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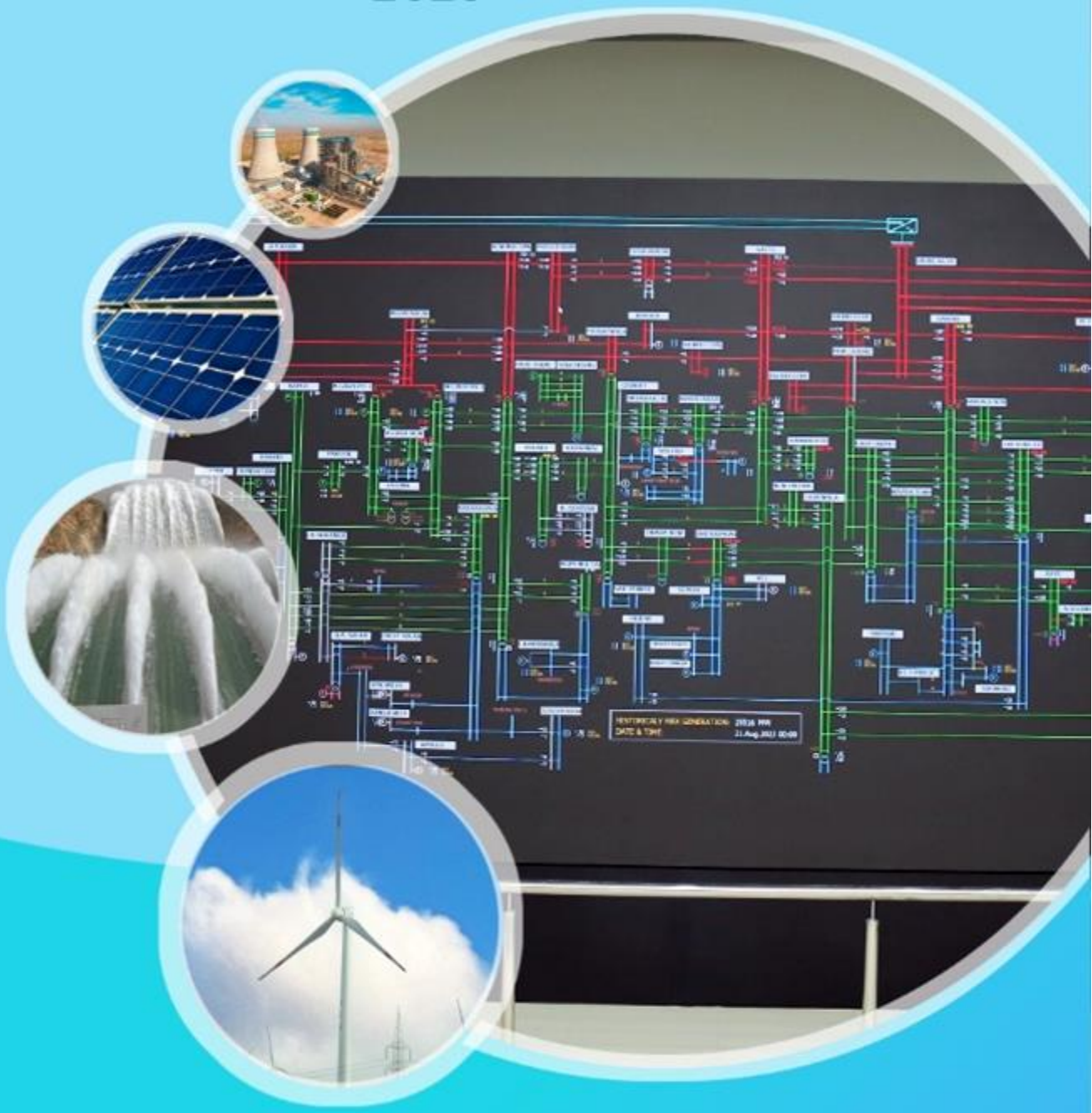
LEADING THE SUSTAINABLE ENERGY FUTURE OF PAKISTAN

Indicative Generation Capacity Expansion Plan

(IGCEP 2025-35)

2025



Independent System and Market Operator of Pakistan (GUARANTEE) Limited

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Indicative Generation Capacity Expansion Plan

IGCEP 2025

MAY 2025

Leading the sustainable Energy Future of Pakistan

Independent System and Market Operator

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Acknowledgement

The preparation of Indicative Generation Capacity Expansion Plan (IGCEP) for the country extensively relies on data inputs from a wide range of entities, which include Pakistan Atomic Energy Commission (PAEC), State Bank of Pakistan, Finance Division–Economic Advisory Wing, National Electric Power Regulatory Authority (NEPRA), Ministry of Planning, Development & Special Initiatives (MoPD&SI), Private Power Infrastructure Board (PPIB), Pakhtunkhwa Energy Development Organization (PEDO), Punjab Power Development Board (PPDB), Azad Jammu & Kashmir Private Power Cell (AJKPPC), Azad Jammu & Kashmir Power Development Organization (AJKPDO), Central Power Purchasing Agency-Guarantee (CPPA-G), Power Planning and Monitoring Company (PPMC), National Energy Efficiency and Conservation Authority (NEECA), Thar Coal and Energy Board (TCEB), K-Electric (KE), Water and Power Development Authority (WAPDA)), National Grid Company (NGC), Generation Companies (GENCOs) and all DISCOs. This outcome could have not been materialized without timely provision of the requisite information by these entities.

The System Operator is highly indebted to power sector professionals from the Ministry of Energy (Power Division), Tariff and Finance Section of NEPRA, Central Power Purchasing Agency-Guarantee (CPPA-G), Private Power Infrastructure Board (PPIB), LUMS Energy Institute and USAID's Power Sector Improvement Activity (PSIA) Project for their continuous and timely support in developing initially a 10-year generation capacity expansion plan (IGCEP) 2024-34, submitted to NEPRA on April 30, 2024 and also in updating the same as Revised IGCEP 2025-35.

The System Operator team is highly grateful to all the power system stakeholders for their respective contributions as well as guidance in the preparation, revision and finalization of the Revised IGCEP 2025-35.

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Disclaimer

a. This revised Indicative Generation Capacity Expansion Plan 2025-35 (the “IGCEP”) has been prepared only as an indicative development plan for the period commencing on FY 2025 to FY 2035 (the “Plan”). It does not contain or determine targets or ascertain liabilities pertaining to power purchase or procurement, commissioning of future power projects, regulation or determination of electricity tariff, performance or ascertainment of economic dispatch, etc. and is merely a suggested guide subject to finalization as per approval of the competent authority according to applicable law, policy and procedure.

b. The IGCEP has been prepared as per Planning Code (PC-4) of the Grid Code 2023, based on proprietary input data as received from various power sector entities. In order to prepare the IGCEP, reliance is also placed on reference data and bench mark practices of international power sector entities for similar plans, tariff determinations by NEPRA, etc. Use of the IGCEP and / or any portion or variation thereof shall be at the sole discretion and risk of the user parties. ISMO shall not be held responsible in any manner whatsoever for the integrity, accuracy, inaccuracy, authenticity, correctness or representation of such data or consequences resulting therefrom. ISMO makes no representation or warranty of any kind, express or implied, statutory or otherwise, including the accuracy or completeness of any data, reports, records, projections, information, or materials made available under the IGCEP and the transactions contemplated as a consequence thereof.

c. The optimization of any generation project in this IGCEP report shall not confer any right or any privilege or any confirmation of the generation project in question in relation to its implementation or execution. As highlighted, the IGCEP is an indicative development plan and confirmation of any new generation project for future procurement shall be subject to approval of respective competent authority as per applicable criteria prescribed in prevailing policies, rules and regulations.

d. The IGCEP is inclusive of tentative costs pertaining to power system evacuation and transmission system expansion for optimized generation projects. Whereas, the exact transmission system expansion and associated costs shall be allocated to the optimized generation project (s) following a detailed study of transmission system expansion cost allocation. In this regard, concept paper for transmission line expansion cost allocation has already been developed and submitted to MoE (PD), for subsequent approval by CCI. This may impact the selection / optimization or ranking of the optimized generation project for which ISMO shall in no circumstances be held liable or accountable.

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List of Acronyms

Acronym	Description
$/GJ	US Dollar per Giga joule
$/kW	US Dollar per kilowatt
$/MWh	US Dollar per Megawatt hour
ADB	Asian Development Bank
AGL	Attock Generation Limited
Agr	Agriculture
AJKPDO	Azad Jammu & Kashmir Power Development Organization
AJKPPC	Azad Jammu and Kashmir Private Power Cell
ARE	Alternative and Renewable Energy
AT&C	Aggregate Technical & Commercial
BAU	Business as Usual
BCF	Billion Cubic Feet
BESS	Battery Energy Storage System
c/Gcal	Cents per Giga calorie
c/kWh	Cents per kilowatt hour
ckm	Circuit kilometer
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CASA	Central Asia South Asia
CCGT	Combined Cycle Gas Turbine
CCI	Council of Common Interests
CCoE	Cabinet Committee on Energy
CFPP	Coal Fired Power Project
COD	Commercial Operation Date
Com	Commercial
CPEC	China Pakistan Economic Corridor
CPI	Consumer Price Index
CPPA-G	Central Power Purchasing Agency – Guarantee
Cumm.	Cumulative
Cus.	Customer
DISCO	Distribution Company
DOM	Domestic
DSM	Demand Side Management
EIA	US Energy Information Administration
EOI	Expression of Interest
EPA	Energy Purchase Agreement
EV	Electric Vehicle
FC	Financial Closure
FCC	Fixed Cost Component
FESCO	Faisalabad Electric Supply Company

Acronym	Description
FKPCL	Fauji Kabirwala Power Company Limited
FS	Feasibility Studies
FY	Fiscal Year
G.R.	Growth Rate
G/s	Grid Station
G2G	Government to Government
GDP	Gross Domestic Product
GENCOs	Generation Companies
GEPCO	Gujranwala Electric Power Company
GoP	Government of Pakistan
GoS	Government of Sindh
GT	Gas Turbine
GTPS	Gas Thermal Power Station
GWh	Gigawatt-hour
HCPC	Habibullah Coastal Power Company
HESCO	Hyderabad Electric Supply Company
HFO	Heavy Furnace Oil
HPP	Hydro Power Projects
HR&A	Human Resource and Administration
HSD	High Speed Diesel
IAEA	International Atomic Energy Agency
IDC	Interest During Construction
IEP	Integrated Energy Plan
IESCO	Islamabad Electric Supply Company
IGCEP	Indicative Generation Capacity Expansion Plan
IIEP	International Institute of Electric Power Ltd.
IMF	International Monetary Fund
Imp.	Imported
Ind	Industry
IPP	Independent Power Producer
ISMO	Independent System and Market Operator
JICA	Japan International Corporation Agency
K2	Karachi Coastal Nuclear Unit 2
KAPCO	Kot Addu Power Company
kcal/kWh	kilo calorie per kilowatt hour
KE	K-Electric
KKI	KANUPP Karachi Interconnection
KPI	Key Performance Indicator
KPK	Khyber Pakhtunkhwa
kV	kilo volts
LCP	Least Cost Plan
LED	Light Emitting Diode
LESCO	Lahore Electric Supply Company

Acronym	Description
LF&GP-ISMO	Load Forecast and Generation Planning of Power System Planning, ISMO
LNG	Liquified Natural Gas
LOI	Letter of Intent
LOLE	Loss of Load Expectation
LOLP	Loss of Load Probability
LOS	Letter of Support
LT	Long-term
M/s	Messers
MEPCO	Multan Electric Power Company
MEPS	Minimum Energy Performance Standards
MoPD & SI	Ministry of Planning, Development & Special Initiatives
MT	Medium Term
MTPA	Million Ton Per Annum
MVA	Mega volt ampere
MW	Megawatt
MW_p	Megawatt Peak
NEECA	National Energy Efficiency and Conservation Authority
NEPRA	National Electric Power Regulatory Authority
NEP	National Electricity Policy / National Electricity Plan
NPHS	Naya Pakistan Housing Scheme
NPP	National Power Plan
NPSEP	National Power System Expansion Plan
NPV	Net Present Value
NGC	National Grid Company
O&M	Operation and Maintenance
OLS	Ordinary Least Squares
PAEC	Pakistan Atomic Energy Commission
PASA	Projected Assessment System Adequacy
PC	Planning Code
PEDO	Pakhtunkhwa Energy Development Organization
PESCO	Peshawar Electric Supply Company
PITC	Power Information Technology Company
PKR	Pakistan Rupee
PP	Project Planning
PPA	Power Purchase Agreement
PPDB	Punjab Power Development Board
PPIB	Private Power Infrastructure Board
PPMC	Planning Power and Monitoring Cell
PSP	Power System Planning
PV	Photo Voltaic
QESCO	Quetta Electric Supply Company
RC	Reference Case

Acronym	Description
RCA	Rationalized Capacity Addition
RE	Renewable Energy
RFO	Residual Furnace Oil
RLNG	Re-gasified Liquid Natural Gas
ROR	Run of the river
RP	Resource Planning
Rs./kWh	Rupees per kilowatt hour
SCADA	Supervisory Control & Data Acquisition
SEPCO	Sukkur Electric Power Company
SS	System Studies
SSRL	Sino Sindh Resources Limited
STs	Steam Turbines
T&D	Transmission and Distribution
TEL	Thar Energy Limited
TESCO	Tribal Electric Supply Company
TP	Transmission Planning
TSEP	Transmission System Expansion Plan
TWh	Terawatt hour
USA	United States of America
USAID	United States Agency for International Development
VRE	Variable Renewable Energy
WAPDA	Water and Power Development Authority
WPP	Wind Power Project

Stakeholder Entities

Stakeholder Entities	Cyber Link
Azad Jammu Kashmir Power Development Organization	http://ajkpdo.com/
Central Power Purchasing Agency (CPPA)	http://www.cppa.gov.pk/
Energy Department, Government of Punjab	http://www.energy.punjab.gov.pk/
Energy Department, Government of Sindh	http://sindhenergy.gov.pk/
Faisalabad Electric Supply Company (FESCO)	http://www.fesco.com.pk/
Federal Ministry of Energy	http://www.mowp.gov.pk/
Federal Ministry of Finance	http://www.finance.gov.pk/
Federal Ministry of Planning, Development & Reforms	https://www.pc.gov.pk/
Government of Azad Jammu and Kashmir	http://www.ajk.gov.pk/
Government of Baluchistan	http://www.balochistan.gov.pk/
Government of Gilgit Baltistan	http://www.gilgitbaltistan.gov.pk/
Government of Khyber Pakhtunkhwa	http://kp.gov.pk/
Government of Pakistan	http://pakistan.gov.pk/
Government of Punjab	https://www.punjab.gov.pk/
Government of Sindh	http://www.sindh.gov.pk/
Gujranwala Electric Power Company (GEPCO)	http://www.gepco.com.pk/
Hyderabad Electric Supply Company (HESCO)	http://www.hesco.gov.pk/
Islamabad Electric Supply Company (IESCO)	http://www.iesco.com.pk/
International Monetary Fund	https://www.imf.org/en
Independent System and Market Operator (ISMO)	http://www.ismo.gov.pk/
K-Electric (KE)	https://www.ke.com.pk/
Lahore Electric Supply Company (LESCO)	http://www.lesco.gov.pk/
LUMS Energy Institute	https://lei.lums.edu.pk/
Multan Electric Power Company (MEPCO)	http://www.mepco.com.pk/
National Electric Power Regulatory Authority (NEPRA)	http://www.nepra.org.pk/
National Transmission and Despatch Company (NGC)	http://www.ntdc.com.pk/
Pakhtunkhwa Energy Development Organization (PEDO)	http://www.pedo.pk/
Pakistan Atomic Energy Commission (PAEC)	http://www.paec.gov.pk/
Pakistan Bureau of Statistics	http://www.pbs.gov.pk/
Peshawar Electric Supply Company (PESCO)	http://www.pesco.gov.pk/
Power Planning and Monitoring Cell	https://www.pepcopakistan.com
Private Power Infrastructure Board (PPIB)	http://www.ppib.gov.pk/
Quetta Electric Supply Company (QESCO)	http://www.qesco.com.pk/
Sukkur Electric Power Company (SEPCO)	http://www.sepco.com.pk/
Thar Coal and Energy Board	http://www.tceb.gos.pk/
Tribal Areas Electric Supply Company (TESCO)	http://www.tesco.gov.pk/
USAID-Pakistan	https://www.usaid.gov/pakistan
Water and Power Development Authority (WAPDA)	http://www.wapda.gov.pk/

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Foreword

As per the Grid Code 2023, the System Operator (SO), is mandated to develop a 10-year Integrated System Plan (ISP) annually, which consists of Demand Forecast, Indicative Generation Capacity Expansion Plan (IGCEP) and Transmission System Expansion Plan (TSEP). This generation planning study presents generation capacity expansion planning simulation results for Pakistan's integrated power system as per the criteria and assumptions specified in the Grid Code 2023, National Electricity Policy (NEP) 2021 and National Electricity Plan (2023-27).

Prior to the submission of IGCEP 2024, Honorable Secretary Power Division, formed a technical committee / working group headed by CEO (CPPA-G), comprising of energy experts and professionals from key power sector organizations—including CPPA-G, PPIB, NGC, and SO. All the experts have been actively involved since the beginning of the IGCEP development process. This process involved continuous deliberations, detailed meetings, and in-depth discussions to ensure a thorough and credible planning exercise.

The IGCEP 2024-34 submitted report provides the grid-connected electricity demand forecast, optimal generation development sequences under different operating scenarios contemplating the existing, committed and candidate power plants to supply the yearly demand forecast in a cost-effective manner while meeting the minimum reliability criteria. Ensuring resource adequacy, affordability and reliability have always been a challenge for the System Operator.

It is to highlight here that it was the expert group that initially identified the need for an addendum. After extensive reviews and improvements, this evolved into the development of a revised IGCEP. The need for this revision arose from numerous meetings held among key power sector stakeholders i.e., CPPA-G, NEPRA, NGC, and experts from LUMS Energy Institute.

The revision process was lengthy and time-intensive, involving coordination /presentations /meetings on multiple forums such as the Special Investment Facilitation Council (SIFC), the Task Force on Energy, and the Ministry of Energy (Power Division). Since the submission of the IGCEP 2024–34, the underlying assumptions have undergone multiple revisions to reflect the dynamic nature of the power sector and to align with national interests.

This revised IGCEP i.e., 2025-35 incorporates several key changes in comparison to the submitted previous version, aimed at addressing Pakistan's current power sector challenges.

Most notable mention includes revised load forecast, quantum of net metering, change in criteria for committed power projects, 800 MW Market based quantum etc. after several stakeholder consultation and consensus.

Further improvements include simulations of multiple scenarios i.e., fine tuning of reference / recommended case, rationalized capacity additions, analysis of conversion of imported coal IPPs to Thar coal. The retirement schedule for power plants has been updated in consultation with SO and NGC's TSEP team to ensure system stability.

In continuation of consultation process, several meetings have been held with KE to address their concerns regarding the unconstrained supply from NGC to KE, non-optimization of KE's renewable energy projects, financial assumptions of these projects in the IGCEP etc.

Apart from above, a distinguishing feature of revised IGCEP is the consideration of Least Cost Violation (LCV) for Diamer Bhasha, and ACWA solar power plants, as per NE Plan, NE Policy and NEPRA's procurement regulations.

In continuation of above, several rounds of meetings were also held among NEPRA, ISMO-G, NGC and CPPA-G resulting in some additional demand sensitivities and generation expansion scenarios: i) the impact of solarization on end consumer tariff; ii) Inclusion of strategic power plants using Least Cost Violation (LCV); iii) induction of significant quantum of Net Metering (8,120 MW); (iv) consideration of 800 MW Market based quantum etc. Consequently, the following additional scenarios and sensitivities were performed:

- Low BAU Demand with Demand Side Management (DSM)
- No Generation Capacity Addition (only existing system to meet the future demand)
- Unconstrained Capacity Addition
- Rationalized Capacity Addition
- Inclusion of strategic projects as per National Electricity Policy
- Dispatch of existing imported coal-based power plants as per merit order
- Increasing Net Metering quantum to 8,120 MW
- Consideration of 800 MW Market based quantum

All these mentioned studies and scenarios / sensitivities have been incorporated in this revised report of IGCEP 2025-35.

The revised report provides a discussion on different scenarios supported by a number of sensitivities to reach an informed and least-cost generation development sequence. The Sensitivity Scenarios provide alternatives for increased energy security considerations. These are important in the context of climate change and the high cost of imported fuels.

I commend the Load Forecasting and Generation Planning team for preparing the revised IGCEP 2025-35. The team's enthusiasm, willingness to learn and collaboration with stakeholders have resulted in a quality outcome.

Executive Director (Planning) ISMO

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Executive Summary

Pursuant to the provisions of the National Electric Power Regulatory Authority (NEPRA) Grid Code 2023 i.e., Planning Code PC 4, SO has prepared revised IGCEP 2025-35 covering 10 years' time frame from 2025 to 2035 encapsulating power generation additions required to meet the future energy and power demand of the country including NGC and KE systems.

The report presents the results of the generation capacity expansion planning study which is composed of two key processes: 1) Load forecast; followed by 2) Generation capacity expansion and high-level despatch optimization. Both processes involve complex statistical and computation efforts performed using dedicated software programs.

Three scenarios of long-term load forecast are prepared. Low (Business As Usual), Medium and High are developed at GDP growth projections of 3.52%, 4.95% and 6.37% for next ten years respectively. It is found that the historical load factor of 70-73% has gradually declined to 58-60%. Therefore, another load forecast scenario is developed by incorporating Demand Side Management (DSM) activities to gradually raise the current Load Factor (LF) of around 58% up to 70% till the end of horizon. Table E1 shows a summary of the forecast results.

Table E1: Summary of Load Forecast (2024-35)

FY	High		Medium		Low (Business-as-usual)			Low (Demand Side Management)	
	Energy	Peak Demand	Energy	Peak Demand	Gross Energy	Energy with Net Metering	Peak Demand	Energy	Peak Demand
	GWh	**MW**	**GWh**	**MW**	**GWh**	**GWh**	**MW**	**GWh**	**MW**
2024	136,760	26,913	136,760	26,913	136,760	136,760	26,913	136,760	26,913
2025	137,025	26,950	137,025	26,950	137,025	133,233	26,950	137,025	26,950
2026	143,602	28,243	142,232	27,974	140,862	135,088	27,704	140,862	27,044
2027	150,495	29,599	147,637	29,037	144,806	137,514	28,480	144,806	27,156
2028	157,719	31,020	153,247	30,140	148,860	140,215	29,278	148,860	27,285
2029	165,289	32,509	159,070	31,286	153,028	143,194	30,097	153,028	27,430
2030	173,223	34,069	165,115	32,475	157,313	146,454	30,940	157,313	27,591
2031	181,538	35,705	171,389	33,709	161,718	149,999	31,806	161,718	27,768
2032	190,252	37,418	177,902	34,990	166,246	153,831	32,697	166,246	27,959
2033	199,384	39,215	184,662	36,319	170,901	157,955	33,613	170,901	28,166
2034	208,954	41,097	191,680	37,699	175,686	162,374	34,554	175,686	28,387
2035	218,984	43,069	198,963	39,132	180,605	167,293	35,521	180,605	28,622
CAGR (2024- 35)	**4.4%**	**4.4%**	**3.5%**	**3.5%**	**2.6%**	**1.8%**	**2.6%**	**2.6%**	**0.6%**

The least cost, long-term generation expansion plan for the power system of country is developed using state-of-the-art generation planning software - PLEXOS. The revised IGCEP 2025-35 is developed through a rigorous data modelling and optimization exercise based on the existing and future generation power projects, existing policy framework, existing contractual obligations, natural resource allocations, relevant provisions of Grid Code 2023, and assumptions laid down in National Electricity Policy 2021 (NEP) along with some additional assumptions.

For the purpose of detailed analysis, four (04) scenarios are developed with multiple sensitivities. The scenarios are i) No Capacity Addition; ii) Unconstrained Capacity Addition iii) Forced Capacity Addition; iv) Rationalized Capacity Addition.

Hourly demand forecast is developed specially to cater for the intermittency of variable renewable energy resources such as wind and solar PV. This is particularly important in view of the aggressive targets pertaining to renewable energy envisioned by the Government of Pakistan.

It is to highlight that in this iteration of IGCEP, candidate transmission line for NGC system from South to Centre / North and another line from NGC to KE system has also been modelled to assess the requirement of any new transmission line. The scenario-wise installed capacity is presented below:

Table E2: Scenario-wise Installed Capacity (MW) by 2034-35

Category	Rationalized Capacity Addition (RCA)						
	Low BAU Demand	Medium Demand	High Demand	Low DSM	No KE Candidate T/L	KE Candidate T/L in 2031	KE 620 MW of REs as committed
Imported Coal	4,680	4,680	4,680	4,680	4,680	4,680	4,680
Local Coal	3,300	3,300	3,300	3,300	3,300	3,300	3,300
RLNG	8,224	8,224	8,224	8,224	8,224	8,224	8,224
Gas	1,433	1,433	1,433	1,433	1,433	1,433	1,433
Nuclear	4,730	4,730	4,730	4,730	4,730	4,730	4,730
Bagasse	400	400	400	400	400	400	400
Solar PV*	11,544	11,544	13,180	12,633	11,544	11,544	12,164
HPP	21,395	21,395	21,477	21,389	21,395	21,395	21,395
Cross Border	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Wind	5,133	8,935	11,478	3,285	4,320	4,817	4,479
RFO	819	819	819	819	819	819	819
Total (MW)	**62,657**	**66,459**	**70,720**	**61,893**	**61,844**	**62,341**	**62,623**

Category	No Capacity Addition	No Capacity Addition without Retirement	Unconstrained Capacity Addition	Forced Capacity Addition	ACWA 1000 MW Solar	ACWA 1800 MW Solar
Imported Coal	4,680	4,680	4,680	4,980	4,680	4,680
Local Coal	3,300	3,300	3,300	3,300	3,300	3,300
RLNG	8,224	9,327	8,224	8,224	8,224	8,224
Gas	1,656	2,477	1,433	1,433	1,433	1,433
Nuclear	3,530	3,530	4,730	4,730	4,730	4,730
Bagasse	400	400	400	1,100	400	400
Solar PV*	8,870	8,870	9,304	11,552	12,544	13,344
HPP	11,804	11,804	16,312	21,395	21,395	21,395
Cross Border	0	0	0	1,000	1,000	1,000
Wind	1,842	1,842	11,725	4,910	4,502	4,711
RFO	819	1,110	819	819	819	819
Total (MW)	**45,125**	**46,230**	**60,927**	**63,442**	**63,026**	**64,035**

**Solar values are in MW_p*

The Annexures in the report present the detailed results of all the scenarios and sensitivity analyses conducted. The results show a shift in the energy mix (GWh) from imported fuel to indigenous ones, i.e., with dominating share of renewables and hydropower. The reference rationalized scenario incorporating all of the policy interventions and other constraints, shows a major contribution from renewables, i.e., 34% of hydropower and 27% of variable renewable energy in the overall capacity mix by the year 2035. There is minimal reliance on the imported fuels with RFO having no contribution at all in the capacity mix, whereas imported coal and RLNG is contributing just 7% and 13% in the total capacity requirements, respectively. The share of indigenous fuels stands 15%, i.e., 5.2% of local coal, 2.6% of local gas and 7.5% of nuclear in the overall capacity mix.

It is pertinent to mention that the tool assures sufficient firm/base capacity in the form of hydro (existing, committed & optimized), RLNG, nuclear and local coal based (existing) power projects are available 24/7 in the system till the end of study horizon to meet the given hourly system demand whilst catering for REs intermittency and system reserve requirements.

The Present Value (PV) of the power generation operations and investments of existing and future power projects by 2035 is computed based on the objective function for the optimization exercise. Table below shows the total PV required to manage generation infrastructure construction, operations and maintenance by 2035 separately for all scenarios.

Table E3: Total Cost Comparison of all Scenarios

Sr. No.	Scenario / Sensitivity	PV (Billion US$) *
Scenario		
1	No Capacity Addition	45.14
Sensitivity		
1(i)	No Capacity Addition without Retirement	45.31
Scenario		
2	Unconstrained Capacity Addition	39.14
3	Forced Capacity Addition	54.80
4	Rationalized Capacity Addition (RCA) with Low BAU Demand-Reference Case	47.13
Sensitivities		
4 (i)	RCA with Low DSM	46.90
4(ii)	RCA with Medium Demand	48.97
4(iii)	RCA with High Demand	51.20
4(iv)	RCA with No KE Candidate T/L	47.52
4(v)	RCA with KE 620 MW of REs as committed	47.32
4(vi)	RCA with KE Candidate T/L in 2031	47.32
4(vii)	ACWA 1000 MW Solar	47.00
4(viii)	ACWA 1800 MW Solar	47.07

**Includes cost of optimized and committed power projects*

The generation planning exercise demands extensive data, i.e., both validated and verified. Strenuous efforts are needed to streamline access to data for future exercises pertaining to forecasting, generation capacity expansion and despatch optimization. In addition to access the available data, provision of certain key targets is essential for the updation of the IGCEP that includes demand side management, net-metering, distributed generation etc.

The revised IGCEP 2025-35 also facilitates structural changes in the power sector planning process with enhanced role of distributed generation and reduction in the large projects distant from the load centers. Further, indigenization of RE technologies through local manufacturing is also suggested to lower the basket price, for provision of relief to the end consumer as well as saving precious foreign exchange while maximizing the nature's endowment bestowed upon Pakistan.

In view of the results stated above, the following conditions are proposed herewith for all the candidate projects being optimized in IGCEP-2025.

a. The cost numbers (CAPEX & OPEX) approved by NEPRA for an optimized project shall either be equal or less than the cost used in IGCEP, if in any case the cost given by NEPRA to any optimized project is more than the one used in IGCEP, then a re-run shall be required to assess the optimization of that very project on the new cost.

b. For issuance of LOS to the private sector projects and PC-1 approval of the public sector projects, the relevant agency must ensure that the project cost determined/approved by NEPRA shall either be less than or equal to the cost considered in IGCEP for that particular optimized project, otherwise, re-evaluation of the project on the basis of new cost shall be done.

In addition to above, it is re-iterated that the selection of any generation project in IGCEP does not ensure any guarantee to execute that project which shall have to undergo approvals from all the relevant government authorities.

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1. Setting the Perspective

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1. Setting the Perspective

1.1. Generation Planning – A Subset of Power System Planning

Power system planning is an important subset of the integrated energy planning. Its objective is, therefore, to determine a minimum cost strategy for long-range expansion of the power generation, transmission and distribution systems adequate to supply the load forecast within a set of prevailing technical, economic and political constraints.

Generation expansion planning concerns decisions for investment pertaining to development of different types of power projects over the long-term horizon – 10 years for IGCEP 2025. The goal of this plan is to improve decision-making under different long-term uncertainties while assuring a robust generation expansion plan with least cost and minimum risk.

As depicted in the Figure 1-1, generation planning is at the heart of planning cycle. In an ideal scenario, the Integrated Energy Plan (IEP), a mandate of Ministry of Planning, Development and Special Initiatives is meant to provide the fuel mix targets for all sectors of the economy including the power sector and such targets are adopted under the National Electricity Policy. The IGCEP is prepared to ensure its maximum contribution in energy security, sustainability and affordability while considering policy inputs and broader macroeconomic perspectives. Under Section 32 of NEPRA Act, such integration should be ensured that brings the full dividends of the integrated planning.

However, in absence of the natural resource allocation targets for power generation, the IGCEP minimize the generation costs while ensuring adequate generation capacity is added to meet the hourly forecasted demand.

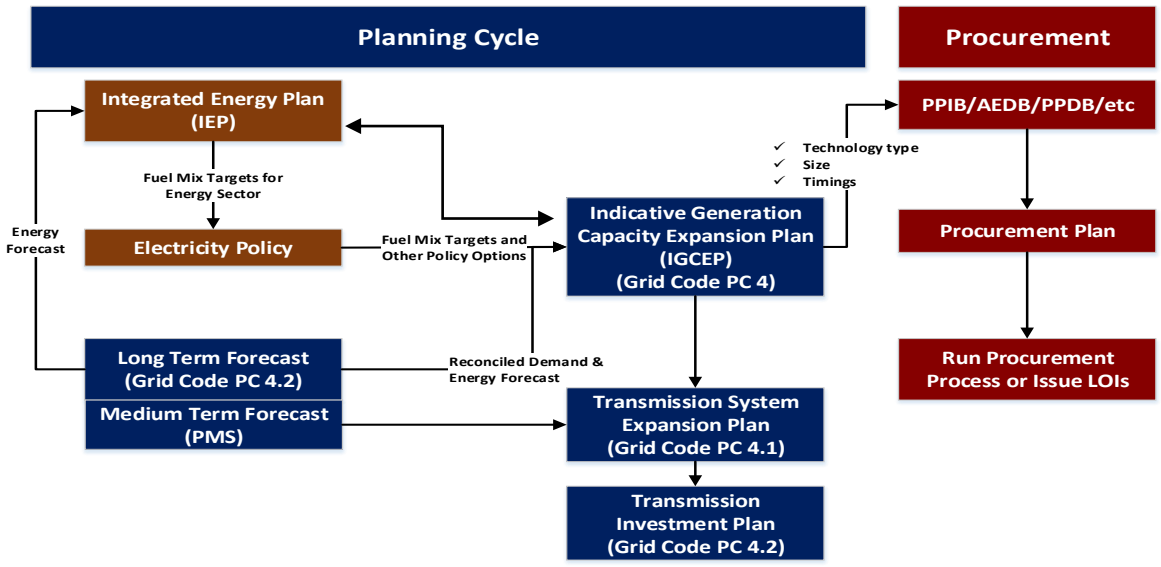

Figure 1-1: Planning Cycle Leading to Procurement

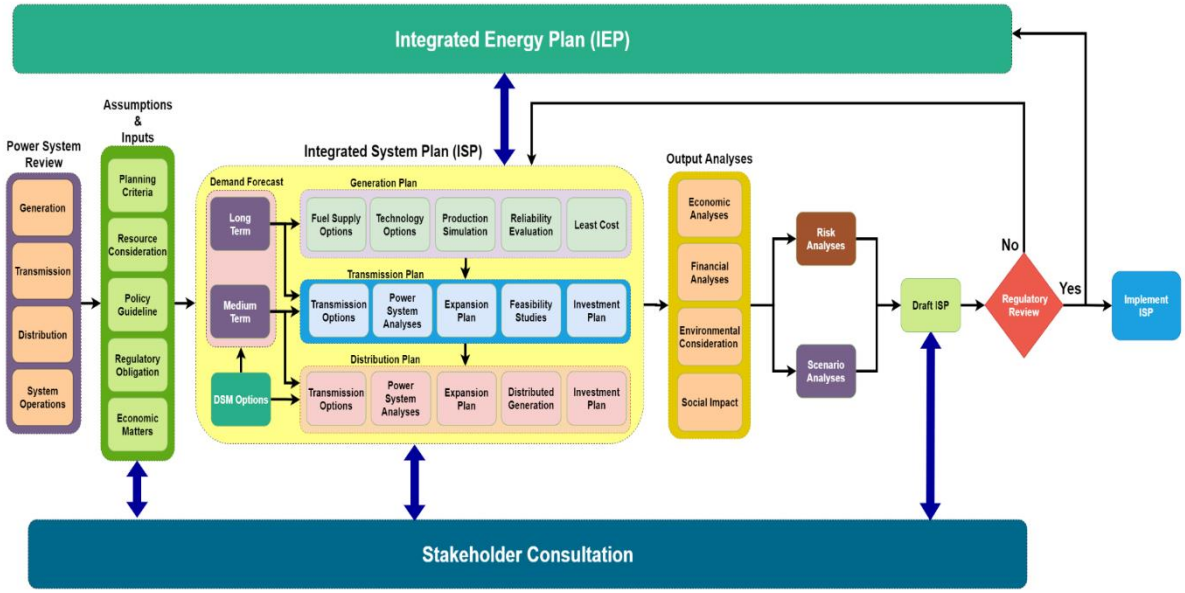

Figure 1-2: Integrated System Planning

1.2. Preamble

Taking a glimpse at the relevant previous milestones, following eight (08) major generation expansion plans have been formulated by the then WAPDA and now NGC & ISMO with the assistance of foreign/local consultants coupled with in-house efforts:

a) National Power Plan (NPP 1994-2018) developed by Canadian Consultant; M/s ACRES International Limited

b) National Power System Expansion Plan (NPSEP 2011-2030) developed by Canadian Consultant; M/s SNC Lavalin

c) Least Cost Plan (LCP 2016-2035) developed by Japanese Consultant; M/s International Institute of Electric Power, Ltd. (IIEP)

d) Indicative Generation Capacity Expansion Plan (IGCEP 2018-40) in-house by NGC

e) Indicative Generation Capacity Expansion Plan (IGCEP 2020-47) in-house by NGC

f) Indicative Generation Capacity Expansion Plan (IGCEP 2021-30) in-house by NGC

g) Indicative Generation Capacity Expansion Plan (IGCEP 2022-31) in-house by NGC

h) Indicative Generation Capacity Expansion Plan (IGCEP 2024-34) in-house by NGC

This latest iteration of revised IGCEP 2025-35 has been developed in-house by ISMO based on the relevant provisions of Grid Code 2023, and assumptions laid down in National Electricity Policy 2021 (NEP), National Electricity Plan 2023 - 2027, using generation capacity expansion planning tool i.e., PLEXOS, by considering all the existing, under construction, strategic and candidate power projects.

It is worth mentioning here that pursuant to National Electricity Policy 2021, ISMO is responsible for power system planning of the whole country, therefore, in this iteration of IGCEP a fixed export of 2050 MW from NGC to K-Electric system has been considered till the end of study horizon. In addition to above, a candidate transmission line has also been given to the tool from NGC to K-Electric system from the July 2028 onwards, for selection on least cost basis. Moreover, expansion of candidate power projects has been allowed both in NGC and K-Electric system, thus covering the whole country.

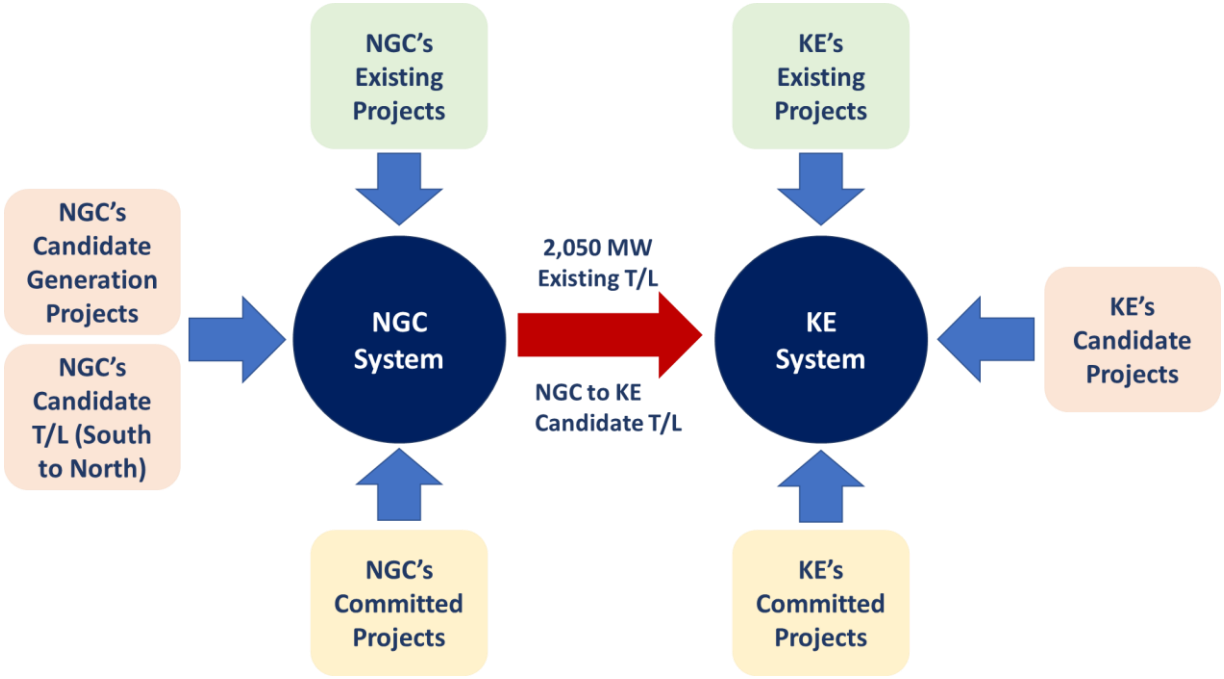

Figure 1-3: Flow Chart (NGC and K-Electric System)

1.3. Introduction

Energy access is an essential requirement of modern society. Therefore, certain electricity indices such as per capita consumption of electricity and access to electricity are used to express the economic strength of a country. Electricity is unique, since it cannot be stored, at least not in large quantities. Power generation and consumption must equate in real time. Additional factors such as seasonal variations make the demand forecast process quite complicated. On the other hand, insufficient or even surplus generation capacity adversely affects the economy. Long-term generation planning is therefore, a complex task, which involves the commitment of large resources, for the power sector and the economy as a whole.

Least cost optimum generation expansion planning is one of the important elements of overall integrated planning of electricity sector. Therefore, and further in compliance to NERPA's approved prevailing Grid Code clause PC-4 (Integrated System Planning) and PC-4.2

(Indicative Generation Expansion Plan), this long-term least cost generation plan or the IGCEP is prepared for review and approval by NEPRA, the Regulator.

The IGCEP is prepared based on long-term electricity demand forecast, updated generation commitment schedule and other parameters.

1.4. Objectives of the IGCEP

The IGCEP is envisioned to meet the following objectives, as highlighted in the Figure 1-4:

a. **Identify** new generation requirements by capacity, fuel, technology and commissioning dates on year-by-year basis;

b. **Satisfy** the Loss of Load Probability (LOLP) not more than 1% year to year, as initially set under the Grid Code 2023: PC - 4.2.3;

c. **Cater** for the long-term load growth forecast and reserve requirements pursuant to the Grid Code 2023; and

d. **Provide** a least cost optimal generation expansion plan for development of hydroelectric, thermal, nuclear and renewable energy resources to meet the expected load demand.

Figure 1-4: The IGCEP Objectives

1.5. Scope and Planning Horizon

The planning horizon of the revised IGCEP is from the fiscal year 2025 to 2035. The IGCEP covers the whole country including NGC and K-Electric systems. The latter is a vertically integrated power utility, which manages all three key stages – generation, transmission and distribution – for consumers within the jurisdiction of the city of Karachi and nearby suburban

areas. However, the revised IGCEP 2025-35 includes a candidate transmission line in addition to a fixed export of 2,050 MW after commissioning of 500 kV KANUPP Karachi Interconnection (KKI) grid station by K-Electric, as detailed in proposed tri-partite agreement among K-Electric, NGC & CPPA-G, till the end of study horizon.

1.6. Purpose of the IGCEP

Overall purpose of the IGCEP is the fulfillment of outlines, actions, and strategies as stipulated in the relevant policies / decisions of Government of Pakistan, latest generation technologies, constraints and certain regulatory obligations. The focus of this plan is to identify generation additions, by capacity and fuel type along with commissioning dates, for a certain plan period, through optimal use of all available generation resources.

The system's optimum expansion is determined by the IGCEP considering various limitations and factors such as governmental policies, investment costs, operation costs, contractual obligations, fuel allocation, reserve requirements, maintenance allowance, etc. For this purpose, generation optimization model based on the generation planning tool i.e., PLEXOS includes consideration of hourly projected electric power demand up to the year 2035 and various other characteristics such as hydrology of hydro power projects, hourly wind profile of wind power projects, hourly solar profile of solar PV projects, fuel costs projections and all technical and financial data pertaining to existing and potential generation options i.e., hydro power, thermal and renewables, and optimization of all options. The IGCEP is the starting point for the Transmission System Expansion Plan which is the next step in the PSP process.

The IGCEP should be considered as an indicative generation expansion plan, since it will be updated on yearly basis to account for any change in generation technologies trends, governmental policies, progress/priorities of different project execution agencies and project sponsors in developing the generation facilities, etc.

1.7. Rationale for Preparation of the IGCEP

Pursuant to the provisions of the Grid Code 2023 i.e., Planning Code (PC) – 4, ISMO is mandated to prepare the IGCEP on annual basis for review and approval of NEPRA. This plan shall take-into account the objectives / criteria as mentioned under sub-section 1.1 above and shall be used as an input for NGC's Transmission System Expansion Plan (TSEP) as stated in the PC 4.3.

The IGCEP plays a key role in the expansion of the power system. The Plan ensures that the demand in the system is adequately met by adding generation capacity on least cost basis. The plan takes long term view and therefore is indicative in nature in the long run, however, it

provides a perspective to potential investors and other players in the market regarding the future demand and supply situation and the probable generation mix.

Along with serving as guiding document for procurement of power for regulated consumers, the IGCEP will also provide basis for the expansion of the transmission network. The IGCEP identifies the types of generation to be added to the system and also the location in case of hydro power projects. The IGCEP is used as one of the main inputs to the TSEP along with spatial demand growth to work out the power evacuation requirements and serving the load in a reliable manner.

1.8. Generation Capacity Expansion Software

For preparation of the IGCEP, PLEXOS package has been utilized. The objective function seeks to minimize the net present value of build costs plus fixed operations and maintenance costs plus production costs. The core formulation for Long Term (LT) Plan by PLEXOS is thus:

Minimize

- $\sum_y \sum_g \boldsymbol{DF_y}(\boldsymbol{BuildCost_g} * \boldsymbol{GenBuild_{g,y}}) + \sum_y \boldsymbol{DF_y}[\boldsymbol{FOMCharge_g} * \boldsymbol{1000} * \boldsymbol{Pmax_g}(\boldsymbol{Units_g} + \sum_{i \le y} \boldsymbol{GenBuild_{g,i}})] + \sum_t \boldsymbol{DF_{t \in y}}\ \boldsymbol{L_t}[\boldsymbol{VOLL} * \boldsymbol{USE_t} + \sum_g (\boldsymbol{SRMC_g} * \boldsymbol{GenLoad_{g,t}})]$

Subject to constraints:

Equation 1: Energy Balance

$$\sum_g GenLoad_{g,t} + USE_t = Demand_t \ \forall t$$

Equation 2: Feasible Energy Dispatch

$$\sum_g GenLoad_{g,t} \le PMAX_g \left(Units_g + \sum_{i \le y} GenBuild_{g,i} \right)$$

Equation 3: Feasible Builds

$$\sum_{i \le y} GenBuild_{g,i} \le MaxUnitsBuilt_{g,y}$$

Element	Description	Unit
$GenBuild_{g,i}$	Number of generating units build in year y for Generator g	integer
$GenLoad_{g,t}$	Dispatch level of generating unit g in period t	continuous
USE_t	Unserved energy in dispatch period t	continuous
DF	Discount rate. We then derive $\boldsymbol{DF_y = \frac{1}{(1+D)^y}}$ which is the discount factor applied to year, and $\boldsymbol{DF_t}$ which is the discount factor applied to dispatch period t	
L_t	Duration of dispatch period t	Hours
$BuildCost_g$	Overnight build cost of generator g	$
$MaxUnitsBuilt_{g,y}$	Maximum number of units of generator g allowed to be built by the end of year y	
$PMAX_g$	Maximum generating capacity of each unit of generator g	MW
$Units_g$	Number of installed generating units of generator g	
$VOLL$	Value of lost load (energy shortage price)	$/MWh
$SRMC_g$	Short-run marginal cost of generator g which is composed of Heat Rate × Fuel Price + VO&M Charge	$/MWh
$FOMCharge_g$	Fixed operations and maintenance charge of generator g	$
$Demand_t$	Average power demand in dispatch period t	MW

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2. Power Sector of Pakistan

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2. Power System of Pakistan

2.1. Economics of Power Sector

Electricity is a critical input for economic development and correspondingly power sector comprises an indispensable infrastructure in any economy. The provision of adequate, reliable and affordable electric power is essential for economic development, human welfare and better living standards. The growth of economy along with its global competitiveness hinges on the availability of reliable and affordable power to all consumers throughout the country. Electricity is central to achieving economic, social and environmental objectives of sustainable human development. Development of different sectors of economy is impossible without matching with development of the power sector.

As an emerging economy, country's demand for electricity is enormous and its GDP is positively related with the sale of electricity as shown in Chart 2-1. This is in concurrence with a similar trend in all developing nations where GDP and sale of electricity have a direct relationship and growth in GDP causes increased sale of electricity.

