Total**	**$18 billion**		

2.5.3 Investment Potential in Energy Efficiency Projects

#	Project Title	Investment Potential	Description of the Project	Responsibility
1.	Provide Improved Cookstoves	US $657.54 Million	Provide Clean and Improved Cook stoves with higher conversion efficiencies to help relieve the environmental damage and to save biomass resources	Provincial Governments and NGOs
2.	Provide Improved Cookstoves	US $3 Billion	Achieve Energy efficiency in the industrial sector by employing a broad range of energy management, efficient technologies and practices to reduce overall energy consumption. Following technologies and practices for improvements of High Impact Opportunity which can offer high energy saving: • Retrofitting; • Variable Frequency Drives (VFDs); • Efficient Electric Motors; • High Pressure and Efficient Boilers; • Energy-Efficient Lighting; • Heating Ventilation & Air Conditioning (HVAC); • Waste Heat Recovery Systems; • Renovation of Process Equipment; • Improved Process Performance with Applications of Sensors and Controls Network; and Development of Adequate Energy Management Systems	Federal and Provincial Governments / NEPRA

#	Project Title	Investment Potential	Description of the Project	Responsibility
3.	Energy Efficient Appliances	$50 Million	Need to set the rules and regulations for the appliances manufacturers to manufacture the energy efficient products (product wise consumption detail is mentioned in the report)	Federal and Provincial Governments / NEECA
4.	Improvement in Process Operation	$50 Million	Improvement in Process Operation. e.g. proper metering in the textile and sugar industry.	Federal and Provincial Governments / NEECA
5.	Installation of Heat Recovery Systems (HRS)	$30 Million	Installation of Heat Recovery Systems (HRS) from exhaust flue gases in sugar and paper industry can increase energy efficiency	Provincial Governments
6.	Thermal Insulation of Steam Lines and Valves	$300 Million	Thermal insulation of steam lines and valves in almost all industrial units	Provincial Governments
7.	Installation of Variable Frequency Drive (VFD)	$70 Million	Installation of Variable Frequency Drive (VFD) or inverters on pumps and motors reduce energy losses;	Federal and Provincial Governments / NEECA
8.	Improvement of Maintenance Operation	$100 Million	Improvement of Maintenance Operation i.e. reduction of air leakages; and Proper maintenance and operation of electrical motors will increase energy efficiency	Federal and Provincial Governments / NEECA
9.	Energy Savings in the Textile Industry	$ 1.1 Billion	Energy savings in the textile industry by installation of meters controls to reduce leakages of compressed air and improved maintenance of electrical motors	Federal and Provincial Governments / NEECA
10.	Energy Efficient Technologies for Sugar Industry	$230 Million	Sugar industry to deploy energy efficient technologies, such as the High-Pressure Cogeneration (HPC). Sugar mills with HPC technology, consumes 46% less bagasse to produce same amount of electricity compared to existing low-pressure technology (23 bar)	Federal and Provincial Governments / NEECA
11.	Single Stage Dry Kilns for Cement Units	$500 Million	Cement units to employ single stage dry kilns which can be shifted to more efficient process of multistage dry kilns to improve overall energy efficiency of cementing process. Higher efficient processes in the cement industry would also help in reduction of dust, GHG emissions and conserve water.	Provincial Governments / NEECA
12.	Implementation of Simple Energy-Saving Techniques in Leather Sector	$134 Million	Implementation of simple energy-saving techniques such as efficient lighting and installing controls for compressed air could help save $134,000 in energy costs annually in leather sector. In addition, proper metering and insulation offer best energy efficiency potential and reduce the energy consumption.	Provincial Governments

#	Project Title	Investment Potential	Description of the Project	Responsibility
13.	Energy Efficiency in Fertilizer Sector	$600 Million	Energy efficiency in fertilizer sector to convert existing processes to a high efficiency steam reforming and Haber-Bosch synthesis. It has the potential to reduce gas consumption by 25% by 2030. Significant energy efficiency gains in fertilizer sector can be achieved by investing in co-generation, installation of meters and improvement of power factors etc.	Federal and Provincial Governments
14.	Boiler and Burner Tuning of Pulp and Paper Mills	$70 Million	Pulp and Paper mills to reduce their gas demand by 7% and overall energy consumption by 5.6% percent just by tuning their boiler burners and adjusting air-to-fuel ratios.	Provincial Governments
15.	Introduction of Zig-Zag Technology	$600 Million	Introduction of Zig-Zag Technology for 12000-18000 Brick Kilns.	Federal and Provincial Governments / NEECA
16.	Smart Metering Technology	$1.0 Billion	Need to deploy smart metering technology for natural gas and power consumers to avoid transmission losses.	Federal Government / DISCOs / NEPRA
17.	Upgradation of the Electricity Grid	$9 Billion	Upgradation and Expansion of the Grid to withstand demand pressures from potential breakdowns is an urgent task for the Pakistan's electricity sector as a whole.	Federal Government / International Donor Agencies.

#	Project Title	Investment Potential	Description of the Project	Responsibility
18.	Replace Maximum Possible Tube Wells Pumps	$700 Million	Replace maximum possible tube wells pumps (out of 180,000) with more efficient pumps by 203	Provincial / Federal Government
C	**Sub-Total**	**$18 Billion**		
	Grand-Total (A+B+C)	**$ 66.56 Billion**		

The total investment is rationalized after analyzing the cost of multiple projects for energy generation, transmission and distribution under the Power Division and Petroleum Division of Ministry of Energy, Private Power Investment Board, Alternate Energy Development Board, Planning Commission of Pakistan under the Public Sector Development Program (around $ 2 billion for the 2018-19 for power project), Investment plans of Provincial Governments Energy Projects and other Donor agencies like World Bank, JICA, ADB, and UNDP.

2.5.4 Investment Potential in Energy Sector Programs

Programme 1: Management Support to SEforALL Secretariat at Energy Wing, Planning Commission

Program Description

This programme aims to provide Technical Advisory services to support the SEforALL Secretariat in the identification, analysis, design, and implementation of other actions and interventions that will contribute to the achievement of SEforALL goals in Pakistan, with a special focus on the identification of investment programmes and projects to be included in Pakistan's IP for its integration into the SEforALL agenda throughout the AA implementation process.

Implementation

Implementation partners
Lead: Energy Wing, Planning Commission
Partners: To be defined.

Objectives

- Identify, analyze, design and implement other SEforALL actions and initiatives;
- Identify projects on energy access, energy efficiency and renewable energy to be implemented in Pakistan that complement on-going projects and initiatives that contribute to the achievement of Pakistan's SEforALL goals.

Financing

Proposed Activities

i. Support the SEforALL Secretariat in the development of Renewable Energy programmes.
ii. Support the SEforALL Secretariat in the implementation and consolidation of Energy Efficiency Programmes, including:
  - Assessment of opportunities for energy efficiency in multiple sectors.
  - Demand side management programmes across different sectors of activity (commercial, residential and industrial).

iii. Create a mechanism to support early stage renewable energy projects into maturity and late stage renewable energy projects into financial close;
iv. Develop a programme to identify, develop and implement renewable energy projects for heat and power, with particular emphasis in clean cooking and off-grid electricity services;

v. Revise and update Pakistan's IP to include the identified programmes and projects;
vi. Develop a capacity building programme for SEforALL Secretariat and Regional Energy Desks on these subjects.