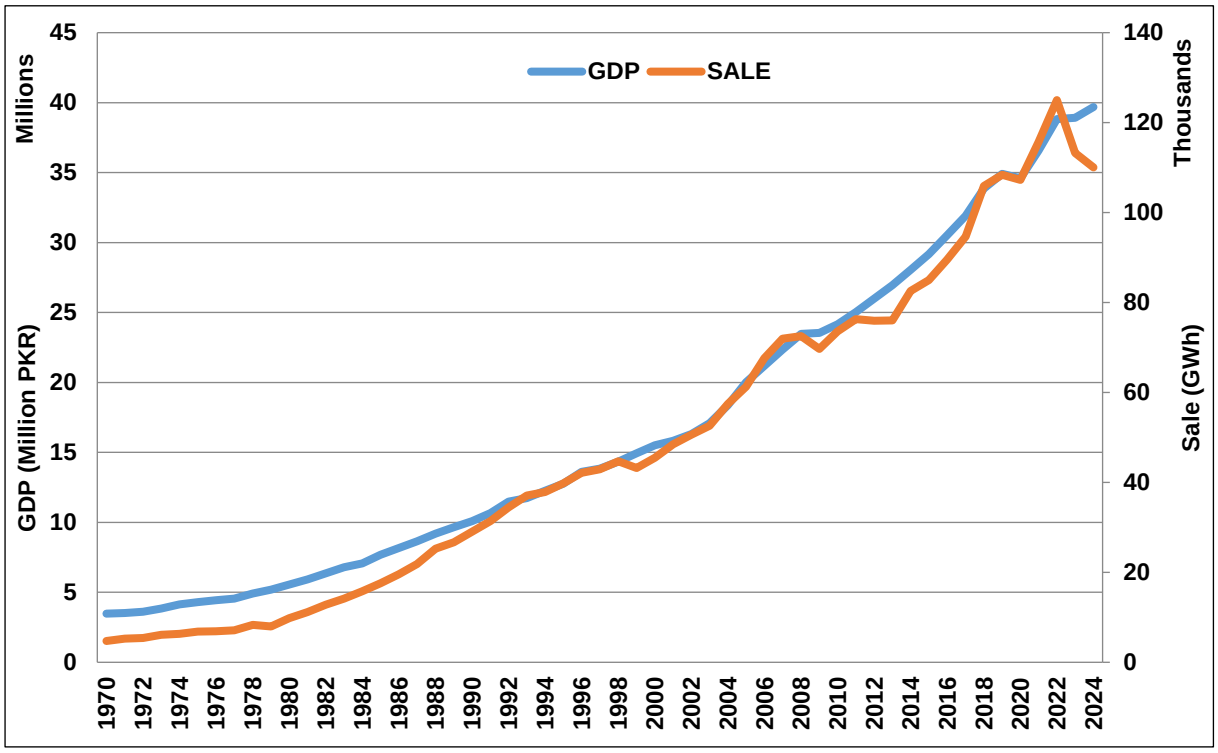

Chart 2-1: GDP (Million PKR) Vs Sale of Electricity (GWh)

During FY 2024, the country has seen 2.38% growth rate in total GDP (source: Economic Survey of Pakistan), whereas, the growth rates of 6.25%, 1.21% and 1.21% are observed in agriculture, industrial and commercial/services sectors, respectively. During the same period, 2.8% decline in grid sales of electricity has been observed which is mainly due to rise in

solarization including net-metering. Generally, the growth in GDP as well as usage of electricity shows strong proportionate relation.

2.2. Power Generation

As of June - 2024 the total installed generation capacity of NGC system reached to 39,591 MW where as derated capacity is 37,780 MW. Out of which 34% is RE share which comprises of hydro, solar PV, wind and bagasse-based technologies, and 66% share is from thermal projects comprising of local gas, local coal, imported coal, RFO, RLNG and nuclear based technologies, as shown in the Chart 2-2. It is important to note that a capacity of 34,378 MW has been utilized in the current revised IGCEP to reflect the capacity additions and retirements that occurred in the subsequent months of 2025.

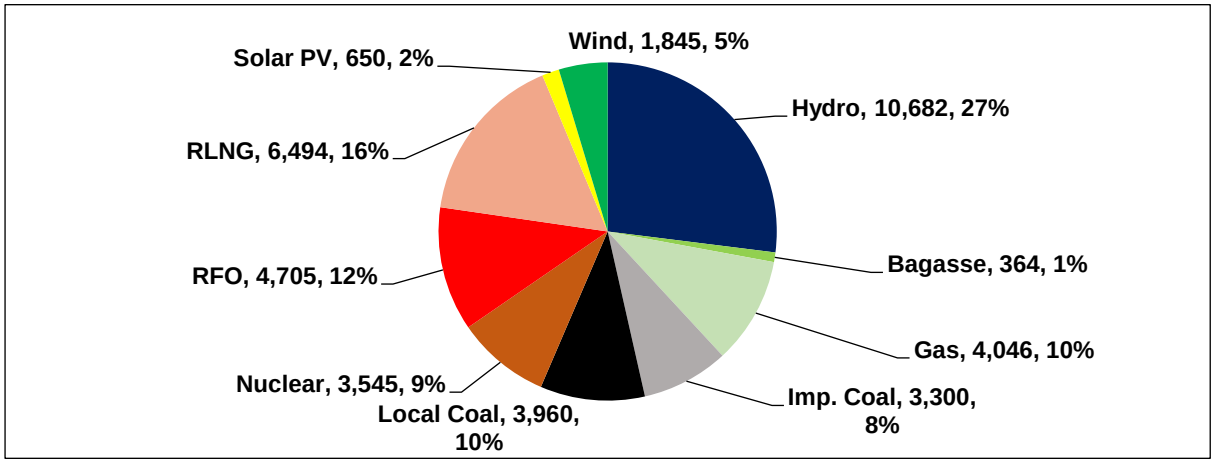

Chart 2-2: NGC System Installed Capacity (MW) as on 2024

The energy produced by NGC system power generation fleet during 2024 was 127,409 GWh which was contributed approximately 31% by hydroelectric projects and 46% by thermal projects on local gas, local coal, imported coal, RFO and RLNG based technologies, 18% by nuclear projects, and 5% by renewable energy power projects which covers solar PV, wind and bagasse-based technologies as shown in the Chart 2-3.

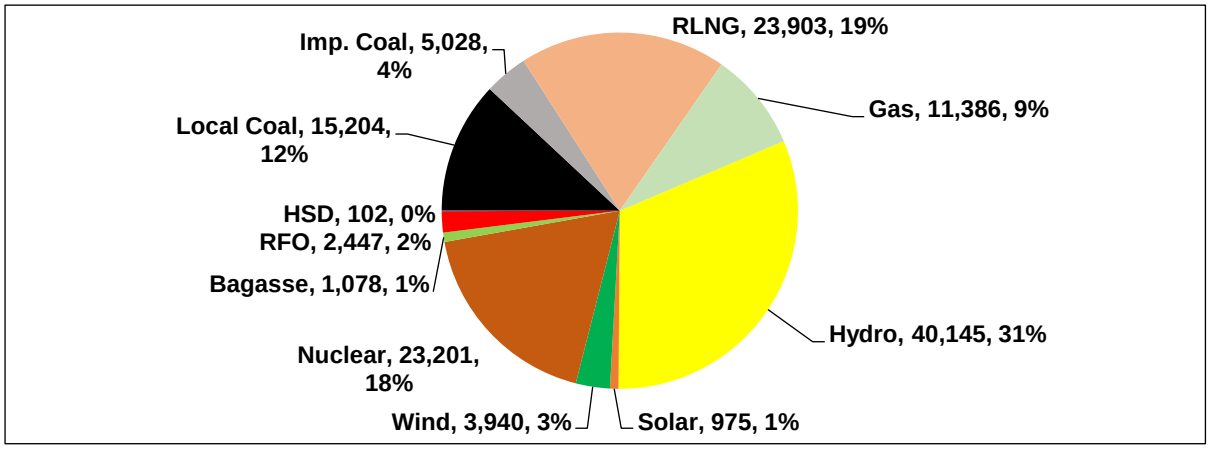

Chart 2-3: NGC System Annual Energy Generation (GWh) as of 2024

Similarly, the total installed generation capacity of K-Electric system reached to 3,343 MW by June - 2024 with thermal projects comprising of local gas, furnace oil and RLNG based

technologies as shown in Chart 2-4. It is important to note that a capacity of 2,923 MW has been utilized in the current revised IGCEP to reflect the capacity additions and retirements that occurred in the subsequent months of 2025.

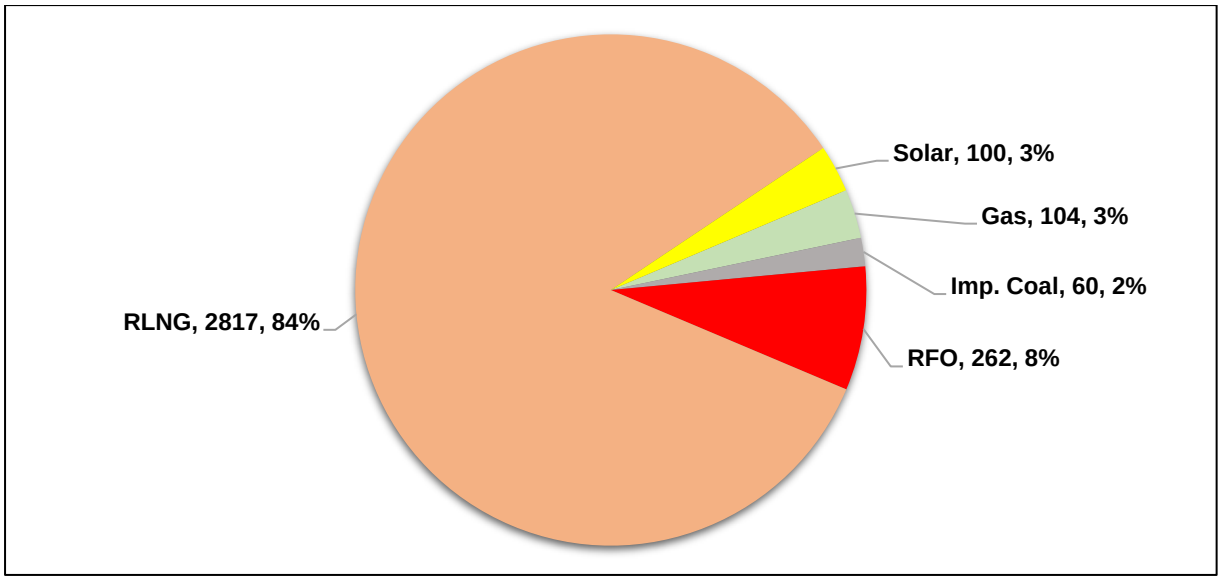

Chart 2-4: K-Electric System Installed Capacity (MW)

The energy produced by K-Electric system power generation fleet during 2024 was 9,149 GWh which was mainly contributed by thermal projects on local gas, RFO, HSD, Coal and RLNG based technologies as shown in the Chart 2-5.

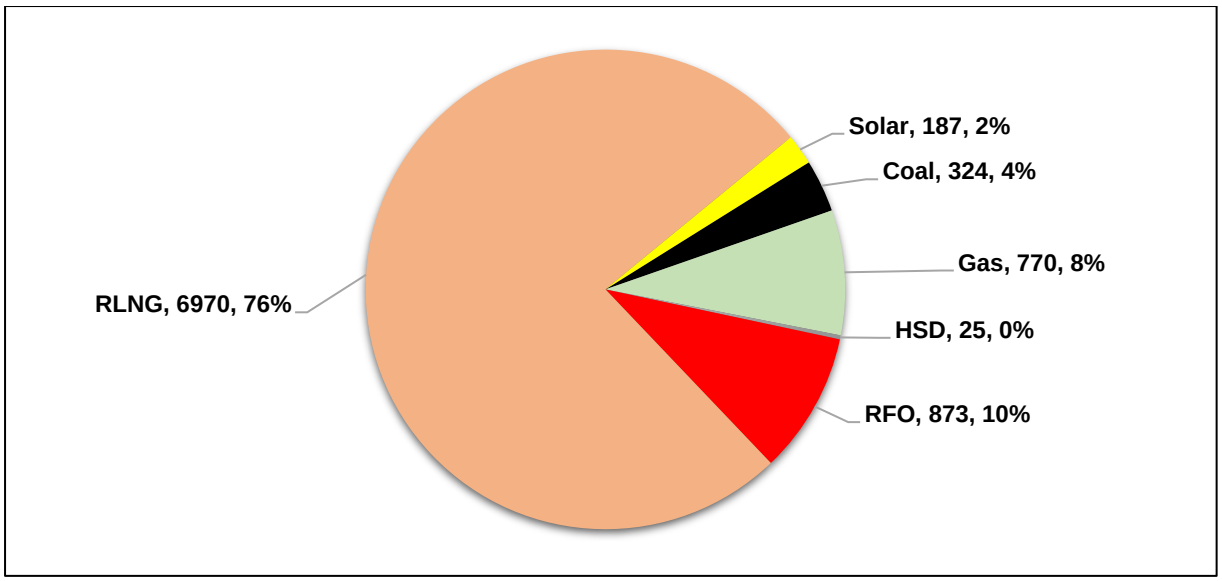

Chart 2-5: K-Electric System Energy Generation (GWh) as of FY-2024

Furthermore, there has been an increasing trend in the electricity generation (GWh) statistics of the country from 2014 to 2019, however, a slight decline is observed in 2020 due to lesser demand owing to struggling economy coupled with the impacts of COVID-19 pandemic. However, since 2021 the trend is again increasing as shown in the Chart 2-6. During 2023 and 2024 there is significant decline in electricity generation which is mainly due to rise in solarization and net-metering.

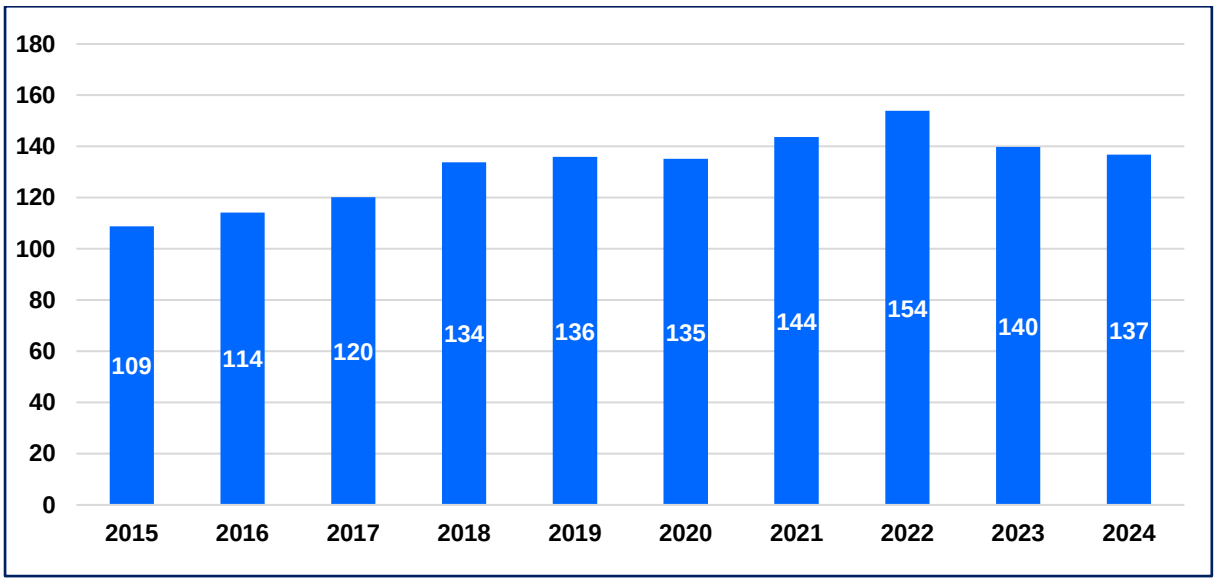

Chart 2-6: Historic Energy Generation (TWh) of Country

Overall, the power demand (MW) has been growing steadily with improved development of electricity supply in the NGC and K-Electric system as it is evident from the electricity peak demand trend as shown in the Chart 2-7.

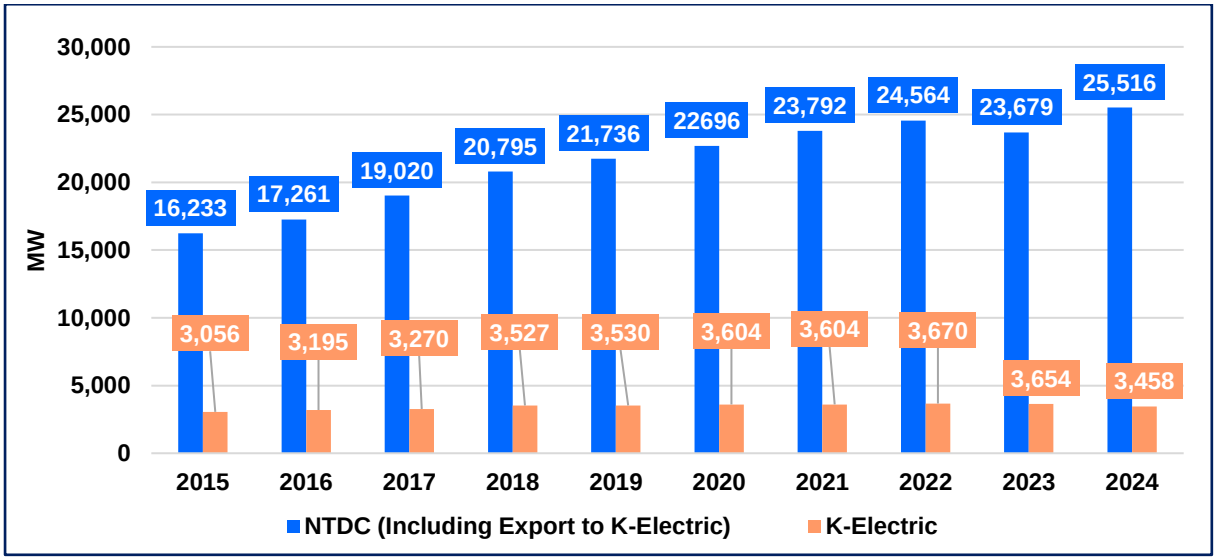

Chart 2-7: Historical Peak Electricity Demand (MW)

Recorded Peak demand of NGC (including export to K-Electric) and K-Electric during year 2024 is 25,516 MW and 3,458 MW respectively. Comparing the energy (GWh) and Peak Demand (MW), it is found that the solarization is not contributing to serve the peak demand and only lowering the energy.

Further, the historical load factors are shown in the Chart 2-8. It has been observed that the load factor has declined from 69% in 2015 to 57% in 2024. This suggest that intervention such as demand side management is the need of hour for better utilization of available capacity.

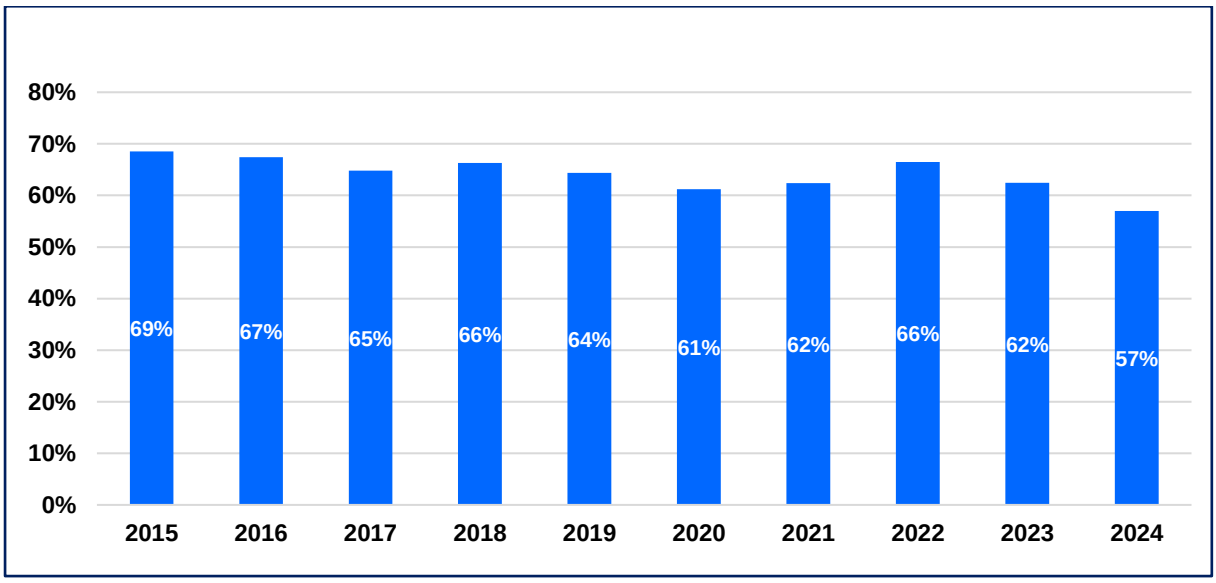

Chart 2-8: Historical NGC Load Factors (%)

2.3. Power Distribution

By the year 2024, total number of electricity consumers in the country have reached to 40,261,540 out of which 34,993,939 belong to domestic category, 4,211,803 belong to commercial category, 402,885 consumers fall under industries, 382,619 are agriculture consumers and other consumers are 270,294 as shown in Chart 2-9.

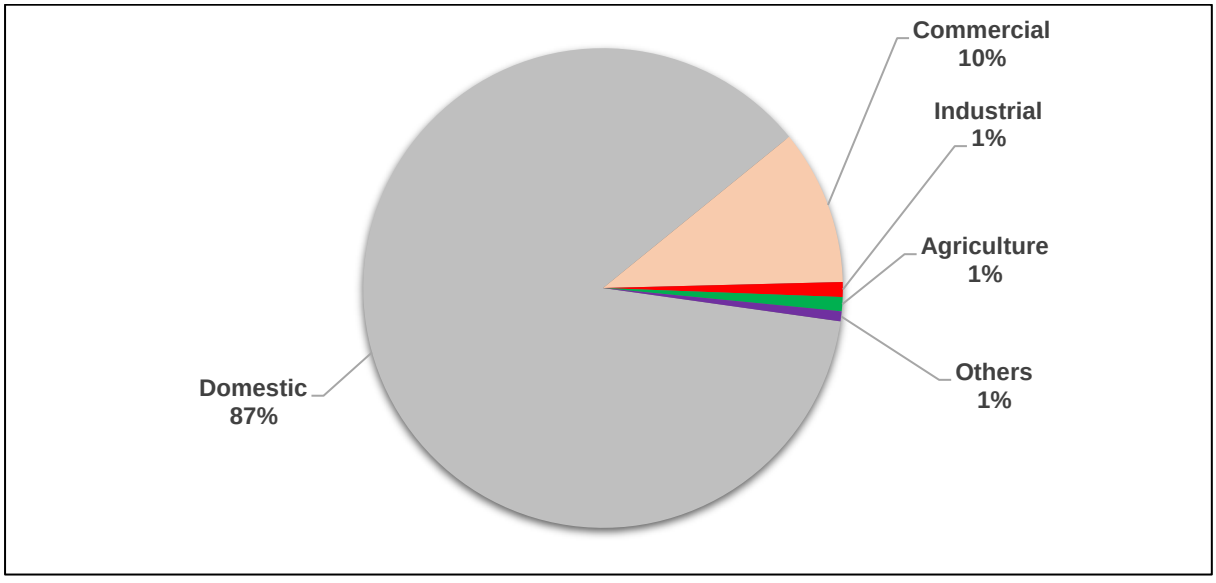

Chart 2-9: Category-wise Number of Electricity Consumers (%)

During the FY-2024, total electricity consumption in country reached to 109,709 GWh, out of which domestic consumption had a share of 54,042 GWh, commercial consumption was 9,075 GWh, industrial consumption was 27,777 GWh, agriculture consumption was 8,578 GWh and 10,238 GWh had been consumed by other categories as shown in Chart 2-10.

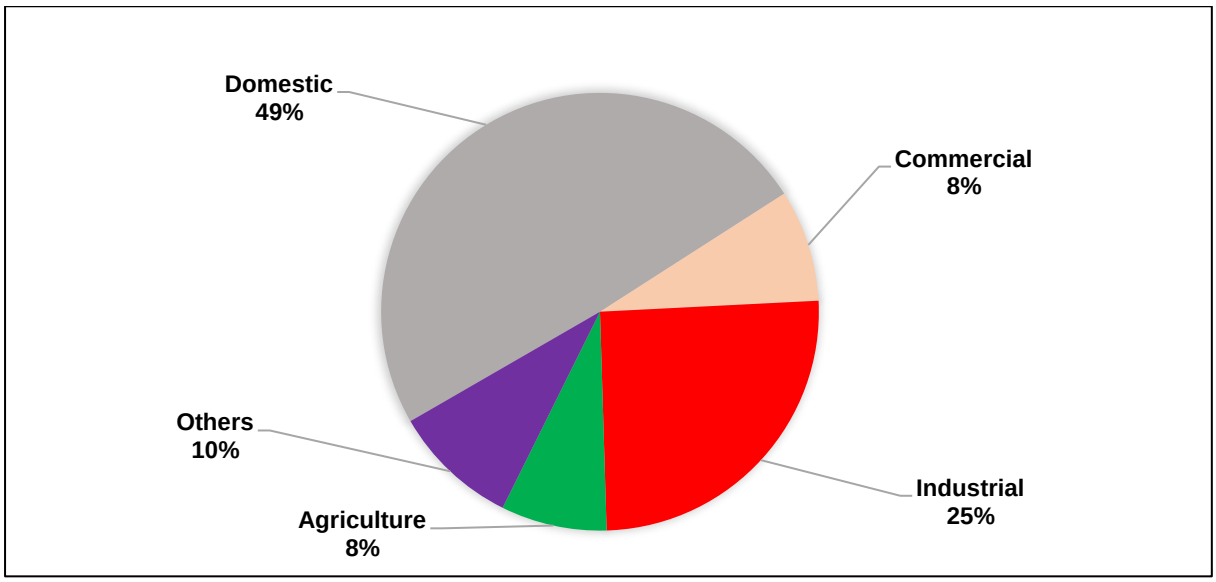

Chart 2-10: Category-wise Sale of electricity (%)

Electricity consumption in Pakistan is dominated by the domestic sector followed by industrial and agricultural sector.

3. The IGCEP Methodology

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3. The IGCEP Methodology

3.1. Regulatory Compliance

Pursuant to the prevailing Grid Code, the IGCEP covers the future development of hydroelectric, thermal, nuclear and renewable energy resources to meet the anticipated load demand by the year 2035. It identifies new generation requirements by capacity, technology, fuel and commissioning dates on year-by-year basis by complying with the various regulatory requirements as set out through the provisions of the prevailing Grid Code including Loss of Load Probability (LOLP), the long-term load growth forecast and system reserve requirements.

3.2. Data Collection Process

The data collection process for the purpose of this study was extremely rigorous; all the concerned project executing entities were approached to provide the requisite data on the prescribed format. The data proformas were made available Online on NGC website through NGC Forms (available at the web link https://diplanning.ntdc.com.pk/) for providing the requisite input data on the prescribed format, the same was shared with all the concerned project executing entities. The following process was followed for the collection of various inputs / data / information pertaining to power projects from the concerned entities:

a. Specific data input formats were customized, involving suitable conversions, as per requirements of the generation capacity expansion planning tool i.e., PLEXOS.

b. Concerned entities were approached to share required data on customized data input formats. Multiple reminders were despatched to ensure timely provision of requisite data.

c. All the data received was precisely analyzed for accuracy and completeness, and gaps were identified and rectified / adjusted accordingly.

d. The data was developed / formulated as per requirement of the generation planning tool.

3.3. The IGCEP Data Sources and Associated Data Types

Following agencies have contributed for the preparation of input data used in IGCEP 2025:

a. Azad Jammu Kashmir Power Development Organization (AJKPDO)

- Existing and future hydro power projects under the jurisdiction of AJ&K

b. Azad Jammu Kashmir Private Power Cell (AJKPPC)

- Existing and future hydro power projects under the jurisdiction of AJ&K

c. Central Power Purchasing Agency Guarantee Limited (CPPA-G)
   - Fuel prices and existing system merit order

d. Energy Department Sindh / Sindh Transmission and Dispatch Company (STDC)

e. GENCOs
   - Existing and future thermal power projects in the public sector

f. K-Electric
   - Hourly energy and power demand forecast
   - Existing and future power plant data

g. Ministry of Planning, Development and Special Initiatives (MoPD&SI)
   - Sector wise GDP projections

h. National Electric Power Regulatory Authority (NEPRA)
   - Different types of input data were collected from NEPRA's publications / website i.e., the latest values from NEPRA quarterly indexation were used to update the costs

i. National Power Control Centre (NPCC)
   - Monthly energy and MW capacities for the existing wind and solar PV power projects

j. Pakhtunkhwa Energy Development Organization (PEDO)
   - Existing and future hydro power projects under the jurisdiction of KPK

k. Pakistan Atomic Energy Commission (PAEC)
   - Existing and future nuclear power projects

l. Pakistan Bureau of Statistics
   - Input data for long-term forecast such as historic GDP and its components, Consumer Price Index (CPI), etc.

m. Power Planning and Monitoring Company (PPMC)
   - Category-wise sale, generation, number of consumers, transmission and distribution losses etc.

n. Private Power Infrastructure Board (PPIB)
   - Existing and future hydro, renewable and thermal power projects under IPP mode

o. Punjab Power Development Board (PPDB)

- Existing and future hydro, thermal and renewables power projects under the jurisdiction of the Punjab province

p. Thar Coal and Energy Board (TCEB)

- Block wise Thar Mine's cost and capacity

q. Water and Power Development Authority (WAPDA)

- Existing and future hydro power projects to be developed by WAPDA

3.4. The IGCEP Preparation Process Map

The IGCEP is prepared after following the process illustrated through Figure 3-1 and is submitted to NEPRA for review and approval, following an extensive internal consultative process.

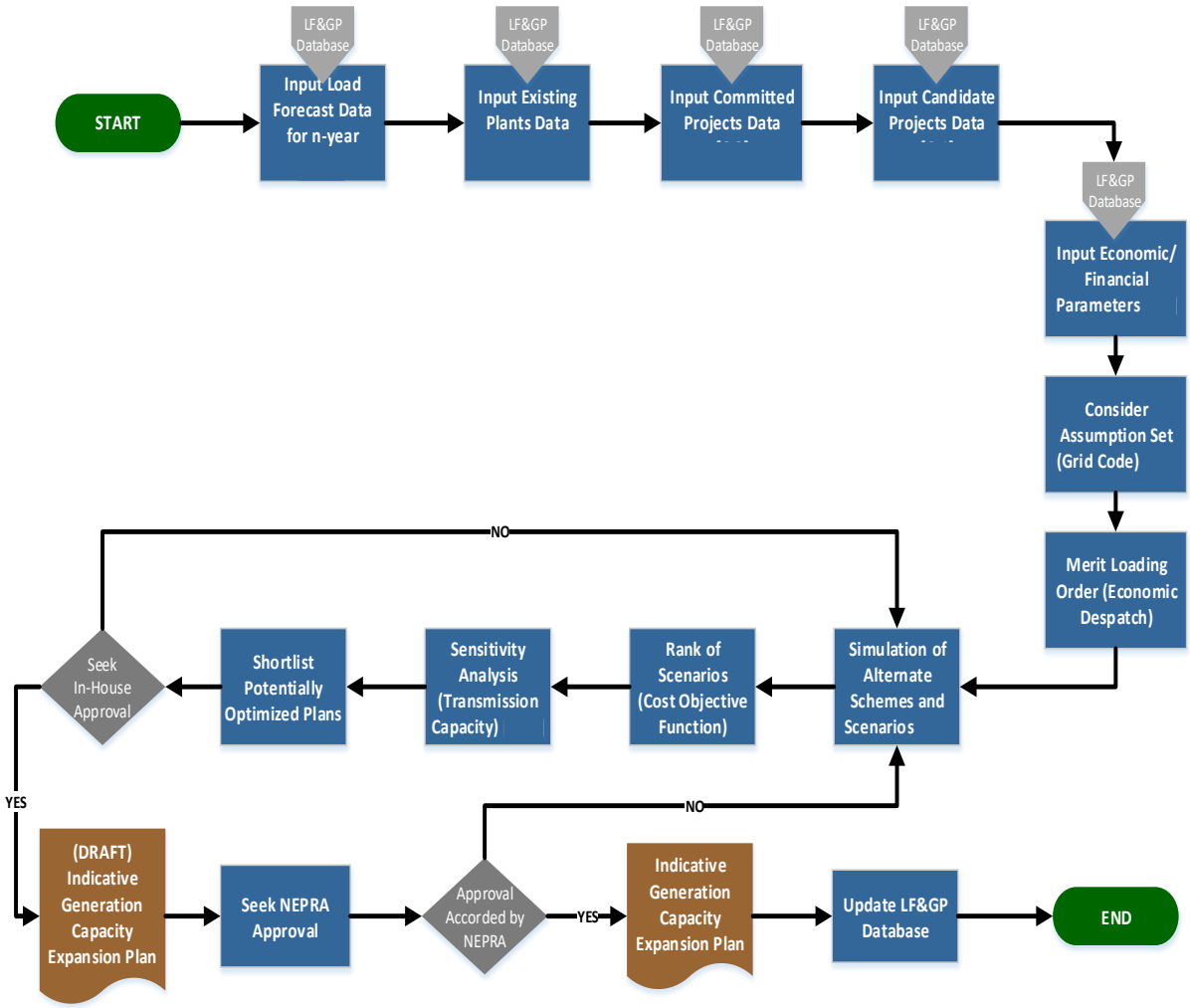

Figure 3-1: The IGCEP Preparation Process Map

3.5. Financial Parameters

For existing system, cost data has been obtained from the merit order of January, 2025 as provided by CPPA-G, whereas, for the future power projects, cost data shared by the concerned project executing agencies, after indexation, have been used.

3.6. Least Cost Violation (LCV)

Pursuant to National Electricity Policy (2021) and National Electricity Plan (2023-27), the criterion of Least Cost Violation has been considered for strategic power plant (s) in this iteration of IGCEP. As per this criterion any incremental cost (beyond least cost), referred as LCV, shall be borne by the relevant sponsoring Federal / Provincial Government.

3.7. Criteria and Other Important Considerations for the IGCEP

3.7.1. Planning Timeframe

The planning period taken for this study is from July 1, 2025 to June 30, 2035.

3.7.2. Generation System Reliability

The capability of the generating system to meet the forecasted peak demand remains a major challenge in the generation planning. In this perspective, the IGCEP takes into account the scheduled maintenance and forced outages allowance of all the generating units as well as the seasonal variability in the energy and capacity of the hydroelectric and RE projects.

Loss of Load Expectation (LOLE) in days or equivalently Loss of Load Probability (LOLP) in percentage is considered as generating system reliability criteria. For the purpose of the IGCEP, yearly LOLP criteria of not more than 1%, as stipulated in the prevailing Grid Code, has been adopted.

3.7.3. Hydrological Risk

For the development of IGCEP, seasonal variation in hydro power plants has been considered. In this regard, the average values of monthly energy and capacity for each respective power plant based on the feasibility study and as conveyed by the concerned project executing agencies, have been used to capture the seasonality factor in the output of hydroelectric projects.

3.7.4. Renewable Energy (RE) Generation

As of Nov 2024, 750 MW_p utility scale solar PV and 1,842 MW wind power on-grid projects, have been commissioned in NGC.

Based on the available data and after multiple rounds of discussions/deliberations with experts committee, PSIA, PPIB and CPPA-G, capacity factors of 22.8%, 17%, 42% and 55% have been considered for candidate utility solar PV, solar net metering, wind and bagasse-based power projects, respectively.

3.7.5. System Reserve Requirement

Reserve of a generating system is a measure of the system's ability to respond to a rapid increase in load or loss of the generating unit(s). In this study, two types of reserves have been modelled as per provisions of the prevailing Grid Code, i.e., contingency and secondary.

3.7.5.1. Contingency Reserve

The contingency reserve is the level of generation over the forecasted demand which is required from real time plus 24 hours so as to cover the uncertainties. This reserve is provided by the generators which are not required to be synchronized but they can be synchronized within 30 minutes of the initiation of the Contingency and the corresponding fall in frequency. As per best industry practices, this is equal to the capacity of the largest thermal generator in the system. In this model, the Contingency Reserve is considered equivalent to 1,145 MW (Karachi Nuclear K-2/K-3 being the largest thermal unit). Moreover, to cater for VRE intermittency, some additional reserve on top of 1,145 MW is added i.e., 2.9% and 5.3% of actual generation (MW) of solar PV and Wind, respectively as per best international practices (considered by M/s Lahmeyer Intl. in 'VRE Integration and Planning study for Pakistan').

3.7.5.2. Secondary Reserve

The secondary reserve is a type of spinning reserve and it is the increase in power output of the online generators following the falling frequency and is fully sustainable for 30 minutes after achieving its maximum value in 30 seconds. It is equal to the one third of the largest unit in the system. Hence, in this model 382 MW of the Secondary Reserve along with 2% of actual generation (MW) of solar PV and wind is considered throughout the planning horizon, to mitigate VRE intermittency.

3.7.6. Scheduled Maintenance of the Generation Projects

Scheduled maintenance plays an important role in retaining the desired efficiency and reliability while at the same time preserving the useful life of a generating unit. It is assumed, for the preparation of the IGCEP, that all generating units, except for VRE and hydro, will undergo an annual maintenance program as provided by the concerned project executing agency.

3.7.7. System Load Characteristics

From the planning perspective, the system load to be met by the generating system is represented by the system's hourly load for each year up till 2035. The country is passing through a transition phase to recover its economic growth, instability, business development, increase in exports, reduction in imports and efficient use of local resources. This all activity will take time to restore; therefore, the current trend of Business As Usual is used in Rationalized Capacity Addition scenario with Low BAU load forecast scenario. However, this load trend is decreasing the utilization of power plants and other infrastructure. Hence, a load forecast scenario with Demand Side Management is also developed and used in Rationalized Capacity Addition scenario.

3.7.8. Fuel Prices Indexation

Pakistan's electricity generation mix relies heavily on fossil fuels including RLNG, imported / domestic coal, local gas and furnace oil, hence, fuel price uncertainty is one of the major determinants for a long-term generation expansion plan. In this regard, the base fuel prices have been taken as per Merit Order of January, 2025 These fuel prices are then indexed for future years as per available international literature including Energy Information Administration (EIA), Argus Media and Platts (except for domestic coal & bagasse where Thar Coal & Energy Board tariff and upfront tariff of bagasse in 2017 was applied, respectively. The variable price index for each of the fuel-based technologies is given in Table 3-1.

Table 3-1: Fuel Price Indexation Factors

Fiscal Year	Furnace Oil	Local Gas / RLNG	Imported Coal	Uranium	Thar Coal	Bagasse
	Variable Price Index for Fuel Based Technologies					
2025	1.1	1.1	0.998	1	0.99	1.00
2026	1	1	0.99	1	1.01	1.05
2027	0.99	1	0.976	1	0.94	1.10
2028	1.01	1.02	0.967	1	0.95	1.16
2029	1.01	1.03	0.955	1	0.95	1.22
2030	1.02	1.03	0.949	0.999	0.94	1.28
2031	1.03	1.05	0.95	0.999	0.95	1.34
2032	1.05	1.06	0.947	0.999	0.93	1.41
2033	1.07	1.09	0.932	0.999	0.7	1.48
2034	1.07	1.09	0.927	0.999	0.68	1.55
2035	1.07	1.09	0.926	1	0.99	1.63

4. Long Term Energy and Demand Forecast

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4. Long Term Energy and Power Demand Forecast

4.1. Energy and Power Demand Forecast

Energy and power demand forecast provides the basis for all planning activities in the power sector. It is one of the decisive inputs for the generation planning. Planning Code (PC-4) of Grid Code 2023 states:

The SO shall also produce a Global Demand Forecast for three growth levels (Low, Medium, High) based on the econometric modelling approach. This forecast shall be prepared every year for a horizon of at least 20 years. The econometric model shall take into account (as required):

(a) The economic activity of the country;
(b) Population Trends;
(c) Industrialization;
(d) Impact of net-metering and embedded generation;
(e) Demand Side Management; and
(f) Any other potential variable that may affect the Demand growth

The methodology adopted for developing the energy and power demand forecast adheres to the requirements outlined in the Grid Code 2023. A comprehensive explanation, including the input data and resulting outputs, is provided in the subsequent sections.

4.2. Long-Term Demand Forecasting Methodology

The long-term demand forecast is based on multiple regression analysis, an internationally recognized econometric method employed to establish a robust statistical relationship between dependent and independent variables. Electricity sales serve as the dependent variable in this study. Electricity consumption patterns differ across the country's various economic sectors, namely domestic, industrial, commercial, and agricultural. Accordingly, a range of variables likely to influence electricity sales was identified and analyzed separately for each sector. These variables were then tested to determine the presence of statistically significant quantitative relationships. The variables considered include electricity prices, gross domestic product (GDP), population, number of consumers, lagged variables, etc. Those variables demonstrating the most significant impact on electricity sales were selected for inclusion in the final forecasting equations. Electricity consumption (GWh) is then regressed on these independent variables using historical data for the period 1970-2023. The methodology of long-term load forecast is illustrated in the process flow map in Figure 4-1.

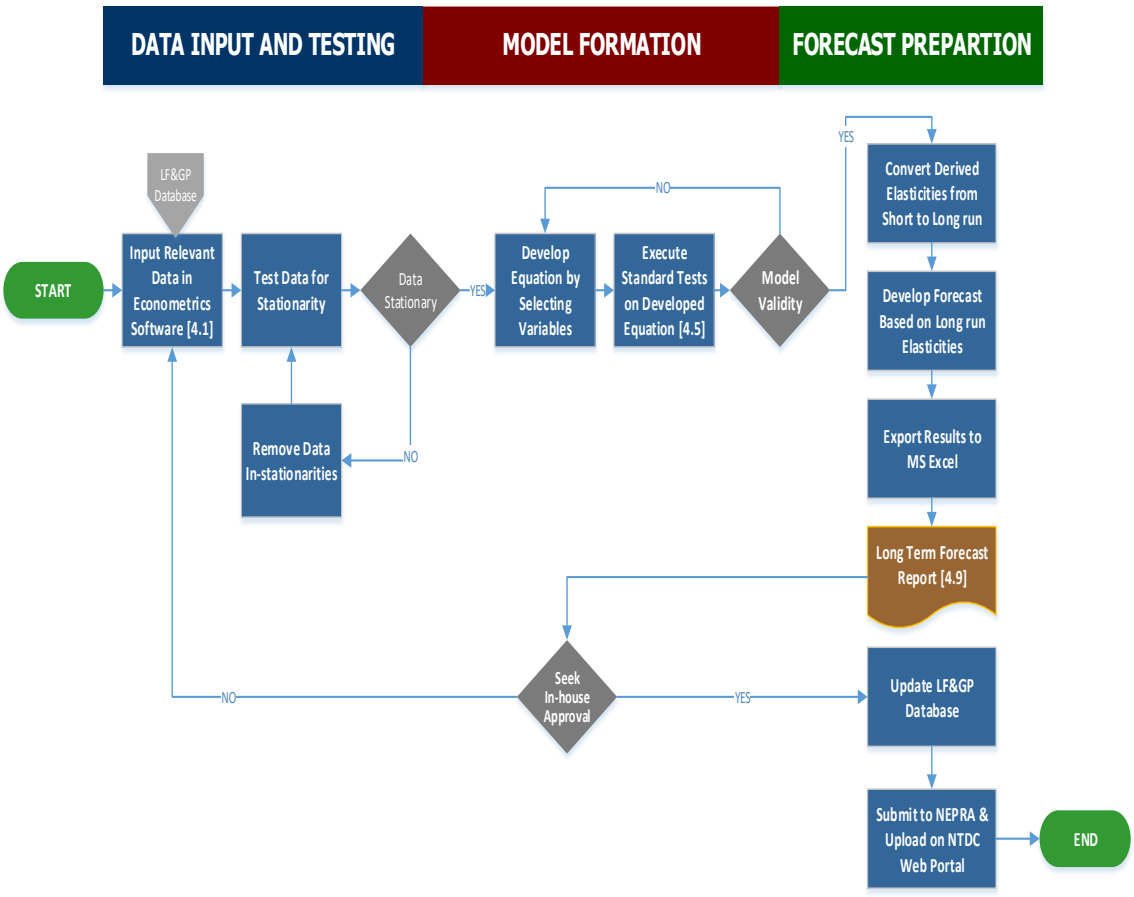

Figure 4-1: Process Flow for Long-Term Load Forecast

4.3. Data Sources

The data sources for the long-term demand forecast are as under:

a) Historical GDP and Consumer Price Index (CPI) are obtained from Economic Survey of Pakistan published by Finance Division, Government of Pakistan.

b) GDP growth rate projections from FY 2024 to 2035 have been provided by the Ministry of Planning, Development and Special Initiatives.

c) Energy Sales, Transmission & Distribution Losses and Energy Purchased data is obtained from DISCOs Performance Statistics by PPMC.

d) Category-wise average tariff is obtained from DISCOs Performance Statistics by PPMC.

e) Peak Demand (MW) and Load management data is obtained from NPCC, KE, PITC and DISCOs.

f) The year-wise energy and power conservation targets based on efficiency improvements of appliances have been provided by NEECA.

4.4. Key Considerations

4.4.1. Energy and Power Conservation Targets

The year 2023 serves as the starting point for calculating the reduction in energy and power consumption resulting from the “Energy Conservation” targets established by NEECA. The targeted reduction quantified by NEECA for 2024 is assumed to have been fully realized and is already reflected in the electricity sales data for 2024.

However, prevailing ground realities indicate that the energy efficiency measures proposed by NEECA have not been effectively implemented or even considered to date. Nonetheless, recent developments, such as the approval of the building code and a few additional measures, suggest that the implementation process has commenced. Consequently, it is anticipated that the tangible effects of these initiatives will begin to materialize within the next four to five years. Therefore, starting from 2028 the targets provided by NEECA are rationalized as presented in the Table 4-1 below. These rationalized targets have been used for energy consumption reduction in the formulation of load forecast.

Table 4-1: NEECA Energy Conservation Targets

FY	(Provided by NEECA)		(Rationalized by NGC)	
	GWh	MW	GWh	MW
2025	4,209	865	0	0
2026	5,691	1170	0	0
2027	6,385	1312	0	0
2028	6,577	1352	2,631	541
2029	7,325	1506	3,663	753
2030	7,325	1506	4,395	903
2031	9,750	2004	6,825	1403
2032	9,750	2004	7,800	1603
2033	11,385	2340	10,247	2106
2034	11,385	2340	11,385	2340
2035	11,385	2340	11,385	2340

4.4.2. Net Metering Projections

Keeping in view the growing demand of net-metering connections in the country, its impact has been considered in IGCEP. The net metering targets for the NGC system were

rationalized by industry experts as part of a solarization study conducted by the Ministry of Petroleum. This assessment was based on recent historical trends and the volume of solar panel imports recorded over the past year. This capacity of 8,120 MW is modelled at the supply side, since the generation through Net Metering will also be contributing towards meeting the Renewable Energy targets. However, the year-wise Net-Metering projections are presented in Table 4-2.

Table 4-2: NGC System Net Metering Addition Projections (MW)

FY	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Annual	2,400	1,200	900	800	700	600	500	400	300	200	120
Cumulative	2,400	3,600	4,500	5,300	6,000	6,600	7,100	7,500	7,800	8,000	8,120

Following the same approach used for the NGC system in the aforementioned solarization study, the net metering targets for the K-Electric system have been considered on the demand side, as shown in Table 4-3.

Table 4-3: K-Electric System Net Metering Addition Projections (MW)

FY	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Annual	135	125	115	105	95	85	75	65	55	45	0
Cumulative	135	260	375	480	575	660	735	800	855	900	900

4.4.3. Load Management

For preparation of the Long-Term Demand Forecast, load management, being carried out in the country in the base year is incorporated in the forecast. Currently, there are six factors that are contributing towards load management namely generation constraints, emergency situations, Industrial cut, technical NGC constraints, DISCOs' constraints and DISCOs' high loss feeders (known as Aggregate Technical and Commercial (AT&C) load management). Primarily, there are only two major types of load Management i.e., AT&C and Non-AT&C. AT&C load management is being carried out deliberately on the feeders where the revenue recovery is low due to electricity theft and other governance issues. Non-AT&C (4,702 GWh) is being carried out due to system constraints, fuel shortage and voltage profile etc. Now Non-AT&C (Technical) based load management has been gradually factored in all scenarios of demand forecast with the assumption that network constraints will improve over the time. Whereas AT&C (Non-Technical) based load management (17,960 GWh) is not considered in Low (BAU and DSM) Demand Forecast scenarios. However, in the Medium and High scenarios of load forecast, AT&C (Non-Technical) LM is also factored in gradually starting from fourth year onwards till the end of study horizon i.e., 2035. This approach aims to streamline the technical aspects of load management while optimizing the non-technical factors to ensure a balanced and efficient electricity distribution system.

Table 4-4: Non-AT&C LM Inclusion

FY	GWh	Percentage (%)
2025	1,881	25
2026	2,821	50
2027	3,762	75
2028	4,702	100

4.4.4. Gross Domestic Product (GDP) Projections

The growth in consumption of electricity is closely related with the growth in economy of the country. Therefore, the accuracy in the projections of GDP plays an important role in load forecasting. The GDP projections data for Low (BAU) and High growth is obtained from Ministry of Planning, Development and Special Initiatives (Planning Commission). However, Medium growth is computed using an average of Low and High growth. The final GDP projections data is presented in Table 4-5.

Table 4-5: GDP Projections

FY	High Growth	Medium Growth	Low (BAU) Growth
2025	4.40	4.00	3.60
2026	4.80	4.25	3.70
2027	5.30	4.55	3.80
2028	5.70	4.72	3.74
2029	6.10	4.50	2.90
2030	6.50	4.85	3.20
2031	7.10	5.30	3.50
2032	7.30	5.45	3.60
2033	7.50	5.55	3.60
2034	7.60	5.50	3.40
2035	7.80	5.80	3.70
Average	**6.37**	**4.95**	**3.52**

4.5. Preparation of Demand Forecast

Country-wide demand forecast is developed for this revised IGCEP, including NGC system and K Electric System. For this purpose, the electricity consumption is segregated into the following four major sectors:

- Domestic;
- Commercial;
- Industrial; and
- Agriculture

These aforesaid sectors typically show different consumption patterns throughout the year. Hence, they are forecasted separately. The load demand forecast of these sectors is then combined to obtain the forecast of total electrical energy demand. In order to forecast the annual consumption of electricity up to the year 2035, a multiple regression model has been used. Electricity energy sale of the respective category is the dependent variable in the regression model, whereas, the independent variables for each category are as follows:

- Annual total GDP and its components, i.e., agriculture sector, industrial sector and services sector;
- Tariff - wise electricity prices, i.e., domestic, commercial, agriculture and industrial;
- Category – wise Number of consumers;
- Lag of dependent and independent variables;
- Consumer Price Index; and
- Dummy variables

Considering the above-mentioned factors, four equations are selected, one for each category of electricity consumption. For statistical analysis, popular statistical software EViews is used.