Programme 2: Support SEforALL Secretariat in the Revision and Alignment of Pakistan's Legal Framework with the SEforALL Action Agenda

Program Description

This programme aims to provide SEforALL Technical Advisory services to the SEforALL Secretariat to review, refresh, consolidate or update policies and mechanisms to promote the implementation of Pakistan's SEforALL NAP and IP. It is expected that under the SEforALL framework, the SEforALL Secretariat will undertake the regulatory framework review to assess the need to appropriately refresh (or renew) policies, regulations and energy plans, and to reinforce synergies across sectors.

Implementation

Implementation partners
Lead: Energy Wing, Planning Commission
Partners: To be defined.

Objectives

The main objective of this programme is to develop a regulatory strategy to address critical areas associated to energy planning and policies in Pakistan.

Financing

Proposed Activities

- Support the SEforALL secretariat in compiling an inventory of the inter-relations between different policies and the identification of the needs for policy updates in the Energy Sector and across sectors
- Review the Energy Sector in Pakistan's current policy, strategy and regulatory framework and assess how itcorrelates to Pakistan's SEforALL Goals and AA.
- Review current strategies in the Energy sector and improve the complementarities and alignment with SEforALL objectives.
- Development of nexus with other sectors like Health, Education and Water and coordination between governmental bodies:
- Coordination of the policies developed with other sectors.
- Review, refresh, consolidate or update policies to promote the implementation of the SEforALL goals and initiatives under the AA and IP:

- Develop a comprehensive Access Acceleration Strategy with clear links to the Rural Electrification Strategy,
- Renewable Energy and Energy Efficiency strategies and any other strategies in place that promote access to energy.
- Develop a comprehensive Rural Electrification Strategy and consolidate the SE4AAL (including strategy for mini-grids and stand-alone systems for access below 1 MW);
- Develop a comprehensive Renewable Energy Strategy with clear goals and targets and integrate it into the Energy Sector Wide policy framework.
- Develop a comprehensive Energy Efficiency strategy with clear goals and targets and integrate it into the Energy Sector Wide policy framework;
- Define, develop and adopt EE standards, labelling schemes, Minimum Performance Standards (MEPS) and other necessary secondary legislation to promote EE.
- Review, adopt and implement a Biomass Energy Strategy (BEST) including supply and demand of forestry products
- Develop specific regulations for sustainable efficient charcoal production methods depending on availability of raw materials.
- Develop a concrete policy, strategy and targets to regulate the clean cooking sector.
- Develop and implement a MER system for the energy sector to monitor the performance of the different strategies and plans being implemented in Pakistan.
- Review, refresh, consolidate or update investment incentives/mechanisms associated to subsidies and incentives for the energy sector, especially those that will have an impact on the IP:
- Create a financial incentive package for the implementation of actions and initiatives in the fields of renewable energy, energy efficiency and energy access.

Programme 3: Support SEforALL Secretariat/MEM in the Identification and Analysis of Investment Projects to be included in Pakistan's IP

Program Description

This programme aims to provide Technical Advisory services to support the SEforALL Secretariat in the identification, analysis, design, and implementation of other actions and interventions that will contribute to the achievement of SEforALL goals in Pakistan, with a special focus on the identification of investment programmes and projects to be included in Pakistan's IP for its integration into the MTP and throughout the AA implementation process.

Implementation

implementation partners
Lead: Energy Wing, Planning Commission
Partners: To be defined.

Objectives

- Identify, analyze, design and implement other SEforALL actions and initiatives;
- Identify projects on energy access, energy efficiency and renewable energy to be implemented in Pakistan that complement on-going projects and initiatives that contribute to the achievement of Pakistan's SEforALL goals.

Financing

Financing already mentioned under Priority Areas

Proposed Activities

- Support the SEforALL Secretariat in the development of Renewable Energy programmes for solar, wind, mini-hydro and geothermal energy.
- Support the SEforALL Secretariat in the implementation and consolidation of Energy Efficiency Programmes, including:
  - Assessment of opportunities for energy efficiency in multiple sectors.
  - Demand side management programmes across different sectors of activity (commercial, residential and industral)
- Create a mechanism to support early stage renewable energy projects into maturity and late stage renewable energy projects into financial close;
- Develop a programme to identify, develop and implement renewable energy projects for heat and power, with particular emphasis in clean cooking and off-grid electricity services;
- Revise and update Pakistan's IP to include the identified programmes and projects;
- Develop a capacity building programme for SEforALL Secretariat/Energy Wing and Regional Energy Desks on these subjects.

3.0

INVESTMENT PROJECTS AND PROGRAMS IN PAKISTAN'S ENERGY SECTOR

This section is presented with three components:

1. **Current Plan and Strategies for energy Projects:** This section is about the detail of existing energy sector projects and initiatives taken by provincial and federal government to make sure the availability of sustainable energy utilization at all level.
2. **Donor Supported Initiatives:** Pakistan is one of the largest recipient of FDI particularly for investment in energy sector projects by bilateral and multilateral donor agencies in energy efficiency, energy generation and enhancing the share of renewable energy projects.
3. **Project Investment at Federal and Provincial Level:** This section gives details about the list of projects started or completed by provincial governments for energy generation through all means i.e. renewable and non-renewable resources.

3.1 The Existing Plans / Strategies and the Gaps

The following are the existing plans and programs under the provincial governments to ensure universal access to energy in the respective province.

Existing Programs on Off-Grid Electrification

Region	Program/Project Name	Beneficiaries/Purpose	Implementing Agency	Funding Sources	Execution Period
Punjab	Khadam-e-Punjab UjalaProgram(KP UP)	Solarization of 20000 off-grid schools and BHUs	Punjab Energy Department	ADB	2016-20[6]
	Energy solution using indigenous resources in villages (PV and Biogas Hybrid)	Vehari and Faisalabad	Directorate of Power Projects, Punjab Energy Department	Annual Development Program	2017-18
Sindh	Pakistan Solar and Renewable Energy Program	50,000 households could be electrified	Sindh Energy Department	World Bank	2017-20

6 Source: http://cm.punjab.gov.pk/node/3971

Region	Program/Project Name	Beneficiaries/Purpose	Implementing Agency	Funding Sources	Execution Period
	Solar Electrification of 284 BHUs	Solar Systems were handed over to School Management Committees through respective District Education Officer	Sindh Energy Department	Total Cost PKR. 454 million to be funded by ADP	2017-18
	Scheme I Electrification of 40 homes each in 300 villages Scheme 2: Electrification of 5000 Schools on Stand Alone off- Grid technology in 10 Border Districts of the province	12,000 households altogether in 300 villages will be electrified through solar home systems	Sindh Energy Department	Total Cost is PKR. 0.5 billion to be funded through ADP	2016-18
	Construction of 230 Biogas Plants in Rural Areas	Rural Populations	Sindh Energy Department	20 million by ADB	2017-18
Khyber Pakhtunkhwa	Mini/Micro Hydel	356 stations to be set up in 12 districts through 6 NGOs (35 MW). 248 completed and 108 under construction. To be scaled up to 1028 stations with cumulative capacity of 100 MW targeting 1.0 Million population	Pakhtunkhwa Electricity Department (PEDO)	PEDO, ADB	2016-20