Ordinary Least Square technique is selected for the estimation of regression equation. The equations are written in logarithmic form to evaluate elasticity in percentage. Various statistical tests were performed to establish the significance of the relationship between the dependent variable and the independent variables.

After thorough statistical analysis using EViews, the appropriate elasticity coefficients are selected for all the four equations. These elasticities were then converted into long-term elasticities. On the other hand, projection of growth rates for independent variables such as total GDP, electricity price, etc. are taken from various sources. The long-term elasticities and the projected independent variables are subsequently used in the equation to develop the long-term energy forecast of each category using the equation below.

$$\boldsymbol{Y_T = Y_{T-1} * (1 + GR\ of\ G)^b * (1 + GR\ of\ R)^c * (1 + GR\ of\ L)^d}$$

Table 4-6 provides the description of all the variables used in this equation.

Table 4-6: Description of Dependent and Independent Variables

Variable	Description
Y_T	Electricity Demand of current year (Sales GWh)
Y_{T-1}	Electricity Demand of previous year (Sales GWh)
GR	Growth Rate
G, R, L	Independent variable (GDP, Real Price, Lag)
b, c, d	Elasticities of independent variables (GDP, Real Price and Lag respectively)

The demand forecast results of the four categories are combined to calculate the sale forecast at the country level. It is important to mention here that, in order to calculate the elasticities of commercial and industrial sectors the impact of load shedding on their historical data has been considered for the study, provided the fact that load shedding does not hinder or majorly affect the activities in these sectors. This is due to the alternative energy supplies widely used in these sectors which keep their activities going.

In compliance to Grid Code 2023, three scenarios of load forecast are developed based on projections of GDP such as Business as usual and High projections provided by MoPD&SI categorized as Low scenario, Medium scenario and High scenario. In Low BAU and Low DSM scenarios, low projections of GDP are considered. Thus, the projected energy and demand is on the lower side as given in Table 4-8 and Table 4-11. For Medium and High scenarios, respective scenarios of GDP projections are considered. Thus, the projected energy and demand is on higher side as given in Table 4-9 and Table 4-10.

Required generation (GWh) for each scenario is calculated after adding projected distribution losses at 11 kV and transmission losses at 132 kV, 220 kV and 500 kV. The calculated base year load factor is projected for the future years which are then used along with projected energy generation to get the peak demand in MW.

The country-wide energy forecast is then segregated into NGC and K-Electric forecast for each respective year. For each system, yearly peak demand forecast is segregated into hourly pattern of NGC and K-Electric based on historical pattern for each system.

4.6. Adjustment of Base Year

This year the process of submission of IGCEP was significantly impacted by extensive and rigorous stakeholder consultations that included new and high-profile participants like the Prime Minister's Office, the Special Investment and Facilitation Council, and Task Force for

Structural Reforms in Power Sector. Initially the base year of demand forecast was 2022-23, but recognizing the lapse of first year of the plan, the Ministry of Energy (Power Division) following profound consultations and analysis of the previous demand forecast at different forums, directed to revise the base year to 2023-24 by carefully integrating the evolving demand trend of the preceding year. Keeping in view the declining trend in the demand and energy consumption pattern it was agreed, a) to keep energy generation and peak demand constant for the first year of plan horizon, i.e., 2024-25 and b) to apply growth rate of 2.8% to energy generation and demand of the year 2024-25 up till the last year of the plan horizon, i.e., 2034-35. This 2.8% compound average growth rate was derived from the previous 2022-23 base year forecast that was used in the IGCEP submitted to NEPRA on April 30th, 2024. The medium and high scenarios are also developed using the same methodology but the growth rates of 3.8% and 4.8% are applied for medium and high growth scenarios respectively ensuring methodological consistency across all projections.

4.7. Historical Demand Pattern

Table 4-7 presents the historical demand pattern of NGC power system which covers major and dominating part of whole country. It can be easily observed that the load factor has continuously decreased from 70% which shows that the utilization of generation resources is gradually decreasing.

This nose-diving load factor is detrimental for the power system as well as the country. This low load factor or the growing difference between the summer and winter peak forces the system operator to plan for greater generation capacity arrangement whereas its average usage is decreasing. This phenomenon leads to increased capacity payments on one side and less cost recovery on the other side thus causing the electricity charges to inflate quite sharply.

Table 4-7: Historical Demand Pattern

FY	Maximum Demand (MW)				Energy Generation (GWh)	Load Factor (%) with Recorded Demand
	NGC Recorded Peak including K-Electric	NGC Computed Peak including Export to K-Electric	NGC Computed Peak Demand	Export to K-Electric during Peak		
2005	12,385	12,595	12,035	560	73,392	67.65
2006	13,066	13,847	13,212	635	82,042	71.68
2007	13,645	15,838	15,138	700	87,641	73.32

FY	Maximum Demand (MW)				Energy Generation (GWh)	Load Factor (%) with Recorded Demand
	NGC Recorded Peak including K-Electric	NGC Computed Peak including Export to K-Electric	NGC Computed Peak Demand	Export to K-Electric during Peak		
2008	14,151	17,398	16,838	560	86,124	69.48
2009	14,055	17,852	17,325	527	84,182	68.37
2010	14,309	18,467	17,847	620	88,692	70.76
2011	14,468	18,521	17,901	620	90,332	71.27
2012	15,062	18,940	18,280	660	89,384	67.74
2013	14,756	18,827	18,227	600	87,621	67.79
2014	16,170	20,576	19,966	610	94,710	66.86
2015	16,233	21,701	21,031	670	97,054	68.25
2016	17,261	23,199	22,559	640	101,679	67.25
2017	19,020	25,717	25,117	600	107,996	64.82
2018	20,795	26,741	26,031	710	120,792	66.31
2019	21,736	26,267	25,627	640	122,542	64.36
2020	22,696	26,252	25,622	630	121,690	61.21
2021	23,792	28,253	27,193	1,060	129,991	62.37
2022	24,564	31,271	30,101	1,170	143,017	66.46
2023	23,679	30,189	29,081	1,108	129,485	62.42
2024	25,516	30,150	29,056	1,094	127,420	57.01

Chart 4-1 shows the intricacies of the historical demand pattern of NGC system from 2017 to 2024. It shows the grave difference of 11,698 MW between the summer season peak demand and winter season peak demand for 2024 whereas the base load demand remains around 7,000 MW. This chart shows that the generation is being added to serve the summer peak for few months and for few hours during the year. Whereas, contrary to this, the reasons for this huge gap between summer and winter peak must be sorted out. In the next step, these factors should be addressed properly by adopting necessary and suitable demand side measures. The major contributing factor here is cooling load which is basically due to confined residential as well as commercial building infrastructure.

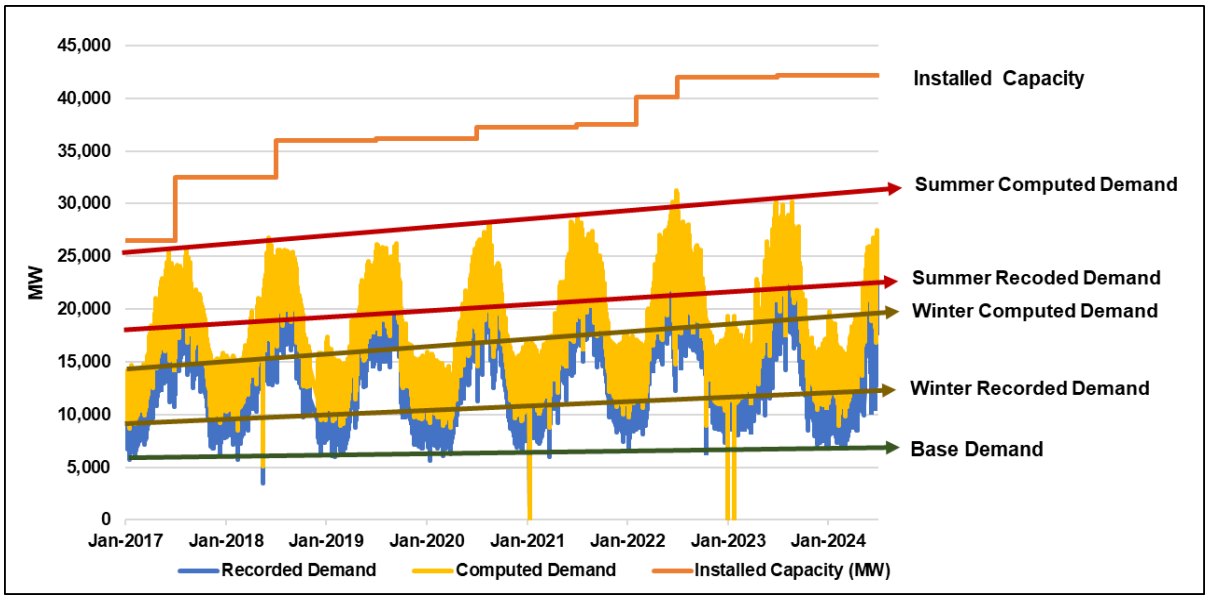

Chart 4-1: Historical Recorded and Computed Demand pattern

Previously, all the emphasis has been to add new generation to meet the forecasted peak demand but nothing has been done to reduce the peak demand by improving the load factor which is quite against the planner's instinct. Therefore, in this load forecast, to counter this decreasing load factor problem, a scenario called "Low DSM" has been introduced so that this problem is not extrapolated in future and the system planning could be done at appropriate and standard level.

4.8. Low DSM Scenario

As mentioned earlier that 15-20 years ago the load factor of NGC power system has been above 70% which gradually reduced due to decline in industrial share and increase in domestic share. It is assumed that the system load factor will increase gradually and correspondingly the system peak demand will not increase at the same pace in comparison to increase in the energy requirement. This is an optimistic assumption because historically, the system load factor has been decreasing due to lack of industrialization and adopting inefficient building construction practices in the country. The household and commercial buildings consume about 60% of the total electric energy consumed in the country.

Keeping in view this demand side management, an additional scenario namely Low (DSM) is also developed as a sensitivity. However, this sensitivity gives a guideline to the regulator and the policy makers on how the electricity consumption pattern should be shaped to avoid financial trap. In this case, the energy demand is not reduced but the system peak demand is significantly shaved, requiring a lot less capacities for generation and transmission facilities to serve the same energy demand. NEECA has made a significant stride and has developed an Energy Conservation Building Code 2023 (ECBC-2023) and has asked all the housing

development authorities of the country to adopt ECBC-2023 and change their respective by-laws accordingly.

It is imperative that the desired growth is achieved in the system load factor by shaving system peak demand. For this, numerous practical demand side management initiatives need to be implemented such as constructing new industries, enhancing the existing industrial consumption, developing energy efficient buildings, retrofitting the existing buildings to become energy efficient, using energy efficient appliances, segregation of holidays, closing commercial buildings earlier, efficient use of daylight, bidding the peak etc.

Based on the variables and methodology explained above, Table 4-8, 4-9, 4-10 and 4-11 highlights forecast result for the Low, Medium, High and Low with DSM scenarios respectively.

Table 4-8: Long-Term Energy & Power Demand Forecast – Low BAU Scenario

FY	NGC			K-Electric			Country		
	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)
2024	118,875	118,875	24,434	17,885	17,885	3,550	136,760	136,760	26,913
2025	118,875	115,285	24,434	18,150	17,948	3,603	137,025	133,233	26,950
2026	122,204	116,819	25,118	18,658	18,269	3,703	140,862	135,088	27,704
2027	125,625	118,894	25,821	19,181	18,620	3,807	144,806	137,514	28,480
2028	129,143	121,215	26,544	19,718	19,000	3,914	148,860	140,215	29,278
2029	132,759	123,784	27,288	20,270	19,410	4,023	153,028	143,194	30,097
2030	136,476	126,604	28,052	20,837	19,850	4,136	157,313	146,454	30,940
2031	140,297	129,677	28,837	21,421	20,321	4,252	161,718	149,999	31,806
2032	144,226	133,007	29,645	22,021	20,824	4,371	166,246	153,831	32,697
2033	148,264	136,597	30,475	22,637	21,358	4,493	170,901	157,955	33,613
2034	152,415	140,449	31,328	23,271	21,925	4,619	175,686	162,374	34,554
2035	156,683	144,717	32,205	23,923	22,576	4,748	180,605	167,293	35,521
CAGR	**2.5%**	**1.8%**	**2.5%**	**2.7%**	**2.1%**	**2.7%**	**2.6%**	**1.8%**	**2.6%**

Table 4-9: Long-Term Energy & Power Demand Forecast - Medium Growth Scenario

FY	NGC			K-Electric			Country		
	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)
2024	118,875	118,875	24,434	17,885	17,885	3,550	136,760	136,760	26,913
2025	118,875	115,285	24,434	18,150	17,948	3,603	137,025	133,233	26,950
2026	123,392	118,008	25,362	18,840	18,451	3,739	142,232	136,458	27,974
2027	128,081	121,350	26,326	19,556	18,995	3,882	147,637	140,345	29,037
2028	132,948	125,021	27,327	20,299	19,581	4,029	153,247	144,602	30,140
2029	138,000	129,026	28,365	21,070	20,210	4,182	159,070	149,236	31,286
2030	143,244	133,372	29,443	21,871	20,884	4,341	165,115	154,256	32,475
2031	148,688	138,068	30,562	22,702	21,602	4,506	171,389	159,670	33,709
2032	154,338	143,120	31,723	23,564	22,368	4,677	177,902	165,487	34,990
2033	160,203	148,536	32,929	24,460	23,181	4,855	184,662	171,717	36,319
2034	166,290	154,324	34,180	25,389	24,043	5,040	191,680	178,367	37,699
2035	172,609	160,643	35,479	26,354	25,008	5,231	198,963	185,651	39,132
CAGR	**3.4%**	**2.8%**	**3.4%**	**3.6%**	**3.1%**	**3.6%**	**3.5%**	**2.8%**	**3.5%**

Table 4-10: Long-Term Energy & Power Demand Forecast – High Growth Scenario

FY	NGC			K-Electric			Country		
	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)
2024	118,875	118,875	24434	17,885	17,885	3,550	136,760	136,760	26,913
2025	118,875	115,285	24,434	18,150	17,948	3,603	137,025	133,233	26,950
2026	124,581	119,196	25,607	19,021	18,632	3,776	143,602	137,829	28,243
2027	130,561	123,830	26,836	19,934	19,373	3,957	150,495	143,203	29,599
2028	136,828	128,900	28,124	20,891	20,173	4,147	157,719	149,073	31,020
2029	143,396	134,421	29,474	21,894	21,034	4,346	165,289	155,455	32,509

FY	NGC			K-Electric			Country		
	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)	Base Energy (GWh)	Energy with Net Metering (GWh)	Peak Demand (MW)
2030	150,279	140,407	30,889	22,945	21,958	4,554	173,223	162,364	34,069
2031	157,492	146,872	32,371	24,046	22,947	4,773	181,538	169,819	35,705
2032	165,052	153,833	33,925	25,200	24,004	5,002	190,252	177,837	37,418
2033	172,974	161,307	35,554	26,410	25,131	5,242	199,384	186,438	39,215
2034	181,277	169,311	37,260	27,678	26,331	5,494	208,954	195,642	41,097
2035	189,978	178,012	39,049	29,006	27,660	5,757	218,984	205,672	43,069
CAGR	**4.4%**	**3.7%**	**4.4%**	**4.5%**	**4.0%**	**4.5%**	**4.4%**	**3.8%**	**4.4%**

Table 4-11: Long-Term Energy & Power Demand Forecast – Low DSM Scenario

FY	NGC			K-Electric			Country		
	Base Energy (GWh)	Load Factor (%)	Peak Demand (MW)	Base Energy (GWh)	Load Factor (%)	Peak Demand (MW)	Base Energy (GWh)	Load Factor (%)	Peak Demand (MW)
2024	118,875	55.5%	24,434	17,885	57.5%	3,550	136,760	58.0%	26,913
2025	118,875	55.5%	24,434	18,150	57.5%	3,603	137,025	58.0%	26,950
2026	122,204	57.0%	24,481	18,658	58.8%	3,625	140,862	59.5%	27,044
2027	125,625	58.4%	24,543	19,181	60.0%	3,649	144,806	60.9%	27,156
2028	129,143	59.9%	24,621	19,718	61.3%	3,674	148,860	62.3%	27,285
2029	132,759	61.3%	24,714	20,270	62.5%	3,702	153,028	63.7%	27,430
2030	136,476	62.8%	24,820	20,837	63.8%	3,731	157,313	65.1%	27,591
2031	140,297	64.2%	24,941	21,421	65.0%	3,762	161,718	66.5%	27,768
2032	144,226	65.7%	25,074	22,021	66.3%	3,794	166,246	67.9%	27,959
2033	148,264	67.1%	25,221	22,637	67.5%	3,828	170,901	69.3%	28,166
2034	152,415	68.6%	25,380	23,271	68.8%	3,864	175,686	70.7%	28,387
2035	156,683	70.0%	25,552	23,923	70.0%	3,901	180,605	72.0%	28,622
CAGR	**2.5%**	**2.1%**	**0.4%**	**2.7%**	**1.8%**	**0.9%**	**2.6%**	**2.0%**	**0.6%**

The Chart 4-2 shows peak demand projections of Low BAU, Low DSM, Medium and High growth scenarios:

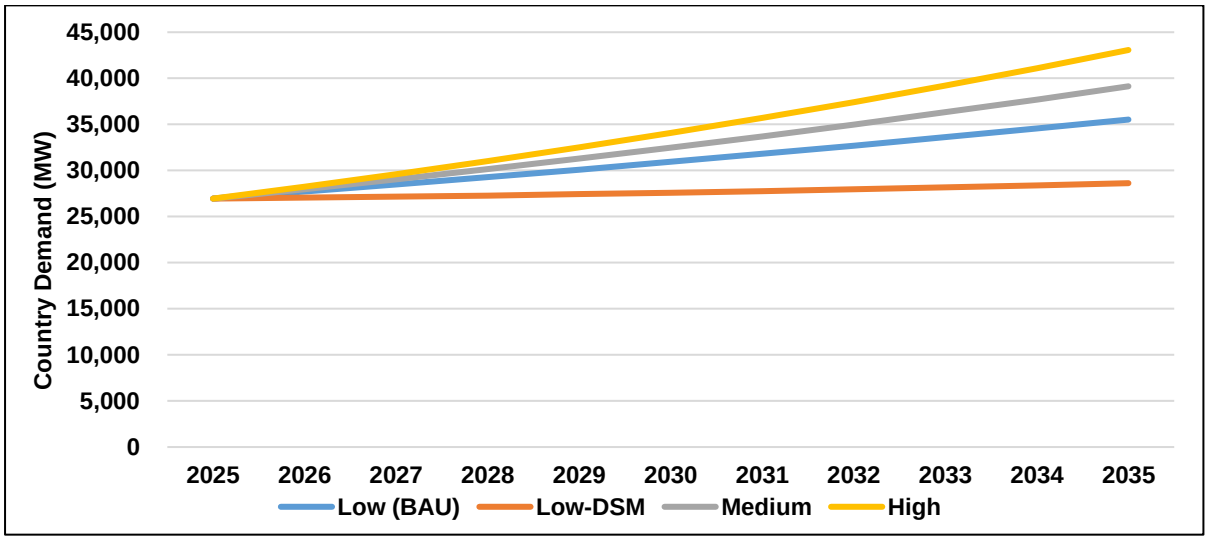

Chart 4-2: Peak Demand (MW) Forecast 2025-2035

4.9. Hourly Demand Forecast

Hourly demand forecast has been developed to cater for the intermittency of variable renewable energy sources. This is particularly important in view of the aggressive targets envisioned by the GoP pertaining to renewable energy. Hence, the demand forecast of 87,600 hours has been estimated for the plan horizon. In this process, the forecasted annual peak demand was converted into hourly demand based on the recent historical hourly demand and generation pattern which is then adjusted to cater for the upcoming net – metering connections in the country. The load duration curve for the fiscal year 2030 and 2035 is given Chart 4-3.

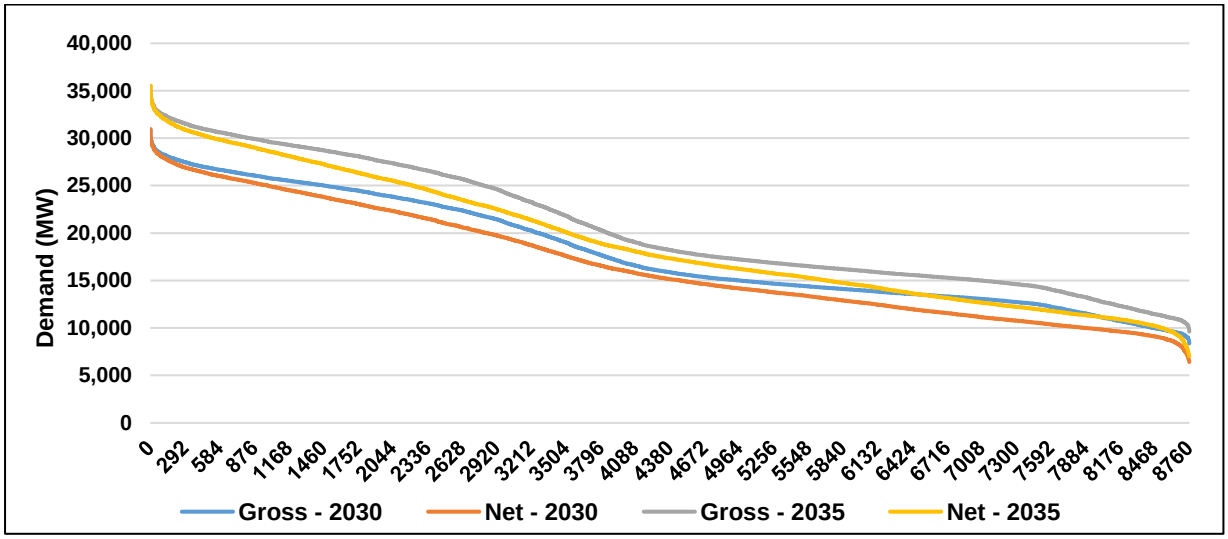

Chart 4-3: Load Duration Curve for 2030 & 2035

It is evident from the chart that net metering does not contribute to alleviating peak system demand. Nonetheless, it provides a notable reduction in total energy consumption, corresponding to the area between the gross and net load curves for each year. Furthermore, net metering contributes to a decrease in the system's base load requirements.

5. Inside the IGCEP

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5. Inside the IGCEP

The key objective of IGCEP is to develop a least cost, 10-year indicative generation capacity expansion plan for the whole country to meet the power and energy demand in a reliable and sustainable manner while maximizing use of indigenous resources for energy security. ISMO prepares this IGCEP every year to meet its regulatory requirement, as stipulated in the Planning Code-4 of the prevailing Grid Code, which takes into account the assumptions laid down in National Electricity Policy 2021 (NEP) along with some additional assumptions and identified constraints, if any. The plan is to be reviewed and approved by NEPRA – the electricity regulator. The following section describes the key parameters and results of the generation planning study.

5.1. Assumptions of IGCEP

The IGCEP 2025-35 was developed in alignment with the criteria laid down in the National Electricity Policy (NEP). Furthermore, a technical committee, constituted by worthy Secretary (Power Division) on November 30, 2023 and headed by CEO (CPPA-G) was tasked with scrutinizing the assumptions for the formulation of the IGCEP. This initiative aimed to alleviate the burden of surplus power on consumers. The committee comprised industrial experts and professionals from relevant power sector entities i.e., CPPA-G, NEPRA, PPIB, ISMO. Subsequently, after multiple rounds of committee meetings/discussion, due deliberation and mutual consensus among committee members the finalized assumptions to be analyzed under multiple scenarios and their different sensitivities, are listed below:

1. Served demand for the year 2023-24 is used as base value for the development of load forecast scenarios namely Low (Business-as-Usual), Low with DSM, Medium and High. These scenarios are derived from projected GDP growth rate scenarios.
2. Low (Business-as-Usual) demand scenario is used in the reference case.
3. Current fuel prices are used as per Merit Order of January 2025.
4. Future projections of fuel prices have been obtained from available international literature including EIA, Argus Media and Platts.
5. A power plant is considered as committed if it has obtained at least 10% both physical and financial progress along with:
    a. PC-1 approved with funding secured (Financial Commitment done) in public sector projects.
    b. Financial Close achieved in private sector projects.

6. A strategic power plant is included, based on Least Cost Violation criterion defined in National Electricity Policy, National Electricity Plan and NEPRA Procurement Regulations.
7. Capital Cost, Fixed (O&M), Variable (O&M) and Fixed FCC (local coal only) of all the projects have been taken as per
    a. Data / information provided by concerned project executing agency or
    b. NEPRA determined tariff or
    c. Data available with Power System Planning, NGC and CPPA-G or
    d. Latest cost number available for relevant technology in the market or
    e. Best international practices
8. Lead time for the candidate power projects has been assumed as follows:
    a. 2 years for Solar PV and Wind power projects.
    b. 4 years for Coal power projects.
    c. 5 years for Hydro power projects.
9. All the costs have been indexed as of December 2024.
10. Exchange Rate Devaluation, LIBOR / KIBOR, Discount Rate etc. have been adjusted as per NEPRA guidelines.
11. For certain power projects i.e., Chashma Nuclear C5, DBD HPP, Gabral Kalam HPP and Madyan HPP, instead of generic WACC (10%), actual WACC as per finalized loan terms and conditions has been considered.
12. Riali-II HPP has been considered as a committed project, since it has achieved significant on-site progress. However, the same will be omitted from the committed power projects category and will be treated as a candidate project (subject to optimization) if it fails to achieve Financial Close by June 2025.
13. Capital Cost of T/L associated with a candidate power plant is added in the capital cost of power plant for true reflection of cost to be parked to end consumer.
14. A candidate T/L is modelled along with relevant construction cost from:
    a. NGC to K-Electric
    b. South NGC to Mid-North NGC
15. For NGC system 8,120 MW Net Metering Capacity is considered on the supply side whereas for K-Electric system 900 MW Net Metering is considered on load side up to year 2035.
16. CASA-1000 is included as committed project.
17. 3,109 MW of REs (435 MW wind and 2,674 MW solar PV) of market-based induction against a demand of around 800 MW has been assumed.
18. Candidate hydro power projects up to 20 MW and connected below 132 kV (and hence, not in central dispatch) have not been included.

19. In order to cater for network requirements/constraints, some existing projects located near load centers have been considered as “Must Run”, for summer months, i.e., May to September until year 2027-28.
20. Contractual obligations of at least minimum annual dispatch are adhered for the following:
    a. 50% for existing low Btu gas-based Uch-II, Engro and Foundation.
    b. 50% for RLNG based projects Bhikki, Balloki and Haveli Bahadur Shah (HBS) until March 2032.
    c. 75% for RLNG based power project BQPS-III up till December 2025
    d. 75% & 50% for domestic gas-based SNPC-I and SNPC-II respectively.
21. Reliability criterion is used as per Grid Code 2023 i.e., LOLP of 1%.
22. Early termination of six (06) plants namely HUBCO, Atlas, Lalpir, Pakgen, Rousch and Saba has been considered.
23. A retirement plan for the power plants has been developed based on the latest available information.
24. BESS (Battery Energy Storage System) has been added for providing immediate power injection to stabilize frequency deviations and support power balance.
25. All years correspond to fiscal years e.g., 2025 is the fiscal year from July 1, 2024 to June 30, 2025.

5.2. Conditions for Optimized / Selected Power Projects

The following conditions are proposed herewith for all the candidate projects being optimized in revised IGCEP 2025-35 for consideration of Authority while issuing tariff:

a. The cost nos. (CAPEX & OPEX) approved by NEPRA for an optimized project shall either be equal or less than the cost used in IGCEP, if in any case the cost given by NEPRA to any optimized project is more than the one used in IGCEP, then a re-run shall be required to assess the viability / optimization of that very project on the new cost.

b. For issuance of LOS to the private sector projects and PC-1 approval of the public sector projects, the relevant agency must ensure that the project cost determined/approved by NEPRA shall either be less than or equal to the cost considered in IGCEP for that particular optimized project, otherwise, re-evaluation of the project on the basis of new cost shall be done.

c. In addition to above, it is re-iterated that selection of any generation project in IGCEP does not ensure any guarantee to execute that project which shall have to undergo approvals from all the relevant government authorities.

5.3. Adherence to Contractual Obligations

In order to develop an effective least cost generation capacity expansion plan that will meet the future power needs of the country, the IGCEP adheres to the existing obligations of at least minimum annual despatch of

a. 50% for existing low Btu gas-based Uch-II, Engro and Foundation.
b. 50% for RLNG based projects Bhikki, Balloki and HBS until March 2032.
c. 75% for RLNG based power project BQPS-III uptill December 2025
d. 75% & 50% for domestic gas-based SNPC-I and SNPC-II respectively.

5.4. Approach and Methodology

The development of the least cost generation capacity expansion plan is the process of optimizing i) existing and committed generation facilities; and ii) addition of generation from available supply technologies/options, which would balance the projected demand while satisfying the specified reliability criteria. For the purpose of the IGCEP, following methodology has been adopted as illustrated in Figure 5-1:

a. First Step: Review the existing generation facilities, committed power projects and explore the range of generation addition options available to meet the future demand.
b. Second Step: Determine the economically attractive / viable generation option (s).
c. Third Step: Define the Base Case subsequent to identification of the economically attractive options.
d. Fourth Step: Develop the least cost plan whilst considering the reliability criteria and reserve requirements under the already defined Base Case using the PLEXOS tool.

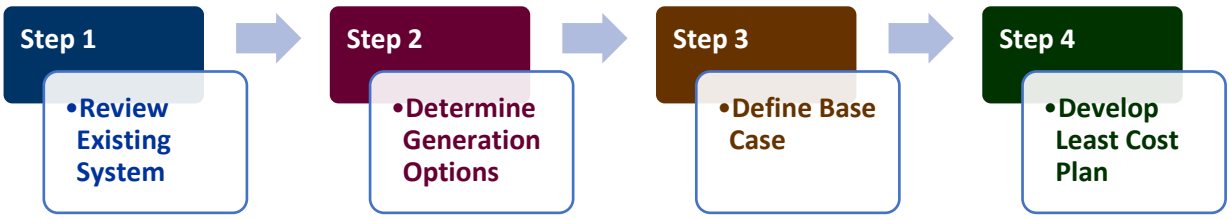

Figure 5-1: The IGCEP Data Modelling Approach

5.5. Planning Basis

The generation planning criteria tabulated in the Table 5-1 is adopted for this study.

Table 5-1: Generation Planning Criteria

Sr. #	Parameter	Value	Sr. #	Parameter	Value
1	Discount Rate	10%	4	CPI (US)	307.03
2	Loss of Load Probability	1%	5	NCPI (Local)	239.27

Sr. #	Parameter	Value	Sr. #	Parameter	Value
3	Dollar Rate (Dec. 2024)	Rs. 278.1	6	ENS	1%

5.6. Retirement of Existing Power Projects

A significant quantum i.e., 2,577 MW of the existing thermal power projects are scheduled to be retired from NGC system during the planning horizon of the IGCEP. The retirement schedule for the IGCEP 2025-35 is provided in the Table 5-2. For the purpose of the IGCEP, a power project stands retired as per its PPA/EPA term. Major retirement of generation capacity for the IGCEP 2025-35 corresponds to RFO based power projects, followed by Local Gas and then RLNG based power projects.

Table 5-2: Retirement Schedule of Power Projects in the Existing System

#	Name of Power Station	Installed Capacity (MW)	Fuel Type	Fiscal Year								
				25	27	28	29	31	32	33	34	35
NGC System												
1	KAPCO*	495	RLNG				✓					
2	Liberty	235	Gas			✓						
3	Kohinoor	131	RFO			✓						
4	FKPCL	157	RLNG						✓			
5	Uch	586	Gas					✓				
6	Altern Energy Limited	31	RLNG						✓			
7	AGL	163	RFO								✓	
9	Gael	136	RFO	✓								
10	Engro Qadirpur	223	Gas									✓
Total (MW)		**2,157**										
K-Electric System												
11	BQPS1-U5	210	RLNG		✓							
12	BQPS1-U6	210	RLNG							✓		
Total (MW)		**420**										

5.7. Candidate Generation Options

The candidate generation technologies, selected to be fed into the model, are as follows:

For NGC system:

a. Steam Turbine New Local Coal candidate (330 MW); reference – Thar Energy Limited (TEL) and CAPEX from upfront generation tariff for projects on Thar Coal

b. Steam Turbine New Local Coal candidate (660 MW); reference – SSRL Thar Block-1 and CAPEX from upfront generation tariff for projects on Thar Coal

c. Gas Turbine on RLNG (400 MW); reference – Punjab Thermal (Trimmu) Open Cycle Gas Turbine (operational data) and CAPEX as per data available with international source (JICA)

d. Combined Cycle Gas Turbine on RLNG (1263 MW); reference – Punjab Thermal (Trimmu) parameters

e. Nuclear Steam PP on Uranium (1,200 MW); reference – Chashma Nuclear (C-5)

f. Block of ≤ 1000 MW Wind Turbine each year from July 2027; Reference – Parameters as per latest competitive bidding carried out by K-Electric

g. Block of ≤ 1300 MW_p utility Solar PV each year from July 2027; Reference – Parameters as per latest competitive bidding carried out by K-Electric

h. Bagasse (Block of ≤ 100 MW); reference – operational parameters – Upfront Tariff 2022 and CAPEX from Shahtaj

For K-Electric system:

a. Steam Turbine New Local Coal candidate (330 MW); reference – Thar Energy Limited (TEL) and CAPEX from upfront generation tariff for projects on Thar Coal

b. Steam Turbine New Local Coal candidate (660 MW); reference – SSRL Thar Block-1 and CAPEX from upfront generation tariff for projects on Thar Coal

i. Wind Turbine (Block of ≤ 300 MW in July 2026 and Block of ≤ 100 MW each year till end of study horizon); – Parameters as per latest competitive bidding carried out by K-Electric shared by PPIB

j. Solar PV (Block of ≤ 300 MW_p in July 2026 and Block of ≤ 200 MW_p each year till end of study horizon); – Parameters as per latest competitive bidding carried out by K-Electric shared by PPIB

5.8. Hydro Projects and Screening

Data for hydro power projects was obtained from the relevant project executing agencies. Indexed Capital Cost and Annualized Cost as per latest NEPRA available indexation of 45 candidate hydro projects considered for optimization are presented in Annexure B-3 & Annexure B-5 respectively.

5.9.Performance Characteristics of Generic Thermal Candidates

Generic Candidate thermal options include Gas Turbines (GTs) using RLNG and Steam Turbines (STs) using Local Coal and Nuclear Fuel. In order to develop a least cost generation expansion plan, it is necessary to examine the economic viability of each thermal option and

select the least cost supply options taking into account technical characteristics, economic and financial parameters and operational requirements. Table 5-3 shows the performance characteristics of the thermal candidate projects.

Table 5-3: Performance Characteristics of Generic Thermal Candidates

	Performance Characteristics	Jamshoro Coal 2	Coal Fired Steam at Thar	Coal Fired Steam at Thar-K-Electric	Coal Fired Steam-II at Thar	Combustion Turbine on RLNG	Combined Cycle on RLNG	Generic Nuclear PP	Bagasse
A	Installed Capacity (MW)	660	660	330	330	400	1263	1200	100
B	Net Capacity (MW)	629	607	301	301	396	1224	1117	100
	Technical Parameters								
C	Heat Rate (GJ/MWh)	8.7	9.23	9.72	9.72	9.46	6.52	9.57	12.6
D	Forced Outage (Hrs %)	6.78	6.8	6.8	6.8	6.8	4	1	-
E	Economic Life (years)	30	30	30	30	30	30	60	30
	O&M								
F	Fixed ($/kW-year)	35.6	41 + 166.27*	40 + 166.27*	40 + 166.27*	31.65	32.63	57.92	15.37
G	Variable ($/MWh)	0.82	4.76	4.76	4.13	1.07	1.07	0	4.2
H	CAPEX ($/kW)	744	1656.23	1640	1728.29	567.45	720.7	3466	1054
I	Earliest availability (year)	2026	2029	2029	2029	2028	2029	2033	2027

**Fixed Fuel Cost Component (FCC) for FY 25, in subsequent years the cost changes*

All candidate thermal technologies are assessed and ranked in terms of annualized unit cost by using screening curve analysis. Screening curves are used to determine the best possible technology to be inducted at a particular time frame from the available supply options. Two types of screening curves are given below:

a. Annualized Cost ($/kW/year) - Screening Curve (Annexure B-4.1)

b. Unit Generation Cost (cents/kWh) - Screening Curve (Annexure B-4.2)

Although the mechanism of project selection by the tool is done through complex computations and optimization techniques, however, these curves give the generic idea / trend about the selection / viability of different candidate thermal power projects at various project factors.

These curves are the plots of unit generation cost on the y-axis and the project capacity factors on the x-axis. The total cost includes the annual capital recovery factor, fuel cost and annual

O&M cost. The projects are ranked for each range of operating factors i.e., base load, intermediate and peak load operation. The project ranked lowest is introduced / selected first and remaining projects follow based on increasing order of merit / rank as per the system requirement.

5.10. Candidate Transmission Line Options

Apart from examining the economic viability of each thermal option, assessment of new transmission line viability is also essential to select the least cost supply options taking into account economic and financial parameters.

Therefore, a generic candidate transmission line is modelled for NGC system from South to Centre/North as follows:

i. Build Cost of 550 USD/kW; Reference - Existing ±660 KV HVDC T/L

ii. Max Flow: 20, 000 MW

iii. Start Date: 1st July, 2028

iv. Economic Life: 30 years

Similarly, a generic candidate transmission line is modelled from NGC system to K-Electric system as follows:

i. Build Cost of 170 USD/kW; Reference – As shared by NGC

ii. Start Date: 1st July, 2028

iii. Economic Life: 30 years

5.11. Parameters of the Candidate REs

RE generation options include Solar PV and Wind. Solar PV and Wind technologies are modelled as candidates, subject to data provision by the relevant agencies. Table 5-4 shows the parameters of the candidate wind and solar PV projects.

Table 5-4: Parameters of Candidate Wind and Solar PV Projects

#	Technology	Installed Capacity	Earliest Availability	FO&M	Installed Cost	Annual Energy	Project Factor	Annualized Cost of Energy	
		(MW)	(Year)	($/kW-Yr)	($/kW)	(GWh)	(%)	(c/kWh)	($/kW-Yr)
1	Solar PV*	100	2027	10.37	489.04	199.73	22.8%	3.13	63.17
2	Wind	100	2027	25.3	995.71	367.92	42%	3.66**	136.88

Solar PV values are in MW_P
***Includes T/L cost also*

5.12. Existing Legal Framework for inclusion of strategic power plants

There are many legal frameworks which guide and control the least cost generation expansion of power sector. These legal instruments ensure the reliable supply of electricity and affordable cost of electricity to end consumer.

5.12.1. National Electricity Policy

Expansion in generation capacity shall be only on competitive and least cost basis except for strategic projects, for which:

(a) the qualification and methodology shall be provided in the National Electricity Plan,
(b) the federal Government, in consultation with the Provincial Governments, shall approve such projects on case-to-case basis and
(c) the relevant sponsoring Government shall provide the funding to bridge the incremental cost

5.12.2. National Electricity Plan

The proposed strategic projects shall be evaluated, to be declared as committed in IGCEP, based on the following:

a) **Qualification Criteria:** The project fulfills at least one of the following objectives:

i. security of energy supply;
ii. water – energy – food nexus;
iii. regional integration;
iv. municipal waste management.

b) **Methodology:** The incremental cost (beyond least cost), hereon referred to as LCV, of each strategic project shall be borne by relevant sponsoring Government / Provincial Government.

5.12.3. NEPRA Procurement Regulation

Strategic project(s) shall be included upon approval by the federal government in consultation with the provincial governments to classify the project(s) as strategic, and an undertaking of the sponsoring government to provide funding to bridge the incremental cost beyond the least cost of any such project.

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6. The IGCEP Study Output

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6. The IGCEP Study Output

The key objective of IGCEP is to develop a least cost, 10-year indicative generation expansion plan for the whole country to meet the load and energy demand in a reliable and sustainable manner while maximizing use of indigenous resources. NGC prepares this IGCEP every year to meet its regulatory requirement, as stipulated in the Planning Code 4 of the prevailing Grid Code, which takes into account the Assumption Sets as mentioned in section 5.2 and assumptions laid down in NEP. The plan is to be reviewed and approved by NEPRA – the electricity regulator. The following section describes the key parameters and results of the generation planning study.

6.1. Planning for the Decade Ahead

This section has been revised from the previous one to enhance clarity and improve readers' understanding. Multiple scenarios have been simulated, generation expansion sequences of each are discussed. Several sensitivities are presented demonstrating the impact of variations in key parameters. The results of these simulations are presented here to provide a comparative analysis of various generation sequences and future options. This approach aims to ensure a secure, reliable, economical, and sustainable electricity supply while transitioning towards cleaner energy.

6.2. Scenarios

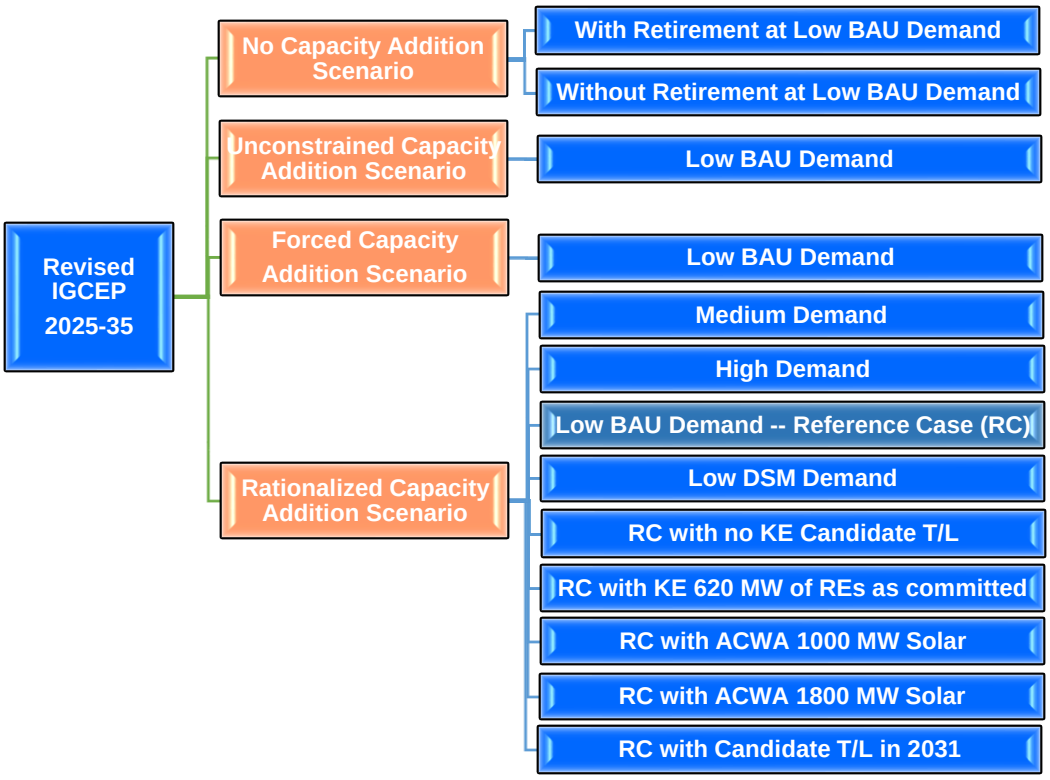


Figure 6-1: Scenario Flow Chart

6.2.1 Scenario – I: No Capacity Addition

This scenario was simulated to assess whether the existing generation capacity would be sufficient to meet the future load requirements adequately and reliably if no further generation is added over the planning horizon. In this regard, following sensitivities were conducted:

a. Sensitivity – I: Low BAU Load Forecast with retirements as per PPA
b. Sensitivity – II: Low BAU Load Forecast without any retirements

Table 6-1: Comparison of Results by 2035

Description	**Sensitivity-I**		**Sensitivity-II**	
Total (Billion US $)	45.14		45.31	
Fixed Cost (Billion US $)	19		19	
Generation Cost (Billion US $)	26		26	
Capacity/Generation	**MW**	**GWh**	**MW**	**GWh**
Imported Coal	4,680	29,241	4,680	27,156
Local Coal	3,300	18,026	3,300	18,026
RLNG	8,224	27,654	9,327	26,850
Gas	1,656	9,605	2,477	14,699
Nuclear	3530	24,866	3,530	24,866
Bagasse	400	949	400	946
Solar	8,870	13,167	8,870	13,167
HPP	11,804	45,720	11,804	45,720
Wind	1,842	5,560	1,842	5,560
RFO	819	1,644	1,110	1,107
Total	45,125	176,431	46,230	178,097
% RE	24%	11%	23%	11%

Table 6-2: Energy Not Served

Year	**Sesitivity-I**			**Sesitivity-II**		
	GWh	**ENS**	**ENS (%)**	**GWh**	**ENS**	**ENS (%)**
2025	136,823	0	0.0%	136,823	0	0.0%
2026	140,473	0	0.0%	140,473	0	0.0%
2027	144,245	0	0.0%	144,245	0	0.0%
2028	148,421	0	0.0%	148,421	0	0.0%
2029	152,157	11	0.0%	152,168	0	0.0%
2030	156,294	106	0.1%	156,322	62	0.0%
2031	160,540	243	0.2%	160,586	94	0.1%
2032	164,951	643	0.4%	165,276	208	0.1%
2033	168,581	1,323	0.8%	169,402	424	0.2%
2034	172,485	2,112	1.2%	173,763	828	0.5%
2035	176,432	3,131	1.7%	178,097	1,456	0.8%

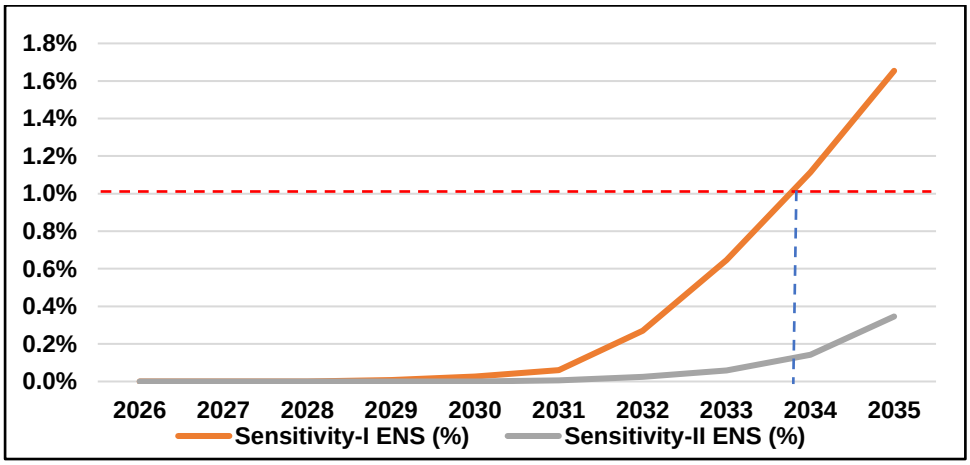


Chart 6-1: Energy Not Served (%)

6.2.1.1 Analysis:

The analysis is based on unserved energy reliability criteria which should be less than 1%, reveals that if the retirements are carried out as per PPA term, the system will not be able to adhere to LOLP (1%) reliability criterion as mentioned in Grid Code (2023). This will result in violation of LOLP (1%) criterion after the year 2034 and onwards, as evident in chart 6-1. However, by delaying / staggering the retirements using BAU demand or using DSM demand, the risk of demand supply deficit is mitigated within the planning horizon.

6.2.2 Scenario – II: Unconstrained Capacity Addition

This scenario is simulated without any commitment to generation projects, irrespective of its physical or financial progress, thus providing maximum flexibility to the tool in optimizing generation technologies / projects, hence, all the future generation capacity addition in this scenario is purely on least cost basis. The results of are summarized as follows.

Description	**Value**	
Fixed Cost*	26.12	
Variable Cost	13.02	
Total	**39.14**	
	MW	**GWh**
Imported Coal	4,680	4,305
Local Coal	3,300	11,264
RLNG	8,224	1,322
Gas	1,656	4,448
Nuclear	4,730	33,452
Bagasse	400	908
Solar	9,304	14,036
HPP	16,312	67,634
Wind	11,725	41,892
RFO	819	0
Total MW	**61,150**	**179,260**
% RE MW	62	69

The detailed results are presented in Annexure-C

6.2.3 Scenario – III: Forced Capacity Addition

A project is considered as committed, if it fulfills at least one of the following pre-requisites:

- Private sector projects having either financial close or under construction with a valid Letter of Support (LOS) along with a signed Project document (EPA/PPA and IA).
- Public sector projects having either strategic importance or under construction with PC-1 approved and financing arranged.
- Government to Government (G2G) projects.
- Wind and Solar PPs listed in Category I & II of CCoE's decision dated 4th April 2019.
- A yearly block of 100 MW of new/disruptive/nascent technology from the year 2028 and onwards, till the end of study horizon.

Table 6-1: List of Additional Committed Projects in Forced Capacity Addition

#	Name of Project	Fuel Type	Agency	MW	Status	Expected COD
1	Kathai-II (U#1)	Hydro	PPIB	4	LOS (Issued)	Jul-26
2	Kathai-II (U#2)	Hydro	PPIB	4	LOS (Issued)	Jul-26
3	Gwadar	Imported Coal	PPIB	300	G2G/CPEC	Dec-27
4	Zorlu	PV	PPDB	100	Category-II Project	Dec-25
5	Access_Solar	PV	PPIB	11.52	Category-I Project	Dec-25
6	Access_Electric	PV	PPIB	10	Category-I Project	Dec-25
7	Safe Solae	PV	PPIB	10	Category-I Project	Dec-25
8	PV_Committed_A	PV	PPIB	600	Committed	Jan-27
9	PV_Committed_B	PV	PPIB	600	Committed	Apr-27
10	PV_Committed_C	PV	PPIB	1200	Committed	Nov-27
11	Siachen	PV	GoS	100	Category-II Project	Jun-28
12	Manjhand	PV	PPIB/ GoS	50	PC-1 Approved	Jun-28
13	Trans_Atlantic	Wind	PPIB	50	Category-II Project	Jun-28
14	Western	Wind	PPIB	50	Category-II Project	Jun-28
15	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-27
16	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-28
17	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-29
18	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-30
19	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-31
20	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-32
21	New Technology	To be decided	PPIB/PPDB	100	Committed	Jul-33

The detailed results are presented in Annexure-D.