Region	Program/Project Name	Beneficiaries/Purpose	Implementing Agency	Funding Sources	Execution Period
	Solar Home Solutions	Chitral – 3750 households (2750 achieved) Central/Southern Districts – 2,950 households	Pakhtunkhwa Electricity Department (PEDO)	ADB	2016-20
	Solarization of Schools and BHUs	8000 Schools and 187 BHUs will be solarized with cumulative capacity of 50 MW	Pakhtunkhwa Electricity Department (PEDO)	ADB	2018-20
	Solarization of Mosques	4440 Mosques will be solarized	Pakhtunkhwa Electricity Department (PEDO)	KPK – ADP	2018-19
Balochistan	Provision of Solar System for Water Access	Tapping shallow groundwater emanating from perennial streams of the river basins of Zhob and Mula, using solar-powered systems in off-grid locations	Balochistan Energy Department	ADB	2018-22
FATA	Micro Hydel	19 Small Hydropower Projects for Power generation and irrigation	FATA Secretariat	ADP	2017-20
AJK	Micro Hydel Stations	34 micro-hydro stations of 1250 kW capacity have been commissioned while another 122 are in	AJK Power Development Organization	ADP	2013-17

Region	Program/Project Name	Beneficiaries/Purpose	Implementing Agency	Funding Sources	Execution Period
		the pipeline. A total of 9,630 households will benefit from this.			
	Solarization of Schools and Hospitals	400 Schools and 100 BHUs	AJK Electricity Department	ADP	2017-20
	Solarization of Remote Areas	10,000 Houses will be electrified	AJK Electricity Department	ADP / Community Participation	2017-22
GB	Solarization of office buildings and hospitals	More than 100 buildings and 5 hospitals in GB	GB Water and Power Departments	GB ADP	2018-25

Source: Review of Government Programs and SEforALL Review Meeting

3.2 Renewable Energy Projects under CPEC

Suki Kinari Hydropower Station, Naran, Khyber Pukhtunkhwa

Primary Energy Input	Hydel
Technology	Hydel
Installed Capacity (MW)	870
Location	River Kunhar (a tributary of River Jhelum)
Province	KPK
District	Mansehra, KPK
Estimated Cost (US $ Million)	1,802
Executing Company / Sponsors	Suki Kinari Hydro (Pvt) Ltd / China Gezhouba Group Company Ltd.
Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	Private Power and Infrastructure Board (PPIB)
Project Progress Update	• Financial Close achieved. • Land acquisition award announced on 17th Nov, 2016. • Construction work under way. • Commercial Operation Date (COD) 2020/2021.

Hydro China Dawood 50MW Wind Farm(Gharo, Thatta)

Primary Energy Input	Wind
Technology	Wind Turbine
Installed Capacity (MW)	50
Tariff	Upfront Tariff
Location	Bhanbore, Gharo, District Thatta
Province	Sindh
Estimated Cost (US $ Million)	125
Executing Company / Sponsors	M/s Hydrochina Dawood Power Pvt. Limited (HDPPL)
Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	Alternative Energy Development Board (AEDB)

Project Progress Update	• Financial Closed (FC) achieved on March 27, 2015. • Commercial Operation Date (COD) attained 5th April, 2017. • Current Status: Operational (5th April 2017)

Quaid-e-Azam 1000MW Solar Park (Bahawalpur) Quaid-e-Azam

Primary Energy Input	Solar
Technology	PV Solar
Installed Capacity (MW)	300
Tariff	Cost plus
Location	Bahawalpur
Province	Punjab
Estimated Cost (US $ Million)	1,302
Executing Company / Sponsors	Zonergy
Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	Punjab Power Development Board (PPDB) / Alternative Energy Development Board (AEDB)
Project Progress Update	• COD of 3 x 100 MW attained in August 2016.

UEP 100MW Wind Farm (Jhimpir, Thatta)

Primary Energy Input	Wind
Technology	Wind Turbine
Installed Capacity (MW)	100
Tariff	Upfront
Location	Jhimpir, District Thatta
Province	Sindh
Estimated Cost (US $ Million)	250
Executing Company / Sponsors	Hydro China (EPC) Gold Wind China (Supplier) / United Energy Pakistan (Pvt.) Ltd
Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power

Supervising Agency	Alternative Energy Development Board (AEDB)
Project Progress Update	• Financial Closed (FC) achieved on March 30, 2015. • Commercial Operation Date (COD) attained 16th June, 2017. • Current Status: Operational.

Sachal 50MW Wind Farm (Jhimpir, Thatta)

Primary Energy Input	Wind
Technology	Wind Turbine
Installed Capacity (MW)	50
Tariff	Cost + Tariff (US cnt/kw 15.8618)
Location	Jhimpir, District Thatta
Province	Sindh
Estimated Cost (US $ Million)	134
Executing Company / Sponsors	Hydro China / Arif Habib Corporation Limited
Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	Alternative Energy Development Board (AEDB)
Project Progress Update	• Financial Closed (FC) achieved on December 18, 2015. • Commercial Operation Date (COD) attained 11 April, 2017. • Project Completed • Current Status: Operational (11 April 2017)

Karot Hydropower Station

Primary Energy Input	Hydel
Technology	Hydel
Installed Capacity (MW)	720
Location	River Jehlum
Province	AJK / Punjab
Estimated Cost (US $ Million)	1,420
Executing Company / Sponsors	Karot Power Company Ltd. (KPCL) / CSAIL/ CTGI /CTG (China Three Gorges)

Financing	Independent Power Producer (IPP)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	Private Power and Infrastructure Board (PPIB)
Project Progress Update	• Land acquisition award done. • Financial Close achieved on 22nd February 2017. • Construction of access road/bridge, concrete batching plant, diversion tunnel and spillway, etc. are in process. • Work initiated through equity – 25% civil works completed. • Commercial Operation Date (COD) 2020/2021.

Three Gorges Second Wind Power Project
Three Gorges Third Wind Power Project

Primary Energy Input	Wind
Technology	Wind Turbine
Installed Capacity (MW)	50
	50
Location	Jhampir, Thatta
Province	Sindh
Estimated Cost (US $ Million)	150
Project Progress Update	• LOS issued in August 2016. • EPA initialed on 30th Nov, 2016. • Construction activity already started from equity. • Financial Close March 2017. • COD September, 2018.

Matiari to Lahore ±660kV HVDC Transmission Line Project

Technology	±660 KW Bipole HCDC with Converter/ Grounding Electrode Stations
Project Description	Scope: • Evacuation of Power from Coal based Plants located at Thar, Port Qasim and Hub. • 4000 MW ±660 kV HVDC Line Matiari-Lahore, 878km.

	• Two (2) 40 km Electrode Lines and associated stations. • Associated 500kV HVAC T/Lines at both Converter Stations.
Project Details	2000 MW with 10% overloaded capability for 2 hours
Location	Matiari to Lahore
Province	Sindh and Punjab
Estimated Cost (US $ Million)	1,500
Executing Company / Sponsors	China Electric Power Equipment and Technology Co.Ltd.(CET) / State Grid Corporation of China (SGCC)
Financing	Independent Transmission Company (ITC)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	National Transmission & Despatch Company (NTDC)
Project Progress Update	• Feasibility study completed. • Tariff determined by NEPRA. • TSA/IA initialed in December 2016. • Land acquisition for converter stations at Lahore and Matiari completed. • China Electric Power Equipment and Technology Company(CET) / State Grid nominated by Chinese side. • COD expected in 2018 / 2019.

Matiari to Lahore ±660kV HVDC Transmission Line Project

Technology	±660 KW Bipole HCDC with Converter/ Grounding Electrode Stations
Project Description	Scope • Evacuation of Power from Coal based Plants located at Thar, Port Qasim and Hub. • 4000 MW ±660 kV HVDC Line Matiari-Lahore, 878km. • Two (2) 40 km Electrode Lines and associated stations. • Associated 500kV HVAC T/Lines at both Converter Stations.
Project Details	2000 MW with 10% overloaded capability for 2 hours
Location	Matiari to Lahore
Province	Sindh and Punjab
Estimated Cost (US $ Million)	1,500

Executing Company / Sponsors	China Electric Power Equipment and Technology Co.Ltd.(CET) / State Grid Corporation of China (SGCC)
Financing	Independent Transmission Company (ITC)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	National Transmission &Despatch Company (NTDC)
Project Progress Update	• Feasibility study completed. • Tariff determined by NEPRA. • TSA/IA initialed in December 2016. • Land acquisition for converter stations at Lahore and Matiari completed. • China Electric Power Equipment and Technology Company(CET) / State Grid nominated by Chinese side. • COD expected in 2018 / 2019.

Matiari (Port Qasim) —Faisalabad Transmission Line Project

Technology	±660 KW Bipole HCDC with Converter/ Grounding Electrode Stations
Project Details	2000 MW with 10% overloaded capability for 2 hours
Location	Matiari to Faisalabad
Province	Sindh and Punjab
Estimated Cost (US $Million)	1,500
Executing Company / Sponsors	China Electric Power Equipment and Technology Co.Ltd.(CET) / State Grid Corporation of China (SGCC)
Financing	Independent Transmission Company (ITC)
Coordinating Ministry	Ministry of Water and Power
Supervising Agency	National Transmission & Despatch Company (NTDC)
Project Progress Update	• Feasibility study completed • Decision on tariff review petition announced by NEPRA • COD expected in 2018 / 2019 • TSA/IA initialed during 6th JCC • China Electric Power Equipment and Technology Company(CET) / State

Promoted Projected

Kohala Hydel Project, AJK

Installed Capacity (MW)	1100
Location	Jhelum River near Muzaffarabad
Estimated Cost (US $ Million)	2,397
Executing Company / Sponsors	CTG/CWEI (China Three Gorges) / (CWE Investment Crop)
Project Progress Update	• Feasibility Study (stage-1) Tariff Announced by NEPRA. • Land Acquisition process started. • Environmental approval in process. • Financial close planned in Dec 2017. • Expected Commercial Operation Date (COD) 2023.

Cacho 50MW Wind Power Project

Primary Energy Input	Wind
Installed Capacity (MW)	50
Province	Sindh

Western Energy (Pvt.) Ltd. 50MW Wind Power Project

Primary Energy Input	Wind
Installed Capacity (MW)	50
Province	Sindh

Potential Projects

Phandar Hydropower Station

Installed Capacity (MW)	80
Location	Gilgit Baltistan
Project Progress Update	• Under review of experts from both sides

Gilgit KIU Hydropower

Installed Capacity (MW)	80
Location	Gilgit Baltistan
Project Progress Update	• Under review of experts from both sides

3.3 Planning Commission Investment Support to NTDC under PSDP 2017

#	Project Title	Estimated Cost	Expenditures up to 30-06-2018	Allocation 2018-19
1.	132 KV T/Line Interconnection arrangement Between 132 KV Kharan& Mall G/Station.	650.558	370.000	561.116
2.	220 Kv G/S & Allied T/L D.I Khan ADB TIV.	3744.000	2909.247	650.000
3.	220 KV G/S at Ghazi Road, Lahore with 220 KV D/C T/Line 132 KV Expansion System EDCF Loan No.PAK-2 & KFW.	2591.000	5139.092	550.000
4.	220 KV Nowshera S/S (ADB-IV)	1875.00	1554.707	600.000
5.	220KV Chakdara S/S ADB Tranche-IV.	3230.000	3763.504	550.000
6.	220-KV Dera Ismail Khan - Zhob Transmission Line alongwith 220-KV Zhob Sub-Station.	6615.000	101.359	500.000
7.	220kV Mirpur Khas G/S alongwith allied T/Ls	4320.000	300.000	2100.000
8.	220-KV Shadman G/S alongwith allied T/Ls. (Now 220 KV Punjab University Substation)	3024.460	100.000	700.000
9.	220Kv Sub-Station LalianTranch-IV.	1581.460	2143.856	600.000
10.	220kV Zero Point Grid Station at Islamabad	3806.390	250.000	500.000
11.	2nd Source of Supply 200-KV I/Abad University S/S(Now 220KV Transmission System Network Reinforcement in Islamabad & Burhan)	2705.000	736.655	900.000
12.	4 Nos New Projects to be financed by JBIC (i) 500 KV RY Khan G/S & T/L (ii)220 KV Chishtian T/L (iii) 220 KV Gujrat G/S & 220 KV T/L (iv) 220 KV Shalamar G/S & 220 KV T/L (4 Projects- JBIC Loan) (JICA Loan No. PK-58).	13152.000	12238.051	700.000
13.	500KV Faisalabad New (2x750) (Now 500KV Faisalabad West).	9380.000	510.349	3000.000
14.	500kV HVAC T/Line for inter connection of HVDC Converter Station at Lahore with existing HVAC System.	5112.000	100.000	600.000

#	Project Title	Estimated Cost	Expenditures up to 30-06-2018	Allocation 2018-19
15.	500KV Islamabad West.	6909.000	1000.000	5100.000
16.	Addition of 500/200KV Sub Station T/L for Strengthening the existing NTDC system i) 500KV Lahore New ii) 500KV Shikarpur iii)220KV D.I.Khan (JICA-PK-61)	24528.000	20769.913	1300.000
17.	Construction of 132 KV Grid Station at Dadar & 132 KV SDT Sibbi-Dadar T/Line.	383.810	100.000	200.000
18.	Construction of 132 KV(AIS) Grid Station at Deep Sea Port Gwadar and the associated 132-KV D/C Transmission line.	806.279	703.550	102.729
19.	Construction of 132-KV G/S at Isplinji District Mastung.	700.400	100.000	200.000
20.	Construction of 500KV T/L for Dispersal of Power form 747 MW from Guddu.	7873.720	4692.065	3000.000
21.	Conversion from 220-KV AIS Grid Stations in GIS Grid Stations. 220-KV Kala Shah Kaku, 220- KV Bund Road, 220- KV Nishatabad, 220-KV Jaranwala.	11024.000	100.000	450.000
22.	Electrification of Village DeraBughti (DeraBughti Package).	718.000	398.000	200.000
23.	Evacuation of Power from 500MW Wind Power Plants at Jhimpir Clusters	5639.760	450.000	1000.000
24.	Extension/Augmentation of Existing Grid Stations	10711.000	100.000	1500.000
25.	Feasibility study for enhancing the transmission capacity of NTDCs 500-KV Transmission System by applying series compensation.	133.180	30.000	55.000
26.	Installation of 2 x 600 MW (Net) Coal Fired Power Project Jamshoro (ADB).	177175.590	17575.224	27108.481
27.	Interconnection of Scheme for Import of Power from CASA-1000	33949.000	944.889	1100.000
28.	PDEP (ADB)-Tranch-IV, MEPCO	3678.790	3386.630	450.000
29.	Power Distribution Enhancement Investment Program- ADB Tranch-IV (Loan) QESCO	1212.250	1065.580	300.000