6.2.4 Scenario – IV: Rationalized Capacity Addition

The results obtained from above scenarios show that the capacity would become excess in future. Consequently, the electricity tariff will touch the highest numbers making it unaffordable for a common person. Hence, there is a dire need to rationalize the capacity addition required to meet the future load demand. In this regard, only under construction power plants have been considered as committed, remaining all power plants are modelled as candidates for least cost selection by the planning tool. The following sensitivities are performed in this scenario:

a. **Sensitivity – I: Low DSM Load Demand** - This sensitivity analysis is conducted on the reference case, with the only modification in the load demand. In this case, the sensitivity is carried out using the Low DSM (Demand Side Management) demand - detailed results are presented in Annexure E.
b. **Sensitivity – II: Medium Demand** - This sensitivity analysis is conducted on the reference case, with the only modification being the load demand. In this case, the sensitivity is run using the medium demand - detailed results are presented in Annexure F.
c. **Sensitivity – II: High Demand** - This sensitivity analysis is conducted on the reference case, with the only modification being the load demand. In this case, the sensitivity is run using the High demand - detailed results are presented in Annexure G.
d. **Sensitivity – IV: No KE Candidate T/L** - This sensitivity analysis is based on the reference case, with the only modification being the exclusion of the candidate transmission line from NGC to KE - detailed results are presented in Annexure H.
e. **Sensitivity – V: KE 620 MW of REs as Committed** - This sensitivity analysis is based on the reference case, with the only modification being the consideration of 620 MW of solar and hybrid capacity as committed for KE - detailed results are presented in Annexure I.
f. **Sensitivity – VI: KE Candidate T/L in 2031** - This sensitivity analysis is based on the reference case, with the only modification being that the candidate transmission line from NGC to KE—originally available for optimization from July 2028 in the reference case—is now available for optimization starting in July 2031 - detailed results are presented in Annexure J.
g. **Sensitivity – VII: ACWA 1000 MW Solar Committed** - This sensitivity analysis is based on the reference case, with the only modification being the inclusion of the 1000 MW ACWA Solar project as a committed with LCV - detailed results are presented in Annexure K.
h. **Sensitivity – VII: ACWA 1800 MW Solar Committed** - This sensitivity analysis is based on the reference case, with the only modification being the inclusion of the 1800 MW ACWA Solar project as a committed with LCV - detailed results are presented in Annexure L.

6.3. Battery Energy Storage System (BESS) Requirement

The aggressive integration of distributed solar generation is rapidly transforming the operational dynamics of Pakistan's power system. While this shift aligns with the country's clean energy ambitions and offers potential benefits in terms of reduced emissions and localized generation, it also introduces complex challenges to grid stability, reliability, and financial sustainability. Distributed solar is inherently variable and intermittent, often causing voltage fluctuations, reverse power flows, and reduced predictability of net demand. These

effects are particularly acute in Pakistan's distribution networks, which were originally designed for unidirectional power flow. Technical complications such as overvoltage conditions, malfunctioning protection schemes, harmonic distortions, and phase imbalances are becoming more frequent, collectively degrading overall power quality. Furthermore, the growing complexity of voltage regulation and load forecasting adds to operational challenges for distribution companies, which are often under-resourced in terms of real-time monitoring and automation infrastructure.

Moreover, the emergence of the "duck curve", where solar generation declines sharply during the evening peak, creates steep net load ramping requirements that strain the operational capabilities of Pakistan's predominantly baseload generation fleet. In particular, nuclear and coal-fired power plants, which constitute a significant share of generation capacity, lack the operational flexibility to respond to such rapid changes in demand.

At the transmission level, these dynamics result in more frequent and pronounced frequency deviations, necessitating rapid dispatch interventions. However, frequent cycling and on-off switching of large-scale baseload plants, such as RLNG and coal-fired units, poses significant operational challenges and leads to technical inefficiencies. In many instances, these fluctuations also result in the breach of "must-run" contractual obligations, creating financial stress for power producers and inefficiencies in the fuel supply chain. The increasing penetration of inverter-based distributed solar further exacerbates the issue by displacing synchronous generators, thereby reducing system inertia. This loss of inertia diminishes the grid's natural ability to withstand frequency disturbances, increasing vulnerability to system instability during faults or other sudden events. In such a low-inertia environment, the grid becomes increasingly dependent on ancillary services such as Battery Energy Storage Systems (BESSs) and Flexible AC Transmission Systems (FACTS) to maintain frequency and voltage stability. Compounding these technical challenges is the limited visibility and controllability of behind-the-meter solar installations, which hampers the system operator's ability to maintain real-time situational awareness and execute effective grid control.

From a financial and regulatory perspective, the current net metering framework presents additional complications. In Pakistan's electricity tariff structure, distributed solar customers are often able to substantially reduce or entirely avoid paying the capacity component of the tariff. These charges are designed to recover fixed costs associated with generation and grid infrastructure, which remain in place regardless of actual consumption. However, under the net metering regime, customers are billed based on their net energy consumption, enabling them to offset not only the energy component but also the embedded capacity costs. Despite continued reliance on the grid during non-solar hours, these consumers do not contribute equitably to the recovery of fixed costs. This creates a structural revenue imbalance for utilities

and introduces cross-subsidization, whereby non-solar consumers bear a disproportionate share of the system's fixed costs.

Without a comprehensive and coordinated reform strategy, including grid modernization, flexible and dispatchable generation assets, improved forecasting tools, dynamic tariff design, and standardized integration protocols, the unchecked expansion of distributed solar resources may undermine the reliability, financial viability, and long-term sustainability of Pakistan's power sector. Addressing these challenges is critical to ensuring that the transition to cleaner energy remains technically sound, economically equitable, and operationally secure.

The requirement for Battery Energy Storage Systems (BESS) for IGCEP is determined in terms of both power capacity (MW) and energy capacity (MWh) to ensure grid stability and operational flexibility. During sudden generation losses (e.g., N-1 contingencies), BESS must limit the Rate of Change of Frequency (ROCOF) by injecting power rapidly. The required power capacity depends on the largest potential power deficit (e.g., losing the biggest generator) and the system's inertia, which is often critically low during winter off-peak periods due to reduced synchronous generation and high renewable penetration.

BESS energy capacity requirement is decided on power system need, amongst FFR duration is the key factor that determine how long BESS should support the grid before other reserves, such as secondary frequency response or spinning reserves, take over. Additionally, Variable Renewable Energy (VRE) forecast errors introduce uncertainty in system operation, requiring sufficient BESS energy storage to compensate for short-term forecasting deviations. Moreover, the increasing penetration of rooftop solar PV installations significantly alters demand patterns, leading to steeper evening ramp-up requirements when solar generation declines. The ramping capabilities of conventional generators, especially thermal power plants slower response, necessitate BESS support during sudden changes in net load. This additional BESS energy capacity manages ramping challenges and ensure smooth transitions in power system operations.

This section will quantify the required MW and MWh capacity of BESS based on these operational challenges, ensuring that the system remains resilient against contingencies, variability in renewable generation, and changing load profiles.

6.3.1 BESS power capacity Requirement

The BESS power capacity is primarily influenced by its role in reducing the ROCOF and responding to sudden power imbalances, particularly during N-1 contingency events with low system inertia, such as winter off-peak conditions. During such scenarios, the system's ability to withstand sudden changes in generation or load is reduced, making fast-response storage critical. A properly sized BESS should be capable of providing immediate power injection

within milliseconds to seconds to stabilize frequency deviations and support power balance before slower reserves from conventional generators responds ensuring secure power system operation.

This section determines the required BESS inverter capacity (MW) through time-domain simulations for ROCOF/inertia validation, considering an N-1 contingency as per grid code requirements that will secure power system operation. The analysis focuses on a low-load scenario when system inertia is at its minimum. K-2/K-3, being the largest single generating units, are classified as the N-1 contingency until 2029. With the integration of C-5 into the system at the end of 2030, the N-1 contingency requirement will increase. Taking into account the operating reserve requirements and the activation mechanisms of the current fleet of conventional generating units, the required BESS power capacity (inverter ratings) is illustrated in Chart 6-1 and in Table 6 along with its intended distribution in the North and South region.

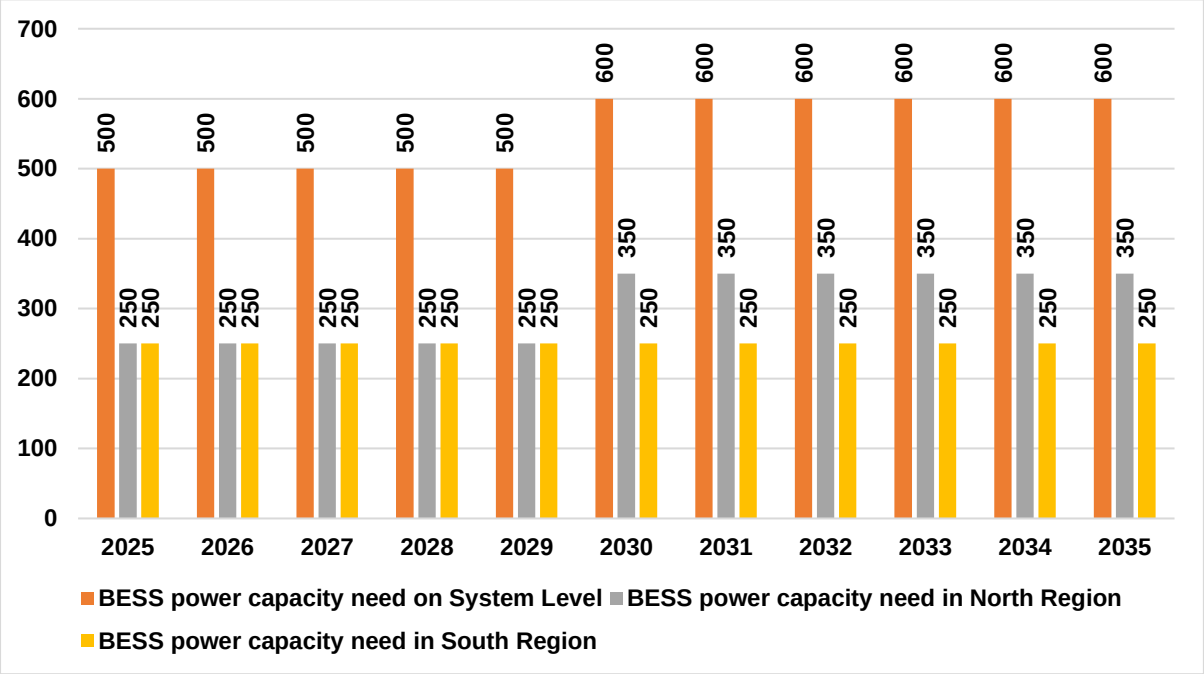


Chart 6-1: System and Region level BESS power capacity needed

Table 6-2: System and Region level BESS capacity needed

FY	BESS power capacity need on System Level	BESS power capacity need in North Region	BESS power capacity need in South Region
2025	500	250	250
2026	500	250	250
2027	500	250	250
2028	500	250	250
2029	500	250	250
2030	600	350	250
2031	600	350	250
2032	600	350	250

FY	BESS power capacity need on System Level	BESS power capacity need in North Region	BESS power capacity need in South Region
2033	600	350	250
2034	600	350	250
2035	600	350	250

6.3.2 BESS Energy Storage Requirement

BESS energy storage requirements are shaped by the duration of FFR, renewable forecast errors, and thermal generation ramp rate limitations. When determining the Fast Frequency Response (FFR) requirements for Battery Energy Storage Systems (BESS), several key factors are considered to ensure effective frequency stability. Proper FFR sizing is aligned with the Primary Frequency Response and other reserve mechanisms to ensure a coordinated and efficient approach to frequency control. A critical aspect of FFR is frequency nadir management, where the response is designed to limit the frequency nadir to no lower than 49.4 Hz during contingencies to avoid under frequency load shedding. This ensures that the system remains stable and within acceptable operational limits. Additionally, the response duration of FFR is crucial as it must remain active for at least 15 minutes until Automatic Generation Control (AGC) takes over, bridging the gap between the initial disturbance and AGC stabilization. The speed of response is another vital factor, as FFR must activate within milliseconds to seconds to mitigate rapid frequency drops and prevent cascading failures. As the share of renewable energy sources increases with increasing load demand, system inertia does not increase, making a higher FFR capacity essential to maintain grid stability. The integration of BESS for FFR plays a key role in addressing these challenges, ensuring a resilient and reliable power system in the presence of high renewable penetration.

Additionally, uncertainties in solar and wind forecasts necessitate operating reserves from BESS to compensate for forecast errors, as well as to manage the rapid load ramping caused by rooftop solar variability, particularly during the evening solar ramp-down when demand rises sharply. If thermal power plants are unable to provide adequate ramping support due to limited flexibility, BESS can fill the gap. However, relying primarily on BESS would require significantly larger storage capacity.

An optimal solution is to strategically allocate reserves among fast-ramping RLNG and coal power plants, especially in the absence of hydropower generation, alongside BESS to meet load ramping requirements. Considering these, the energy requirement from BESS is evaluated on a winter off-peak day when hydro generation is minimal and system inertia is at its lowest during certain hours. Chart 6-2 illustrates the daily system load from 2024 to 2034, while Chart 6-3 presents solar PV generation for the same period. Chart 6-4 shows the net load seen by generating units from 2024 to 2034. Over time, increased solar integration will result in the well-known "duck curve." While BESS can smooth out short-term variations, it cannot fully address long-duration imbalances without substantial energy capacity, which

would significantly increase its size and cost. Instead, power plants must be flexible enough to reduce output during peak solar generation and ramp up production when solar output declines.

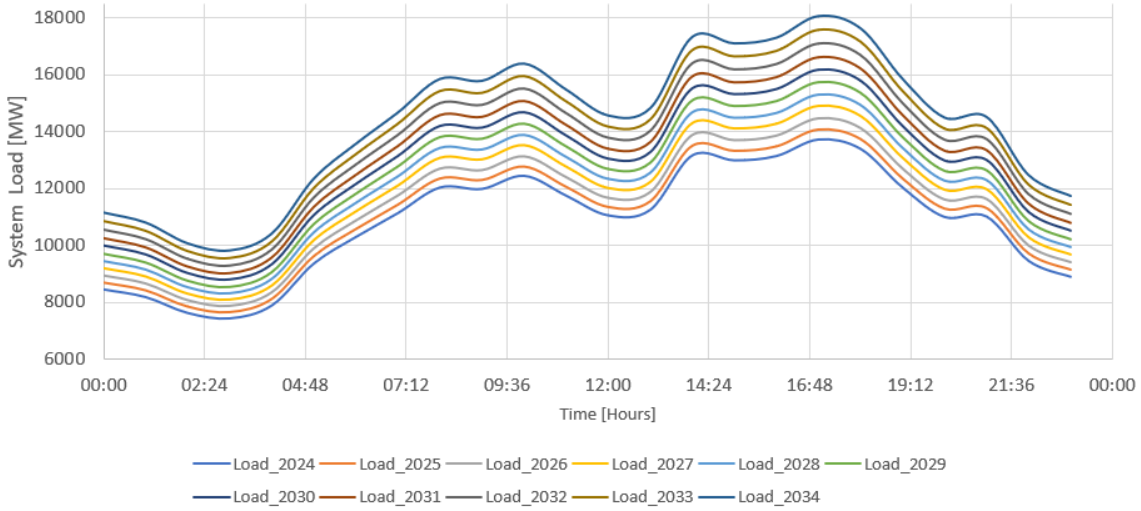


Chart 6-2: System load on winter off-peak day from year 2024 - 2034

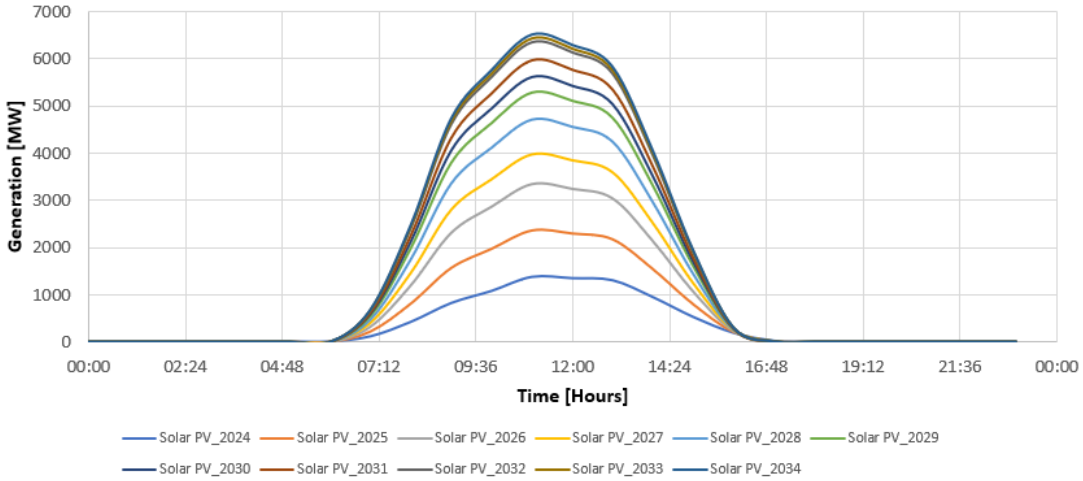


Chart 6-3: Solar PV generation on winter off-peak day from year 2024 - 2034

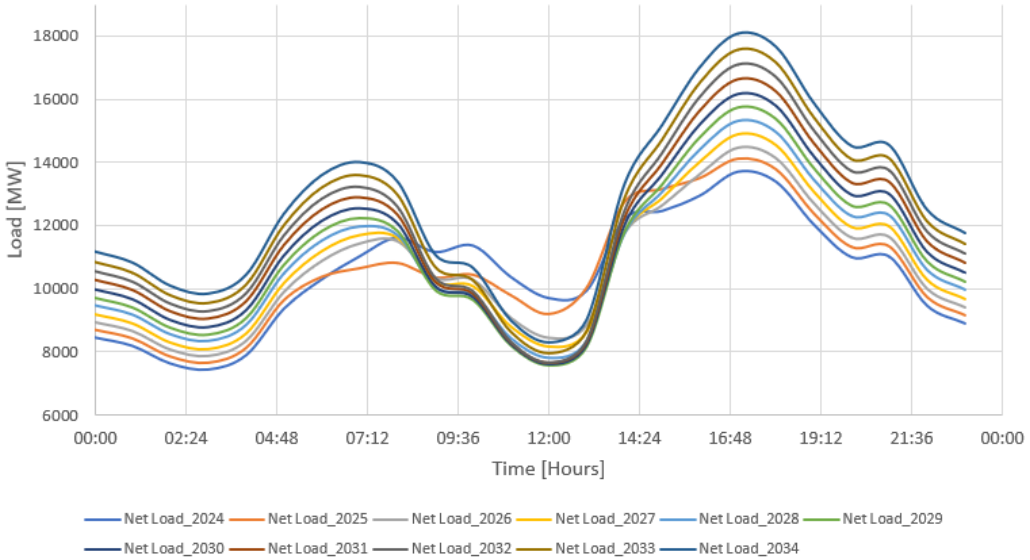


Chart 6-4: Net load on winter off-peak day from year 2024 – 2034

Considering solar PV integration and the capabilities of available generating units, the required BESS energy storage is shown in Chart 6-5. This figure illustrates the energy storage needed for fast frequency response (FFR), minimizing variable renewable energy (VRE) forecast errors, and managing load ramping when solar PV generation declines in afternoon. The figure shows that existing thermal units can handle the net load ramping requirements until 2027, despite the increasing integration of solar PV. However, after 2027, thermal power plants alone will not be sufficient to manage net load ramping, necessitating support from battery energy storage systems (BESS). The energy storage required from BESS after 2027 to meet net load ramping requirements as shown in Chart 6-5. The total system-wide energy requirement, along with its distribution across the northern and southern regions, is presented in Chart 6-6 and Table . The estimated cost for BESS is provided in Table 6-4.

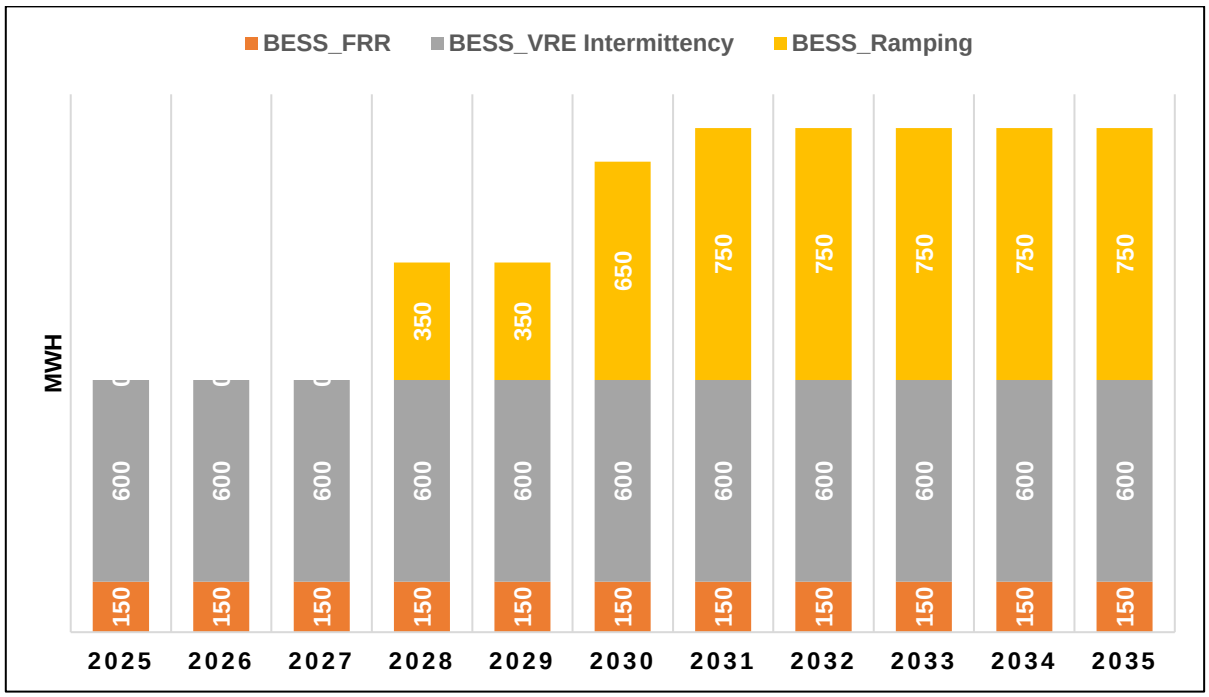


Chart 6-5: BESS MWh Requirement

Thermal power plants provide essential baseload generation and system inertia, while BESS plays a complementary role by delivering rapid response capabilities. BESS ensures fast compensation for sudden variations in solar output caused by cloud cover or sunset, helping maintain grid stability. Properly sizing the MWh capacity of BESS is crucial for balancing short-term fluctuations, enabling smooth transitions between generation sources, and ensuring efficient power system operation in a high-renewable environment.

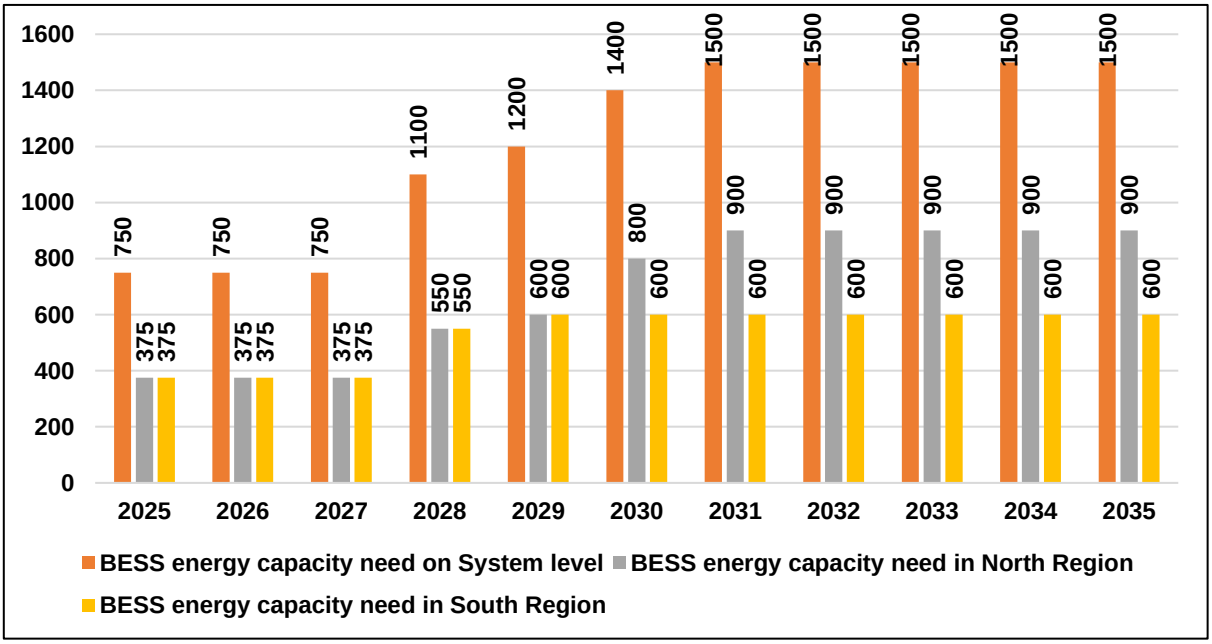


Chart 6-6: System and Region level BESS Storage Requirement

Table 6-3: System and Region level BESS Storage Requirement

FY	BESS energy capacity need on System level	BESS energy capacity need in North Region	BESS energy capacity need in South Region
2025	750	375	375
2026	750	375	375
2027	750	375	375
2028	1100	550	550
2029	1200	600	600
2030	1400	800	600
2031	1500	900	600
2032	1500	900	600
2033	1500	900	600
2034	1500	900	600
2035	1500	900	600

Table 6-4: Estimated cost for BESS

Years	BESS Requirement		Cost (million USD)
2025 - 2029	Inverter Requirement	500 MW	560
	Storage Requirement	1200 MWh	
2030 – 2034 (With C-5 integration)	Inverter Requirement (additional)	100 MW	140
	Storage Requirement (additional)	300 MWh	
2025 - 2034 Overall Requirement	Inverter Requirement	600 MW	700 + 210* = 910
	Storage Requirement	1500 MWh	

** The installation, contingency, and logistics cost is estimated to be 30% of the BESS cost*

6.4. Comparison of all scenarios

Four scenarios have been developed to facilitate the decision makers to reach an informed decision. Scenario-I is “No Generation Addition” scenario to assess whether the existing generation fleet can meet the forecasted load demand or not. Scenario-II is developed without any constraint which actually determines the boundary of the system with respect to minimum investment for sustainable supply of forecasted demand. Scenario-III comprise of projects forced as committed projects. Whereas, Scenario-IV is developed by including only under construction generation power plants as committed. This scenario is the most critical for planners and multiple sensitivities are performed on this scenario for the planner to carefully choose the best least cost option for future investments and generation additions.

The installed capacities for all the scenarios for the year 2034-35 are summarized as category-wise in the table 6-5 for comparison.

Table 6-5: Scenario-wise Installed Capacity (MW) by 2034-35

Category	Rationalized Capacity Addition (RCA)						
	Low BAU Demand	Medium Demand	High Demand	Low DSM	No KE Candidate T/L	KE Candidate T/L in 2031	KE 620 MW of REs as committed
Imported Coal	4,680	4,680	4,680	4,680	4,680	4,680	4,680
Local Coal	3,300	3,300	3,300	3,300	3,300	3,300	3,300
RLNG	8,224	8,224	8,224	8,224	8,224	8,224	8,224
Gas	1,433	1,433	1,433	1,433	1,433	1,433	1,433
Nuclear	4,730	4,730	4,730	4,730	4,730	4,730	4,730
Bagasse	400	400	400	400	400	400	400
Solar PV*	11,544	11,544	13,180	12,633	11,544	11,544	12,164
HPP	21,395	21,395	21,477	21,389	21,395	21,395	21,395
Cross Border	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Wind	5,133	8,935	11,478	3,285	4,320	4,817	4,479
RFO	819	819	819	819	819	819	819
Total (MW)	**62,657**	**66,459**	**70,720**	**61,893**	**61,844**	**62,341**	**62,623**

Category	No Capacity Addition	No Capacity Addition without Retirement	Unconstrained Capacity Addition	Forced Capacity Addition	ACWA 1000 MW Solar	ACWA 1800 MW Solar
Imported Coal	4,680	4,680	4,680	4,980	4,680	4,680
Local Coal	3,300	3,300	3,300	3,300	3,300	3,300
RLNG	8,224	9,327	8,224	8,224	8,224	8,224
Gas	1,656	2,477	1,433	1,433	1,433	1,433
Nuclear	3,530	3,530	4,730	4,730	4,730	4,730
Bagasse	400	400	400	1,100	400	400
Solar PV*	8,870	8,870	9,304	11,552	12,544	13,344
HPP	11,804	11,804	16,312	21,395	21,395	21,395
Cross Border	0	0	0	1,000	1,000	1,000
Wind	1,842	1,842	11,725	4,910	4,502	4,711
RFO	819	1,110	819	819	819	819
Total (MW)	**45,125**	**46,230**	**60,927**	**63,442**	**63,026**	**64,035**

6.5. Financial Analyses:

The cost comparison of these scenarios is presented in the table below.

Table 6-6: Total PV Cost Comparison of all Scenarios

Sr. No.	Scenario / Sensitivity	PV (Billion US$) *
Scenario		
1	No Capacity Addition	45.14
Sensitivity		
1(i)	No Capacity Addition without Retirement	45.31
Scenario		
2	Unconstrained Capacity Addition	39.14
3	Forced Capacity Addition	54.80
4	RCA with Low BAU Demand-Reference Case	47.13
Sensitivities		
4 (i)	RCA with Low DSM	46.90
4(ii)	RCA with Medium Demand	48.97
4(iii)	RCA with High Demand	51.20
4(iv)	RCA with No KE Candidate T/L	47.52
4(v)	RCA with KE 620 MW of REs as committed	47.32
4(vi)	RCA with KE Candidate T/L in 2031	47.32
4(vii)	ACWA 1000 MW Solar	47.00
4(viii)	ACWA 1800 MW Solar	47.07

The Scenario/Sensitivity (Sr. No. 4, 4(vii) and 4(viii)) are simulated by including strategic projects (i.e., C-5, Diamer Bhasha, ACWA 1000 MW Solar and ACWA 1800 MW Solar), included based on Least Cost violation (LCV).

6.6. Least Cost Violation:

Following is the table showing the LCVs mentioned in section 6.5. The table shows that for Scenario 4 Diamer bhasha was included against its original CoD, on LCV basis, which is less than its original cost. Same is the case with ACWA 1000 and 1800 MW.

Table 6-7: Least Cost Violation

Reference	Project	Original Cost	Selection Cost	LCV
		Billion $		
Sceanrio 4	Diamir Bhasha-Reference Case	10.539	7.5375	3.0015
Sensitivity 4(vii)	ACWA 1000 MW	0.489	0.21	0.279
Sensitivity 4(viii)	ACWA 1800 MW	0.8802	0.396	0.4842

6.7. Detailed Results for Least Cost Rationalized Scenario (Scenario 4)

The detailed results for the recommended scenario are presented below.

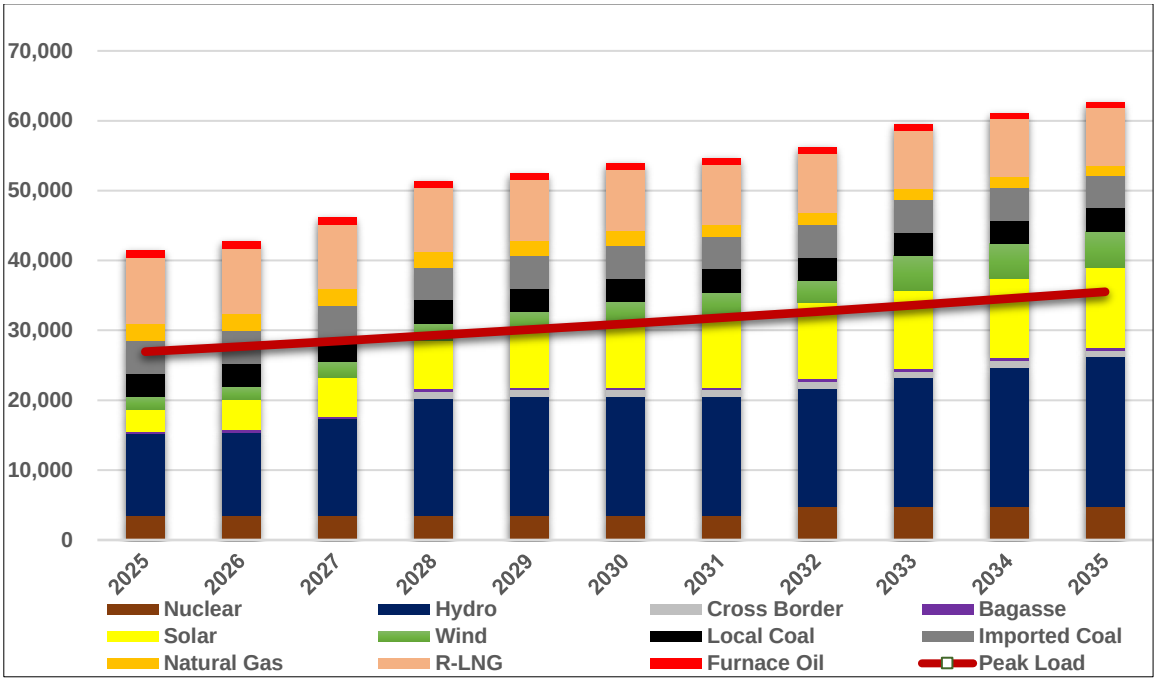


Chart 6-7: Annual Installed Capacity vs Demand (GWh) 2024-25 to 2034-35

Chart 6-7, shows that by the year 2034-35, 62,880 MW of the capacity demand is met, in which 61% of energy generation is contributed by RE sources comprising of 34% by hydro, 1% by bagasse, 8% by wind and 18% by solar PV. The remaining 39% is provided by conventional thermal sources.

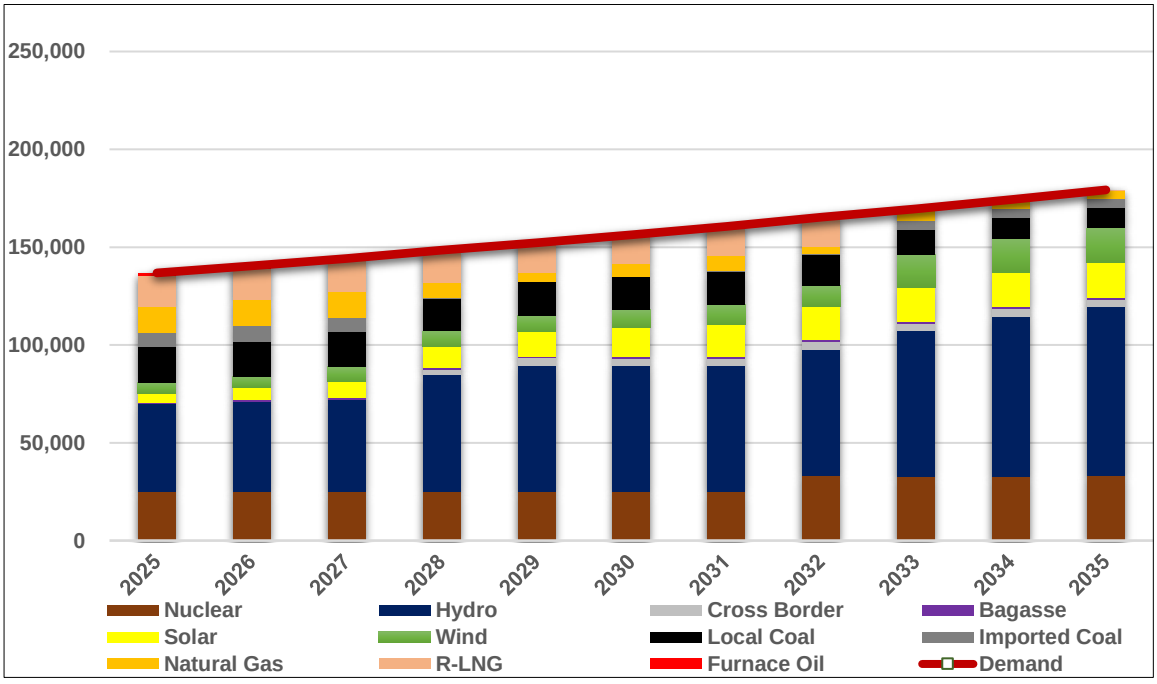


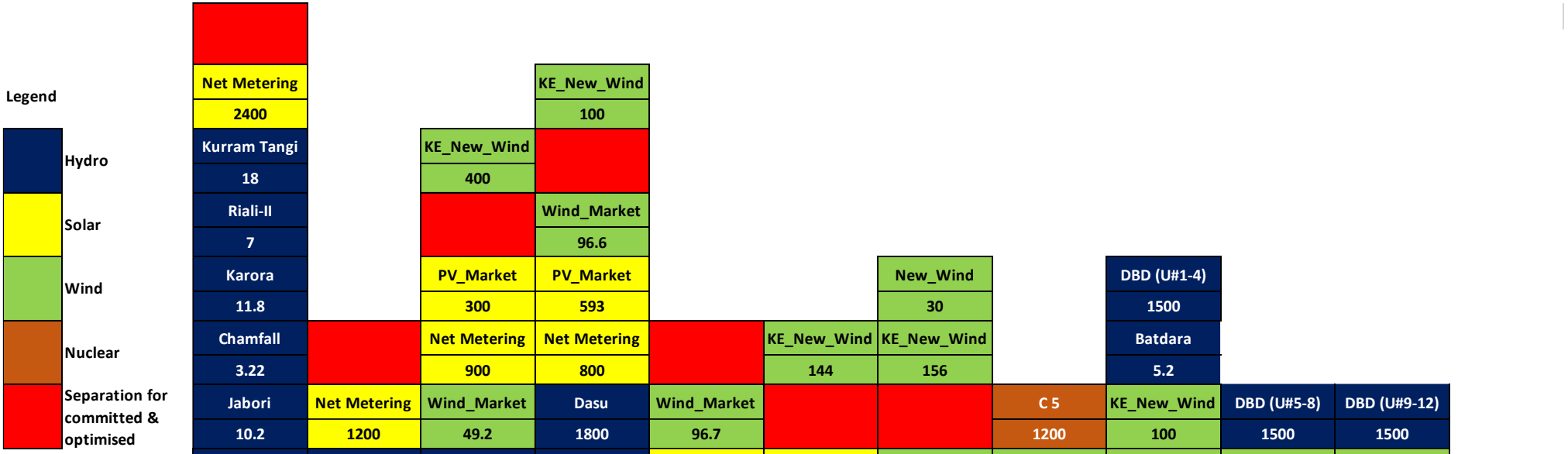
Chart 6-8: Annual Energy Generation vs Demand (GWh) 2024-25 to 2034-35

Chart 6-8, shows that by the year 2034-35, 179,259 GWh of the energy demand is met, in which 69% of energy generation is contributed by RE sources comprising of 48% by hydro, 1% by bagasse, 10% by wind and 10% by solar PV. The remaining 31% is provided by conventional thermal sources.

Table 6-7: Optimized Generation Capacity Additions (2025-35)

FY	Nuclear	HPP	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	2,400	-	-	2,400	2,400
2026	-	-	1,200	-	-	1,200	3,600
2027	-	-	900	-	400	1,300	4,900
2028	-	-	800	-	100	900	5,800
2029	-	-	700	-	-	700	6,500
2030	-	-	600	-	144	744	7,244
2031	-	-	500	30	156	686	7,930
2032	1,200	-	400	-	100	1,700	9,630
2033	-	1,505	300	1,625	100	3,530	13,160
2034	-	1,500	200	-	41	1,741	14,901
2035	-	1,500	120	-	159	1,779	16,680
Total	**1,200**	**4,505**	**8,120**	**1,655**	**1,200**	**16,680**	

** Net Metering is Committed*



	Net Metering			KE_New_Wind								
	2400			100								
	Kurram Tangi		KE_New_Wind									
	18		400									
	Riali-II			Wind_Market								
	7			96.6								
	Karora		PV_Market	PV_Market			New_Wind		DBD (U#1-4)			
	11.8		300	593			30		1500			
	Chamfall		Net Metering	Net Metering		KE_New_Wind	KE_New_Wind		Batdara			
	3.22		900	800		144	156		5.2			
	Jabori	Net Metering	Wind_Market	Dasu	Wind_Market			C 5	KE_New_Wind	DBD (U#5-8)	DBD (U#9-12)	
	10.2	1200	49.2	1800	96.7			1200	100	1500	1500	
	Koto	MR (U#1&2)	Tarbela_Ext_5	Mohmand	PV_Market	PV_Market	Wind_Market	KE_New_Wind	New_Wind	KE_New_Wind	KE_New_Wind	
	40.8	70	1530	800	593	593	96.6	100	1625	41	159	
	Jagran-II	Nardagian	MR (U#9&10)	Balakot	Net Metering	Wind_Market	PV_Market					
	48	3.22	70	300	700	96.6	593					
	Lawi	Gorkin Matiltan	Dasu (U#1)	CASA	MR (U#7&8)	Net Metering	Net Metering	Net Metering	Net Metering	Net Metering	Net Metering	
	69	84	360	1000	30	600	500	400	300	200	120	
Fiscal Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
Committed MW	2,608	1,357	3,209	5,390	1,420	1,290	1,190	400	300	200	120	17,483
Optimised MW	0	0	400	100	0	144	186	1,300	3,230	1,541	1,659	8,560
Total MW	2,608	1,357	3,609	5,490	1,420	1,434	1,376	1,700	3,530	1,741	1,779	26,043

Note: MR = Mangla Refurbishment, DBD = Diamer Bhasha Dam

Chart 6-9: Generation Addition Sequence (Committed and Optimised)

Due to limited space, in Figure 6-1, several projects (Hydro) being commissioned in the same year are combined together in the form of blocks for the purpose of reporting. The detail of these blocks, is provided in Table 6-2.

Break-up of Blocks

Sr.No.	Year	Block	Name of Project	Installed Capacity
				MW
1	2025	Riali-II	Riali-II (U#1)	3.5
2			Riali-II (U#2)	3.5
Total (2025)				**7**
1	2027	Tarbela Ext 5	Tarbela_Ext_5 U#1	510
2			Tarbela_Ext_5 U#2	510
3			Tarbela_Ext_5 U#3	510
Total (2027)				**1,530**
1	2028	Mohmand Dam	Mohmand Dam (U#1)	200
2			Mohmand Dam (U#2)	200
3			Mohmand Dam (U#3)	200
4			Mohmand Dam (U#4)	200
5		Dasu	Dasu (U#2)	360
6			Dasu (U#3)	360
7			Dasu (U#4)	360
8			Dasu (U#5)	360
9			Dasu (U#6)	360
Total (2028)				**2,600**

The final output of PLEXOS simulation, comprising year-wise addition of all committed and candidate power projects is given below in Table 6-3.

Table 6-8: PLEXOS Annual Addition of Power Projects 2025-2035

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
Generation Additions in 2028-29 (MW)			**1,420**	**1,420**			
Cumulative Addition up till 2029 (MW)			**14,486**	**14,486**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	144	144	KE	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**1433**	**1433**			
Cumulative Addition up till 2030 (MW)			**15,919**	**15,919**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	156	156	KE	Optimised	Jul-30
51	New_Wind	Wind	30	30	NGC	Optimised	Jul-30

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
Generation Additions in 2030-31 (MW)			**1,376**	**1,376**			
Cumulative Addition up till 2031 (MW)			**17,295**	**17,295**			
2031-32							
52	Net Meter	PV	400	400	NGC	Committed	Jul-31
53	C-5	Nuclear	1200	1117	PAEC	Optimised	Jul-31
54	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,700**	**1,617**			
Cumulative Addition up till 2032 (MW)			**18,995**	**18,912**			
2032-33							
55	Net Meter	PV	300	300	NGC	Committed	Jul-32
56	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
58	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-32
59	New_Wind	Wind	1625	1625	NGC	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**3,530**	**3,530**			
Cumulative Addition up till 2033 (MW)			**22,525**	**22,442**			
2033-34							
60	Net Meter	PV	200	200	NGC	Committed	Jul-33
61	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimised	Jul-33
62	KE_New_Wind	Wind	41	41	KE	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**1,741**	**1,741**			
Cumulative Addition up till 2034 (MW)			**24,266**	**24,183**			
2034-35							
63	Net Meter	PV	120	120	NGC	Committed	Jul-34
64	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimised	Jul-34
65	KE_New_Wind	Wind	159	159	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,779**	**1,779**			
Cumulative Addition up till 2035 (MW)			**26,045**	**25,962**			

6.8. Annual Capacity Factors

The annual capacity factors information based on the Installed Capacity for the corresponding year, as shows in the Table 6-4.

Table 6-9: Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.81	0.00	0.00	0.03	0.10	0.10	1.16	1.19	0.15
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.68	18.68	18.15	18.44	18.42	18.42	18.45
13	Atlas_Solar (Zhenfa)	PV	18.36	18.19	18.35	18.36	17.80	18.08	17.98	17.98	18.18
14	Best	PV	18.57	18.53	18.57	18.53	18.26	18.26	17.99	17.99	18.43
15	Crest	PV	18.82	18.78	18.77	18.77	18.51	18.26	18.25	18.25	18.56
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_ 8000	PV	16.71	16.70	16.71	16.71	16.70	16.71	16.69	16.70	16.71
20	New_Solar_ North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_ South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.22	17.18	16.68	16.93	16.68	16.92	17.22
24	Gharo	KE_PV	22.03	21.82	22.03	22.03	21.35	21.50	21.35	21.35	22.03
25	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Oursun	KE_PV	20.96	20.91	20.96	20.96	20.50	20.57	20.50	20.50	20.96
27	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
37	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
38	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
41	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.98
48	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	0.00	0.00	0.00	41.98	41.92	41.98	41.98	41.98
51	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.80	31.85	31.85	31.69	31.64	31.69	31.69	31.69
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
68	CASA	Interconnection	0.00	36.38	41.88	41.88	41.88	41.80	41.88	41.88	41.88
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	41.22	40.19	39.72
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.43	44.35	44.22	43.70	44.35	44.35
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.76	38.76	38.76	38.66	38.76	38.76	38.76
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.37	54.08	54.08	53.93	53.74	53.64	54.08
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.12	9.15	9.15	9.15	9.05	8.85	8.23	8.18
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
121	Jagran-I	Hydro Existing	49.49	49.35	49.49	49.49	49.49	49.27	48.26	46.88	46.70
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.37	45.36	45.48	45.46	45.41	45.25	45.37	45.35	45.37
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.22	40.11	39.76	40.22	40.22
125	Malakand-III	Hydro Existing	54.04	53.89	53.89	53.89	52.88	49.96	45.07	44.54	45.43
126	Mangla	Hydro Existing	62.49	61.50	55.12	54.51	54.42	54.34	54.34	54.42	54.51
127	Neelum Jehlum	Hydro Existing	53.48	53.33	53.44	53.44	53.44	53.33	53.44	53.44	53.44
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.49	55.34	55.49	55.49	55.49
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.59
131	Suki Kinari	Hydro Existing	51.17	51.03	51.17	51.04	51.03	50.90	51.03	51.03	51.06
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	28.01	14.87	11.10	11.73	11.93	9.33	9.45	7.22	4.12
136	Foundation	CCGT_Gas	76.27	53.66	53.66	53.66	68.72	53.66	53.65	53.66	53.66
137	Guddu-V (747)	CCGT_Gas	78.47	47.86	4.58	27.17	68.24	15.73	36.68	21.97	22.44
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	67.90	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	69.38	34.11	7.63	9.00	16.84	10.87	31.04	23.93	22.74
142	SNPC-II	KE_CCGT_Gas	71.92	37.05	8.18	9.51	17.61	12.35	31.39	25.42	23.36
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.24	89.97	89.91	89.81	89.84	88.85	88.03	89.11
153	C-2	Nuclear	90.00	90.24	89.97	89.91	89.81	89.84	88.85	88.02	89.16
154	C-3	Nuclear	90.00	90.23	89.97	89.89	89.82	89.85	88.90	88.08	89.10
155	C-4	Nuclear	90.00	90.23	89.97	89.91	89.82	89.85	88.90	88.08	89.14
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	87.80	84.37	85.68	87.92
157	K-2	Nuclear	85.07	85.29	85.03	84.94	84.82	84.69	83.45	82.97	84.02
158	K-3	Nuclear	85.07	85.29	85.03	84.94	84.82	84.74	83.56	83.13	84.02
159	NEW_Nuclear_North/ Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.44	82.80	83.45	82.11	81.36	79.28	68.81	48.55	38.91
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.54	81.22	81.23	79.92	79.66	77.41	65.26	34.99	32.02
166	Thar TEL	Local Coal	84.49	81.21	81.23	80.08	79.90	77.55	65.19	38.14	36.41
167	Thar-I (SSRL)	Local Coal	84.92	74.55	78.11	77.95	76.55	71.23	54.40	62.64	62.77
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	46.69	0.61	0.43	0.86	2.91	3.31	18.05	16.86	15.78
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.24	0.30	0.27	9.24	6.42	10.52
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	18.70	0.23	0.11	0.19	0.48	0.70	8.79	9.31	7.69
175	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.05	0.14	8.67	8.00	9.89
176	FPCL	KE_Imported Coal	21.87	23.54	2.60	2.74	2.77	2.84	8.68	7.93	7.45
177	Altern	Gas Engine_RLNG	0.19	0.86	0.57	2.24	4.51	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	38.75	33.92	43.95	45.66	42.12	41.70	0.30	0.14	0.00
179	Bhikki	CCGT_RLNG	14.30	20.62	21.68	16.85	20.11	21.42	0.00	0.00	0.00
180	FKPCL	CCGT_RLNG	12.24	12.63	0.60	2.39	4.71	3.23	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	13.20	3.31	3.76	4.81	6.28	6.48	0.00	0.00	0.00
182	Haveli	CCGT_RLNG	61.98	61.63	68.92	70.72	65.15	66.25	4.78	4.03	2.89
183	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.29	1.76	1.98	3.33	4.92	4.66	0.00	0.00	0.00
185	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	13.20	3.47	4.52	5.04	7.08	7.02	0.00	0.00	0.00
188	Saif	CCGT_RLNG	12.89	13.82	0.94	4.11	5.75	5.60	0.00	0.00	0.00
189	Saphire	CCGT_RLNG	13.13	2.76	3.46	4.60	6.12	5.86	0.00	0.00	0.00
190	Trimmu	CCGT_RLNG	5.24	9.21	8.39	7.34	10.45	9.14	1.78	0.92	0.92
191	BQPS2	KE_CCGT_RLNG	4.29	4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192	BQPS3	KE_CCGT_RLNG	14.22	14.64	0.59	0.65	0.69	0.77	1.05	0.93	0.84
193	KCCPP	KE_CCGT_RLNG	0.27	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.96	41.85	41.96	41.96	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.52	64.27	64.26	64.02	64.00
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	77.13	67.41	55.72
202	Gorkin Matiltan	Hydro_Committed	44.70	44.37	44.49	44.21	44.06	43.94	43.36	43.50	43.99
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.36	82.23	82.33	82.25	82.38
204	Jagran-II	Hydro_Committed	50.98	51.08	51.22	51.14	50.81	48.82	47.27	46.77	46.63

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
205	Karora	Hydro_Committed	71.09	71.77	71.90	71.11	70.94	70.81	69.91	70.41	71.07
206	Koto	Hydro_Committed	58.36	58.59	58.75	58.42	58.42	58.26	57.53	57.78	58.42
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	16.93	16.93	16.93
208	Lawi	Hydro_Committed	48.20	48.84	48.96	48.96	48.75	48.57	48.59	48.59	48.81
209	Mohmand Dam	Hydro_Committed	0.00	56.74	42.80	42.68	42.36	41.81	40.73	40.74	41.07
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.66	54.64	54.79	54.79	54.79	54.64	54.77	54.63	54.63
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

6.9. Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	1,390	-	-	-	1,125	52,465
2030	-	-	-	-	-	1,434	-	-	-	1,434	53,898
2031	-	-	-	-	-	1,376	-586	-	-	790	54,688
2032	-	-	-188	1,200	-	500	-	-	-	1,512	56,200
2033	-	1,505	-210	-	-	2,025	-	-	-	3,320	59,520
2034	-	1,500	-	-	-	241	-	-160	-	1,581	61,101
2035	-	1,500	-	-	-	279	-223	-	-	1,556	62,657
Total	3,300	21,395	8,224	4,730	4,680	17,077	1,433	819	1,000	62,657	

6.10. Carbon Emissions Reduction

Pakistan, like other South Asian countries, grapples with the challenges of a large and growing population, combined with rapidly growing energy needs. Heavily dependent on fossil-fuel imports, the country finds itself vulnerable to global oil price volatility and effects of increased carbon footprint due to power generation by fossil-fuel based technologies.