#	Project Title	Estimated Cost	Expenditures up to 30-06-2018	Allocation 2018-19
30.	Power Distribution Enhancement Project (Tranche-I & II) (STG-ELR-DOPRehabilitation Capacitor Installation & Energy Efficiency (IESCO)(ADB).	2717.860	2393.558	214.811
31.	Power Distribution Enhancement Project (Tranche-I & II) (STG-ELR-DOPRehabilitation Capacitor Installation & Energy Efficiency (LESCO)(ADB).	3273.000	3098.370	366.930
32.	Power Distribution Enhancement Project (Tranche-I & II) (STG-ELR-DOPRehabilitation Capacitor Installation & Energy Efficiency (PESCO)(ADB).	1689.000	1465.870	223.129
33.	Power Distribution Enhancement Project (Tranche-I & II) (STG-ELR-DOPRehabilitation Capacitor Installation & Energy Efficiency, HESCO (ADB)	2860.000	2421.320	918.170
34.	Power Distribution Enhancement Project (Tranche-IV) (LESCO).	4808.000	2904.000	1466.130
35.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (HESCO).	2622.000	2354.730	945.340
36.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (IESCO)	2633.341	2662.690	567.291
37.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (LESCO)	2346.000	1988.000	540.370
38.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (MEPCO).	3306.920	3582.170	100.000
39.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (PESCO).	2305.820	2123.370	182.452
40.	Power Distribution Enhancement Project (Tranch- III) (STG-ELR-DOP-Rehabilitation Capacitor Installation & Energy Efficiency (QESCO).	8732.342	7883.730	900.000

#	Project Title	Estimated Cost	Expenditures up to 30-06-2018	Allocation 2018-19
41.	Power Distribution Enhancement Project (Tranch- IV) (HESCO).	1291.950	1198.620	230.730
42.	Power Distribution Enhancement Project (Tranch- IV) (IESCO).	2061.657	1164.360	794.745
43.	Power Distribution Enhancement Project, Tranch- IV (PESCO)	2749.740	2228.110	521.630
44.	Rehabilitation of NTDC system in south area for improvement in system reliability to avoid the frequent tripping.	1064.000	200.000	700.000
45.	Reinforcement of existing 220kV GudduUch-Sibbi Single Circuit Transmission Line for improvement of Power Supply System in South Area	8624.230	50.000	1000.000
46.	Strengthening of TSG Centre for Grid System Operations and Maintenance	941.000	150.000	350.000
47.	Upgradation/ Extension of NTDC's Telecommunication & SCADA System at NPCC	11004.000	150 000	500.00
Total Investment				**65099.54**

3.4 PSDP Allocations for Energy Projects

3.4.1 PSDP Allocations in Last Five Years

Public Sector Development Program- Last Five Years Allocations for Energy Sector

	2013-14	2014-15	2015-16	2016-17	2017-18	Total
National Development Program	153,210	164,390	197,907	267,095	345,620	1,128,222
Provincial Development Programs	106,110	115,600	142,227	205,020	270,000	838,957

Source: Pakistan's 11th Development Plan- Planning Commission of Pakistan

3.4.2 PSDP Allocations for 2018-19 for Energy Projects

#	Project Title	Estimated Cost Pkr	Allocation 2018-19
1.	132-KV T/Line from Golan Gol Project. Grid Station for Provision of Electricity. For Area Distt. Chitral (New Electrification Works at Different Valleys of District Chitral	3446.972	200.000
2.	220-KV Mastung G/S alongwtih Allied T/Ls.	13892.010	500.000
3.	500-KV Lahore, North.	15592.500	400.000
4.	AFD Support to PPIB for Tariff Based Bidding and Review of Feasibility Studies and Capacity Building	56.824	35.000
5.	Construction of 132KV grid station at Sunny & 132KV SDT Bhag –Sunny T/Line (QESCO)	471.500	100.000
6.	Construction of 132-KV Mashkay G/S with Allied 132-KV Nal- Mashkay T/Line	761.084	100.000
7.	Construction of 33kV S/S and 26 KM HT Line from 132kV Grid Station Loralai to Do-sarka District Loralai (QESCO)	84.430	84.430
8.	Construction of 132KV Grid Station at Kan Mehterzai with Allied T/Line (50:50)	124.885	100.000

#	Project Title	Estimated Cost Pkr	Allocation 2018-19
9.	Conversion of Existing Electric Operated. Tube Wells in Balochistan to Solar. System Phase-I: 10.000 Pumps (QESCO)	49520.000	1000.000
10.	Electrification of Different Union Councils, Killa Abdullah	344.770	100.000
11.	Electrification of Various Villages at District Nausharo Feroze	500.000	125.000
12.	Establishment of 132 KV Grid System along with upgradation of existing 33 KV Grid System to 132 kV in District Chitral	1795.045	300.000
13.	Establishment of Program Management office (PMO) in Ministry of Water and Power for Energy Efficiency Program	2112.000	100.000
14.	Evacuation of Power from 2160MW Dasu HPP Stage-I.	72645.000	1000.000
15.	Evacuation of Power from Tarbela 5th Extension	5330.000	550.000
16.	Interconnection of Isolated Makran Network at Basima via Nag G/Station from Panjgoor G/Station	14070.220	2000.000
17.	Supply and Installation of Electric Poles and Transformers in Munciple Corporation, District Khuzdar	354.000	354.000
18.	Rehabilitation of 66KV Damaged Grid Station at Ghiljo, Orkazai Agency (TESCO)	134.940	107.940
Total			**7156.370**

Hydel Power Projects

#	Project Title	Estimated Cost PKR	Expenditures up to 30.06.2018	Allocation 2018-19
1.	AllaiKhwar Hydropower Project (121 MW) District Battgram	17216.406	16374.892	68.000
2.	Dasu Hydro Power Project Stage-I (2160 MW) (District Kohistan, Khyber Pakhtunkhwa)	486093.300	81551.206	76200.000
3.	DubairKhwar Hydropower Project (130MW) District Battgram	24673.573	23870.043	497.000
4.	Establishment of Pakistan Glacier Monitoring Network Upper Indus Basin Area Falling within KPK, Gilgit Baltistan, and Azad Jammu & Kashmir	891.780	61.000	103.000
5.	Golan Gol Hydro Power Project (106 MW) Chitral	29077.173	32071.192	2733.000
6.	KeyalKhawar Hydro Power Project, Khyber Pakhtunkhwa, (Kohistan) (128MW)	26084.178	4366.128	1079.000
7.	Khan Khwar Hydropower Project (72 MW) District Shangla	10732.788	10061.613	271.000
8.	Mangla Hydropower Training Institute (HPTI) AFD Grant Mirpur Azad Kashmir	486.151	199.998	210.000
9.	Mangla Power Station Refurbishment & Upgradation of Generation Units (310 MW)	52224.307	6575.767	4985.000
10.	Neelum Jhelum Hydro Power Project (969 MW) (China, Kuwait, Saudi Arabia, IDB and OPEC)	404321.100	451852.000	32516.000
11.	Tarbela Fifth Extension Hydro Power Project (1410 MW) Sawabi	82361.600	1317.200	2283.000
12.	Tarbela Fourth Extension Hydro Power Project (1410 MW) (Swabi)	83601.040	90798.469	13898.505
13.	Thakot Hydro Power Project (4000 MW) (Battagram) (Study)	719.628	600.197	119.000
14.	Warsak Hydroelectric Power Station 2nd Rehabilitation (242.96 MW)	22254.230	1374.634	293.000
Total				**135255.505**

3.5 International Donor Agencies Projects

#	Donor Name	On-going Initiatives	Amount (US$ mil)	Year	Remarks
		Renewable Energy			
1.	World Bank	Pakistan Community-Based Renewable Energy Development in Northern Areas and Chithral			Active
		Pakistan Solar and Renewable Energy Program	200		Pipeline
		Pakistan Hydro- meteorological and Climate Services Project	100		Pipeline
		Additional Financing to PK: Tarbela 4th Extension Hydropower Project	390		Active
		Dasu Hydropower Stage I Project	588		Active
		Energy Access			
		Electricity Distribution and Transmission Improvement Project	256		Closed
		Transmission Extension & Reinforcement Project	162		Closed
		National Transmission Modernization I Project	425		Pipeline
		Energy Access			
2.	Asian Development Bank	MFF Power Transmission Enhancement Investment Program II Tranche 2	US$ 260.00 million	29-Sep-17	Approved
		Second Power Transmission Enhancement Investment Program - Tranche 1	Ordinary capital resources US$ 115.00 million Loan 3420-PAK: Second Power Transmission Enhancement Investment Program - Tranche 1 concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million	31-Aug-16	Active
		Second Power Transmission Enhancement Investment Program	Ordinary capital resources US$ 800.00 million concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million	23-Aug-16	Active
		Power Transmission Enhancement Investment Program II	TA 8818-PAK: Power Transmission Enhancement Investment Program II Technical Assistance Special Fund US$ 1.50 million TA 8818-PAK: Power Transmission Enhancement Investment Program II (Supplementary) Technical Assistance Special Fund US$ 600,000.00	16-Dec-14	Active
		Second Power Distribution Enhancement Investment Program	Concessional ordinary capital resources lending / Asian Development Fund US$ 20.00 million Ordinary capital resources US$ 970.00 million	20-Nov-15	Active
		Second Power Distribution Enhancement Investment Program - Tranche 1	Ordinary capital resources US$ 380.00 million Loan 3329-PAK:	25-Nov-15	Active

#	Donor Name	On-going Initiatives	Amount (US$ mil)	Year	Remarks
			Second Power Distribution Enhancement Investment Program Tranche 1 concessional ordinary capital resources lending / Asian Development Fund US$ 20.00 million		
		Power Transmission Enhancement Investment Program Tranche 4	Concessional ordinary capital resources lending / Asian Development Fund US$ 400.00 million Loan: Sustainable Energy Sector Reform Program - Subprogram 1 World Bank US$ 600.00 million Japan International Cooperation Agency US$ 49.00 million	3-Dec-14	Active
		Power Transmission Enhancement Investment Program Tranche 3	US$ 243.24 million	22-Dec-11	Active
		Power Distribution Enhancement Investment Program - Tranche 3	US$ 245.00 million	14-Dec-12	Active
		Power Transmission Enhancement Investment Program Tranche 2	US$ 165.00 million	17-Dec-17	Closed
		Power Distribution Enhancement Investment Program-Project 1	Ordinary capital resources US$ 200.83 million Loan 2439-PAK: Power Distribution Enhancement Investment Program-Project 1 concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million	12-Sep-08	Active
		Power Distribution Enhancement Investment Program	Ordinary capital resources US$ 800.00 million concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million	3-Sep-08	Active
		Renewable Energy			
		Renewable Energy Development Sector Investment Program - Tranche 2	US$ 200.00 million	13-Dec-10	Closed
		Renewable Energy Development Sector Investment Program - Project I	Ordinary capital resources US$ 105.00 million Loan 2287-PAK: Renewable Energy Development Sector Investment Program - Project I concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million	13-Dec-06	Archived

#	Donor Name	On-going Initiatives	Amount (US$ mil)	Year	Remarks
		MFF - Renewable Energy Development Sector Investment Program (formerly Renewable Energy Development Facility)	Ordinary capital resources US$ 500.00 million concessional ordinary capital resources lending / Asian Development Fund US$ 10.00 million TA 4881-PAK: Renewable Energy Policy Formulation and Capacity Development of the Alternate Energy Development Board Technical Assistance Special Fund US$ 800,000.00	1-Dec-06	Archived
3.	JICA	**Energy Access**			
		Punjab Transmission Lines and Grid Stations Project	11,943 million Yen	May 2008 to October 2015 (7 year)	
		National Transmission Lines and Grid Stations Strengthening Project	23,300 million Yen	March 2010 to January 2017 (7 year)	
		Dadu Khuzdar Transmission System Project	3702 million Yen	December 2006 to June 2015 (8 year)	
		Renewable Energy			
		Introduction of Clean Energy by Solar Electricity Generation System	480 million Yen	2010 to 2012 (3 year)	

#	Donor Name	On-going Initiatives	Amount (US$ mil)	Year	Remarks
		Energy Access			
4.	Kfw	A whole generation of hydropower plants were built in Pakistan with German involvement, including the large-scale Tarbela Dam and Ghazi Barotha plant, plus the associated transmission and distribution system across the country. The substantial commitments in the field of hydropower utilization have made a key contribution to the development of urban areas and industrial zones in Pakistan.			
		Together with our Pakistani partner, German experts have conducted numerous feasibility studies for hydropower projects with an energy potential of 3,000 MW. Run-of-river power plants with a total output of 2,000 MW have been constructed or are under construction.			
		Renewable Energy			
		Political objectives in regard to renewable energies and energy efficiency in Pakistan were defined on the basis of the combined efforts of experts from Germany and Pakistan; these objectives have been adopted by the Pakistani cabinet.			
5.	DFID				
6.	UNDP	**Energy Access**			
		Renewable Energy			

#	Donor Name	On-going Initiatives	Amount (US$ mil)	Year	Remarks
		Energy Access			
7.	USAID	Generation of Electricity: USAID-funded renovations of Tarbela Dam in Khyber Pakhtunkhwa, the Jamshoro and Guddu Thermal Power Plants in Sindh, and the Muzaffargarh Thermal Power Plant in Punjab generated 978 MW of electricity.			
		Transmission to Distribution Companies: Byrepairing and replacing aging equipment – including transformers, circuit breakers, and transformer cooling fans – USAID programs have increased transmission capacity by 1,791 MW.			
		Distribution to Customers: USAID worked with power distribution companies (DISCOs) to improve management systems, upgrade equipment, and maintain the distribution network. DISCO improvements recovered 212 megawatts of electricity and saved over $429 million.			
		Renewable Energy			

3.6 Province Wise Projects Investment

Investment Prospective

#	Project Title	Description	Budget
		Sindh Province	
1.	Development of 05X20 MWs SOLAR POWER PROJECTS AT VARIOUS LOCATIONS IN SINDH	05 Solar Power Projects each of 20 MW capacity are under processing in five districts. i) Thatta ii) Shaheed Benazirabad, iii) Larkana, iv) Sukkar and v) at Jamshoro	1MW Solar Thermal Plant is around 2-2.5 million
2.	Establishment of 2 X 50 MW Wind Power Projects in the Province.	Sindh Renewable Energy Company is actively engaged in developing two 50 MW Wind Power projects in the province. The feasibility Studies have been completed and negotiations are underway with foreign development partners to start the physical activities.	
3.	20 MW "Waste-to- Energy" Power Plant, Based on Municipal Solid Waste and Agricultural waste in Khairpur Special Economic Zone.	The Municipal Solid waste and Agro –waste are available in abundance in the province, but are not properly utilized for energy sector development as per international practice. The Government of Sindh initiated a project of 20 MW based on MSW and Agro waste in the Khairpur Distt. The bidding process is near finalization.	
4.	Asia's Biggest Wind Power Project of 500 MW.	The Energy Department has signed an Agreement with Norwegians investor and Asia's biggest Wind Power Project of 500 MW will start producing electricity within 2-3 years. The feasibility studies have been completed and as soon as tariff is awarded, the ground works will be started.	
5.	Feasibility Study for Concentrated Solar Thermal Power Generation Projects	The approved cost of the project is 18.6 million. Through this project a detailed feasibility study will be carried out for establishment of Concentrated Soar	18.6 million