Pakistan has abundant renewable energy resources that can be utilized for power generation. Hydropower, with its potential in the Northern part of the country, has traditionally been the most prominent source of renewable energy in Pakistan. In addition to hydropower potential, Pakistan is blessed with huge variable renewable resources, however, its harnessing, in true sense, is yet to be materialized.

Pakistan ranks #26 globally, #11 in Asia, #2 among SAARC member states in carbon emissions index, with 200 $MtCO_2$ territorial emissions, all GHG emissions from a country's territory, apart from those associated with international aviation and shipping, in 2022 according to the Global Carbon Atlas.

IGCEP 2025-35 addresses the pursuit of low-carbon energy options, to sustain the relatively low carbon emissions, to bolster energy security and to spur sustainable economic growth. Based on the IGCEP output, carbon emissions have been calculated for existing and upcoming power generation for base case scenario as shown in Chart 7-6 and for all other scenarios. Carbon emissions in the country by power generation accounts for 0.278 kg-CO_2/kWh in FY 2024-2025 and this indicator reduces to 0.105 kg-CO_2/kWh by FY 34-35 which is even less than current average of OECD countries.

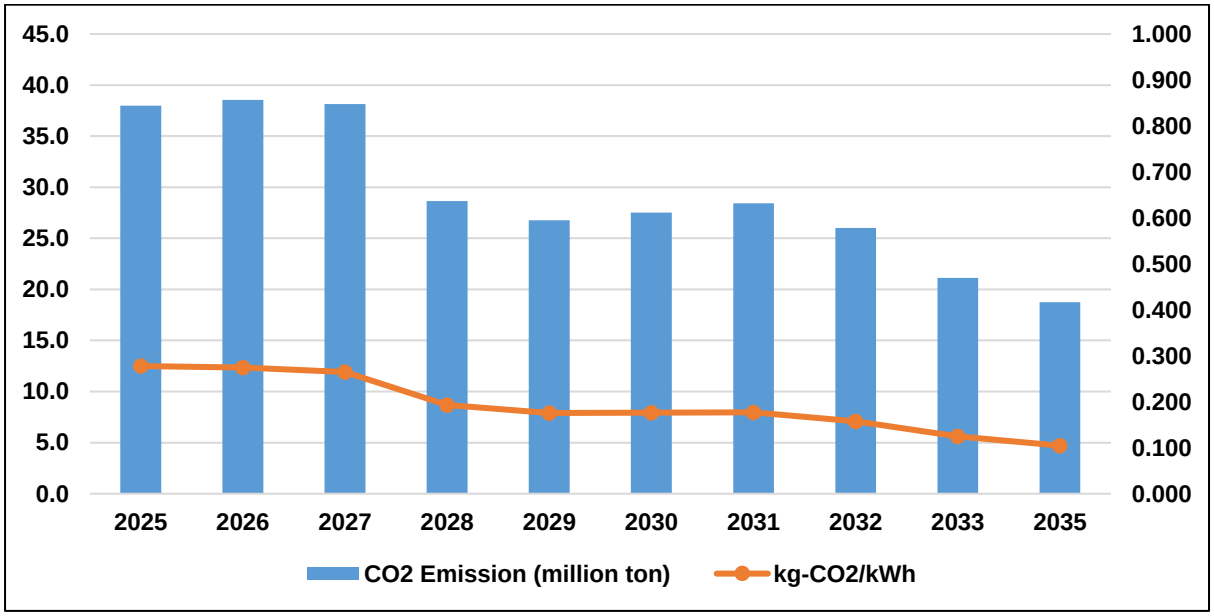


Chart 6-10: Annual CO_2 Emission

6.11. Year-wise Discounted and Un-Discounted Cost

The year wise cost breakup is shown in Table 6-10 and 6-11.

Table 6-11: Year wise Discounted Cost (Million US$)

FY	FO&M Cost	Generation Cost	Total Cost	Objective Function (Cumulative)*
2025	2,728	3,040	5,768	5,768
2026	2,475	2,664	5,139	10,907
2027	2,281	2,371	4,651	15,559
2028	2,128	1,704	3,833	19,391
2029	1,967	1,356	3,322	22,714
2030	1,802	1,265	3,067	25,781
2031	1,609	1,218	2,827	28,607
2032	1,579	1,061	2,640	31,248
2033	1,607	538	2,145	33,392
2034	1,508	445	1,954	35,346
2035	1,425	399	1,824	37,170

**CAPEX of committed power projects not included*

Table 6-12: Year wise Un-Discounted Cost (Million US$)

FY	FO&M Cost	Generation Cost	Total Cost	Objective Function (Cumulative)*
2025	2,728	3,040	5,768	5,768
2026	2,723	2,930	5,653	11,421
2027	2,760	2,868	5,628	17,049
2028	2,833	2,268	5,101	22,150
2029	2,879	1,985	4,864	27,015
2030	2,902	2,038	4,940	31,955
2031	2,850	2,158	5,007	36,962
2032	3,077	2,068	5,145	42,107
2033	3,445	1,153	4,597	46,705
2034	3,557	1,050	4,607	51,312
2035	3,695	1,035	4,730	56,042

**CAPEX of committed power projects not included*

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7. The Way Forward

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7. The Way Forward

A few suggestions are offered in this section to further enhance the contents and quality of the future editions of the IGCEP as well as the planning process on the whole.

7.1 Proposed Actions for the Future Generation Plans

a. For a sustainable power system and to reduce cost of electricity, instead of adding further generation capacity, more options for Demand Side Management (DSM) other than energy efficiency targets, provided by NEECA for the IGCEP 2024, shall be explored for next iterations of the IGCEP by coordinating and working closely with all relevant entities in the country.

b. Power generation policies should be regularly reviewed and updated to align the policy instruments with the latest trends in generation technologies and other factors that can influence both the demand and supply side of the electricity business.

c. Access to relevant and quality data must be facilitated. A central data repository may be formed to facilitate planners and policy makers, having specific data privileges and to ensure access to quality data, for data modeling and decision making. In a similar vein, project execution entities should enhance and accelerate their response, with respect to provision of project data to NGC, for updating of the IGCEP, in a precise and timely manner.

d. Keeping in view the latest technological changes and latest advancements in the power supply and delivery business, customized trainings should be provided, especially for the power system planners, system operators, and DISCO staff.

7.2 Making Way for the High Share of Renewables in the Grid

In order to ensure indigenization of energy mix with higher share of clean energy, future plans are required to be aligned with international best practices pertaining to renewable energy.

7.2.1 Hybridization of Variable Renewable Energy Projects

a. Though not envisaged in the prevailing schemes, wind power projects can provide grid support such as frequency regulation, voltage regulation, and reserve power provided hybridization is opted with solar PV as well as battery energy storage. Grid impact and economic implication studies for individual wind power project will need to be carried out by the stakeholders.

b. The combination of wind and solar PV has the advantage that the two sources will complement each other since the peak operating times for each system occur at different times of the day and year. The power generation of such a hybrid system including battery storage, is more continuous i.e., fluctuates less in terms of time and frequency if these are developed and operated jointly. Enabling environment including regulatory and commercial arrangements as well as technical studies should be undertaken for this purpose to maximize the value of indigenous energy resources. The relevant project execution agencies should provide data hybrid RE technologies.

c. All the stakeholders including the sponsors should join hands on setting up and sustaining an energy forecasting system with consensus on some suitable business model for the above purpose. This will significantly help in combatting the existing challenges with respect to dispatch of renewable energy.

7.2.2. Operational Challenges and Solutions for VRE Integration

System operational performance and grid flexibility studies are required to be carried out for VRE intermittency management to ensure its optimal region wise penetration by considering ramping up/down capability by synchronous generators in the system and FACTS / BESS applications. The quantum and/or timelines of wind and solar may vary in future as a result of these studies.

In order to utilize huge renewable resource potential of Pakistan in a sustainable manner, the VRE projects supported by appropriate energy storage should be able to provide the following grid support:

a. Base load operation for certain number of hours.

b. Support in frequency control & regulation and maintaining the reactive power balance.

c. Reserve power even when the renewable resource is not available.

Further, those technologies should be promoted which can be manufactured locally with the ultimate goal of achieving manufacturing of complete WTG, solar PV and associated equipment. All stakeholders should try to maximize local value addition.

7.3 Focusing on Indigenization through Harnessing the Potential of Local Coal

Thar coal reserves are estimated by the Geological Survey of Pakistan to be approximately 175 billion tons – making it one of the largest lignite coal reserves in the world. Thar coalfield, Block II area has exploitable lignite coal reserves of 1.57 billion tons. The total mining capacity of the project is expected to be 20.6 MT/annum. (Source: Engro report).

The power system planners should be communicated, by the project execution agencies, of the study-based analysis of block-wise potential of Thar coal that can be exploited for generation of electric power so it can be adequately modelled in the generation capacity expansion software for the next iterations. Similarly, the precision and authenticity of data and information pertaining to hydrology of upcoming hydro power projects needs to be validated by the concerned project execution agencies in the most meticulous manner.

7.4 Revised Regulations for Net Metering with batteries

The addition of Net-Metering in the recent past has shown very aggressive trend which has also reduced the energy supply from interconnected grid. However, the present regulations governing the net-metering are showing a great loss to remaining grid connected consumers. Therefore, an amendment in the regulations is very necessary so that the financial burden of infrastructure development should be fairly shared by all the consumers. The Government and NEPRA are in a process to amend these regulations. The new policy or regulations should be developed in such a way that there is a balance between the both type of consumers.

7.5. Electric Vehicles Load

The policy for Electric Vehicles was approved in 2019 according to which 30% of the vehicles should be EVs until 2030. But the cost of EVs is much higher compared with other types, so the ground realities show that the implementation of the policy is negligible. In the iteration of IGCEP 2019-47, the load of EVs was calculated with extensive efforts and it was added to IGCEP then. But based on real data, the load of EVs is negligible and its adaptation is also negligible, hence the EVs load is not included in this IGCEP 2025. However, in next iteration, it may be included in IGCEP.

7.6. Enhancing Base Load With Industrial Development

Sustainability of base load is a key factor in power system planning. Industrial load should be around 50% for affordable and reliable electricity tariff. Industrial development also guarantees the economic development of country which further reduces the burden of imports in the form of foreign exchange. This will help to elevate the social standards of the people of country.

Similarly, the regulations regarding subsidy in gas for captive power plants needs to be revised so that high efficiency grid connected power plants could supply the same industrial load. This will also help to increase the base load of power sector. Consequently, the end-consumer tariff will be reduced.

7.7. Thinking, Synergizing and Enhancing the Vision Beyond the Borders

It is a well-known fact that there is a severe lack of research culture in the country. It is high time that concrete initiatives are taken to inculcate a thinking culture in the power sector of Pakistan. Role of academia, which is currently restricted to at best a couple of initiatives, may be further encouraged and enhanced by launching certain projects especially envisioned for this purpose. Academia along with the established think-tanks may add much needed value to the power sector interventions in all three segments. For this purpose, securing maximum benefits from the regional and international experience is critical. Power sector professionals need to know the success as well as failure stories of rest of the world in order to customize the best strategies for power sector of Pakistan. Perhaps our professionals and decision makers need to understand that borders are not the hurdles but opportunities for exponential growth.

Annexures (A-L)

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Annexure A. Load Forecast Data

A-1.Projected GDP Growth Rate by Sector (%)

FY	Low (Business-as-Usual)				Medium				High			
	Tot	Com	Ind	Agr	Tot	Com	Ind	Agr	Tot	Com	Ind	Agr
2025	3.60	3.62	3.80	3.40	4.00	4.17	4.15	3.45	4.40	4.72	4.50	3.50
2026	3.70	3.68	4.00	3.50	4.25	4.36	4.65	3.65	4.80	5.03	5.30	3.80
2027	3.80	3.75	4.20	3.60	4.55	4.65	5.15	3.80	5.30	5.54	6.10	4.00
2028	3.74	3.80	4.10	3.30	4.72	4.85	5.55	3.70	5.70	5.89	7.00	4.10
2029	2.90	3.21	2.30	2.60	4.50	4.77	4.90	3.45	6.10	6.32	7.50	4.30
2030	3.20	3.38	3.00	2.90	4.85	5.08	5.40	3.75	6.50	6.77	7.80	4.60
2031	3.50	3.65	3.40	3.20	5.30	5.52	6.15	3.95	7.10	7.36	8.90	4.70
2032	3.60	3.75	3.50	3.30	5.45	5.70	6.30	4.00	7.30	7.60	9.10	4.70
2033	3.60	3.78	3.40	3.30	5.55	5.84	6.30	4.05	7.50	7.84	9.20	4.80
2034	3.40	3.58	3.20	3.10	5.50	5.77	6.30	4.00	7.60	7.87	9.40	4.90
2035	3.70	3.91	3.40	3.40	5.75	6.02	6.55	4.20	7.80	8.03	9.70	5.00
Avg.	**3.52**	**3.65**	**3.48**	**3.24**	**4.95**	**5.16**	**5.58**	**3.82**	**6.37**	**6.63**	**7.68**	**4.40**

A-2.Historical GDP at constant factor cost 2015-16, Consumer Price Index

FY	GDP				Consumer Price Index (CPI)	CPI (G.R)
	Total	Commercial	Industrial	Agriculture		
	(Rs. Million)					
1970	3,477,476	1,517,378	477,776	1,729,191	1.68	-
1971	3,520,384	1,556,098	508,239	1,676,108	1.80	7.40%
1972	3,602,006	1,611,306	500,689	1,734,279	2.01	11.40%
1973	3,846,978	1,766,671	552,502	1,763,158	2.30	14.60%
1974	4,133,676	1,939,625	598,978	1,836,870	2.90	26.30%
1975	4,294,016	2,134,321	610,694	1,797,951	3.56	22.60%

FY	GDP				Consumer Price Index (CPI)	CPI (G.R)
	Total	Commercial	Industrial	Agriculture		
	(Rs. Million)					
1976	4,433,709	2,165,345	640,637	1,878,401	3.77	5.90%
1977	4,559,744	2,230,936	659,513	1,925,846	4.11	9.00%
1978	4,912,256	2,465,328	722,262	1,980,167	4.40	7.20%
1979	5,183,791	2,615,929	777,330	2,041,501	4.81	9.30%
1980	5,563,617	2,770,440	861,038	2,176,410	5.35	11.20%
1981	5,919,785	2,952,677	941,818	2,256,034	6.15	15.00%
1982	6,367,416	3,185,884	1,042,956	2,362,607	6.63	7.80%
1983	6,799,664	3,480,310	1,094,458	2,466,669	7.10	7.00%
1984	7,069,819	3,755,140	1,171,753	2,347,665	7.57	6.70%
1985	7,685,466	4,052,662	1,263,542	2,604,130	8.16	7.80%
1986	8,174,492	4,286,484	1,365,891	2,759,042	8.44	3.50%
1987	8,649,496	4,537,778	1,483,977	2,848,812	8.92	5.60%
1988	9,206,192	4,844,842	1,629,723	2,926,623	9.57	7.40%
1989	9,648,855	5,029,418	1,705,522	3,127,690	10.35	8.10%
1990	10,091,613	5,254,644	1,815,185	3,222,480	11.29	9.10%
1991	10,653,444	5,528,425	1,939,678	3,382,383	12.72	12.60%
1992	11,475,327	5,902,079	2,089,644	3,703,754	13.91	9.40%
1993	11,735,975	6,175,579	2,204,839	3,507,972	15.18	9.10%
1994	12,268,880	6,435,085	2,304,984	3,691,351	16.99	11.90%
1995	12,775,892	6,743,837	2,320,908	3,933,790	19.05	12.10%
1996	13,618,986	7,080,474	2,430,537	4,394,954	21.01	10.30%
1997	13,850,875	7,336,143	2,422,634	4,400,387	23.63	12.50%
1998	14,334,813	7,456,814	2,570,784	4,599,181	25.16	6.50%
1999	14,934,552	7,829,010	2,697,295	4,688,803	26.09	3.70%
2000	15,517,929	8,154,084	2,731,596	4,974,532	27.42	5.1%
2001	15,823,202	8,406,031	2,844,471	4,866,220	28.11	2.5%

FY	GDP				Consumer Price Index (CPI)	CPI (G.R)
	Total	Commercial	Industrial	Agriculture		
	(Rs. Million)					
2002	16,315,604	8,806,394	2,921,215	4,871,251	29.16	3.7%
2003	17,086,643	9,265,776	3,044,976	5,073,273	29.72	1.9%
2004	18,365,293	9,806,968	3,540,180	5,196,531	32.23	8.5%
2005	20,010,403	10,639,778	3,969,088	5,533,564	35.05	8.7%
2006	21,174,660	11,329,945	4,132,022	5,882,009	37.73	7.6%
2007	22,347,017	11,962,655	4,451,424	6,083,380	40.37	7.0%
2008	23,461,708	12,553,428	4,828,575	6,193,327	49.06	21.5%
2009	23,546,340	12,720,576	4,577,158	6,409,945	57.42	17.0%
2010	24,153,955	13,128,428	4,733,888	6,424,659	63.22	10.1%
2011	25,029,238	13,645,735	4,947,262	6,550,711	71.85	13.7%
2012	25,989,532	14,245,756	5,073,292	6,787,987	79.76	11.0%
2013	26,946,755	14,977,029	5,111,364	6,969,568	85.63	7.4%
2014	28,039,002	15,644,927	5,342,921	7,143,565	93.01	8.6%
2015	29,176,784	16,327,237	5,619,686	7,295,725	97.22	4.5%
2016	30,508,205	17,261,613	5,939,636	7,306,957	100.0	2.9%
2017	31,914,207	18,232,012	6,213,295	7,468,900	104.8	4.8%
2018	33,859,620	19,317,324	6,783,864	7,758,432	109.7	4.7%
2019	34,916,041	20,284,070	6,800,675	7,831,296	117.2	6.8%
2020	34,586,665	20,038,838	6,409,966	8,137,860	129.8	10.7%
2021	36,572,644	21,241,331	6,910,607	8,420,705	141.3	8.9%
2022	38,755,090	22,555,934	7,407,709	8,791,447	158.5	12.2%
2023	38,927,390	22,816,361	7,191,050	8,919,979	204.7	29.2%
2024	39,684,694	22,914,547	7,231,017	9,539,130	252.1	23.1%

A-3.NGC System Category-wise Nominal Tariff (Rs/kWh)

NGC System Nominal Tariff (Rs/kWh)									
Year	Dom	Com	Ind	Agr	Year	Dom	Com	Ind	Agr
1973	0.20	0.27	0.14	0.10	1999	2.35	7.18	4.48	2.33
1974	0.20	0.32	0.18	0.11	2000	2.33	7.04	4.16	2.31
1975	0.21	0.36	0.21	0.12	2001	2.59	7.04	4.16	2.58
1976	0.23	0.46	0.28	0.16	2002	3.18	7.08	4.19	2.93
1977	0.25	0.53	0.34	0.16	2003	3.34	7.03	4.42	3.33
1978	0.24	0.60	0.37	0.14	2004	4.34	6.85	4.46	3.51
1979	0.29	0.72	0.46	0.21	2005	3.40	6.60	4.25	3.49
1980	0.35	0.95	0.57	0.28	2006	3.68	8.07	5.09	3.57
1981	0.40	1.00	0.63	0.32	2007	3.76	8.21	5.17	3.64
1982	0.42	1.08	0.68	0.36	2008	4.36	10.10	6.56	3.55
1983	0.43	1.18	0.76	0.38	2009	5.40	11.54	7.48	5.02
1984	0.44	1.21	0.76	0.43	2010	6.54	13.24	8.94	6.15
1985	0.44	1.23	0.78	0.38	2011	7.31	14.90	9.60	7.99
1986	0.49	1.43	0.92	0.43	2012	8.41	16.64	10.90	9.35
1987	0.48	1.40	0.89	0.37	2013	8.83	17.87	12.18	11.38
1988	0.52	1.71	1.11	0.40	2014	9.48	21.27	15.83	12.02
1989	0.62	2.13	1.33	0.46	2015	10.22	22.24	15.39	14.00
1990	0.66	2.46	1.50	0.55	2016	10.48	20.17	13.75	12.66
1991	0.76	2.76	1.66	0.57	2017	10.65	20.22	14.12	10.64
1992	0.81	3.16	1.89	0.63	2018	11.14	21.04	14.92	11.25
1993	0.84	3.31	1.99	0.66	2019	12.86	26.12	18.23	11.29
1994	0.96	3.86	2.29	0.74	2020	13.62	29.77	23.18	10.60
1995	1.10	4.27	2.68	0.94	2021	14.29	31.10	22.48	13.65
1996	1.36	5.37	3.36	1.31	2022	18.52	36.99	28.23	16.84
1997	1.56	5.66	3.75	1.63	2023	26.83	53.78	39.08	26.49
1998	1.85	6.55	4.11	1.87	2024	35.07	69.03	53.44	40.00

A-4.Category-wise Real Tariff

Real Tariff (Excluding K Electric) (Rs/kWh)									
Year	Dom	Com	Ind	Agr	Year	Dom	Com	Ind	Agr
1973	8.58	11.56	6.23	4.33	1999	9.00	27.53	17.19	8.95
1974	6.85	10.96	6.07	3.69	2000	8.51	25.66	15.18	8.43
1975	5.88	10.16	5.97	3.37	2001	9.21	25.03	14.79	9.17
1976	6.11	12.33	7.47	4.12	2002	10.92	24.29	14.36	10.04
1977	6.09	13.01	8.17	3.83	2003	11.24	23.65	14.87	11.20
1978	5.50	13.55	8.50	3.26	2004	13.46	21.25	13.84	10.89
1979	5.93	14.90	9.61	4.37	2005	9.70	18.83	12.13	9.96
1980	6.46	17.69	10.68	5.32	2006	9.75	21.39	13.49	9.46
1981	6.43	16.26	10.26	5.23	2007	9.31	20.34	12.81	9.02
1982	6.28	16.25	10.20	5.41	2008	12.43	28.83	18.72	10.14
1983	6.10	16.62	10.65	5.41	2009	14.32	30.58	19.83	13.32
1984	5.79	16.02	10.10	5.63	2010	16.21	32.79	22.14	15.23
1985	5.38	15.03	9.62	4.70	2011	10.18	20.74	13.36	11.11
1986	5.86	16.92	10.89	5.12	2012	10.55	20.87	13.66	11.72
1987	5.33	15.66	10.00	4.13	2013	10.31	20.87	14.22	13.29
1988	5.46	17.89	11.61	4.17	2014	10.19	22.87	17.02	12.92
1989	6.01	20.62	12.85	4.42	2015	10.51	22.88	15.83	14.40
1990	5.85	21.78	13.31	4.83	2016	10.48	20.17	13.75	12.66
1991	5.98	21.73	13.02	4.44	2017	10.16	19.29	13.47	10.16
1992	5.79	22.68	13.57	4.54	2018	10.15	19.18	13.60	10.25
1993	5.54	21.81	13.10	4.36	2019	10.97	22.29	15.56	9.63
1994	5.65	22.69	13.48	4.34	2020	10.50	22.94	17.86	8.17
1995	5.79	22.43	14.08	4.91	2021	10.17	22.13	15.99	9.71
1996	6.48	25.56	16.00	6.22	2022	11.87	23.70	18.09	10.79
1997	6.59	23.93	15.85	6.90	2023	13.11	26.27	19.09	12.94
1998	7.36	26.03	16.33	7.43	2024	13.91	27.38	21.20	15.87

A-5.Category-wise Electricity Consumption (Excluding K Electric)-GWh

Year	Dom	Com	Ind	Agr	Street-Light	Bulk	Others	Total
1970	367	125	1,646	956	20	487	0	3,600
1971	382	152	1,689	1,080	24	638	0	3,966
1972	392	142	2,109	997	75	422	0	4,137
1973	462	165	2,236	1,184	22	530	0	4,599
1974	523	179	2,267	1,142	20	569	42	4,742
1975	566	184	2,245	1,531	20	604	63	5,212
1976	678	222	2,262	1,386	26	697	45	5,315
1977	780	246	2,357	1,400	29	597	43	5,452
1978	1,004	305	2,596	1,718	42	784	42	6,490
1979	1,240	336	2,770	1,666	70	856	43	6,981
1980	1,564	389	3,154	2,057	50	900	46	8,160
1981	1,858	445	3,482	2,125	58	1,056	44	9,068
1982	2,408	574	3,960	2,357	74	873	42	10,288
1983	2,866	634	4,427	2,546	78	992	44	11,587
1984	3,470	739	4,708	2,663	75	1,069	38	12,762
1985	3,887	796	5,061	2,783	77	1,115	37	13,756
1986	4,513	875	5,894	2,880	90	1,215	36	15,504
1987	5,357	991	6,436	3,452	110	1,361	38	17,745
1988	6,290	1,054	7,236	4,394	117	1,571	40	20,702
1989	6,939	1,068	7,578	4,356	127	1,795	35	21,982
1990	7,647	1,106	8,360	5,004	148	1,646	38	24,121
1991	8,617	1,152	9,115	5,596	178	1,700	33	26,585
1992	9,691	1,192	10,213	5,823	229	1,799	29	29,267
1993	11,220	1,303	10,913	5,595	195	1,925	27	31,272
1994	11,963	1,318	10,532	5,743	216	1,964	27	32,131
1995	13,448	1,490	10,604	6,220	252	2,112	22	35,032
1996	14,792	1,648	10,335	6,657	301	2,377	20	36,925
1997	15,594	1,757	10,115	7,018	308	2,485	19	38,529
1998	16,367	1,768	10,238	6,888	307	2,694	16	39,422

Year	Dom	Com	Ind	Agr	Street-Light	Bulk	Others	Total
1999	16,927	1,825	9,945	5,575	159	2,646	15	38,900
2000	18,942	2,003	10,773	4,512	150	2,676	15	40,910
2001	20,019	2,120	11,744	4,896	146	2,634	14	43,384
2002	20,549	2,285	12,637	5,582	149	2,662	12	45,204
2003	20,855	2,516	13,462	5,986	166	2,626	10	47,421
2004	22,668	2,884	14,476	6,624	192	2,796	9	51,492
2005	24,049	3,192	15,568	6,921	227	2,892	12	55,278
2006	27,009	3,768	16,596	7,873	279	3,031	13	62,405
2007	28,944	4,289	17,603	8,097	316	3,252	13	67,419
2008	28,711	4,358	17,299	8,380	340	3,319	11	66,489
2009	27,755	4,203	16,035	8,695	347	3,188	10	65,248
2010	29,479	4,465	16,372	9,585	371	3,357	10	68,847
2011	30,972	4,683	17,700	8,847	374	3,607	10	71,642
2012	30,365	4,563	18,403	8,414	360	3,509	43	71,341
2013	30,329	4,435	18,636	7,548	351	3,659	60	70,481
2014	33,325	4,795	20,550	8,130	351	3,872	32	76,496
2015	34,567	4,853	21,086	7,866	330	3,909	33	78,071
2016	37,123	5,417	21,150	8,364	295	4,239	34	81,682
2017	41,412	6,114	20,067	9,063	298	4,566	31	86,628
2018	46,114	6,753	23,274	9,978	319	5,014	450	97,030
2019	45,590	6,629	24,285	9,676	291	5,082	2,335	98,844
2020	47,643	6,260	21,489	9,642	273	4,887	2,597	98,197
2021	49,814	6,688	24,663	10,116	314	4,973	2,802	99,370
2022	52,407	7,387	28,115	10,922	347	5,382	3,306	107,866
2023	46,153	7,074	25,738	9,477	474	5,150	3,272	97,338
2024	47,143	7,253	22,532	8,559	596	5,365	3,235	94,683

A-6.Category-wise Number of Consumers (Excluding K Electric)

Year	Dom	Com	Ind	Agr	Street Light	Bulk & Others	Total
1971	930,350	238,147	64,494	50,212	587	434	1,284,224
1972	998,922	258,328	67,056	52,343	663	477	1,377,789
1973	1,070,192	275,273	72,158	58,472	684	530	1,477,309
1974	1,137,676	300,219	78,277	63,730	718	534	1,581,154
1975	1,232,621	322,252	80,730	69,687	740	560	1,706,590
1976	1,347,122	347,167	85,250	76,508	801	524	1,857,372
1977	1,498,747	376,284	91,365	81,813	926	722	2,049,857
1978	1,670,213	422,901	95,036	90,341	1,018	832	2,280,341
1979	1,866,550	462,950	100,946	95,666	1,315	787	2,528,214
1980	2,049,728	471,757	101,228	98,268	1,477	821	2,723,279
1981	2,479,453	571,800	111,484	104,108	2,090	1,010	3,269,945
1982	2,732,903	624,900	115,890	111,278	2,161	1,118	3,588,250
1983	2,989,397	674,600	119,417	114,390	2,390	1,225	3,901,419
1984	3,261,362	724,462	123,508	118,265	2,511	1,428	4,231,536
1985	3,500,171	770,465	128,441	120,905	2,447	1,541	4,523,970
1986	3,779,838	834,127	133,573	124,918	2,647	1,684	4,876,787
1987	4,106,424	898,118	139,537	130,034	2,801	1,772	5,278,686
1988	4,525,987	964,377	147,439	136,860	3,017	1,943	5,779,623
1989	5,077,686	1,039,033	153,042	143,869	3,462	2,075	6,419,167
1990	5,467,690	1,088,932	158,800	149,554	3,453	2,250	6,870,679
1991	5,805,382	1,134,754	162,624	152,169	3,531	2,261	7,260,721
1992	6,219,656	1,185,723	169,436	155,305	3,759	2,362	7,736,241
1993	6,622,977	1,221,223	172,145	153,088	3,829	2,488	8,175,750
1994	6,995,561	1,257,887	174,577	157,710	3,730	2,577	8,592,042
1995	7,376,032	1,342,946	179,392	162,303	3,954	2,649	9,067,276
1996	7,783,832	1,344,975	181,092	165,114	3,990	2,728	9,481,731
1997	8,154,894	1,354,940	184,301	167,245	4,064	3,168	9,868,612
1998	8,455,442	1,396,973	186,539	170,562	4,645	2,911	10,217,072
1999	8,911,587	1,517,199	190,084	173,078	4,708	2,979	10,799,635

Year	Dom	Com	Ind	Agr	Street Light	Bulk & Others	Total
2000	9,553,828	1,653,870	194,566	174,456	4,892	3,045	11,584,657
2001	10,045,035	1,737,199	195,511	180,411	4,993	3,195	12,166,344
2002	10,482,804	1,803,132	199,839	184,032	4,854	3,361	12,678,022
2003	11,043,530	1,867,226	206,336	191,961	5,441	3,739	13,318,233
2004	11,737,078	1,935,462	210,296	198,829	5,800	3,873	14,091,338
2005	12,490,189	1,983,216	212,233	200,756	6,171	3,677	14,896,242
2006	13,389,762	2,068,312	222,283	220,501	6,550	3,753	15,911,161
2007	14,354,365	2,151,971	233,162	236,255	6,990	3,811	16,986,554
2008	15,226,711	2,229,403	242,401	245,640	7,337	3,874	17,955,366
2009	15,859,373	2,291,628	253,089	258,368	7,680	3,976	18,674,114
2010	16,673,015	2,362,312	263,507	271,268	8,034	4,088	19,582,224
2011	17,322,140	2,421,221	273,067	280,603	8,386	4,066	20,309,483
2012	17,978,395	2,482,702	286,401	286,287	8,698	4,128	21,046,611
2013	18,713,537	2,550,808	296,849	301,115	9,107	4,184	21,875,600
2014	19,323,307	2,635,086	305,294	310,578	9,369	4,236	22,587,870
2015	20,148,495	2,723,708	315,116	318,081	9,554	4,293	23,519,247
2016	21,040,707	2,814,234	325,816	321,055	9,857	5,030	24,516,699
2017	21,991,479	2,905,517	336,045	323,524	10,124	5,114	25,571,803
2018	23,173,856	3,028,054	339,853	315,021	10,426	149,335	27,016,545
2019	24,465,300	3,144,247	342,949	326,656	10,567	183,350	28,473,069
2020	25,803,759	3,245,508	348,087	344,690	10,932	204,393	29,957,369
2021	27,227,283	3,359,777	357,366	359,124	11,284	210,353	31,529,604
2022	28,743,039	3,475,468	367,736	369,356	11,807	222,390	33,189,796
2023	30,108,981	3,576,002	373,950	374,973	12,365	231,119	34,677,390
2024	31,868,378	3,678,978	279,455	380,964	12736	336,679	36,557,190

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Annexure B. Generation Planning Data

B-1(i) NGC Existing Installed Capacity (As of Nov 2024)

Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
Public Sector				
WAPDA Hydro				
1	Allai Khwar	Hydro	121	121
2	Chashma	Hydro	184	184
3	Dubair Khwar	Hydro	130	130
4	Ghazi Brotha	Hydro	1,450	1,450
5	Golen Gol	Hydro	108	108
6	Jinnah	Hydro	96	36
7	Khan Khwar	Hydro	72	72
8	Mangla	Hydro	1,070	960
9	Neelum Jehlum	Hydro	969	0
10	Tarbela 1-14	Hydro	3,478	3,478
11	Tarbela_Ext_04	Hydro	1,410	1,410
12	Warsak	Hydro	243	160
Sub Total: WAPDA Hydro			**9,331**	**8,109**
Small Hydro				
13	Gomal Zam	Hydro	17	17
14	Rasul	Hydro	22	22
15	Dargai	Hydro	20	20
16	Nandipur	Hydro	14	14
17	Shadiwal	Hydro	14	14
18	Chichoki	Hydro	13	13
19	Kurram Garhi	Hydro	4	4
20	Renala	Hydro	1	1
21	Chitral	Hydro	1	1
22	Jabban	Hydro	22	22
Total Small Hydro			**128**	**128**
Sub Total: WAPDA Hydro			**9,459**	**8,237**
GENCOs				
23	Guddu 747	Gas	747	486
Sub Total: GENCOs – II			**747**	**486**
24	Nandipur	RLNG	525	525
Sub Total: GENCOs – III			**525**	**525**

Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
Total GENCOs (Public Sector)			**1,272**	**1,011**
Nuclear				
25	CHASHNUPP - I	Nuclear	325	300
26	CHASHNUPP-II	Nuclear	325	300
27	CHASHNUPP-III	Nuclear	340	315
28	CHASHNUPP-IV	Nuclear	340	315
29	K-2	Nuclear	1100	1030
30	K-3	Nuclear	1100	1030
Sub Total: Nuclear			**3,530**	**3,290**
Private Sector				
Hydro IPPs				
31	Jagran - I	Hydro	30	30
32	Malakand - III	Hydro	81	81
33	New Bong	Hydro	84	84
34	Daral Khwar	Hydro	37	37
35	Gul Pur	Hydro	103	103
36	Patrind	Hydro	150	149
37	Ranolia	Hydro	18	17
38	Suki Kinari	Hydro	884	883
39	Karot	Hydro	720	713
Sub Total: IPPs Hydro			**2,107**	**2,097**
Thermal IPPs				
40	AGL	RFO	165	156
41	Balloki	RLNG	1223	1157
42	Bhikki	RLNG	1186	1130
43	China HUBCO	Imp. Coal	1320	1249
44	Engro	Gas	217	215
45	Engro Thar	Local Coal	660	602
46	FKPCL	RLNG	157	151
47	Foundation	Gas	178	174
48	Halmore	RLNG	215	200
49	Haveli	RLNG	1231	1180
50	HuB N	RFO	219	216
51	KAPCO	RLNG	495	495
52	Kohinoor	RFO	131	124
53	Liberty	Gas	235	222
54	Liberty Tech	RFO	200	196.139

Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
55	Nishat C	RFO	200	196
56	Nishat P	RFO	200	195
57	Orient	RLNG	218	206
58	Port Qasim	Imp. Coal	1320	1243
59	JPCL	Imp. Coal	660	620
60	Sahiwal Coal	Imp. Coal	1320	1231
61	Saif	RLNG	209	204
62	Sapphire	RLNG	209	204
63	Trimmu	RLNG	1263	1244
64	Uch	Gas	586	549
65	Uch-II	Gas	404	355
66	Lucky Coal	Local Coal	660	607
67	Thal Nova	Local Coal	330	301
68	Thar TEL	Local Coal	330	301
69	Thar-I (SSRL)	Local Coal	1320	1214
Sub Total (IPPs Fossil Fuels)			**17,061**	**16,137**
70	Shahtaj	Bagasse	32	32
71	Almoiz	Bagasse	36	36
72	Chanar	Bagasse	26	21
73	Chiniot	Bagasse	63	63
74	Fatima Energy (FEL)	Bagasse	120	108
75	Hamza	Bagasse	15	15
76	JDW - II	Bagasse	26	25
77	JDW - III	Bagasse	27	26
78	Ryk_Mills	Bagasse	30	30
79	Thal_Layyah	Bagasse	25	24
Sub Total Bagasse			**400**	**380**
Wind Power Projects				
80	Act/Tapal Wind	Wind	30	30
81	Artistic_Wind	Wind	50	50
82	Artistic_Wind-2	Wind	50	50
83	Dawood	Wind	50	50
84	Din Wind Energy	Wind	50	50
85	FFC	Wind	50	50
86	FWEL-I	Wind	50	50
87	FWEL-II	Wind	50	50
88	Gul Ahmed	Wind	50	50

Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
89	Gul Ahmed-II	Wind	50	50
90	Hawa	Wind	50	50
91	Indus	Wind	50	50
92	Jhimpir	Wind	50	50
93	Lakeside Wind	Wind	50	50
94	Liberty Wind-I	Wind	50	50
95	Master	Wind	50	50
96	Master Green	Wind	50	50
97	Metro_Wind	Wind	50	50
98	Metro_Wind-II	Wind	60	60
99	NASDA Green Wind	Wind	50	50
100	Sachal	Wind	50	50
101	Sapphire_Wind	Wind	50	50
102	Tapal Wind-2	Wind	50	50
103	Tenaga	Wind	50	50
104	Three_Gorges_I	Wind	50	50
105	Three_Gorges_II	Wind	50	50
106	Three_Gorges_III	Wind	50	50
107	Tricom	Wind	50	50
108	Tricon_A	Wind	50	50
109	Tricon_B	Wind	50	50
110	Tricon_C	Wind	50	50
111	UEP	Wind	99	99
112	Yunus	Wind	50	50
113	Zephyr	Wind	50	50
114	Zorlu_Wind	Wind	56	56
115	Liberty Wind-II	Wind	50	50
Sub Total (Wind)			**1,845**	**1,845**
Solar Power Projects				
116	Helios	Solar PV	50	50
117	HNDS	Solar PV	50	50
118	Meridian	Solar PV	50	50
119	Appolo Solar	Solar PV	100	100
120	Best	Solar PV	100	100
121	Crest	Solar PV	100	100
122	QA_Solar	Solar PV	100	100
123	Zhenfa	Solar PV	100	100

Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
Sub Total Solar Power Project			**650**	**650**
Import from Iran			**100**	**100**
Total Public Sector			**17,156**	**15,413**
Total Private Sector			**19,168**	**18,234**
Total Installed Capacity (MW)			**36,424**	**33,747**

B-1 (ii).K-Electric Existing Installed Capacity (As of Nov 2024)

K-Electric System				
Sr. No.	Name of Power Project	Fuel	Installed Capacity	Dependable Capacity
			(MW)	
1	SNPC-I	KE_CCGT_Gas	52	51
2	SNPC-II	KE_CCGT_Gas	52	52
3	FPCL	KE_Imported Coal	60	52
4	BQPS2	KE_CCGT_RLNG	573	493
5	BQPS3	KE_CCGT_RLNG	942	889
6	KCCPP	KE_CCGT_RLNG	248	212
7	KTGTPS	KE_CCGT_RLNG	107	92
8	SGTPS	KE_CCGT_RLNG	107	93
9	BQPS1-U5	KE_ST_RLNG	210	188
10	BQPS1-U6	KE_ST_RLNG	210	191
13	Gharo	KE_PV	50	50
14	Oursun	KE_PV	50	50
Total K-Electric System			**2,661**	**2,413**

B-2.Cost Data of Existing, Committed and Candidate Thermal Projects

#	Project Name	Category	Fixed O&M	Variable O&M	Fuel Cost	Heat Rate
			($/kW/Year)	($/MWh)	($/GJ)	(GJ/MWh)
Existing Power Projects						
1	Engro_Qadirpur	CCGT_Gas	71.62235	3.93	4.37	9.23
2	Foundation	CCGT_Gas	36	4.45	4.36	7.62
3	Guddu-V (747)	CCGT_Gas	23.87292	4.01	3.94	7.31
4	Liberty	CCGT_Gas	92.04	3.66	2.26	6.93
5	Liberty (Above 152 GWh)	CCGT_Gas	92.04	3.66	10.958	6.93
6	Uch	CCGT_Gas	189.0222	2.64	6.18	3.72
7	Uch Above 61 GWh	CCGT_Gas	189.0222	2.64	11.422	3.72
8	Uch-II	CCGT_Gas	36.79435	2.58	7.12	7.53
9	SNPC-I	KE_CCGT_Gas	118.86	7.1	3.45	8.64
10	SNPC-II	KE_CCGT_Gas	150.67	7.1	3.45	8.58
11	AGL	DG_RFO	34	10.94	12.83	8.4
12	HuB N	DG_RFO	38.20384	9.69	15.62	8.01
13	Kohinoor	DG_RFO	67.46926	7.44	12.97	8.86
14	Liberty Tech	DG_RFO	43.92306	11.86	14.3	8.4
15	Nishat C	DG_RFO	34.8732	10.77	13.87	8.29
16	Nishat P	DG_RFO	35.17424	10.79	13.59	8.41
17	GAEL	KE_DG_RFO	94.33	3.7	12.68	8.83
18	C-1	Nuclear	147.9441	0	0.63	10.91
19	C-2	Nuclear	144.6543	0	0.63	10.91
20	C-3	Nuclear	114.2652	0	0.63	10.91
21	C-4	Nuclear	113.1566	0	0.63	10.91
22	K-2	Nuclear	59.02576	0	0.63	10
23	K-3	Nuclear	59.83374	0	0.63	10
24	Engro Thar	Local Coal	40.2	4.76	1.76	9.73
25	Lucky	Local Coal	61.34563	2.5	4.69	9.23

#	Project Name	Category	Fixed O&M	Variable O&M	Fuel Cost	Heat Rate
			($/kW/Year)	($/MWh)	($/GJ)	(GJ/MWh)
26	Thal Nova	Local Coal	39.31	4.77	1.76	9.73
27	Thar TEL	Local Coal	39.31	4.77	1.76	9.73
28	Thar-I (SSRL)	Local Coal	37.45	4.32	1.69	9.23
29	China HUBCO	Imported Coal	78.69418	2.5	4.98	9.23
30	Jamshoro Coal 2	Imported Coal	35.6	0.82	6.5182	9.11
31	Port Qasim	Imported Coal	66.02791	1.4	5.26	9.19
32	Sahiwal Coal	Imported Coal	70.15976	1.38	6.29	9.06
33	FPCL	KE_Imported Coal	613.84	1.17	6.71	12.3
34	Altern	Gas Engine_RLNG	95.842	8.368	13.05	9.25
35	Balloki	CCGT_RLNG	31	1.6	12.27	6.58
36	Bhikki	CCGT_RLNG	30.99621	1.25	12.27	6.67
37	FKPCL	CCGT_RLNG	19.484	8.32	12.27	9.19
38	Halmore	CCGT_RLNG	34.48784	4.58	12.27	7.89
39	Haveli	CCGT_RLNG	32	1.43	12.27	6.51
40	KAPCO 495	CCGT_RLNG	19.484	2.2	12.27	8.62
41	Nandipur	CCGT_RLNG	26.46375	2.76	12.47	8.14
42	Orient	CCGT_RLNG	37.28047	2.68	12.27	7.98
43	Saif	CCGT_RLNG	32	4.56	12.27	8.01
44	Saphire	CCGT_RLNG	25	4.51	12.27	7.98
45	Trimmu	CCGT_RLNG	41	3.57	12.27	6.52
46	BQPS2	KE_CCGT_RLNG	143.42	2.5	14.31	8.74
47	BQPS3	KE_CCGT_RLNG	114.08	1.43	12.02	6.78
48	KCCPP	KE_CCGT_RLNG	157.13	6.35	14.31	8.76
49	KTGTPS	KE_CCGT_RLNG	77.19	6.74	13.01	9.48
50	SGTPS	KE_CCGT_RLNG	86.2	6.74	13.01	9.66
51	BQPS1-U5	KE_ST_RLNG	97.85	1.12	13.01	10.73
52	BQPS1-U6	KE_ST_RLNG	98.07	0.9	13.01	11.95