#	Project Title	Description	Budget
		Thermal Power Generation Projects of 50 MW, 20 MW and 10 MW at most feasible sites in Northern areas of Sindh	
6.	02x50 MWs Gas Based Power Generation Projects.	02X50 MWs gas based power generation projects were initiated in PPP mode at Jhimpir Road adjacent to Sindh Nooriabad Industrial Trading Estate, District Jamshoro, by the Government of Sindh through Energy Department and M/s TechnomenKenetics Pvt. Ltd., has been declared qualified bidder for both the projects.	
7.	05 MWs HYDRO POWER GENERATION PROJECTS.	RD-15, Rohri Canal, near Sukkur Barrage, Sukkur, under PPP mode. M/s Iqbalalimohammad Pvt. Ltd., has been declared successful bidder.	
8.	2×660MW Coal-fired Power Plants at Port Qasim Karachi	1320 MW	1,980 (US$ M)
9.	Engro Thar Block II 2×330MW Coal fired Power Plant TEL 1×330MW Mine Mouth Lignite Fired Power Project at Thar Block-II, Sindh, Pakistan ThalNova 1×330MW Mine Mouth Lignite Fired Power Project at Thar Block-II, Sindh, Pakistan	660 MW 330 MW 330 MW	2000 (US$ M)
10.	Surface mine in block II of Thar Coal field, 6.5 million tons/year		1470 (US$ M)
11.	Hydro China Dawood 50MW Wind Farm(Gharo, Thatta)	50 MW	125(US$ M)

#	Project Title	Description	Budget
	Punjab Province		
1.	Quaid-e-Azam 1000MW Solar Park (Bahawalpur) Quaid-e- Azam	300 MW 600 MW 100 MW	1302 (US$ M)
2.	Establishment of 2x55 MW Coal Based Power Plant at M-3 Industrial Estate Faisalabad		15,158 (Rs. M)
3.	PC-II, Feasibility Study Consultancy for Bio-Mass based power plants setup near wheat and rice proceeding areas Punjab		104.050 (Rs. M)
4.	Solar solution for P & D building Lahore		35.601 (Rs. M)
5.	Establishment of 2x55 MW Coal Based Power Plant at Sunder Industrial Estate Lahore		15,114.000 (Rs. M) 10,803.000 (Rs. M)
6.	Renewable Energy Development Sector Investment Programme (REDSIP) Construction of Marala Hydel Power Station		239.000 (Rs.M)
7.	PC-II, Feasibility Study for Development of Coal Based Power Projects and Industrial States in Punjab i) M-3 Faisalabad ii) Sunder, Lahore		3000 (Rs. M)
8.	Establishment of 15-20 MW Bio Mass Thermal Power Plant near Chak Jhumra, Faisalabad		

#	Project Title	Description	Budget
KPK Province			
		MW	**Rs. M**
1.	Ranolia HPP	17 MW	
2.	Machai HPP		
3.	DaralKhwar HPP	36.6 MW	
4.	Koto HPP		
5.	Jabori HPP	10.2 MW	
6.	Karora (New) HPP		
7.	Matiltan HPP	84 MW	
8.	Lawi HPP		
9.	KeyalKhwar HPP	122 MW	21,713
10.	Dasu Dam	4000 MW	473,746
11.	Chor Nullah HPP	665 MMW	133,133
12.	Spat Gah HPP	496 MW	99,299
13.	Thakot Dam	2800 MW	546,000
14.	Patan Dam	2800 MW	546,000
15.	AllaiKhwar HPP	121	13,835
16.	Khan Khwar HPP	72	8,301
17.	DuberKhwar HPP	130	16,324
18.	Golen Gol HPP	106	11,830
19.	KurammTangi	83.4	59,000
20.	GomalZam Dam	17.4	12,829
21.	Basha Dam	4500	894,257
22.	Munda Dam	740	119,000
23.	Barum Gol	24.93	17.63
24.	Mastuj River	18.21	17.63
25.	Ayun Gol	15.17	30.2
26.	Gande Gar HPP	3.21	5.1
27.	Balkani HPP	5.17	6.25
28.	Bhimbal Katha	7.86	21.72
29.	Nila da Katha	2.47	4.28
30.	Safar Maluk Katha	7.43	27.2
31.	ChowkelKhwar	12	19.01

#	Project Title	Description	Budget
KPK Province			
		MW	**Rs. M**
32.	KedamKhwar	17.14	20.02
33.	Kunhar	147	Feasibility study completed 19-6-2007 PPIB issued LOS 19-06-2010 PPA initiated WUAs of KP and AJK under process Land Acquisition in AJK started Land Acquisition in KP under process
34.	Suki Kinari HPP		168,168
35.	Asrit-Kedam HPP		43,043
36.	Madian HPP		31,431
37.	Kalam-Asrit HPP		39,439
38.	Kaigah HPP		109,710
39.	GabralKalam HPP		20,220

3.7 Power Project List by 2025 (Source PPIB)

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
			2017				
1.	Patrind Hydropower Project	Star Hydropower Limited	2002	Kunhar River, KP/AJ&K	Hydel	147	Oct-17 Under testing & commissioning
2.*	1320 MW Imported coal based Power Project at Qadarabad-Dist Sahiwal	Huaneng Shandong Ruyi (Pakistan) Energy (Pvt) Limited	2015	Qadarabad, District Sahiwal	Coal	First Unit 660 Second Unit 660	Inaugurated on 25.05.17 Inaugurated on 03.07.17
3(i)*	1320 MW Imported coal based Power Project	Port Qasim Electric Power Co. (Pvt) Ltd	2015	Port Qasim, Karachi	Coal	First Unit 660 MW	Dec-17 Under construc-tion
4	1180 MW RLNG based Project at Bhikki	QATPL	2015	Bhikki, Punjab	RLNG	1180	Open Cycle (717 MW) commission ed Combined Cycle by Dec-17
5(i)	1223 MW RLNG based Project at Balloki, Punjab	NPPMCL	2015	Balloki, Punjab	RLNG	GT1 & GT2 800	Open Cycle by Sep-17
6(i)	1230 MW RLNG based Project at Haveli Bahadur Shah, Punjab	NPPMCL	2015	Haveli Bahadur Shah, Punjab	RLNG	GT1 & GT2 800	Open Cycle (760 MW) inaugurated on 07.07.17
7	Fatima Energy Cogene-ration Project	Fatima Energy Limited	Co- gen Policy 2008	Muzaffargarh	Bagasse/ Imported Coal	118	Dec-17 LOS issued FC in progress (Under Construction)
	Sub-Total (2017)	**5025**					