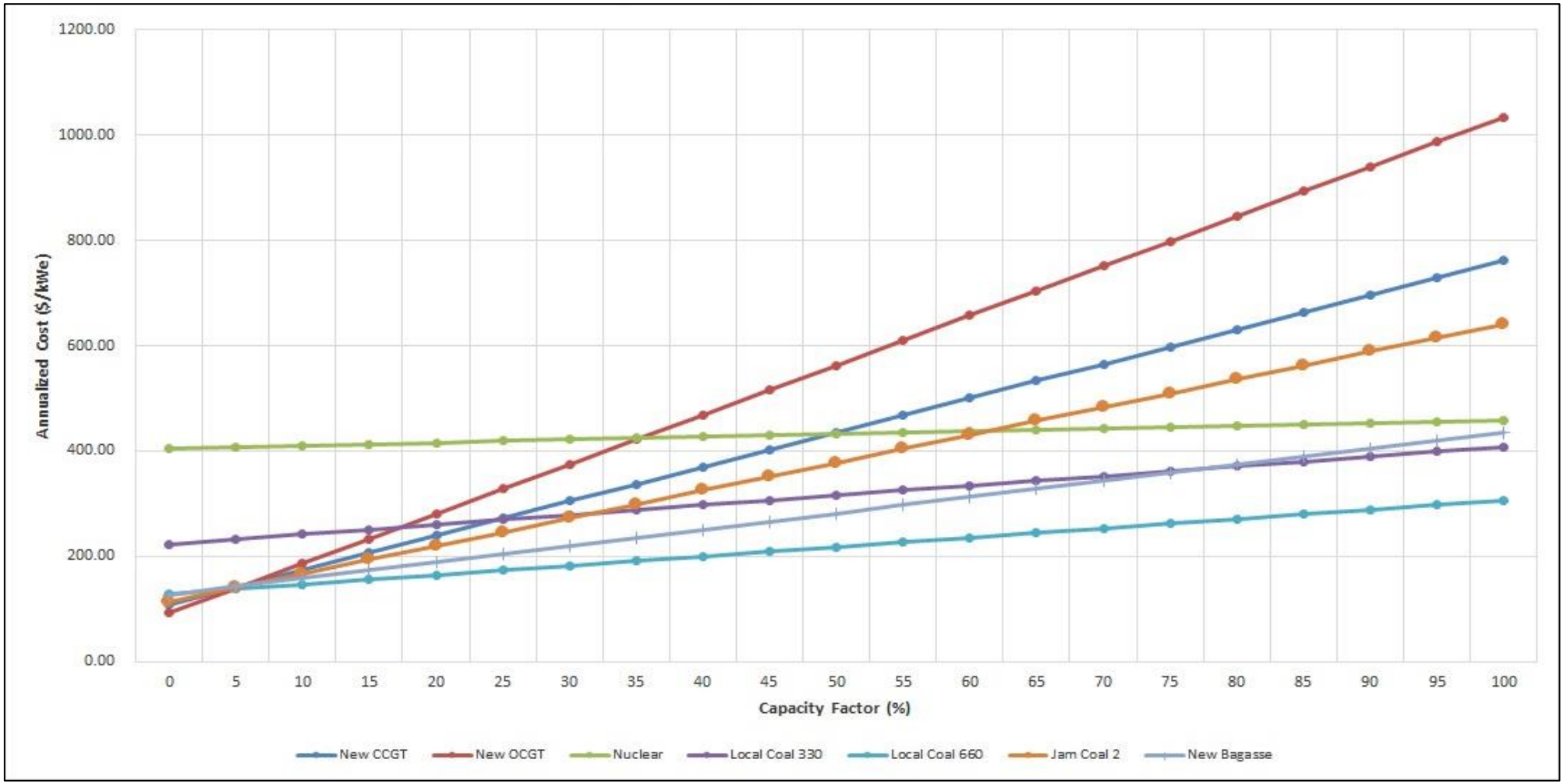
#	Project Name	Category	Fixed O&M	Variable O&M	Fuel Cost	Heat Rate
			($/kW/Year)	($/MWh)	($/GJ)	(GJ/MWh)
Candidate Power Projects						
53	NEW OCGT_North/Center	OCGT	31.64	1.07	11.15	9.46
54	NEW OCGT_South	OCGT	31.64	1.07	11.15	9.46
55	C-5	Nuclear	57.92	0	0.36	9.57
56	NEW_Nuclear	Nuclear	57.92	0	0.63	9.57
57	NEW_L.Coal 330	Local Coal	40	4.76	1.68	9.73
58	NEW_L.Coal 660	Local Coal	41	4.76	1.68	9.73
59	K.E_NEW_L.Coal 330	KE_Local Coal	0	4.13	1.68	9.73
60	K.E_NEW_L.Coal 660	KE_Local Coal	0	4.13	1.68	9.73
61	NEW_CCGT	CCGT_RLNG	32.63	1.07	11.26	6.52

B-3.Indexed Project Cost of Candidate Hydro Power Projects

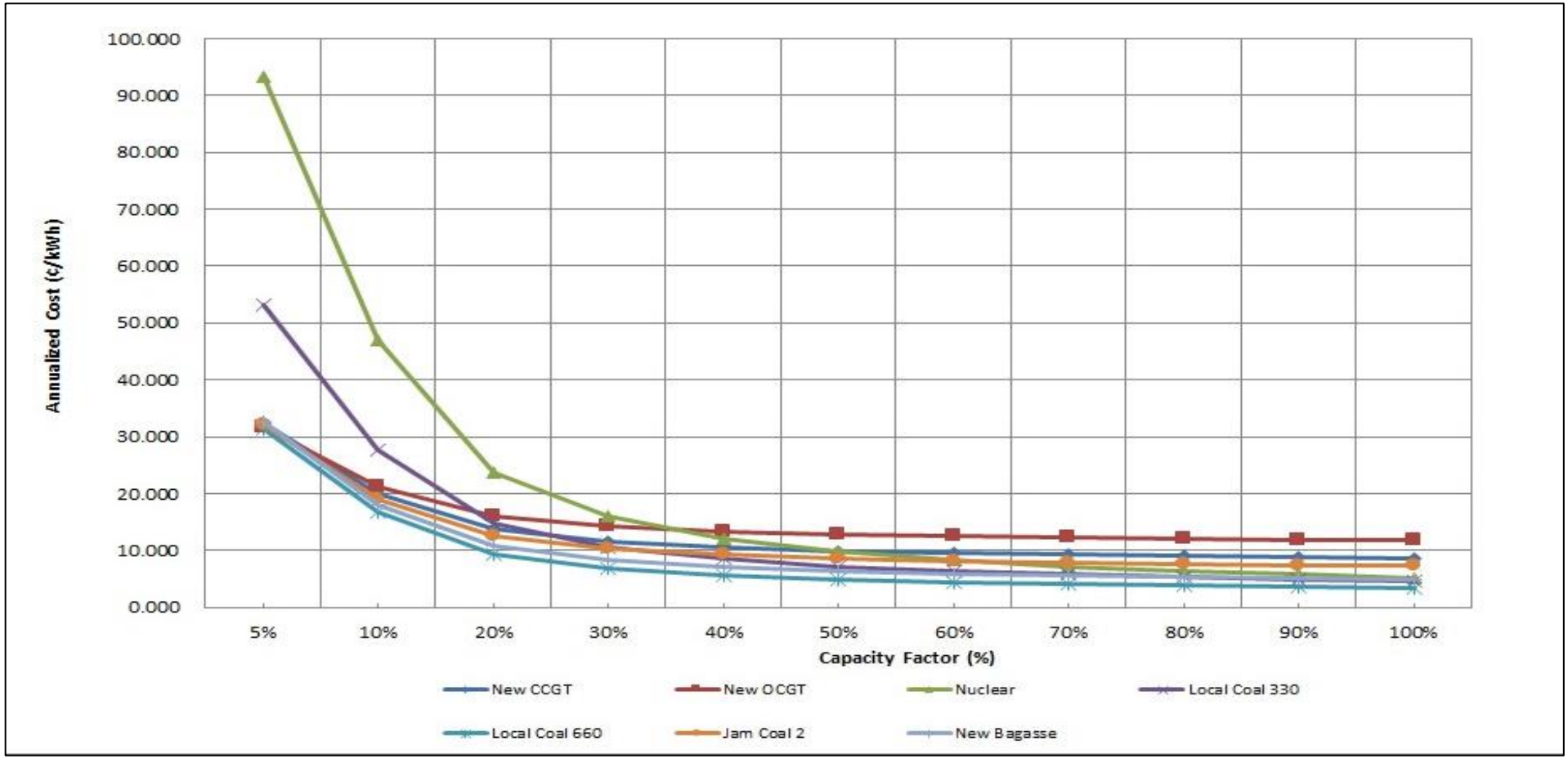
Sr.#	Plant Name	Built Cost ($/kW)	Sr.#	Plant Name	Built Cost ($/kW)
1	Balkani	2470	24	Jagran-IV	2610
2	Batdara	936	25	Kaigah	385
3	Daral Khwar-II	3475	26	Kalam Asrit	2468
4	Ghail	6482	27	Keyal Khwar	1825
5	Jhing-II	3758	28	Kohala	2717
6	Nandihar	5166	29	Lower Spat Gah	2431
7	Arkari Gol	2706	30	Luat	3673
8	Artistic-I	4593	31	Madyan	3943
9	Artistic-II	2432	32	Mahl	2079
10	Ashkot	2240	33	Mastuj	3997
11	Asrit Kedam	2544	34	Nagdar	1945
12	Athmuqam	3580	35	Naran	3001
13	Azad Pattan	2294	36	Nila Da Katha	2794
14	Bankhwar	3531	37	Qadirabad	2649
15	Bata Kundi	3487	38	Rajdhani	2577
16	Chakoti Hatian	2521	39	Shalfalam	2792
17	CJ	2406	40	Sharmai	2881
18	Dowarian	2024	41	Shigo Kas	2916
19	Gabral Kalam	3520	42	Shounter	2139
20	Gabral Utror	3254	43	Soan	2483
21	Gumat Nar	4152	44	Taunsa	2226
22	Harigehl-Majeedgala	3007	45	Turtonas Uzghor	1591
23	Jagran-III	3186			

B-4.Screening Curve for Candidate Thermal Projects

B - 4.1. Screening Curve For Candidate Thermal Projects ($/kW/Yr)



B - 4.2 Screening Curve for Candidate Projects (¢/kWh)



B-5. Annualized Cost of Candidate Hydro Power Projects

Sr.No.	Project Name	Dependable Capacity	Fixed O&M	Total Project cost	Energy	Economic Life	Plant Factor	CAPEX	Annualized Cost of Energy (BOOT)		Earliest Date of Availability
		MW	$/kW/Yr	USD/kW	GWh	Years	%	USD/kW	US C/kWh	$/kW-yr	FY
1	Balkani	8	46.79	2470	35	50	52%	1977	9	384	2030
2	Batdara	5	20.81	936	22	30	50%	790	11	472	2028
3	Daral Khwar-II	10	51.37	3475	44	50	53%	2781	9	411	2028
4	Ghail	1	36.39	6482	5	50	53%	5187	14	645	2028
5	Jhing-II	6	21.90	3758	34	50	63%	3007	11	600	2029
6	Nandihar	12	79.20	5166	82	50	76%	4256	9	602	2031
7	Arkari Gol	99	34.55	2706	378	50	44%	2384	8	315	2031
8	Artistic-I	63	77.81	4593	304	50	56%	4048	12	585	2031
9	Artistic-II	55	38.02	2432	211	50	44%	2143	9	354	2031
10	Ashkot	300	32.93	2240	1263	50	48%	1597	7	306	2031
11	Asrit Kedam	229	48.96	2544	971	50	48%	2241	9	361	2033
12	Athmuqam	450	72.77	3580	1982	50	50%	3154	11	490	2033
13	Azad Pattan	701	54.79	2294	3264	50	53%	2022	8	374	2032
14	Bankhwar	35	47.37	3531	123	50	40%	2826	12	425	2030
15	Bata Kundi	96	25.26	3487	508	50	60%	2160	5	271	2032
16	Chakoti Hatian	500	278.35	2521	2430	50	55%	2221	12	568	2030
17	CJ	25	38.33	2406	111	50	51%	1925	7	326	2029
18	Dowarian	40	24.71	2024	174	30	50%	1347	13	556	2029
19	Gabral Kalam	88	57.68	3520	274	50	35%	3137	10	321	2028
20	Gabral Utror	79	60.48	3254	309	50	45%	2868	11	432	2032
21	Gumat Nar	50	26.02	4152	220	50	51%	3322	10	439	2030
22	Harigehl-Majeedgala	40	17.15	3007	226	50	64%	2406	11	598	2031

Sr.No.	Project Name	Dependable Capacity	Fixed O&M	Total Project cost	Energy	Economic Life	Plant Factor	CAPEX	Annualized Cost of Energy (BOOT)		Earliest Date of Availability
		MW	$/kW/Yr	USD/kW	GWh	Years	%	USD/kW	US C/kWh	$/kW-yr	FY
23	Jagran-III	35	19.87	3186	161	30	53%	2584	10	467	2031
24	Jagran-IV	22	32.50	2610	96	30	50%	2203	15	654	2028
25	Kaigah	545	68.08	385	374	50	8%	339	18	123	2033
26	Kalam Asrit	238	47.11	2468	973	50	47%	2174	9	348	2033
27	Keyal Khwar	128	22.50	1825	595	50	53%	1531	13	592	2029
28	Kohala	1124	53.29	2717	5140	50	52%	2394	15	676	2032
29	Lower Spat Gah	470	51.05	2431	1925	50	47%	2167	8	319	2032
30	Luat	49	23.19	3673	212	50	49%	2939	9	394	2030
31	Madyan	157	47.27	3943	729	50	53%	3514	10	463	2029
32	Mahl	640	42.70	2079	4649	50	83%	1832	7	503	2032
33	Mastuj	49	25.83	3997	238	30	56%	3242	9	461	2032
34	Nagdar	35	22.84	1945	152	30	50%	1281	13	549	2029
35	Naran	188	28.82	3001	700	50	43%	2674	7	266	2032
36	Nila Da Katha	31	35.80	2794	142	50	52%	2236	7	337	2030
37	Qadirabad	23	39.70	2649	49	50	24%	2120	13	281	2035
38	Rajdhani	132	85.19	2577	677	50	59%	2271	8	420	2031
39	Shalfalam	60	31.31	2792	269	50	51%	2460	8	339	2032
40	Sharmai	152	73.75	2881	690	50	52%	2538	8	380	2032
41	Shigo Kas	102	58.38	2916	525	50	59%	2569	8	426	2031
42	Shounter	48	27.98	2139	208	30	50%	1445	4	185	2029
43	Soan	25	38.77	2483	113	50	52%	1987	7	335	2036
44	Taunsa	135	37.95	2226	651	50	55%	1905	7	317	2029
45	Turtonas Uzghor	82	40.99	1591	381	50	53%	1387	7	321	2030

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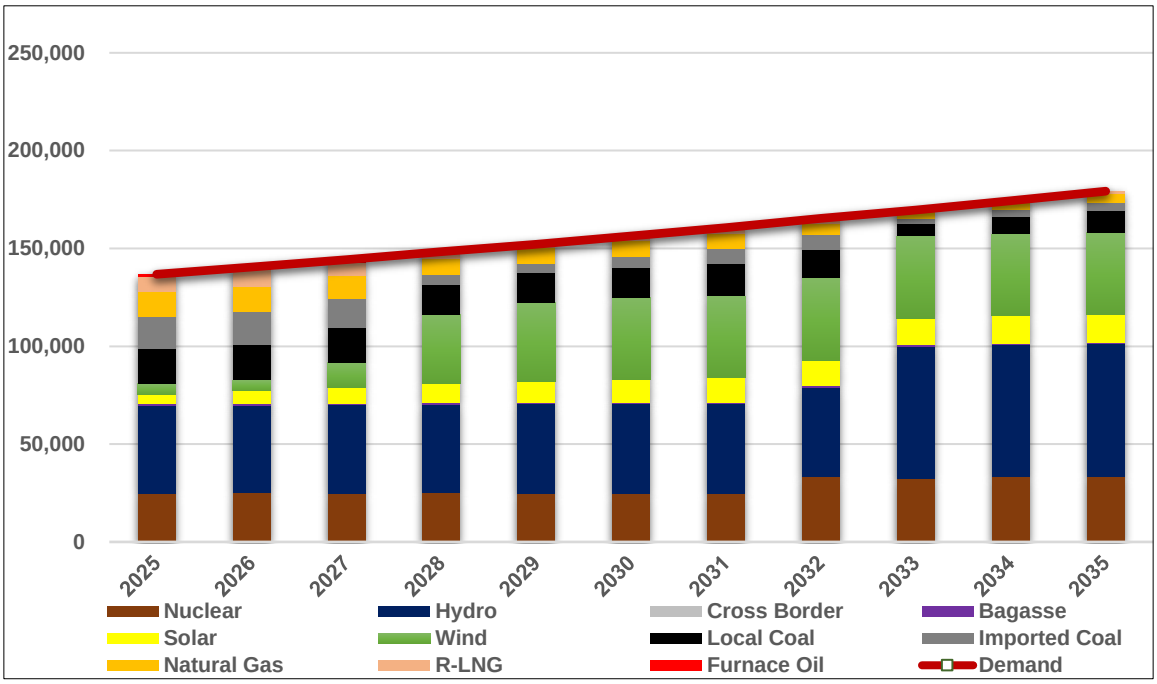
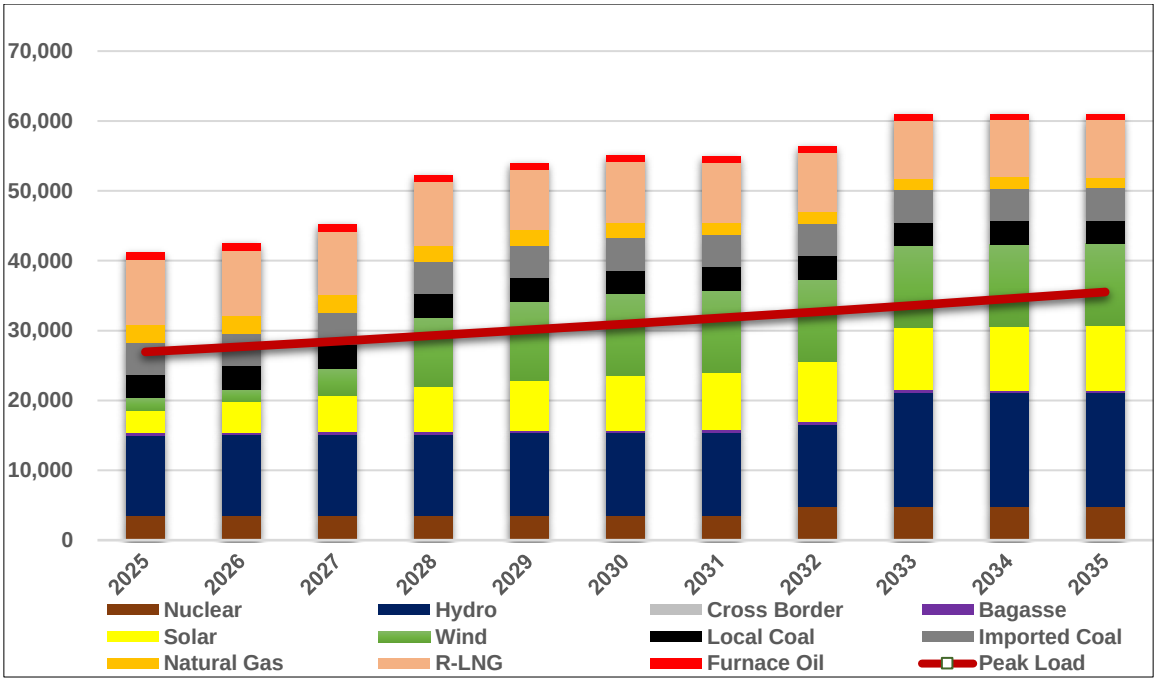
Annexure C. Unconstrained Capacity Addition

C-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



C-2.Installed Capacity Vs Peak Demand (MW) - Country



C-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Solar Utility MW_p	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	3	-	2,400	-	-	2,403	2,403
2026	-	-	-	1,200	-	-	1,200	3,603
2027	-	-	-	900	-	2,000	2,900	6,503
2028	-	-	434	800	6,061	-	7,295	13,798
2029	-	5	-	700	1,367	-	2,072	15,871
2030	-	-	-	600	455	-	1,055	16,926
2031	-	-	-	500	-	-	500	17,426
2032	1,200	-	-	400	-	-	1,600	19,026
2033	-	4,500	-	300	-	-	4,800	23,826
2034	-	-	-	200	-	-	200	24,026
2035	-	-	-	120	-	-	120	24,146
Total	**1,200**	**4,505**	**434**	**8,120**	**7,883**	**2,000**	**24,146**	

** Net Metering is committed*

C-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
			MW	MW			mm-yy
2024-25							
1	Chamfall	Hydro	3.22	3.22	AJK-HEB	Optimised	Jul-24
Generation Additions in 2024-25 (MW)			**3.22**	**3.22**			
Cumulative Addition up till 2025 (MW)			**3.22**	**3.22**			
2025-26							
Generation Additions in 2025-26 (MW)			**0**	**0**			
Cumulative Addition up till 2026 (MW)			**3.22**	**3.22**			
2026-27							
2	KE_New_Wind	Wind	2000	2000	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**2000**	**2000**			
Cumulative Addition up till 2027 (MW)			**2003.22**	**2003.22**			
2027-28							
3	New_Solar	PV	434	434	NGC	Optimised	Jul-27
4	New_Wind	Wind	6061	6061	NGC	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**6495**	**6495**			
Cumulative Addition up till 2028 (MW)			**8498.22**	**8498.22**			
2028-29							
5	New_Wind	Wind	1367	1367	NGC	Optimised	Jul-28
6	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-28
Generation Additions in 2028-29 (MW)			**1372.2**	**1372.2**			
Cumulative Addition up till 2029 (MW)			**9870.42**	**9870.42**			
2029-30							
7	New_Wind	Wind	455	455	NGC	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**455**	**455**			
Cumulative Addition up till 2030 (MW)			**10325.42**	**10325.42**			
2030-31							
Generation Additions in 2030-31 (MW)			**0**	**0**			
Cumulative Addition up till 2031 (MW)			**10325.42**	**10325.42**			
2031-32							
8	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
Generation Additions in 2031-32 (MW)			**1200**	**1117**			
Cumulative Addition up till 2032 (MW)			**11525.42**	**11442.42**			
2032-33							
9	Diamer Bhasha	Hydro	4500	4500	WAPDA	Optimized	Jul-32
Generation Additions in 2032-33 (MW)			**4500**	**4500**			
Cumulative Addition up till 2033 (MW)			**16025.42**	**15942.42**			
2033-34							
Generation Additions in 2033-34 (MW)			**0**	**0**			
Cumulative Addition up till 2034 (MW)			**16025.42**	**15942.42**			
2034-35							
Generation Additions in 2034-35 (MW)			**0**	**0**			
Cumulative Addition up till 2035 (MW)			**16025.42**	**15942.42**			

C-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.68	2.68	1.59	1.84	2.18	1.74	1.19	1.29	0.23
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.45	18.45	18.19	18.19	18.50	18.19	18.73	18.73
13	Atlas_Solar(Zhenfa)	PV	18.36	17.92	18.18	17.94	18.03	18.15	17.94	18.36	18.36
14	Best	PV	18.57	18.30	18.30	18.03	18.03	18.34	18.03	18.57	18.57
15	Crest	PV	18.82	18.53	18.56	18.30	18.30	18.59	18.30	18.82	18.82
16	Helios	PV	22.03	22.00	21.12	21.85	21.85	20.98	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	21.12	21.85	21.85	20.98	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	21.12	21.85	21.85	20.98	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.71	16.70	16.71	16.71	16.71	16.71	16.71	16.71
20	New_Solar_North/Center	PV	0.00	22.32	22.64	22.48	22.31	22.89	22.55	22.95	22.95
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	QA_Solar	PV	17.22	16.73	16.97	16.72	16.91	17.00	16.72	17.22	17.22
23	Gharo	KE_PV	22.03	21.59	21.55	20.82	20.82	20.66	21.48	21.48	21.53
24	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	Oursun	KE_PV	20.96	20.64	20.71	20.18	20.18	20.02	20.41	20.42	20.63
26	Act	Wind	30.99	30.95	30.77	30.85	30.85	30.79	30.99	30.92	30.99
27	Act_2	Wind	37.94	37.89	37.54	37.74	37.74	37.57	37.94	37.84	37.94
28	Artistic_wind	Wind	34.86	34.82	34.62	34.71	34.71	34.62	34.86	34.77	34.86
29	Artistic_Wind_2	Wind	37.94	37.89	37.64	37.74	37.74	37.57	37.94	37.84	37.94
30	Dawood	Wind	30.99	30.95	30.77	30.85	30.85	30.79	30.99	30.92	30.99
31	Din	Wind	37.94	37.89	37.64	37.74	37.74	37.69	37.94	37.84	37.94
32	FFC	Wind	31.99	31.94	31.77	31.85	31.85	31.70	31.99	31.91	31.99
33	FWEL-I	Wind	31.99	31.94	31.70	31.85	31.85	31.78	31.99	31.91	31.99
34	FWEL-II	Wind	31.99	31.94	31.70	31.85	31.85	31.70	31.99	31.91	31.99
35	Gul Ahmed	Wind	30.99	30.95	30.77	30.85	30.85	30.71	30.99	30.98	30.99
36	Gul_Electric	Wind	37.94	37.89	37.54	37.74	37.74	37.57	37.94	37.94	37.94
37	Hawa	Wind	34.86	34.82	34.62	34.71	34.71	34.49	34.86	34.86	34.86
38	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Indus_Energy	Wind	37.94	37.89	37.54	37.74	37.74	37.57	37.94	37.84	37.94

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Jhimpir	Wind	34.86	34.82	34.62	34.71	34.71	34.62	34.86	34.77	34.86
41	Lakeside	Wind	38.93	38.88	38.63	38.73	38.73	38.56	38.93	38.83	38.93
42	Liberty_Wind_1	Wind	37.94	37.89	37.54	37.74	37.74	37.69	37.94	37.94	37.94
43	Liberty_Wind_2	Wind	37.94	37.89	37.54	37.74	37.74	37.69	37.94	37.84	37.94
44	Master	Wind	30.99	30.95	30.77	30.85	30.85	30.71	30.99	30.92	30.99
45	Master_Green	Wind	37.94	37.89	37.64	37.74	37.74	37.69	37.94	37.84	37.94
46	Metro_Power	Wind	31.99	31.94	31.77	31.85	31.85	31.78	31.99	31.91	31.99
47	Metro_Wind	Wind	37.94	37.89	37.64	37.74	37.74	37.57	37.94	37.84	37.94
48	NASDA	Wind	38.93	38.88	38.52	38.73	38.73	38.69	38.93	38.83	38.93
49	New_Wind	Wind	0.00	41.92	41.95	41.97	41.98	41.86	41.98	41.98	41.98
50	Sachal	Wind	30.99	30.95	30.77	30.85	30.85	30.79	30.99	30.92	30.99
51	Sapphire_Wind	Wind	30.99	30.95	30.77	30.85	30.85	30.71	30.99	30.92	30.99
52	Tenaga	Wind	30.99	30.95	30.71	30.85	30.85	30.79	30.99	30.92	30.99
53	Three_Gorges_I	Wind	31.99	31.94	31.70	31.85	31.85	31.70	31.99	31.91	31.99
54	Three_Gorges_II	Wind	34.86	34.82	34.55	34.71	34.71	34.60	34.86	34.77	34.86
55	Three_Gorges_III	Wind	34.86	34.82	34.62	34.71	34.71	34.62	34.86	34.77	34.86
56	Tricom	Wind	37.94	37.89	37.64	37.74	37.74	37.57	37.94	37.84	37.94
57	Tricon_A	Wind	34.86	34.82	34.62	34.71	34.71	34.62	34.86	34.77	34.86
58	Tricon_B	Wind	34.86	34.82	34.55	34.71	34.71	34.62	34.86	34.77	34.86
59	Tricon_C	Wind	34.86	34.82	34.60	34.71	34.71	34.62	34.86	34.77	34.86
60	UEP	Wind	30.99	30.95	30.77	30.85	30.85	30.79	30.99	30.92	30.99
61	Yunus	Wind	30.99	30.95	30.77	30.85	30.85	30.71	30.99	30.92	30.99
62	Zephyr	Wind	34.86	34.82	34.62	34.71	34.71	34.62	34.86	34.77	34.86
63	Zorlu_Wind	Wind	31.99	31.57	31.54	31.54	31.54	31.49	31.69	31.69	31.69
64	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	KE_New_Wind	KE_Wind	41.98	41.72	41.92	41.61	41.64	41.80	41.83	41.82	41.90
66	CASA	Interconnection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68	Batdara	Hydro Candidate	0.00	0.00	45.21	45.21	45.21	45.09	39.42	43.71	45.29
69	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.41	44.41	44.23	44.43	44.43	44.43
113	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
114	Daral Khwar	Hydro Existing	38.77	38.66	38.75	38.75	38.75	38.66	38.76	38.76	38.76
115	Dubair Khwar	Hydro Existing	54.44	54.02	54.23	53.99	54.23	54.02	54.03	54.16	54.14
116	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
117	Golen Gol	Hydro Existing	9.15	9.12	9.07	9.07	9.07	9.05	6.92	7.54	8.41
118	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
119	Jagran-I	Hydro Existing	49.49	49.35	49.40	49.40	49.40	49.27	46.06	47.03	47.85
120	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
121	Karot	Hydro Existing	45.37	45.14	45.29	45.20	45.21	45.05	45.29	45.30	45.32

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Khan Khwar	Hydro Existing	40.22	39.72	40.22	40.22	40.22	40.11	40.22	40.22	40.22
123	Malakand-III	Hydro Existing	54.04	53.89	50.55	50.55	52.45	50.42	42.62	50.33	50.88
124	Mangla	Hydro Existing	62.49	61.50	55.09	54.47	54.47	54.34	54.48	54.48	54.49
125	Neelum Jehlum	Hydro Existing	53.48	53.26	53.44	53.43	53.42	53.22	53.44	53.44	53.44
126	New Bong	Hydro Existing	55.49	55.34	55.42	55.19	55.46	55.08	55.33	55.09	54.93
127	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
128	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.59
129	Suki Kinari	Hydro Existing	51.17	50.94	51.05	50.98	51.06	50.95	50.94	51.02	51.05
130	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
131	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
132	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
133	Engro_Qadirpur	CCGT_Gas	27.27	20.48	16.89	15.87	15.27	12.91	6.79	6.41	3.87
134	Foundation	CCGT_Gas	61.98	53.47	53.53	53.63	53.58	53.64	53.66	53.66	53.66
135	Guddu-V (747)	CCGT_Gas	69.03	35.54	36.61	36.58	54.22	42.76	16.55	18.44	25.98
136	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
137	Uch	CCGT_Gas	67.29	48.42	48.87	47.72	15.83	0.00	0.00	0.00	0.00
138	Uch-II	CCGT_Gas	55.70	55.69	55.68	55.68	55.69	55.69	55.70	55.70	55.70
139	SNPC-I	KE_CCGT_Gas	60.68	35.46	33.81	33.19	42.06	40.31	17.66	20.19	23.44
140	SNPC-II	KE_CCGT_Gas	61.38	36.61	34.41	34.22	45.03	42.12	19.09	21.22	23.95
141	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
142	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
143	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	C-1	Nuclear	90.00	90.17	89.51	89.51	89.70	89.69	84.86	88.18	89.84
151	C-2	Nuclear	90.00	90.17	89.54	89.51	89.70	89.69	84.86	88.18	89.84
152	C-3	Nuclear	90.00	90.17	89.49	89.49	89.71	89.71	84.90	88.19	88.55
153	C-4	Nuclear	90.00	90.17	89.52	89.49	89.71	89.71	84.90	88.19	88.75
154	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	87.07	88.01	88.48	88.82
155	K-2	Nuclear	85.07	85.19	84.40	84.39	84.65	84.49	81.33	83.68	84.93
156	K-3	Nuclear	85.07	85.19	84.55	84.55	84.67	84.60	82.19	84.06	84.94
157	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
158	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
159	Engro Thar	Local Coal	85.29	79.30	77.95	78.14	79.65	75.37	45.41	35.81	44.50
160	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
162	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163	Thal Nova	Local Coal	83.29	76.98	77.72	76.84	78.68	74.59	35.03	25.13	36.31
164	Thar TEL	Local Coal	83.70	77.44	77.56	76.82	78.84	75.17	36.77	26.68	37.12
165	Thar-I (SSRL)	Local Coal	84.86	65.65	64.78	68.03	74.02	64.24	21.73	52.08	65.64
166	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
167	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
168	China HUBCO	Imported Coal	46.49	19.32	20.63	22.00	26.57	28.92	10.41	11.87	13.95
169	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	Jamshoro Coal	Imported Coal	17.98	2.31	2.87	6.81	16.48	5.16	4.91	4.63	9.02
171	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Port Qasim	Imported Coal	37.12	3.59	5.98	4.47	9.63	13.75	4.64	7.44	7.50
173	Sahiwal Coal	Imported Coal	41.54	21.89	18.34	23.22	28.49	20.42	6.03	9.66	13.19
174	FPCL	KE_Imported Coal	6.62	7.18	4.30	4.97	5.52	6.27	4.18	4.63	6.31
175	Altern	Gas Engine_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
176	Balloki	CCGT_RLNG	8.54	3.47	2.21	4.77	7.20	5.14	0.00	0.00	0.82
177	Bhikki	CCGT_RLNG	0.86	0.13	0.13	0.49	1.68	1.69	0.00	0.00	0.00
178	FKPCL	CCGT_RLNG	12.03	12.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
179	Halmore	CCGT_RLNG	12.86	0.00	0.00	0.00	0.31	0.31	0.00	0.00	0.00
180	Haveli	CCGT_RLNG	25.91	12.33	11.43	13.32	15.22	12.61	3.22	4.84	7.09
181	KAPCO 495	CCGT_RLNG	25.13	25.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
182	Nandipur	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
183	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185	Orient	CCGT_RLNG	12.89	0.00	0.00	0.10	0.31	0.44	0.00	0.00	0.00
186	Saif	CCGT_RLNG	12.58	12.58	0.00	0.00	0.31	0.00	0.00	0.00	0.00
187	Saphire	CCGT_RLNG	12.58	0.00	0.00	0.00	0.31	0.09	0.00	0.00	0.00
188	Trimmu	CCGT_RLNG	7.24	2.38	3.69	4.92	6.85	5.70	0.13	1.89	4.13
189	BQPS2	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190	BQPS3	KE_CCGT_RLNG	1.53	1.80	0.58	0.96	1.30	1.38	0.24	0.49	0.71
191	KCCPP	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
193	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	Balakot	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	Chamfall	Hydro_Committed	47.77	47.64	47.77	47.77	47.77	47.64	48.01	48.01	48.01
198	Dasu	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	55.72	55.72	55.72
200	Gorkin Matiltan	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
201	Jabori	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
202	Jagran-II	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
203	Karora	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
204	Koto	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
205	Kurram Tangi	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206	Lawi	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
207	Mohmand Dam	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
208	Nardagian	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
209	Riali-II	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
210	Tarbela_Ext_5	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C-6.Year-wise Installed Capacity Addition (MW)

Year	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Net Yearly Addition	Cumulative Total
Nov-25	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	41,516
2026	-	70	-	-	-	1,200	-	-	1,270	42,523
2027	-	70	-210	-	-	2,900	-	-	2,760	45,283
2028	-	-	-	-	-	7,295	-235	-131	6,929	52,212
2029	-	235	-495	-	-	2,067	-	-	1,807	54,019
2030	-	-	-	-	-	1,055	-	-	1,055	55,074
2031	-	-	-	-	-	500	-586	-	-86	54,988
2032	-	-	-188	1,200	-	400	-	-	1,412	56,400
2033	-	4,500	-210	-	-	300	-	-	4,590	60,990
2034	-	-	-	-	-	200	-	-160	40	61,030
2035	-	-	-	-	-	120	-223	-	-103	60,927
Total	**3,300**	**16,312**	**8,224**	**4,730**	**4,680**	**21,429**	**1,433**	**819**	**60,927**	

C-7.IGCEP Generation Mix 2025-2035 (GWh)

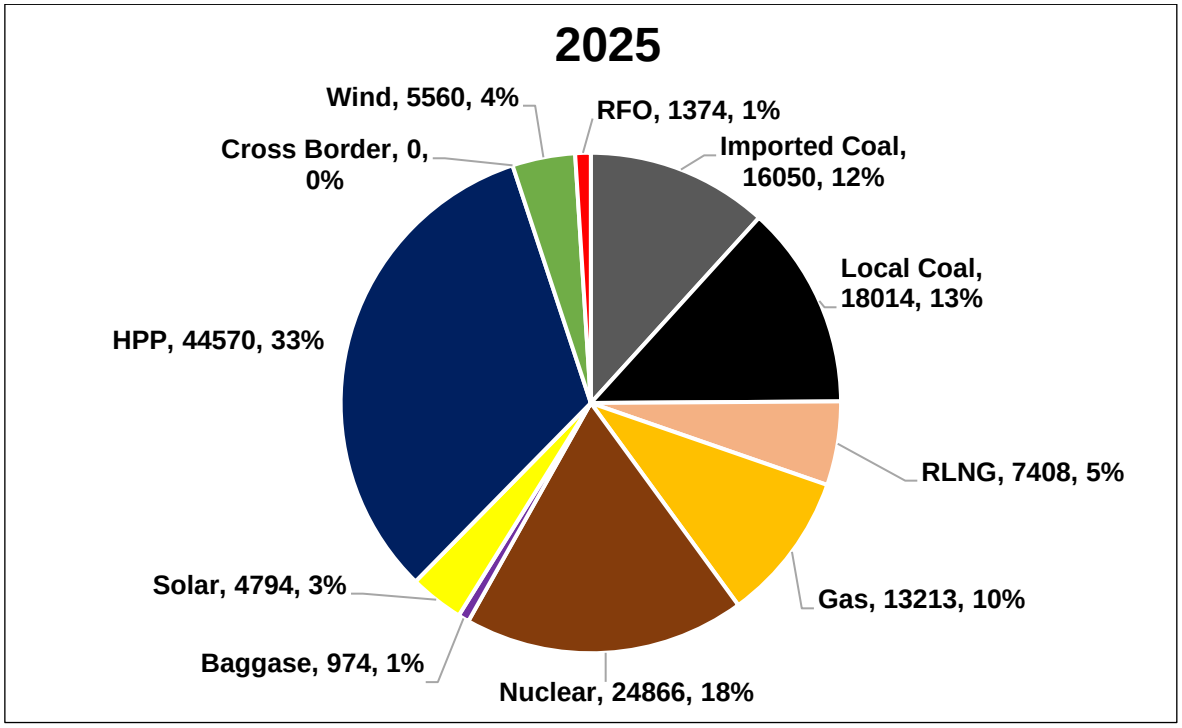


Chart C-1: IGCEP Generation Mix 2025 (GWh)

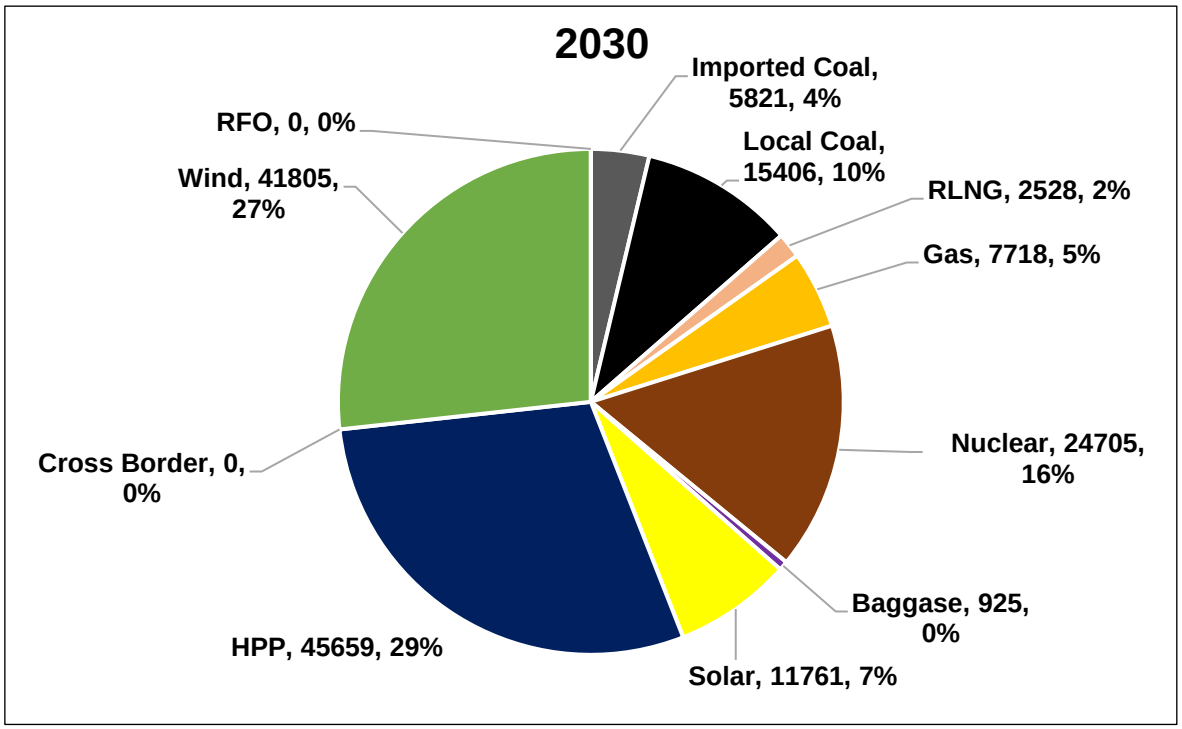


Chart C-2: IGCEP Generation Mix 2030 (GWh)

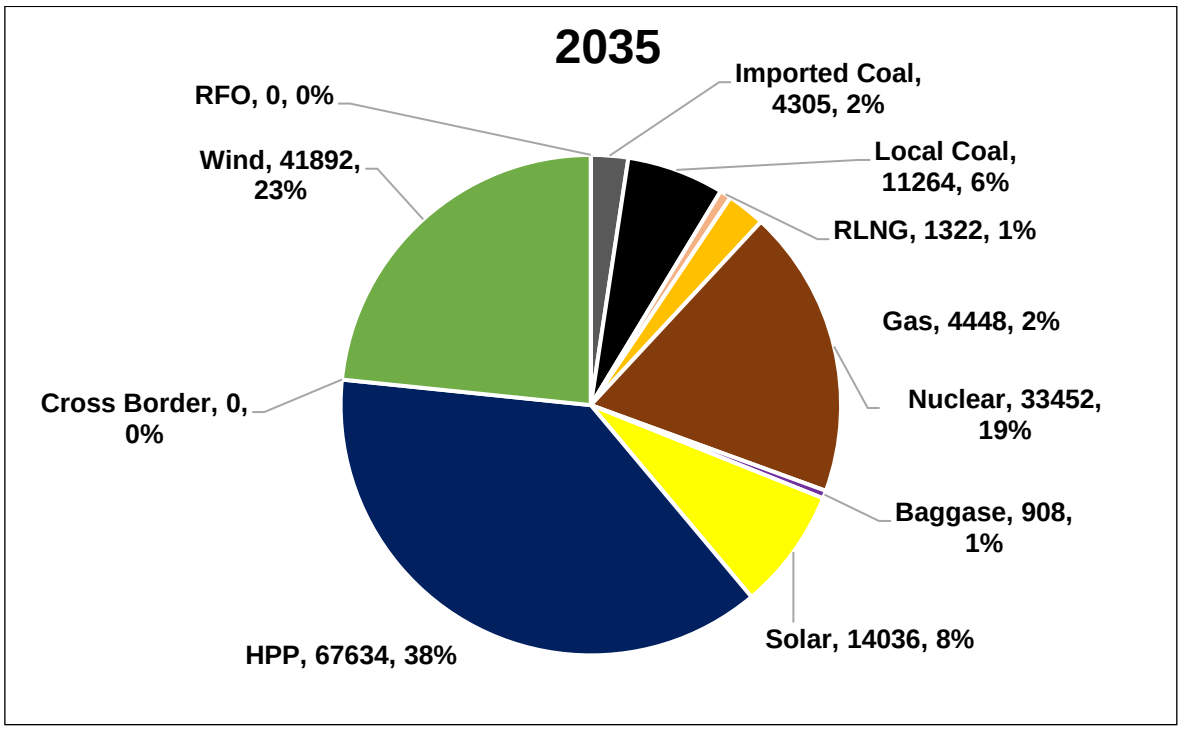


Chart C-3: IGCEP Generation Mix 2035 (GWh)

C-8.IGCEP Capacity Mix 2025-35 (MW)

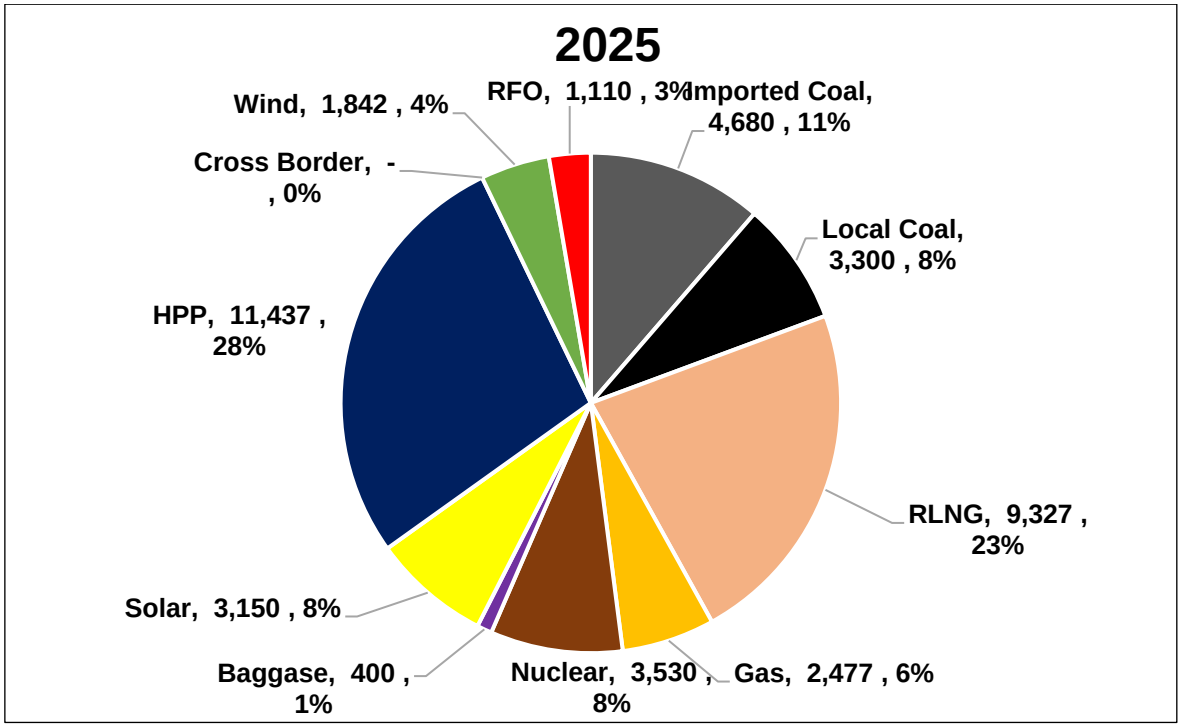


Chart C-4: IGCEP Capacity Mix 2025 (MW)

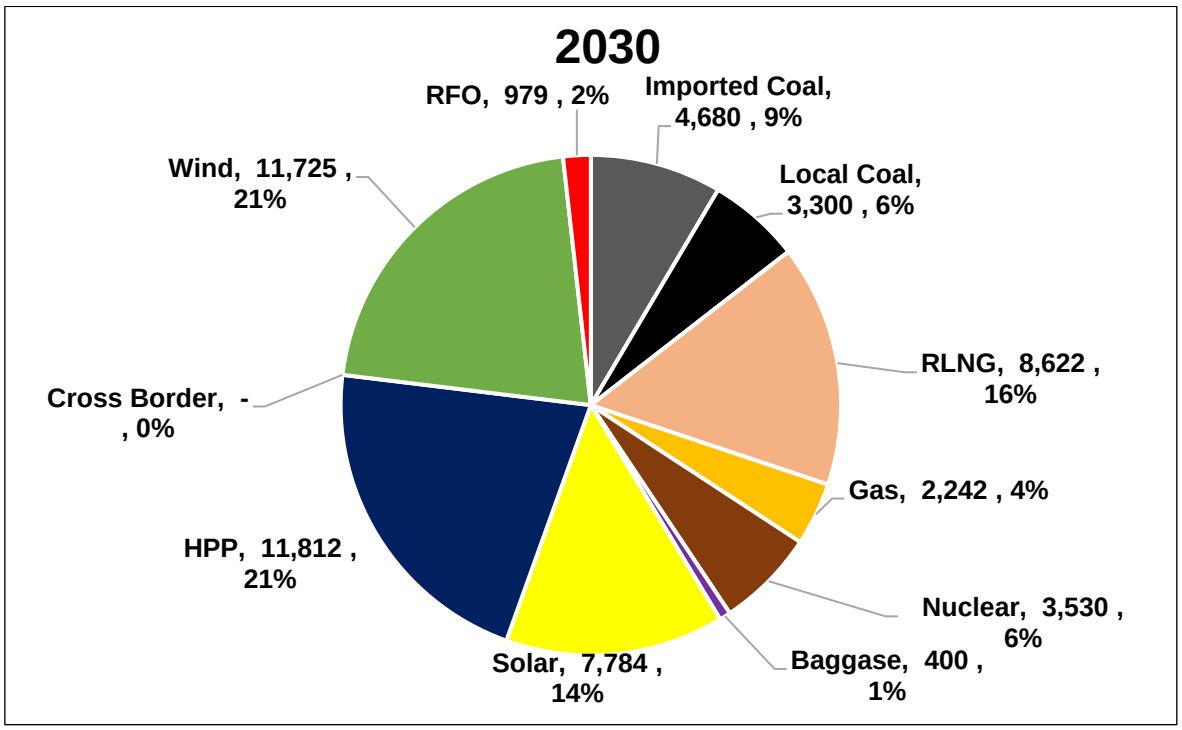


Chart C-5: IGCEP Capacity Mix 2030 (MW)

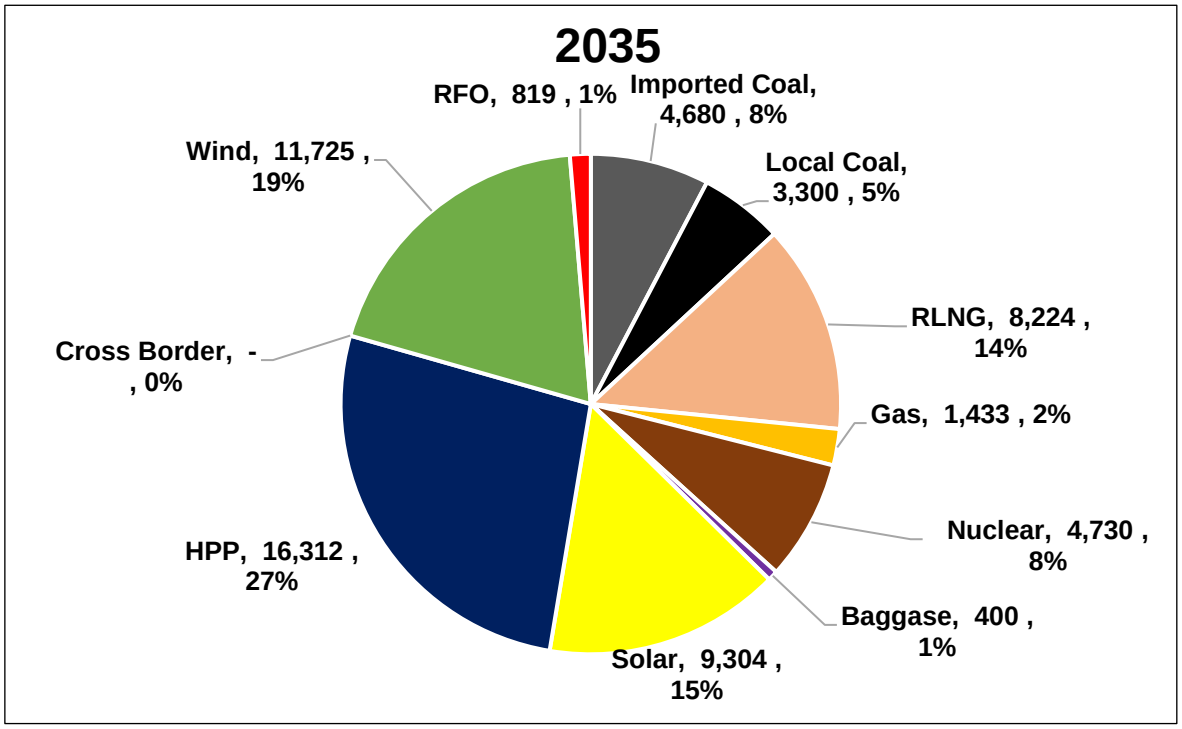


Chart C-6: IGCEP Capacity Mix 2035 (MW)

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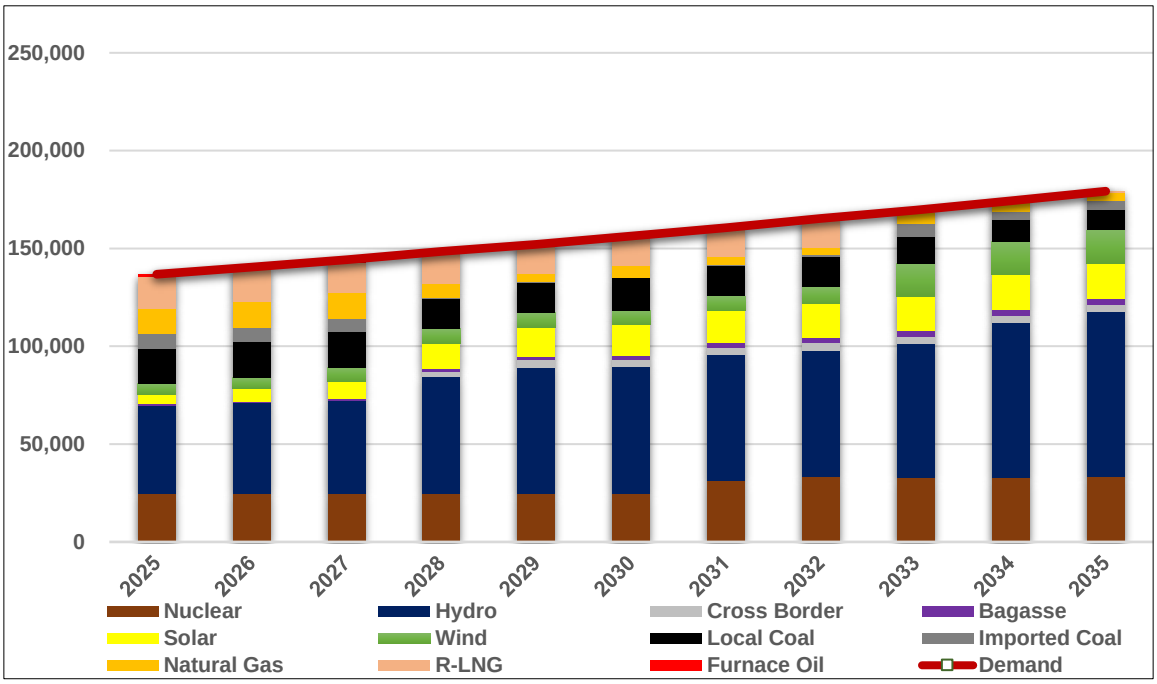
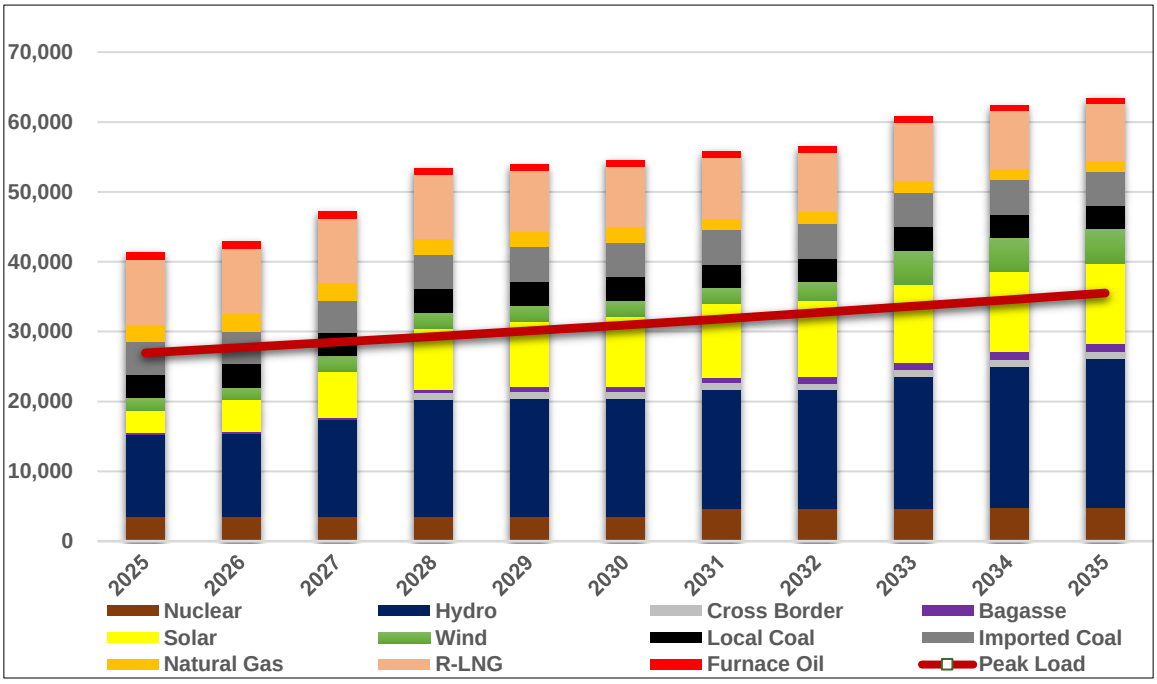
Annexure D. Forced Capacity Addition

D-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



D-2.Installed Capacity Vs Peak Demand (MW) - Country



D-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	HPP	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	2,400	-	-	2,400	2,400
2026	-	1,200	-	-	1,200	3,600
2027	-	900	-	400	1,300	4,900
2028	-	800	-	-	800	5,700
2029	-	700	-	-	700	6,400
2030	-	600	-	-	600	7,000
2031	-	500	-	-	500	7,500
2032	-	400	-	-	400	7,900
2033	5	300	624	600	1,529	9,429
2034	-	200	-	-	200	9,629
2035	-	120	-	-	120	9,749
Total	**5**	**8,120**	**624**	**1,000**	**9,749**	

** Net Metering is Committed*

D-4.List of Projects uptill 2034 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
2024-25							
1	Net Meter	PV	2400	2400	AEDB	Committed	Jul-24
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	Mar-25
3	Lawi	Hydro	69	69	GoKPK	Committed	May-25
4	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Jabori	Hydro	10.2	10.2	KPK	Committed	May-25
8	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Net Meter	PV	1200	1200	AEDB	Committed	Jul-25
12	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
13	Zorlu	PV	100	100	AEDB	Committed	Dec-25
14	Access_Solar	PV	11.52	11.52	AEDB	Committed	Dec-25
15	Access_Electric	PV	10	10	AEDB	Committed	Dec-25
16	Safe	PV	10	10	AEDB	Committed	Dec-25
17	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
18	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
Generation Additions in 2025-26 (MW)			**1,489**	**1,489**			
Cumulative Addition up till 2026 (MW)			**4,097**	**4,097**			
2026-27							
15	Net Meter	PV	900	900	AEDB	Committed	Jul-26
16	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
17	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
18	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
19	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
20	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Nov-26
21	PV_Committed_A	PV	600	600	NGC	Committed	Jan-27
22	PV_Committed_B	PV	600	600	NGC	Committed	Apr-27
23	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
24	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
25	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**4,811**	**4,811**			
Cumulative Addition up till 2027 (MW)			**8,908**	**8,908**			

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
2027-28							
26	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
27	Net Meter	PV	800	800	AEDB	Committed	Jul-27
28	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
29	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
30	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-27
31	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
32	CASA	Hydro	1000	1000	GoP	Committed	Aug-27
33	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
34	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
35	PV_Committed_C	PV	1200	1200	PPIB	Committed	Nov-27
36	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
37	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
38	Gwadar	Imported Coal	300	300	PPIB	Committed	Dec-27
39	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
40	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
41	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
42	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
43	Siachen	PV	100	100	GoS	Committed	Jun-28
44	Manjhand	PV	50	50	PPIB/GoS	Committed	Jun-28
45	Trans_Atlantic	Wind	50	50	PPIB	Committed	Jun-28
46	Western	Wind	50	50	PPIB	Committed	Jun-28
Generation Additions in 2027-28 (MW)			**7,240**	**7,240**			
Cumulative Addition up till 2028 (MW)			**16,148**	**16,148**			
2028-29							
47	New Technology	Hydro	30	30	WAPDA	Committed	Aug-28
48	Net Meter	PV	700	700	NGC	Committed	Jul-28
49	PV_Market	PV	593	593	Market	Committed	Jul-28
50	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
Generation Additions in 2028-29 (MW)			**1,420**	**1,420**			
Cumulative Addition up till 2029 (MW)			**17,567**	**17,567**			
2029-30							
51	Net Meter	PV	600	600	AEDB	Committed	Jul-29
52	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
53	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
54	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-29
Generation Additions in 2029-30 (MW)			**1389.7**	**1389.7**			
Cumulative Addition up till 2030 (MW)			**18,957**	**18,957**			
2030-31							

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
55	Net Meter	PV	500	500	AEDB	Committed	Jul-30
56	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
57	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
58	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-30
Generation Additions in 2030-31 (MW)			**1289.8**	**1289.8**			
Cumulative Addition up till 2031 (MW)			**20,247**	**20,247**			
2031-32							
59	C-5	Nuclear	1200	1117	PAEC	Committed	Sep-30
60	Net Meter	PV	400	400	AEDB	Committed	Jul-31
61	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-31
Generation Additions in 2031-32 (MW)			**1700**	**1617**			
Cumulative Addition up till 2032 (MW)			**21,947**	**21,864**			
2032-33							
62	Net Meter	PV	300	300	AEDB	Committed	Jul-32
63	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-32
64	Diamer Bhasha (U#1)	Hydro	375	375	WAPDA	Committed	Oct-32
65	Diamer Bhasha (U#2)	Hydro	375	375	WAPDA	Committed	Dec-32
66	Diamer Bhasha (U#3)	Hydro	375	375	WAPDA	Committed	Feb-33
67	Diamer Bhasha (U#4)	Hydro	375	375	WAPDA	Committed	Apr-33
68	Diamer Bhasha (U#5)	Hydro	375	375	WAPDA	Committed	Jun-33
69	KE_New_Wind	Wind	600	600	KE	Optimised	Jul-32
70	New_Wind	Wind	624	624	NGC	Optimised	Jul-32
71	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**3,504**	**3,504**			
Cumulative Addition up till 2033 (MW)			**25,451**	**25,368**			
2033-34							
72	Net Meter	PV	200	200	AEDB	Committed	Jul-33
73	New Technology	-	100	100	PPIB/PPDB	Committed	Jul-33
74	Diamer Bhasha (U#6)	Hydro	375	375	WAPDA	Committed	Aug-33
75	Diamer Bhasha (U#7)	Hydro	375	375	WAPDA	Committed	Feb-34
76	Diamer Bhasha (U#8)	Hydro	375	375	WAPDA	Committed	Apr-34
77	Diamer Bhasha (U#9)	Hydro	375	375	WAPDA	Committed	Jun-34
Generation Additions in 2033-34 (MW)			**1,800**	**1,800**			
Cumulative Addition up till 2034 (MW)			**27,251**	**27,168**			
2034-35							
78	Diamer Bhasha (U#10)	Hydro	375	375	WAPDA	Committed	Aug-34
79	Diamer Bhasha (U#11)	Hydro	375	375	WAPDA	Committed	Feb-35
80	Diamer Bhasha (U#12)	Hydro	375	375	WAPDA	Committed	Apr-35
81	Net Meter	PV	120	120	AEDB	Committed	Jul-34
Generation Additions in 2034-35 (MW)			**1,245**	**1,245**			
Cumulative Addition up till 2035 (MW)			**28,496**	**28,413**			

D-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	CSP	Bagasse	0.00	40.00	41.17	40.78	38.11	39.09	37.65	34.48	34.67
5	Fatima	Bagasse	5.66	0.00	0.00	0.00	0.00	0.08	1.11	0.15	0.15
6	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
7	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
8	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
9	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
11	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
12	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
13	Access_Electric	PV	21.01	20.15	19.24	18.45	18.97	18.91	18.58	17.73	18.42
14	Access_Solar	PV	21.01	20.15	19.33	18.72	18.74	18.54	18.28	17.85	18.42
15	Appolo	PV	18.73	18.18	17.39	17.73	17.17	17.03	16.90	16.30	17.54
16	Atlas_Solar(Zhenfa)	PV	18.36	17.88	17.21	17.03	17.08	16.89	15.96	16.34	16.29
17	Best	PV	18.57	18.25	17.49	17.49	16.73	16.73	16.87	16.60	16.40
18	Crest	PV	18.82	18.57	17.99	17.77	17.75	17.03	17.14	16.72	17.59
19	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
20	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
21	Manjhand	PV	0.00	40.25	22.03	22.03	22.03	22.00	22.03	22.03	22.03
22	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
23	Net_Meter_8000	PV	16.71	16.71	16.71	16.69	16.69	16.71	16.69	16.71	16.71
24	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	PV_Committed_A	PV	22.63	20.80	20.80	20.36	19.85	20.42	19.65	20.02	19.95
27	PV_Committed_B	PV	33.40	20.80	20.36	19.85	20.05	20.41	19.54	19.54	19.86
28	PV_Committed_C	PV	0.00	20.78	20.90	20.77	20.46	20.22	19.76	20.20	20.70
29	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
30	QA_Solar	PV	17.22	16.98	16.17	16.21	15.58	15.75	15.66	15.59	16.14
31	Safe	PV	21.01	20.15	19.46	18.71	18.81	18.75	17.87	17.73	18.72
32	Siachen	PV	0.00	40.25	22.03	22.03	22.03	22.00	22.03	22.03	22.03
33	Zorlu	PV	21.01	20.59	19.24	19.24	19.03	19.52	18.77	18.18	19.46
34	Gharo	KE_PV	22.03	21.32	21.04	20.21	19.73	19.95	18.54	19.43	19.67
35	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	Oursun	KE_PV	20.96	20.51	20.28	19.70	19.19	19.46	18.20	18.95	19.20
37	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
38	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
39	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
40	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
41	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
42	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
43	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
44	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
45	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
46	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
47	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
48	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
49	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
51	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
52	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
53	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
54	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
55	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
56	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
57	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
58	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
59	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
60	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
61	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
63	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
65	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
66	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
67	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
68	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
69	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
70	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
71	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
72	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
73	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
74	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
75	Zorlu_Wind	Wind	31.99	31.28	31.18	30.65	30.28	30.49	30.04	30.22	30.65
76	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
78	CASA	Interconnection	0.00	36.34	41.78	41.63	41.75	41.67	41.26	41.22	41.61

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
79	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	40.69	38.89	37.13
81	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
117	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
118	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
119	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
121	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
122	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
123	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
124	Allai Khwar	Hydro Existing	44.43	43.48	43.43	42.87	42.87	42.75	42.55	42.87	43.36
125	Chashma	Hydro Existing	48.91	48.78	48.80	48.24	48.24	48.10	48.24	48.24	48.60
126	Daral Khwar	Hydro Existing	38.77	38.66	38.77	38.77	38.77	38.66	38.77	38.77	38.77
127	Dubair Khwar	Hydro Existing	54.44	53.30	52.71	52.49	52.49	52.35	51.61	51.83	51.83
128	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
129	Golen Gol	Hydro Existing	9.15	8.76	9.07	9.07	8.78	8.98	8.78	8.25	8.17
130	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
131	Jagran-I	Hydro Existing	49.49	47.84	49.18	48.88	48.14	48.01	48.14	46.63	45.55
132	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
133	Karot	Hydro Existing	45.31	45.22	45.36	45.34	45.29	45.22	45.25	45.34	45.34
134	Khan Khwar	Hydro Existing	40.22	39.38	39.76	39.49	39.49	39.38	39.21	39.49	39.49
135	Malakand-III	Hydro Existing	54.04	45.37	49.08	49.09	44.98	47.21	45.16	44.18	44.16
136	Mangla	Hydro Existing	62.49	60.90	54.80	54.00	53.78	53.82	53.45	53.58	54.02
137	Neelum Jehlum	Hydro Existing	53.48	53.29	53.40	53.37	53.18	53.08	52.88	53.16	52.95
138	New Bong	Hydro Existing	55.49	54.98	55.13	55.13	54.98	54.98	54.73	55.11	55.13
139	Patrind	Hydro Existing	43.76	43.35	42.80	42.80	42.80	42.68	41.58	41.92	41.92
140	Small Hydro	Hydro Existing	45.59	45.27	45.28	45.28	45.28	45.15	45.08	45.20	45.20
141	Suki Kinari	Hydro Existing	51.17	50.76	50.54	50.48	50.48	50.34	50.48	50.48	50.49
142	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
143	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
144	Warsak	Hydro Existing	50.63	50.49	50.63	50.45	50.13	50.20	49.72	49.72	50.22
145	Engro_Qadirpur	CCGT_Gas	27.27	14.87	6.00	4.17	5.24	4.46	9.74	7.65	4.12
146	Foundation	CCGT_Gas	75.39	53.66	53.66	53.66	53.65	53.65	53.65	53.66	53.66
147	Guddu-V (747)	CCGT_Gas	77.26	17.05	1.15	3.59	3.78	5.02	40.91	30.05	25.14
148	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	Uch	CCGT_Gas	64.18	37.87	38.00	38.00	9.50	0.00	0.00	0.00	0.00
150	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
151	SNPC-I	KE_CCGT_Gas	65.82	37.34	3.21	5.47	7.33	9.27	41.11	24.14	24.26
152	SNPC-II	KE_CCGT_Gas	71.29	39.29	3.21	6.48	7.82	9.41	41.67	24.23	24.54
153	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
154	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
156	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
158	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
159	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
162	C-1	Nuclear	90.00	89.16	89.38	89.30	88.53	89.16	88.49	88.18	87.66
163	C-2	Nuclear	90.00	89.20	89.38	89.30	88.55	89.16	88.49	88.18	87.87
164	C-3	Nuclear	90.00	89.08	89.41	89.32	88.58	89.21	88.55	87.50	87.63
165	C-4	Nuclear	90.00	89.20	89.41	89.32	88.58	89.19	88.55	87.72	87.63
166	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	83.93	80.84	79.40	82.83
167	K-2	Nuclear	85.07	84.07	84.23	84.15	82.98	83.71	82.92	82.31	83.15
168	K-3	Nuclear	85.07	84.18	84.27	84.15	83.03	83.80	82.86	82.36	83.21
169	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
171	Engro Thar	Local Coal	84.38	76.01	71.47	75.32	72.53	72.97	70.94	45.65	41.90
172	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
173	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	Thal Nova	Local Coal	83.67	75.39	65.82	73.44	71.29	71.55	69.89	40.40	33.68
176	Thar TEL	Local Coal	83.76	75.46	66.03	73.85	71.10	71.63	70.28	41.27	34.53
177	Thar-I (SSRL)	Local Coal	84.61	67.65	52.00	60.20	40.22	51.47	58.85	59.20	57.40
178	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
179	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	China HUBCO	Imported Coal	39.48	0.59	0.36	0.63	1.83	2.79	26.66	17.27	16.93
181	Gwadar	Imported Coal	0.00	0.00	0.60	1.49	3.40	4.52	34.30	20.96	20.48
182	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.14	0.27	0.27	11.35	7.79	11.78
183	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Port Qasim	Imported Coal	18.34	0.22	0.04	0.18	0.46	0.60	11.05	10.05	8.85
185	Sahiwal Coal	Imported Coal	0.84	0.00	0.00	0.00	0.02	0.12	11.91	7.25	7.56
186	FPCL	KE_Imported Coal	21.86	25.44	2.21	2.30	2.60	3.23	8.48	7.97	8.59
187	Altern	Gas Engine_RLNG	0.19	0.86	2.80	4.23	4.59	0.00	0.00	0.00	0.00
188	Balloki	CCGT_RLNG	38.08	37.95	15.47	17.90	18.11	18.34	2.34	0.40	0.88
189	Bhikki	CCGT_RLNG	13.92	21.82	36.24	37.36	39.56	34.13	0.48	0.11	0.00
190	FKPCL	CCGT_RLNG	12.24	12.63	3.45	4.42	4.70	3.51	0.00	0.00	0.00
191	Halmore	CCGT_RLNG	13.20	3.24	4.45	5.32	6.46	8.18	0.00	0.00	0.00
192	Haveli	CCGT_RLNG	63.34	58.71	81.35	73.24	69.55	71.33	6.13	5.09	5.10
193	KAPCO 495	CCGT_RLNG	25.24	25.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	Nandipur	CCGT_RLNG	0.29	1.69	4.43	5.67	6.91	7.80	0.00	0.00	0.00
195	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	Orient	CCGT_RLNG	13.20	3.40	5.14	7.09	8.48	8.63	0.15	0.00	0.00
198	Saif	CCGT_RLNG	12.89	13.82	3.71	4.75	5.26	6.50	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
199	Saphire	CCGT_RLNG	13.13	2.60	3.88	4.95	5.62	7.50	0.00	0.00	0.00
200	Trimmu	CCGT_RLNG	4.92	7.10	7.48	10.06	9.87	11.97	3.96	2.50	2.11
201	BQPS2	KE_CCGT_RLNG	4.28	5.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202	BQPS3	KE_CCGT_RLNG	14.22	16.05	0.25	0.30	0.64	1.11	0.43	0.61	1.06
203	KCCPP	KE_CCGT_RLNG	0.28	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
204	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
205	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
207	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
208	Balakot	Hydro_Committed	0.00	36.84	41.93	41.89	41.93	41.81	41.86	41.86	41.62
209	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
210	Dasu	Hydro_Committed	99.00	69.45	64.46	64.50	64.22	64.22	64.38	64.48	64.03
211	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	60.82	68.32	57.80
212	Gorkin Matiltan	Hydro_Committed	44.56	42.34	42.41	42.17	42.17	42.06	40.98	41.37	41.19
213	Jabori	Hydro_Committed	82.35	82.18	82.35	82.33	82.30	82.18	82.17	82.03	82.22
214	Jagran-II	Hydro_Committed	50.98	46.79	48.71	48.33	47.31	47.22	47.18	46.10	45.40
215	Karora	Hydro_Committed	70.99	68.95	69.41	68.87	68.44	68.91	67.25	67.53	68.34
216	Koto	Hydro_Committed	58.36	55.78	56.21	55.91	55.91	55.75	54.17	54.84	54.95
217	Kurram Tangi	Hydro_Committed	17.05	16.98	17.05	17.05	17.05	17.01	16.93	16.93	17.05
218	Lawi	Hydro_Committed	48.03	48.41	48.53	48.37	48.31	48.22	47.85	47.93	48.22
219	Mohmand Dam	Hydro_Committed	0.00	53.80	41.91	41.51	40.57	40.92	38.81	39.39	39.94
220	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
221	Riali-II	Hydro_Committed	54.65	54.64	54.79	54.79	54.78	54.63	54.75	54.57	54.61
222	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

D-6.Year-wise Installed Capacity Addition (MW)

Year	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
Nov-25	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2026	-	182	-	-	-	1,332	-	-	-	1,514	42,947
2027	-	1,960	-210	-	-	2,500	-	-	-	4,250	47,197
2028	-	2,900	-	-	300	2,350	-235	-131	1,000	6,184	53,381
2029	-	230	-495	-	-	800	-	-	-	535	53,916
2030	-	-	-	-	-	700	-	-	-	700	54,616
2031	-	-	-	1,200	-	602	-586	-	-	1,216	55,832
2032	-	-	-188	-	-	853	-	-	-	665	56,497
2033	-	1,880	-210	-	-	2,613	-	-	-	4,283	60,780
2034	-	1,500	-	-	-	300	-	-160	-	1,640	62,420
2035	-	1,125	-	-	-	120	-223	-	-	1,022	63,442
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,980**	**17,561**	**1,433**	**819**	**1,000**	**63,442**	

D-7. IGCEP Generation Mix 2025-2035 (GWh)

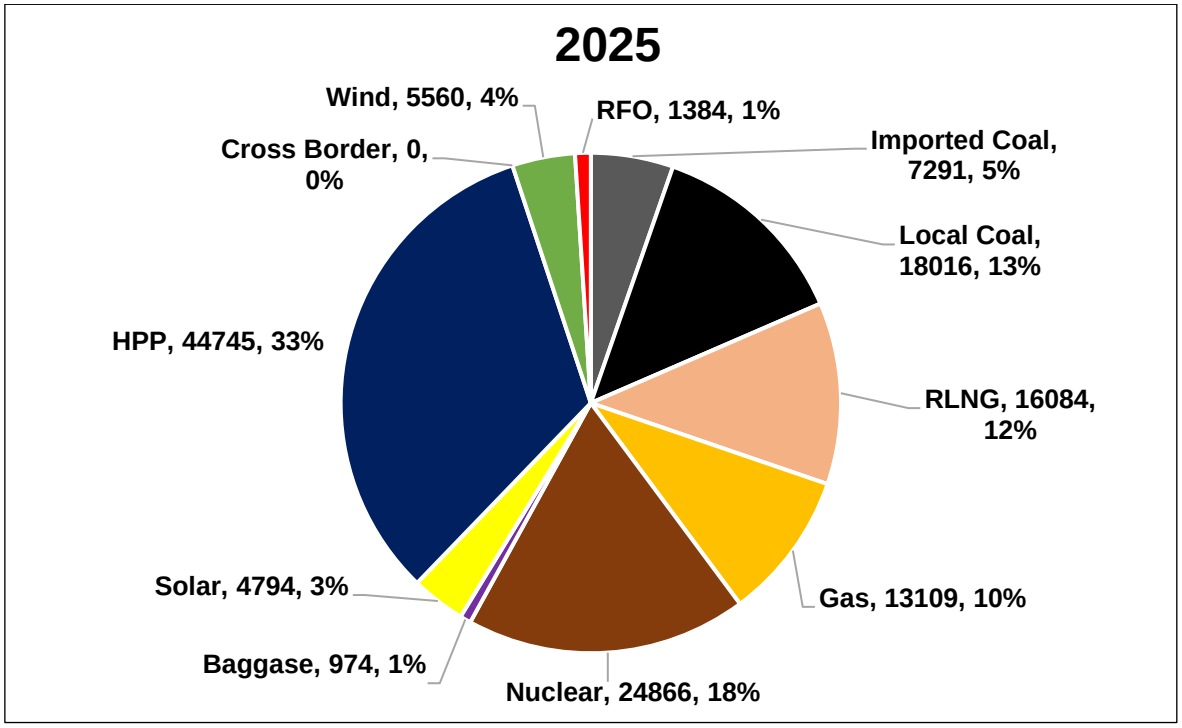


Chart D-1: IGCEP Generation Mix 2025 (GWh)

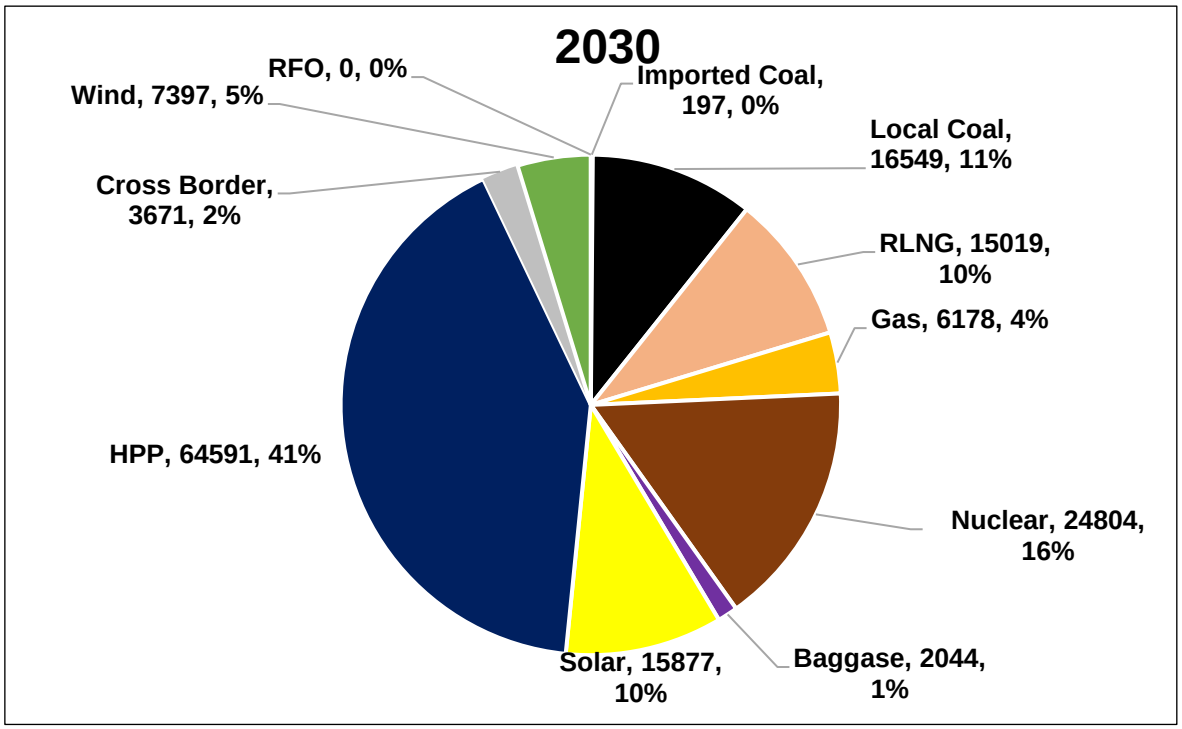


Chart D-2: IGCEP Generation Mix 2030 (GWh)

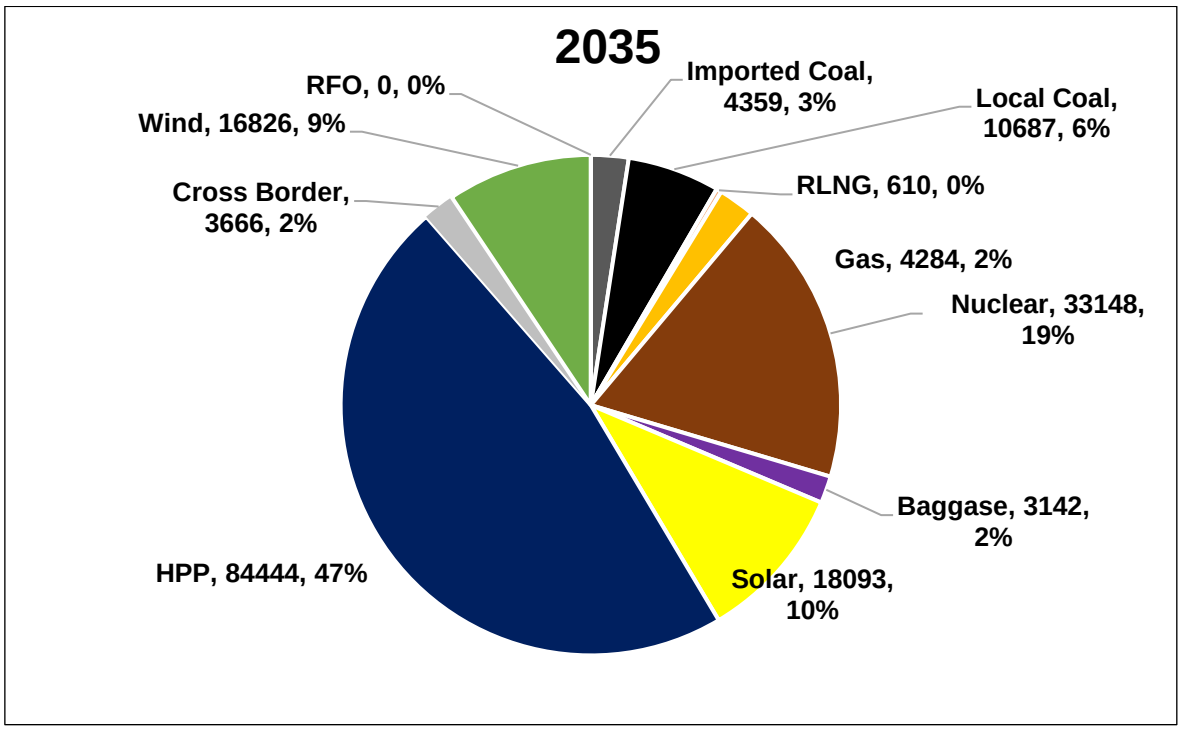


Chart D-3: IGCEP Generation Mix 2035 (GWh)

D-8.IGCEP Capacity Mix 2025-35 (MW)

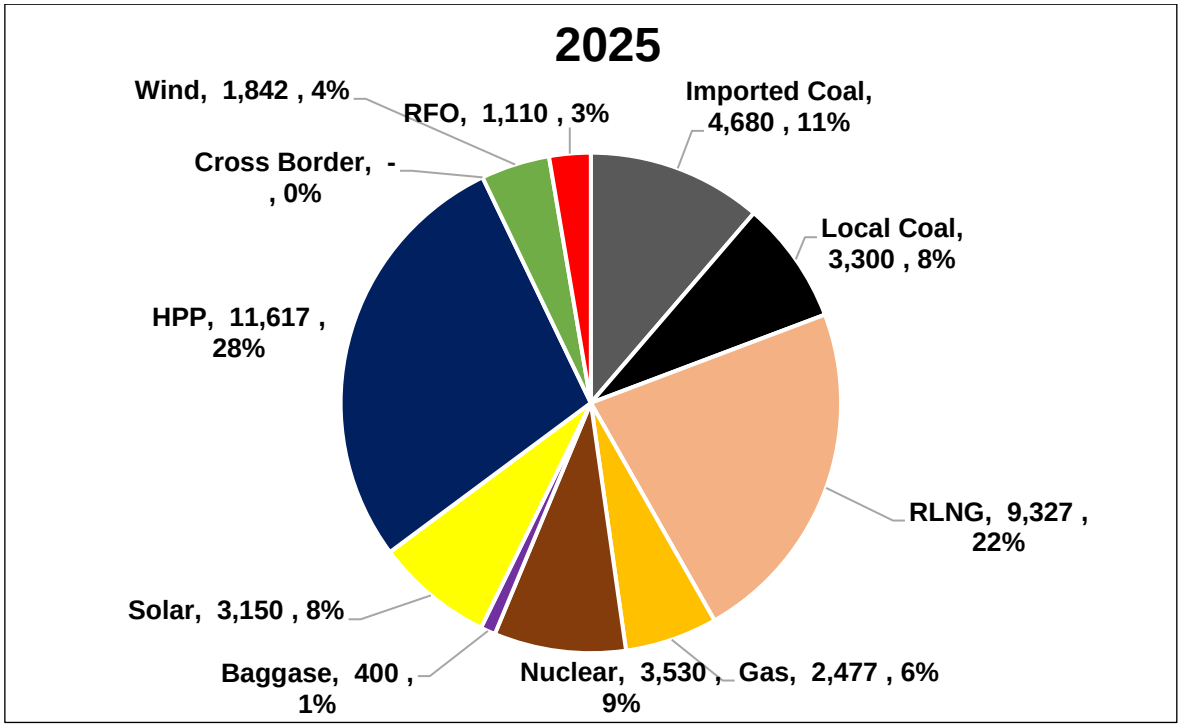


Chart D-4: IGCEP Capacity Mix 2025 (MW)

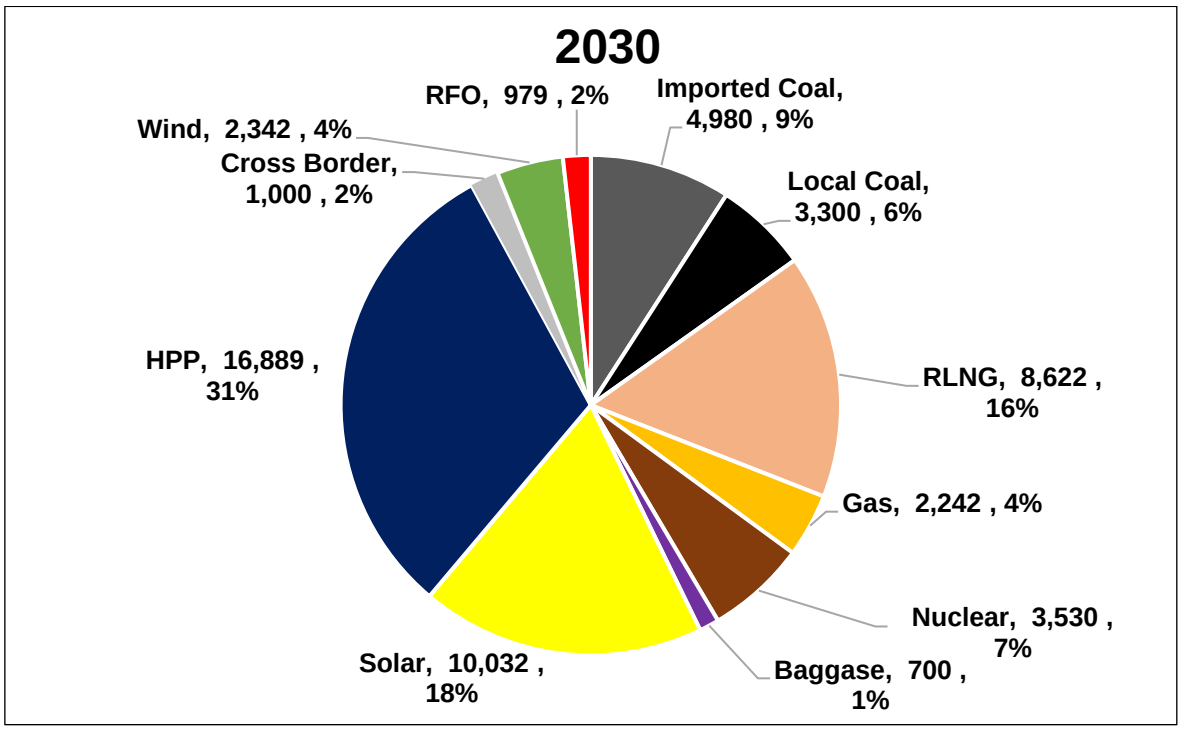


Chart D-5: IGCEP Capacity Mix 2030 (MW)

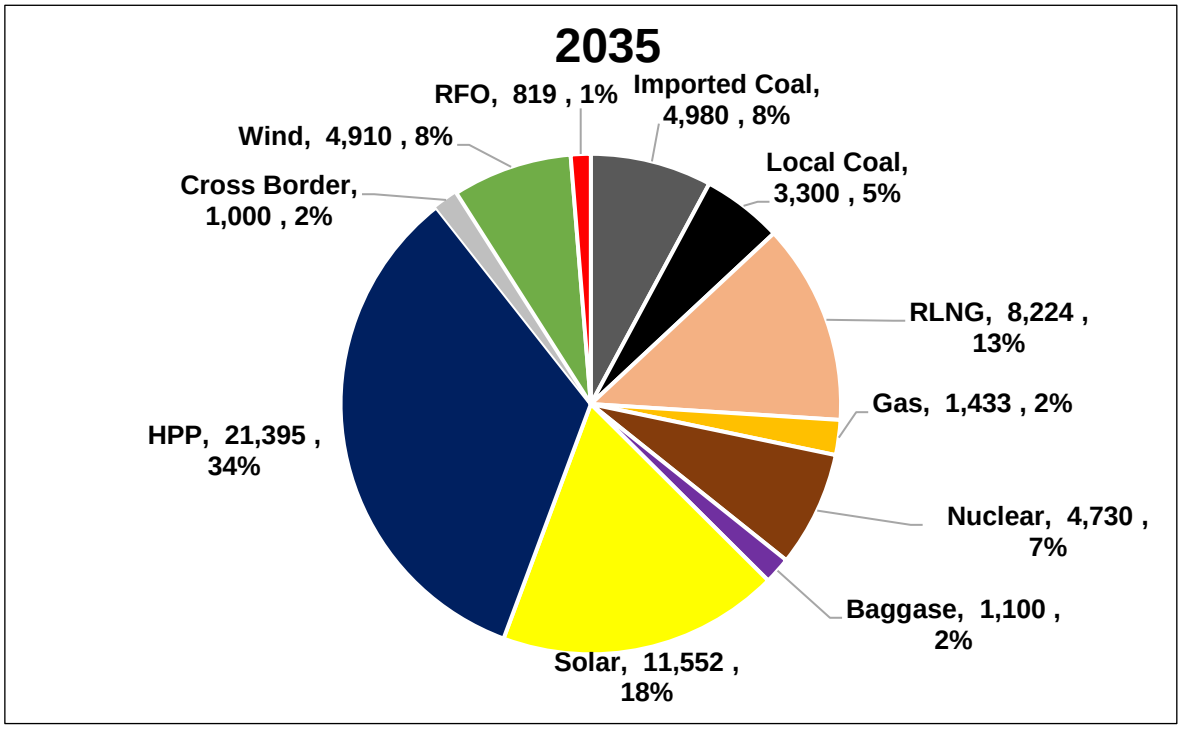


Chart D-6: IGCEP Capacity Mix 2035 (MW)

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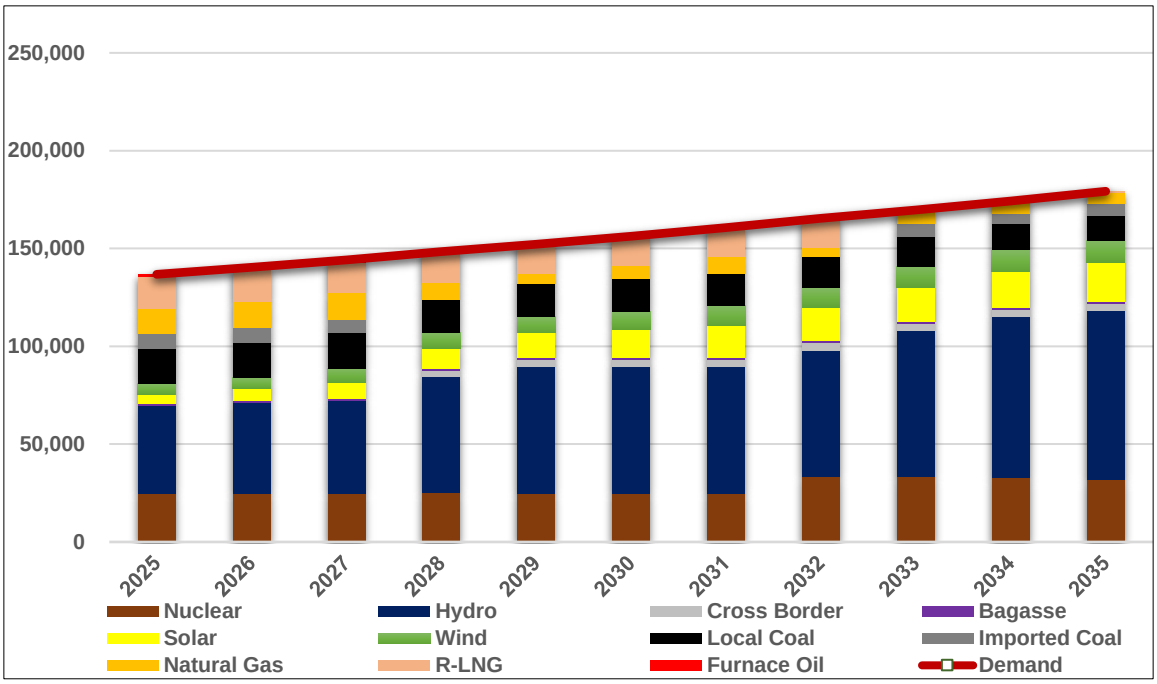
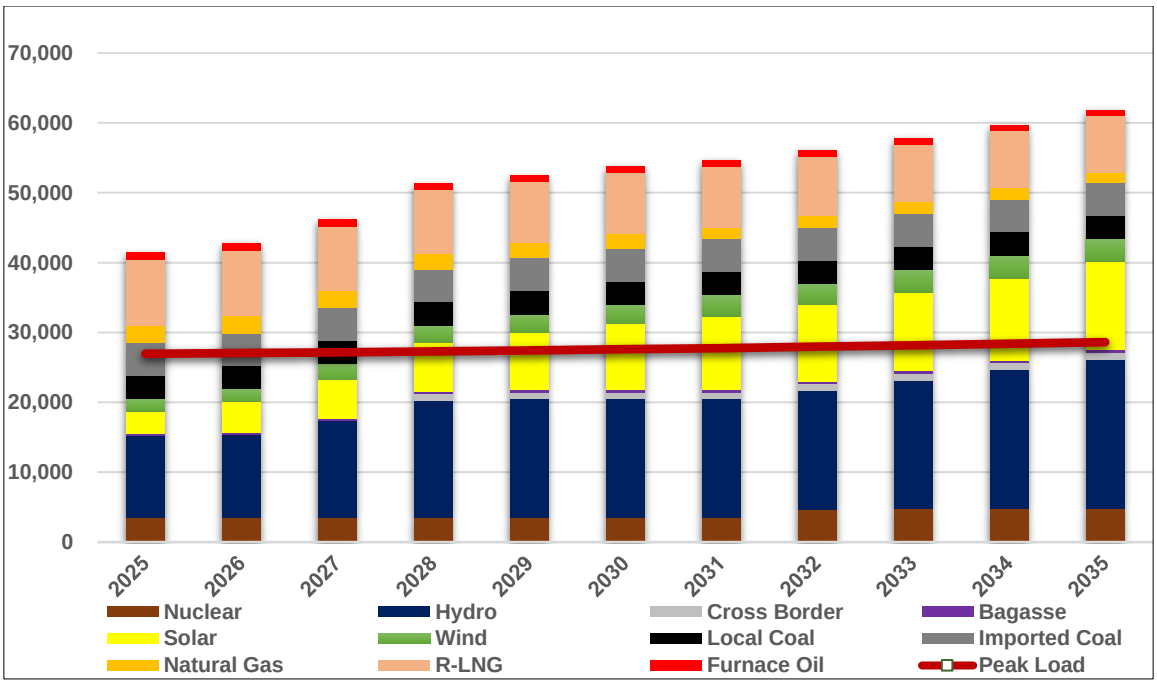
Annexure E. RCA with Low DSM

E-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



E-2.Installed Capacity Vs Peak Demand (MW) - Country



E-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Solar Utility MWp	Net Meter MWp*	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	-	2,400	-	2,400	2,400
2026	-	-	-	1,200	-	1,200	3,600
2027	-	-	-	900	400	1,300	4,900
2028	-	-	-	800	100	900	5,800
2029	-	-	-	700	-	700	6,500
2030	-	-	-	600	70	670	7,170
2031	-	-	-	500	230	730	7,900
2032	1,200	-	-	400	-	1,600	9,500
2033	-	1,500	-	300	200	2,000	11,500
2034	-	1,500	342	200	7	2,049	13,549
2035	-	1,500	747	120	-	2,367	15,916
Total	**1,200**	**4,500**	**1,089**	**8,120**	**1,007**	**15,916**	

** Net Metering is committed*

E-4.List of Projects uptill 2034 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
Generation Additions in 2028-29 (MW)			**1,420**	**1,420**			
Cumulative Addition up till 2029 (MW)			**14,486**	**14,486**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	70	70	KE	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**1359.7**	**1359.7**			
Cumulative Addition up till 2030 (MW)			**15,845**	**15,845**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	230	230	KE	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**1,420**	**1,420**			
Cumulative Addition up till 2031 (MW)			**17,265**	**17,265**			
2031-32							
51	Net Meter	PV	400	400	NGC	Committed	Jul-31
52	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
Generation Additions in 2031-32 (MW)			**1,600**	**1,517**			

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
Cumulative Addition up till 2032 (MW)			**18,865**	**18,782**			
2032-33							
54	Net Meter	PV	300	300	NGC	Committed	Jul-32
55	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
57	KE_New_Wind	Wind	200	200	KE	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**2,000**	**2,000**			
Cumulative Addition up till 2033 (MW)			**20,865**	**20,782**			
2033-34							
59	Net Meter	PV	200	200	NGC	Committed	Jul-33
60	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
61	KE_New_Wind	Wind	7	7	KE	Optimised	Jul-33
62	New_Solar_NGC	PV	342	342	NGC	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**2,049**	**2,049**			
Cumulative Addition up till 2034 (MW)			**22,914**	**22,831**			
2034-35							
62	Net Meter	PV	120	120	NGC	Committed	Jul-34
63	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
64	New_Solar_NGC	PV	747	747	NGC	Optimised	Jul-33
Generation Additions in 2034-35 (MW)			**2,367**	**2,367**			
Cumulative Addition up till 2035 (MW)			**25,281**	**25,198**			