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
			2018				
5(ii)	1223 ME RLNG based Project at Balloki, Punjab	NPPMCL	2015	Balloki, Punjab	RLNG	ST 423	Combined Cycle by Jan-18
6(ii)	1230 MW RLNG based Project at Haveli Bahadur Shah, Punjab	NPPMCL	2015	Haveli Bahadur Shah, Punjab	RLNG	ST 430	Combined Cycle by Jan-18
8(i)*	1320 MW Imported coal based Power Project at HUB Baloch-istan	China Power HUB Generation Co. Ltd.	2015	HUB, Baloch-istan	Coal	First Unit 660 MW	Dec-18 LOS issued FC in progress (under construction)
9(i)*	660 MW Thar Coal based Power Project	Engro Powergen Thar Limited	2015	Thar Block-II, Sindh	Coal	First Unit 330 MW	Oct-18 FC achieved Under construc-tion
3(ii)*	1320 MW Imported coal based Power Project	Port Qasim Electric Power Co. (Pvt) Ltd	2015	Port Qasim, Karachi	Coal	Second Unit 660 MW	Jun-18 FC achieved. Under construc-tion
	Sub-Total (2018)	**2503**					
			2019				
8(ii)*	1320 MW Imported coal based Power Project at HUB Baloch-istan	China Power HUB Generation Co. Ltd.	2015	HUB, Baloch-istan	Coal	Second Unit 660 MW	Aug-19
9(ii)*	660 MW Thar Coal based Power Project	Engro Powergen Thar Limited	2015	Thar Block-II, Sindh	Coal	Second Unit 330 MW	Jun-19

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
9(ii)*	660 MW Thar Coal based Power Project	Engro Powergen Thar Limited	2015	Thar Block-II, Sindh	Coal	Second Unit 330 MW	Jun-19
10.	163MW imported coal based Power Project at Arifwala Punjab	Grange Power Limited	2002	Arifwala, Punjab	Coal	163	Sep-19 LOS issued FC in progress
11.	Gulpur Hydropower project	Mira Power Ltd	2002	Poonch River/Gulpur, AJ&K	Hydel	102	Oct-19 FC achieved Under Construction
12.	1250 MW RLNG based Project near Trimmu Barrage, Jhang, Punjab	Punjab Thermal Power (Pvt) Ltd (PTPL)	2015	Near Trimmu Barrage, Jhang, Punjab	RLNG	1250	Oct-19 LOI issued. LOS in progress
	Sub-Total (2019)	**2505**					
	2020						
13*	1320 MW Thar Coal based Power Project	Thar Coal Block-I Power Generation Co. Ltd.	2015	Thar Block-I, Sindh	Coal	1320	Dec-20 LOS issued FC in progress
14*	330 MW Thar Coal based Power Project	Thar Energy Limited	2015	Thar Block- II, Sindh	Coal	330	Dec-20 LOS issued FC in Progress
15*	330 MW Thar Coal based Power Project	Thal Nova Power Thar (Pvt) Ltd	2015	Thar Block- II, Sindh	Coal	330	Dec-20 LOS issued FC in Progress
	Sub-Total (2020)	**1980**					
	2021						
16.	660 MW Thar Coal based Power Project	Lucky Electric Power Company Ltd.	2015	Port Qasim, Karachi	Coal	660	Jun-21 LOS issued FC in progress

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
17.	330 MW Thar Coal based Power Project	Siddiqsons Energy Limited	2015	Thar Block- II	Coal	330	Sep-21 LOS issued FC in progress
18*	1320MW Thar coal based Power Project	Oracle Coal Fields PLC England	2015	Thar Block VI, Sindh	Coal	1320	Dec-21 Project proposal yet to be submitted
19*	300 MW Imported coal based Power Project at Gawadar	China Communication Construction Co. Ltd. (CCCC)	2015	Gawadar	Coal	300	Dec-21 LOI issued Tariff determinati on in progress
20*	Karot Hydropower Project	Karot Power Com-pany Pvt Ltd	2002	Jehlum River, Distt. Rawalpindi Punjab	Hydel	720	Dec-21 FC achieved Under construc-tion
	Sub-Total (2021)	**3330**					
	2022						
21*	Suki Kinari Hydropower Project	S.K Hydro Pvt Ltd	2002	Kunhar River/Mansehra, KP	Hydel	870	Dec-22 FC achieved Under construc-tion
	Sub-Total (2022)	**870**					
	2024						
22*	Kohala Hydropower Project	China International Water & Electric Company	2002	Jehlum River/ Kohala, AJ&K	Hydel	1124	Jun-24 LOS issued FC in progress

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
23.	Chakothi-Hattian Hydropower Project	Suhail Jute Mills Ltd	2002	Muzaffarabad, AJ&K	Hydel	500	Jun-24 Feasibility Study level tariff determined by NEPRA. PPIB has requested the Sponsors for submission of Performanc e Guarantee for issuance of LOS.
24.	Azad Pattan Hydropow-er Project	Alamgir Power Pvt Ltd	2002	Jehlum River/ Sudhnoti, AJ&K	Hydel	640	Dec-24 LOS issued FC in progress
25.	Kaigah Hydropower Project	Telecom Valley Pvt Ltd	2002	Kaigah/Indus River, KP	Hydel	548	Dec-24 Feasibility Study completed. Sponsors submitted feasibility study level tariff to NEPRA
	Sub-Total (2024)	**2812**					

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
	2025						
26.	Mahl Hydropower Project	CWE Investment Corporation/ China Three Gorges & Trans Tech Pakistan	2002	Jehlum River, AJ&K/Punjab	Hydel	590	Dec-25 LOI issued. FS completed and approved by POE. Tariff Application has been filed with CPPAG for negotiation
27.	Turtonas-Uzghor Hydropower Project	Sinohydro-Sachal Consortium	2015	Golen Gol River, Chitral Valley KP	Hydel	58	Dec-25 LOI issued. Feasibility Study in progress
28.	Athmuqam Hydropow-er Project	Korea Hydro and Nuclear Company	2015	Neelum River, AJ&K	Hydel	350	Dec-25 LOI issued. Feasibility Study in progress
	Sub-Total (2025)	**998**					

#	Project	Sponsor/ Company Name	Power Policy	Location	Fuel	Capacity (MW)	Expected COD/ Remarks
29.	Rajdhani Hydrop ower Project	-	2002	Poonch River AJ&K	Hydel	132	** to be advertised shortly
30.	Neckeherdim- Paur Hydropower Project	-	2015	Yarkun River, Chitral Valley KP	Hydel	80	
31.	MadianHydropo wer Project	-	2015	Swat River, KP	Hydel	157	
32	Asrit-Kedam Hydro-power Project	-	2015	Near Kalam/Swat River, KP	Hydel	215	
33.	Kalam-Asrit Hydropow-er Project	-		Swat River, KP	Hydel	197	
	Sub-Total	781					
	Grand Total	20804					

3.8 Transmission Line Projects

#	Project	Sponsor/ Company Name	Transmission Line Policy	Location	Technology	Expected COD/ Remarks
1*	Matiari-Lahore HVDC Transmission Line Project	China Electric Power Equipment and Technol-ogy Co. Ltd. (CET)/ State Grid Corporation of China (SGCC)	TLP 2015	Matiari to Lahore (Approx 880 Km)	+ 660 kV HVDC Transmission Line	2020 LOS issued. Tariff Approved by NEPRA FC in progress

* CPEC Projects

** COD will be assessed after issuance of LOI GT = Gas Turbine

ST = Steam Turbine