E-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	6.16	0.00	0.00	0.00	0.00	0.00	2.86	1.22	1.01
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73
13	Atlas_Solar(Zhenfa)	PV	18.36	18.33	18.36	18.36	18.36	18.33	18.36	18.36	18.36
14	Best	PV	18.57	18.57	18.57	18.57	18.50	18.57	18.57	18.57	18.57
15	Crest	PV	18.82	18.82	18.82	18.82	18.82	18.82	18.82	18.82	18.82
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.71	16.71	16.71	16.71	16.71	16.71	16.71	16.71
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.95	22.95
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.22	17.22	17.22	17.22	17.22	17.22	17.22	17.22
24	Gharo	KE_PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
25	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Oursun	KE_PV	20.96	20.97	20.96	20.96	20.96	20.97	20.96	20.96	20.96
27	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
37	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
38	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
41	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
48	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.94	31.99	31.99	31.79	31.94	31.99	31.99	31.99
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
68	CASA	Interconnection	0.00	36.42	41.92	41.92	41.92	41.80	41.92	41.92	41.92
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.43	44.43	44.31	44.43	44.43	44.43
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.77	38.77	38.77	38.66	38.77	38.77	38.77
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.44	54.44	54.15	54.29	54.22	54.00	52.33
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.12	9.15	9.15	9.15	8.76	8.92	8.92	8.68
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
121	Jagran-I	Hydro Existing	49.49	49.35	49.49	49.49	49.49	48.01	48.40	47.36	45.11

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.40	45.36	45.48	45.48	45.48	45.36	45.48	45.48	45.48
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.22	40.11	40.22	40.22	40.22
125	Malakand-III	Hydro Existing	54.04	53.89	54.04	52.88	52.88	47.65	48.18	46.46	42.33
126	Mangla	Hydro Existing	62.49	61.66	55.31	54.69	54.69	54.54	54.69	54.69	54.69
127	Neelum Jehlum	Hydro Existing	53.48	53.33	53.48	53.48	53.44	53.33	53.48	53.48	53.48
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.49	55.34	55.49	55.49	55.49
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	42.75
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.37
131	Suki Kinari	Hydro Existing	51.17	51.03	51.17	51.17	51.17	51.03	51.17	51.17	50.73
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	31.22	14.11	12.10	10.40	9.70	7.71	12.12	9.47	4.88
136	Foundation	CCGT_Gas	80.33	53.66	53.66	53.66	77.11	53.66	53.65	53.66	53.66
137	Guddu-V (747)	CCGT_Gas	81.63	52.43	5.10	33.49	72.53	23.70	50.48	44.89	43.85
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	69.75	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.69	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	78.26	31.89	4.39	4.40	12.95	8.27	50.16	50.94	41.91
142	SNPC-II	KE_CCGT_Gas	78.85	35.00	5.15	5.78	41.21	10.28	51.00	51.94	43.39
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.24	89.99	89.85	89.85	89.62	89.20	88.83	87.83
153	C-2	Nuclear	90.00	90.24	89.99	89.85	89.85	89.62	89.20	88.83	87.83
154	C-3	Nuclear	90.00	90.24	89.99	89.86	89.85	89.64	89.23	88.84	87.83
155	C-4	Nuclear	90.00	90.24	89.99	89.86	89.85	89.63	89.23	88.84	87.84
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	89.10	88.63	87.04	81.44
157	K-2	Nuclear	85.07	85.29	85.05	84.95	84.84	84.57	83.84	83.29	81.66
158	K-3	Nuclear	85.07	85.29	85.05	85.01	84.84	84.65	83.84	83.29	81.70
159	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.45	83.23	83.89	83.23	81.90	77.59	77.07	60.85	59.76

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.93	80.16	81.55	79.07	77.45	76.64	74.18	56.73	57.73
166	Thar TEL	Local Coal	84.93	78.25	81.55	80.22	77.84	76.92	74.89	58.93	57.89
167	Thar-I (SSRL)	Local Coal	84.92	75.88	76.95	76.53	76.49	75.39	65.30	69.06	63.30
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	49.47	0.00	0.00	0.00	0.00	0.00	41.47	29.21	29.31
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Jamshoro Coal	Imported Coal	1.36	0.00	0.00	0.00	0.00	0.00	15.72	0.34	20.47
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	12.88	0.00	0.00	0.00	0.00	0.00	8.06	10.65	7.75
175	Sahiwal Coal	Imported Coal	0.65	0.00	0.00	0.00	0.00	0.00	5.85	6.68	6.43
176	FPCL	KE_Imported Coal	21.35	23.08	2.95	2.89	2.31	2.41	1.92	2.43	2.47
177	Altern	Gas Engine_RLNG	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	39.22	35.97	44.52	45.62	45.42	48.14	0.00	0.00	0.00
179	Bhikki	CCGT_RLNG	10.36	16.25	19.30	15.74	23.15	20.88	0.00	0.00	0.00
180	FKPCL	CCGT_RLNG	12.03	12.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	12.58	0.63	0.00	0.00	4.57	0.00	0.00	0.00	0.00
182	Haveli	CCGT_RLNG	67.00	74.13	78.56	79.83	68.44	70.91	3.97	5.13	6.37
183	KAPCO 495	CCGT_RLNG	25.13	25.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	12.79	0.62	0.11	0.18	5.09	3.07	0.00	0.00	0.00
188	Saif	CCGT_RLNG	12.58	12.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
189	Saphire	CCGT_RLNG	12.58	0.44	0.00	0.00	2.76	0.00	0.00	0.00	0.00
190	Trimmu	CCGT_RLNG	4.30	1.98	4.46	5.51	7.24	6.23	0.00	0.00	1.05
191	BQPS2	KE_CCGT_RLNG	2.52	2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192	BQPS3	KE_CCGT_RLNG	12.80	12.60	0.57	0.54	0.22	0.33	0.11	0.15	0.13
193	KCCPP	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.93	41.85	41.96	41.96	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.51	64.30	64.48	64.48	64.48
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	77.81	67.49	55.69

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
202	Gorkin Matiltan	Hydro_Committed	44.69	44.37	44.77	44.77	44.22	44.65	44.50	44.23	41.63
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.35	82.23	82.33	82.25	82.02
204	Jagran-II	Hydro_Committed	50.98	51.08	51.22	50.81	50.81	47.06	49.00	47.90	45.03
205	Karora	Hydro_Committed	71.16	71.77	72.12	72.12	71.69	71.92	71.77	70.93	69.58
206	Koto	Hydro_Committed	58.36	58.59	59.06	59.06	58.43	58.90	58.74	58.42	55.73
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	16.89	16.93	16.93	16.93
208	Lawi	Hydro_Committed	48.20	48.84	48.96	48.96	48.91	48.78	48.79	48.77	48.38
209	Mohmand Dam	Hydro_Committed	0.00	56.74	42.92	42.88	42.22	41.66	40.42	39.85	39.91
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.68	54.64	54.79	54.79	54.79	54.64	54.79	54.79	54.79
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

E-6.Year-wise Installed Capacity Addition (MW)

Year	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	1,390	-	-	-	1,125	52,465
2030	-	-	-	-	-	1,360	-	-	-	1,360	53,824
2031	-	-	-	-	-	1,420	-586	-	-	834	54,658
2032	-	-	-188	1,200	-	400	-	-	-	1,412	56,070
2033	-	1,500	-210	-	-	500	-	-	-	1,790	57,860
2034	-	1,500	-	-	-	549	-	-160	-	1,889	59,749
2035	-	1,500	-	-	-	867	-223	-	-	2,144	61,893
Total	**3,300**	**21,389**	**8,224**	**4,730**	**4,680**	**16,318**	**1,433**	**819**	**1,000**	**61,893**	

E-7.IGCEP Generation Mix 2025-2035 (GWh)

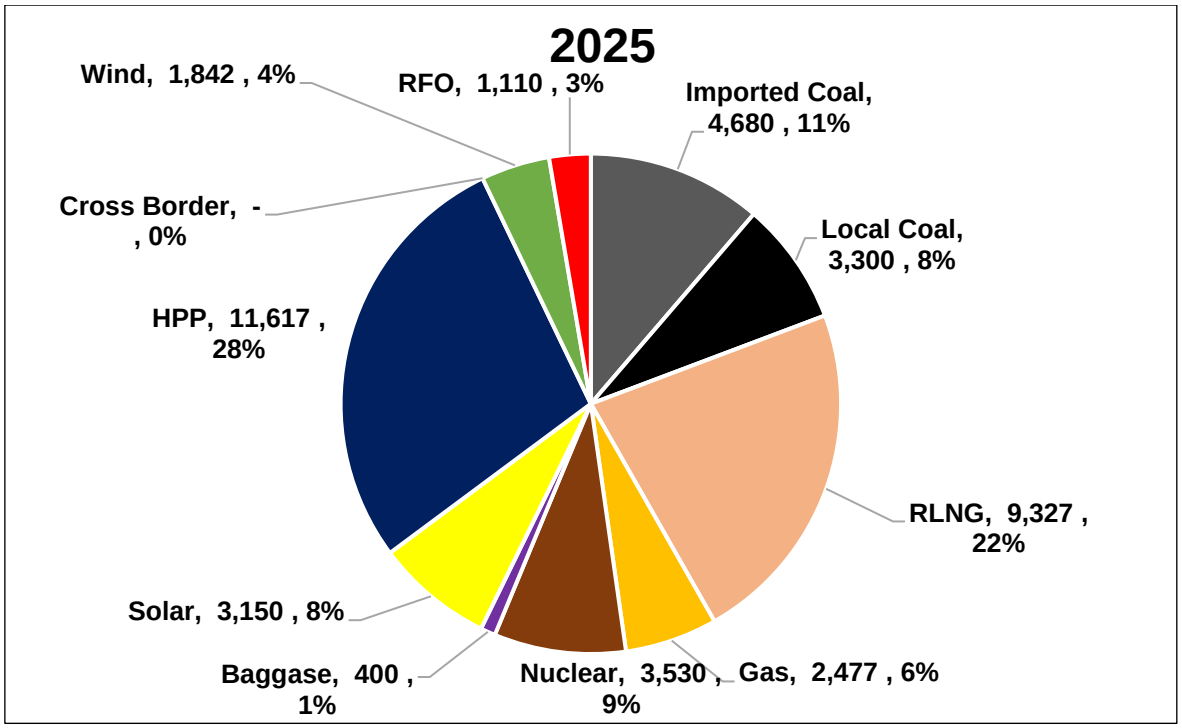


Chart E-1: IGCEP Generation Mix 2025 (GWh)

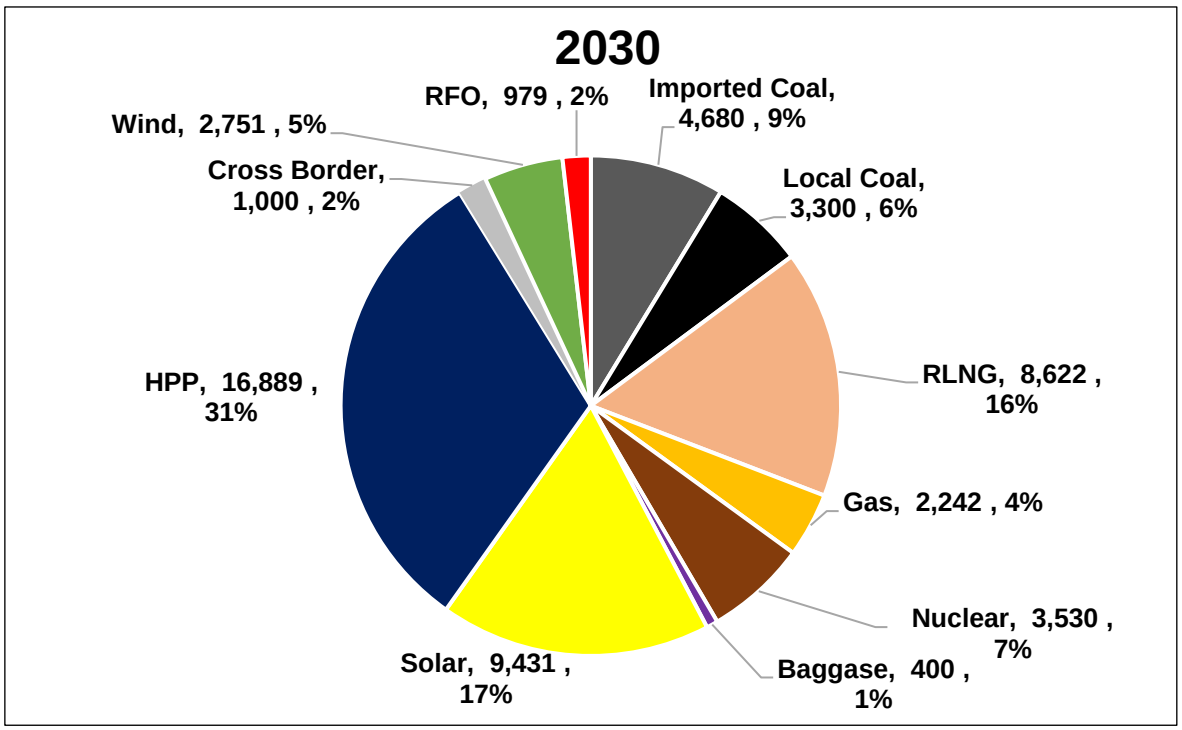


Chart E-2: IGCEP Generation Mix 2030 (GWh)

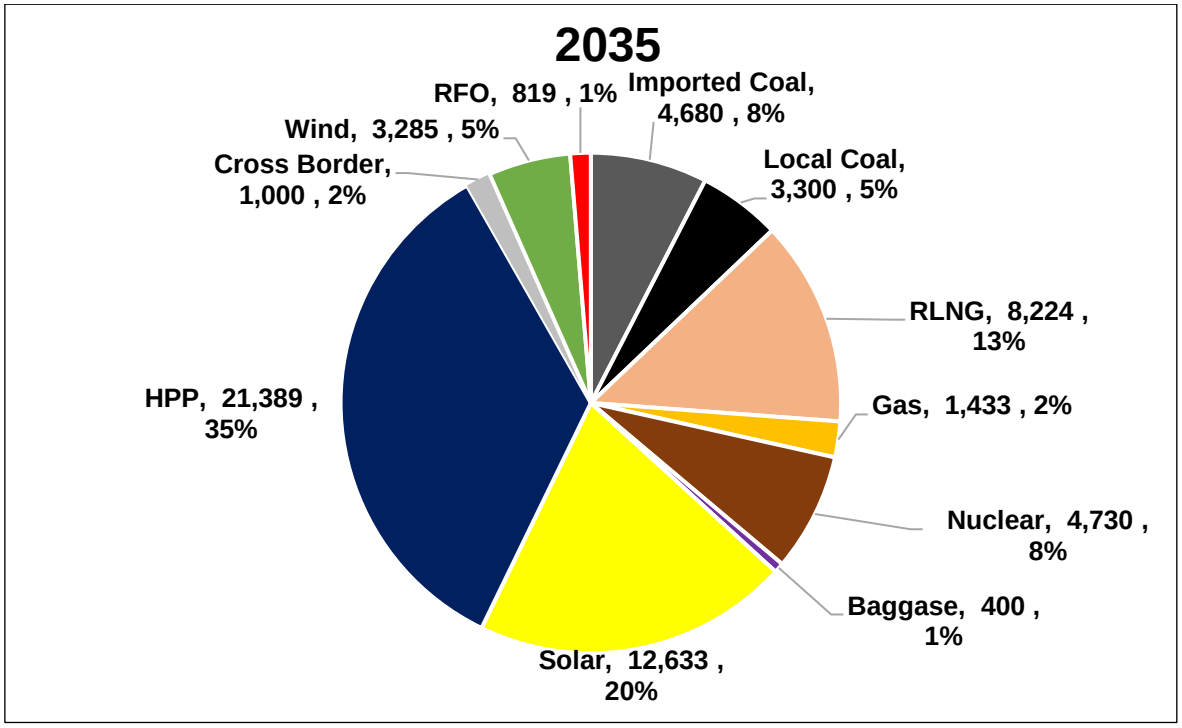


Chart E-3: IGCEP Generation Mix 2035 (GWh)

E-8. IGCEP Capacity Mix 2025-35 (MW)

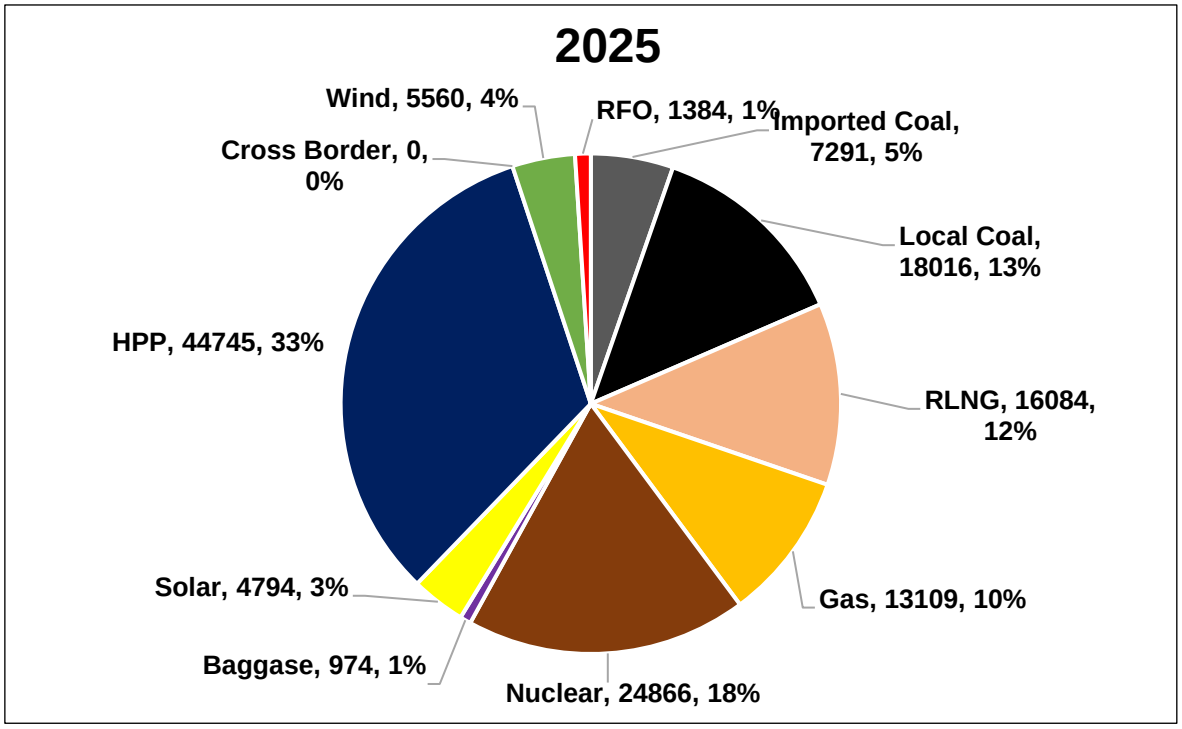


Chart E-4: IGCEP Capacity Mix 2025 (MW)

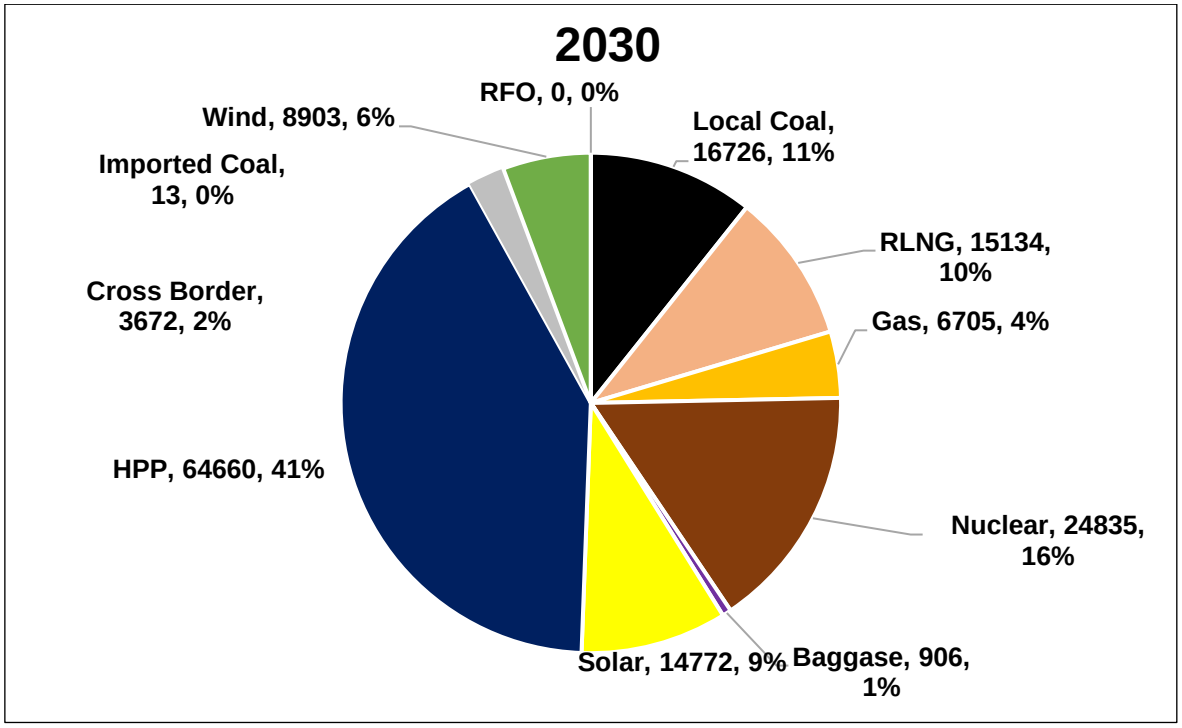


Chart E-5: IGCEP Capacity Mix 2030 (MW)

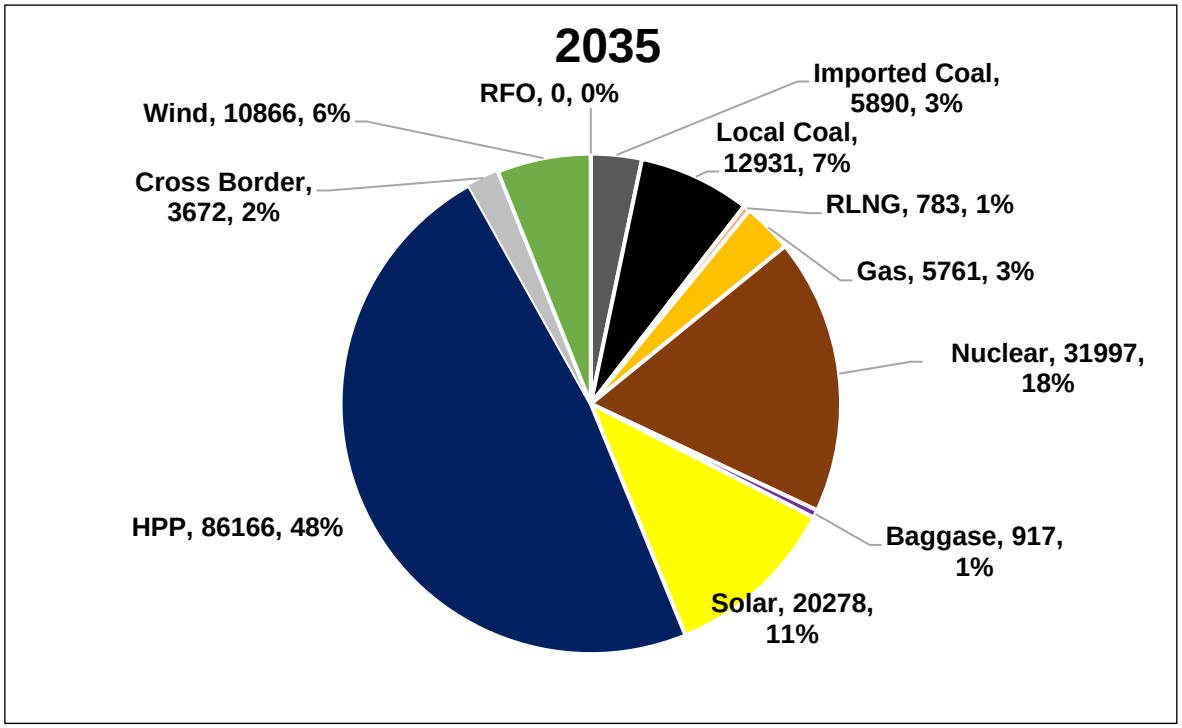


Chart E-6: IGCEP Capacity Mix 2035 (MW)

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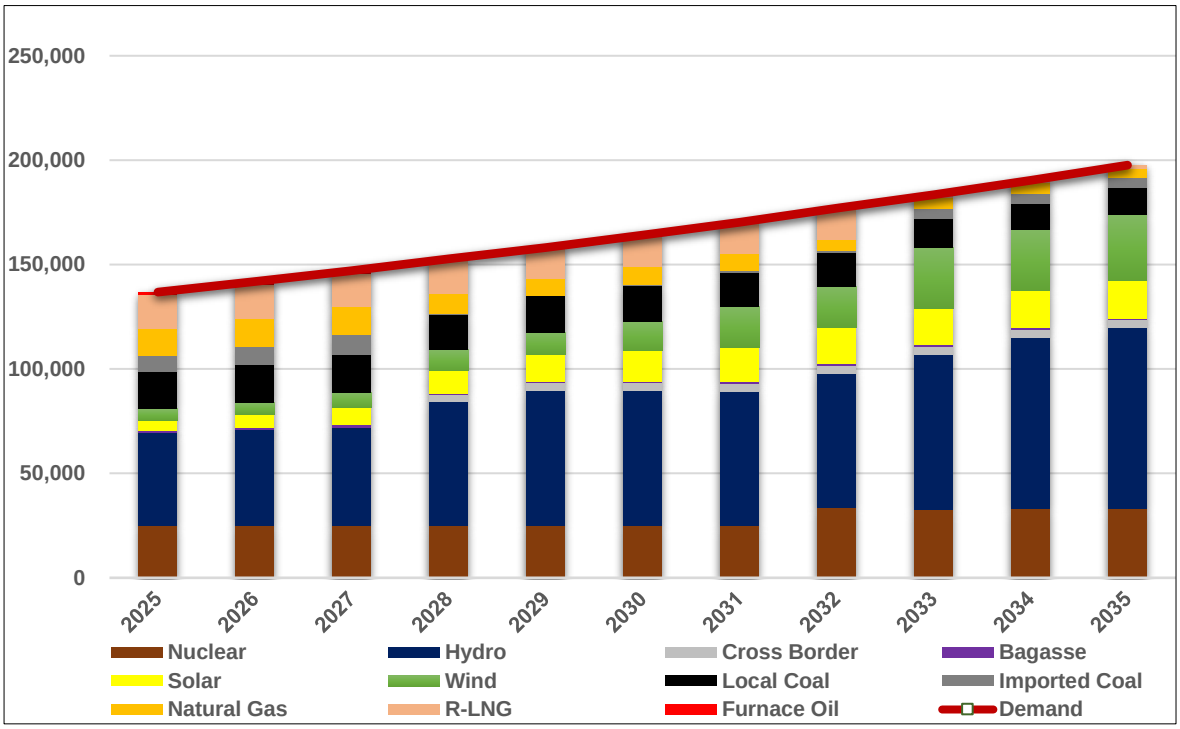
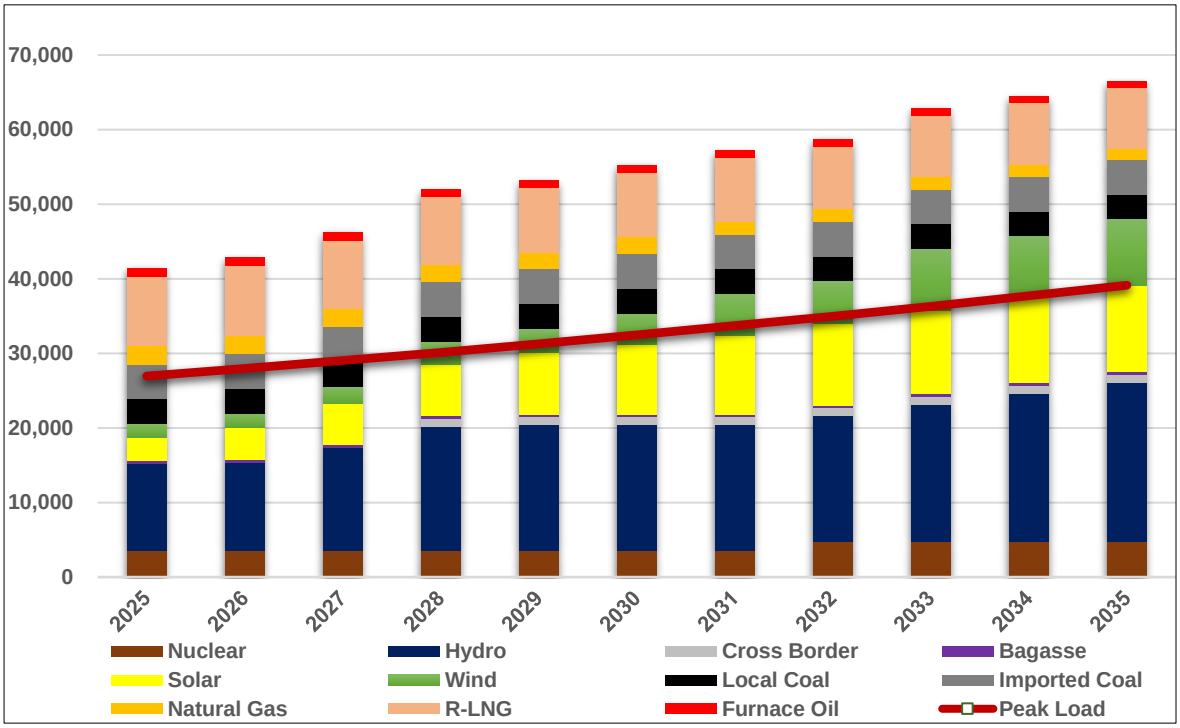
Annexure F. RCA with Medium Demand

F-1. Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



F-2.Installed Capacity Vs Peak Demand (MW) - Country



F-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	2,400	-	-	2,400	2,400
2026	-	-	1,200	-	-	1,200	3,600
2027	-	-	900	-	400	1,300	4,900
2028	-	-	800	586	100	1,486	6,386
2029	-	-	700	-	100	800	7,186
2030	-	-	600	650	100	1,350	8,536
2031	-	-	500	1,308	100	1,908	10,444
2032	1,200	-	400	-	100	1,700	12,144
2033	-	1,505	300	2,422	100	4,327	16,471
2034	-	1,500	200	-	28	1,728	18,199
2035	-	1,500	120	491	172	2,283	20,482
Total	**1,200**	**4,505**	**8,120**	**5,457**	**1,200**	**20,482**	

**Net Metering is Committed*

F-4.List of Projects (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
39	New_Wind	Wind	586	586	NGC	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**6,076**	**6,076**			
Cumulative Addition up till 2028 (MW)			**13,652**	**13,652**			
2028-29							
40	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
41	Net Meter	PV	700	700	NGC	Committed	Jul-28
42	PV_Market	PV	593	593	Market	Committed	Jul-28
43	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
44	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-28
Generation Additions in 2028-29 (MW)			**1,520**	**1,520**			
Cumulative Addition up till 2029 (MW)			**15,172**	**15,172**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-29
47	New_Wind	Wind	650	650	NGC	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**2039.7**	**2039.7**			
Cumulative Addition up till 2030 (MW)			**17,211**	**17,211**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-30
51	New_Wind	Wind	1308	1308	NGC	Optimised	
Generation Additions in 2030-31 (MW)			**2,598**	**2,598**			
Cumulative Addition up till 2031 (MW)			**19,809**	**19,809**			
2031-32							
51	Net Meter	PV	400	400	NGC	Committed	Jul-31
52	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,700**	**1,617**			
Cumulative Addition up till 2032 (MW)			**21,509**	**21,426**			
2032-33							
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32

#	Name of Project	Fuel Type	Installed Capacity (MW)	Dependable Capacity (MW)	Agency	Status	CoD
55	KE_New_Wind	Wind	200	200	KE	Optimised	Jul-32
56	New_Wind	Wind	2422	2422	NGC	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**4,427**	**4,427**			
Cumulative Addition up till 2033 (MW)			**25,936**	**25,853**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	28	28	KE	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**1,728**	**1,728**			
Cumulative Addition up till 2034 (MW)			**27,664**	**27,581**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	172	172	KE	Optimised	Jul-34
64	New_Wind	Wind	491	491	NGC	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**2,283**	**2,283**			
Cumulative Addition up till 2035 (MW)			**29,947**	**29,864**			

F-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	6.16	0.00	0.03	0.08	0.10	0.10	1.33	1.37	1.39
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.73	18.73	18.45	18.73	18.68	18.73	18.73
13	Atlas_Solar (Zhenfa)	PV	18.36	18.19	18.36	18.36	18.18	18.33	18.08	18.36	18.36
14	Best	PV	18.57	18.53	18.57	18.57	18.44	18.57	18.52	18.57	18.57
15	Crest	PV	18.82	18.78	18.82	18.82	18.56	18.82	18.52	18.82	18.82
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.70	16.71	16.71	16.71	16.71	16.68	16.71	16.71
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.22	17.22	16.97	17.22	17.18	17.22	17.22
24	Gharo	KE_PV	22.03	21.82	21.85	21.85	21.35	21.55	20.73	21.59	21.85
25	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Oursun	KE_PV	20.96	20.91	20.90	20.90	20.50	20.51	20.02	20.77	20.90
27	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
37	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
38	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
41	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
48	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
51	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.80	31.85	31.85	31.48	31.64	31.33	31.69	31.85
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.86	41.78	41.84	41.68	41.78	41.78
68	CASA	Interconnection	0.00	36.38	41.88	41.88	41.69	41.72	41.85	41.88	41.88
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	40.94	40.28	42.24
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.43	44.35	44.22	43.70	44.24	44.43
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.77	38.77	38.77	38.66	38.77	38.77	38.77
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.37	54.08	53.57	53.93	53.35	53.64	54.08
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.12	9.15	9.15	9.07	9.05	8.85	8.28	8.91
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
121	Jagran-I	Hydro Existing	49.49	49.35	49.49	49.49	49.40	49.27	48.26	47.01	48.40
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.36	45.36	45.48	45.48	45.40	45.24	45.37	45.36	45.48
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.22	40.11	39.76	40.22	40.22

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
125	Malakand-III	Hydro Existing	54.04	53.89	54.04	53.89	50.55	49.87	44.78	46.16	47.69
126	Mangla	Hydro Existing	62.49	61.50	55.12	54.51	54.36	54.32	54.32	54.42	54.51
127	Neelum Jehlum	Hydro Existing	53.48	53.33	53.45	53.42	53.43	53.30	53.39	53.35	53.45
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.49	55.34	55.49	55.49	55.49
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.59
131	Suki Kinari	Hydro Existing	51.17	51.03	51.17	51.11	51.03	50.90	50.94	51.03	51.05
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	29.15	15.20	13.74	12.88	11.93	9.87	9.74	8.11	4.47
136	Foundation	CCGT_Gas	77.88	70.25	53.66	53.66	68.77	53.66	53.65	53.66	53.66
137	Guddu-V (747)	CCGT_Gas	80.00	65.79	53.77	68.86	69.98	44.26	34.82	29.96	26.09
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	68.82	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	73.88	57.69	8.98	10.27	68.27	11.94	31.33	24.84	26.09
142	SNPC-II	KE_CCGT_Gas	77.54	68.83	9.50	10.63	68.73	12.89	31.95	25.53	26.56
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.24	89.99	89.97	89.78	89.84	88.60	89.23	89.09
153	C-2	Nuclear	90.00	90.24	89.99	89.97	89.77	89.84	88.66	89.20	89.09
154	C-3	Nuclear	90.00	90.24	89.99	89.97	89.77	89.85	88.65	89.17	89.12
155	C-4	Nuclear	90.00	90.24	89.99	89.97	89.78	89.85	88.65	89.17	89.12
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	87.88	84.28	86.22	88.40
157	K-2	Nuclear	85.07	85.29	85.05	85.03	84.74	84.75	83.25	83.94	83.77
158	K-3	Nuclear	85.07	85.29	85.05	85.03	84.74	84.76	83.22	83.97	83.79
159	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.45	83.59	84.64	82.88	80.82	79.35	72.99	56.50	57.57
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.79	81.75	81.68	80.72	78.65	77.82	66.44	42.31	37.63

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
166	Thar TEL	Local Coal	84.78	81.63	81.88	80.68	79.33	77.97	66.32	46.42	42.26
167	Thar-I (SSRL)	Local Coal	84.92	76.60	79.87	78.70	75.30	73.71	59.10	67.91	71.73
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	50.23	1.11	1.02	2.57	3.57	4.36	19.43	16.34	15.80
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Jamshoro Coal	Imported Coal	11.82	0.15	0.02	0.27	0.46	0.72	9.59	8.00	9.93
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	31.17	0.32	0.31	0.53	1.08	2.35	9.48	10.27	8.59
175	Sahiwal Coal	Imported Coal	1.34	0.00	0.00	0.04	0.08	0.28	11.64	13.91	14.93
176	FPCL	KE_Imported Coal	23.77	26.34	2.73	2.95	2.95	2.95	9.51	9.16	8.65
177	Altern	Gas Engine_RLNG	0.29	0.00	2.61	3.60	4.69	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	32.47	37.38	41.36	42.74	39.62	37.84	1.42	1.17	0.73
179	Bhikki	CCGT_RLNG	16.27	23.18	18.57	20.73	20.65	18.73	0.13	0.06	0.00
180	FKPCL	CCGT_RLNG	12.33	12.03	2.85	3.82	4.94	3.55	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	13.20	3.79	4.80	5.63	6.47	7.51	0.00	0.00	0.00
182	Haveli	CCGT_RLNG	65.56	53.25	73.03	66.01	65.99	69.66	7.36	7.50	10.44
183	KAPCO 495	CCGT_RLNG	25.24	25.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.47	2.68	3.30	4.34	5.12	5.44	0.00	0.00	0.00
185	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	13.27	4.20	5.32	6.13	6.91	8.48	0.00	0.00	0.00
188	Saif	CCGT_RLNG	13.20	14.12	4.21	5.26	6.13	6.55	0.00	0.00	0.00
189	Saphire	CCGT_RLNG	13.20	3.41	4.65	5.53	6.47	7.07	0.00	0.00	0.00
190	Trimmu	CCGT_RLNG	5.80	10.65	7.52	9.45	11.25	10.74	3.15	3.53	3.32
191	BQPS2	KE_CCGT_RLNG	5.24	6.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192	BQPS3	KE_CCGT_RLNG	15.83	16.91	0.65	0.79	0.96	0.90	1.32	1.19	1.08
193	KCCPP	KE_CCGT_RLNG	1.13	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	KTGTPS	KE_CCGT_RLNG	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	BQPS1-U5	KE_ST_RLNG	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.96	41.85	41.93	41.96	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.47	64.19	64.10	64.48	64.48
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	77.21	67.42	55.72
202	Gorkin Matiltan	Hydro_Committed	44.68	44.37	44.49	44.21	43.48	43.89	43.09	43.45	44.21
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.33	82.23	82.30	82.27	82.38
204	Jagran-II	Hydro_Committed	50.98	51.08	51.22	51.22	48.96	48.82	47.27	46.83	48.29
205	Karora	Hydro_Committed	71.09	71.77	71.90	71.64	70.61	70.88	69.85	70.62	71.64
206	Koto	Hydro_Committed	58.36	58.59	58.75	58.42	57.77	58.26	57.21	57.78	58.42
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	16.91	16.93	16.93

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
208	Lawi	Hydro_Committed	48.23	48.84	48.96	48.92	48.71	48.63	48.48	48.66	48.96
209	Mohmand Dam	Hydro_Committed	0.00	56.74	42.98	42.66	42.24	41.63	39.67	39.96	40.72
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.68	54.64	54.79	54.79	54.79	54.64	54.79	54.63	54.79
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

F-6. Year-wise Installed Capacity Addition (MW)

Year	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	2,176	-235	-131	1,000	5,710	51,926
2029	-	230	-495	-	-	1,490	-	-	-	1,225	53,151
2030	-	-	-	-	-	2,040	-	-	-	2,040	55,190
2031	-	-	-	-	-	2,598	-586	-	-	2,012	57,202
2032	-	-	-188	1,200	-	500	-	-	-	1,512	58,714
2033	-	1,505	-210	-	-	2,822	-	-	-	4,117	62,831
2034	-	1,500	-	-	-	228	-	-160	-	1,568	64,399
2035	-	1,500	-	-	-	783	-223	-	-	2,060	66,459
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**20,879**	**1,433**	**819**	**1,000**	**66,459**	

F-7.IGCEP Generation Mix 2025-2035 (GWh)

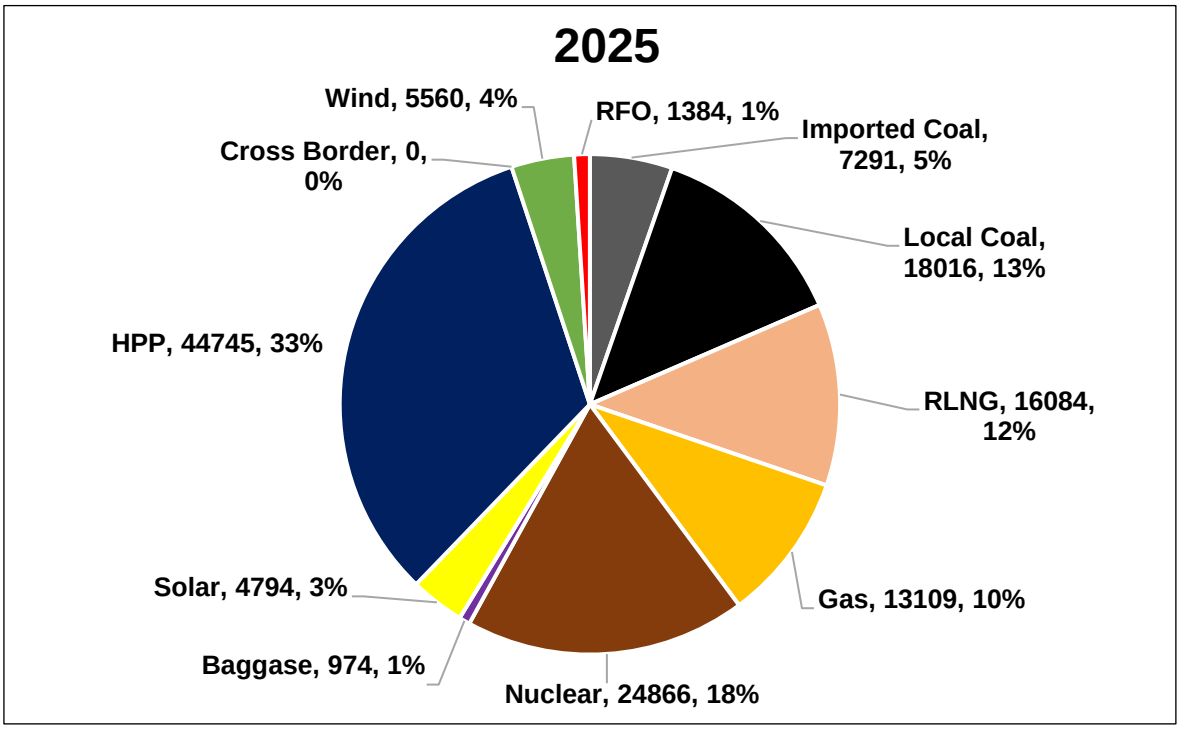


Chart F-1: IGCEP Generation Mix 2025 (GWh)

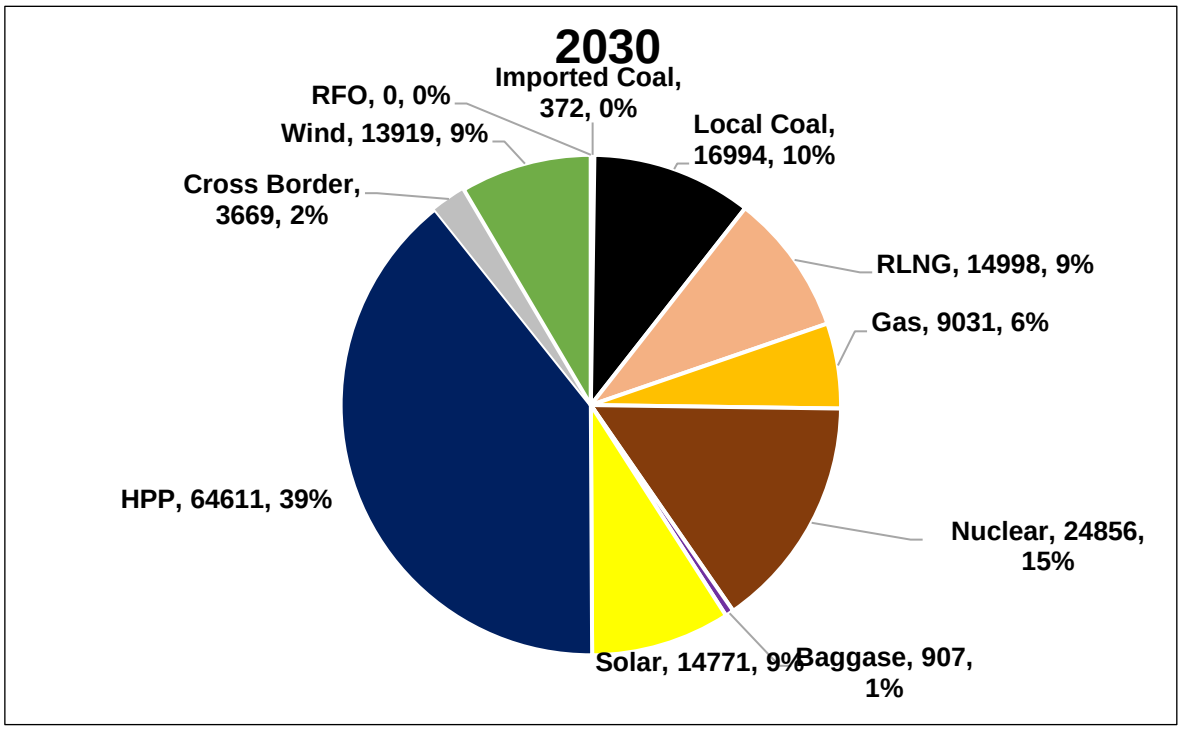


Chart F-2: IGCEP Generation Mix 2030 (GWh)

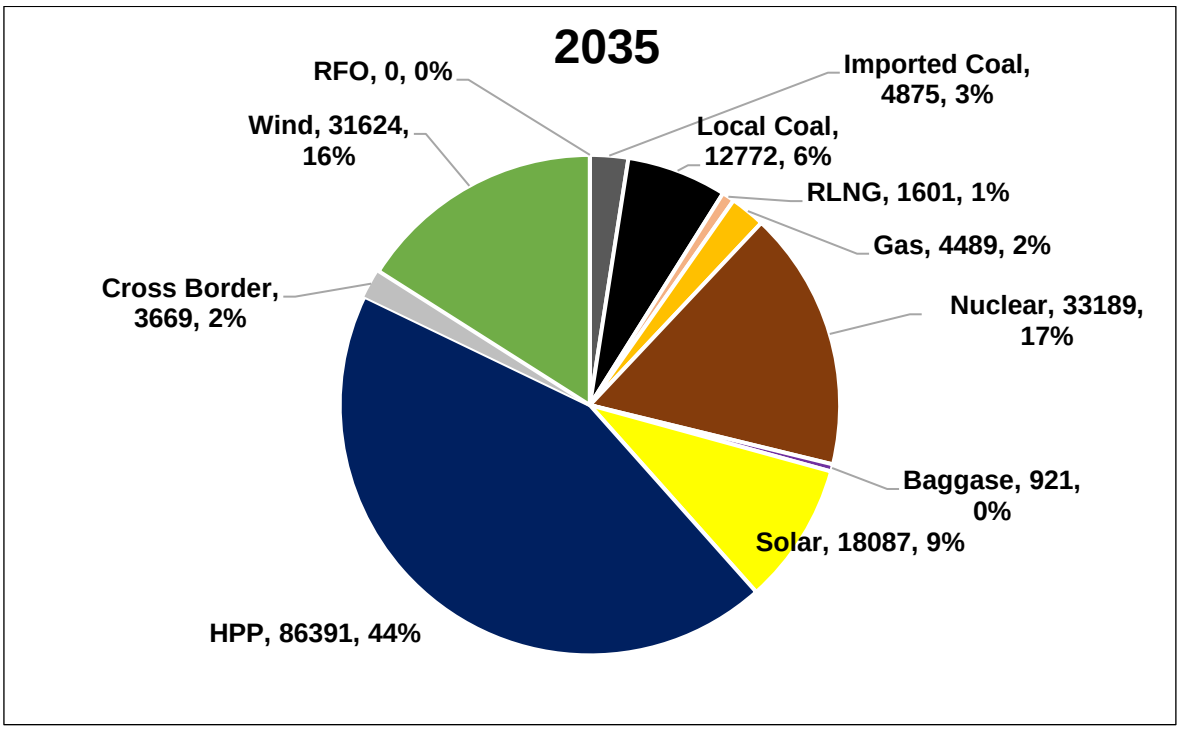


Chart F-3: IGCEP Generation Mix 2035 (GWh)

F-8.IGCEP Capacity Mix 2024-34 (MW)

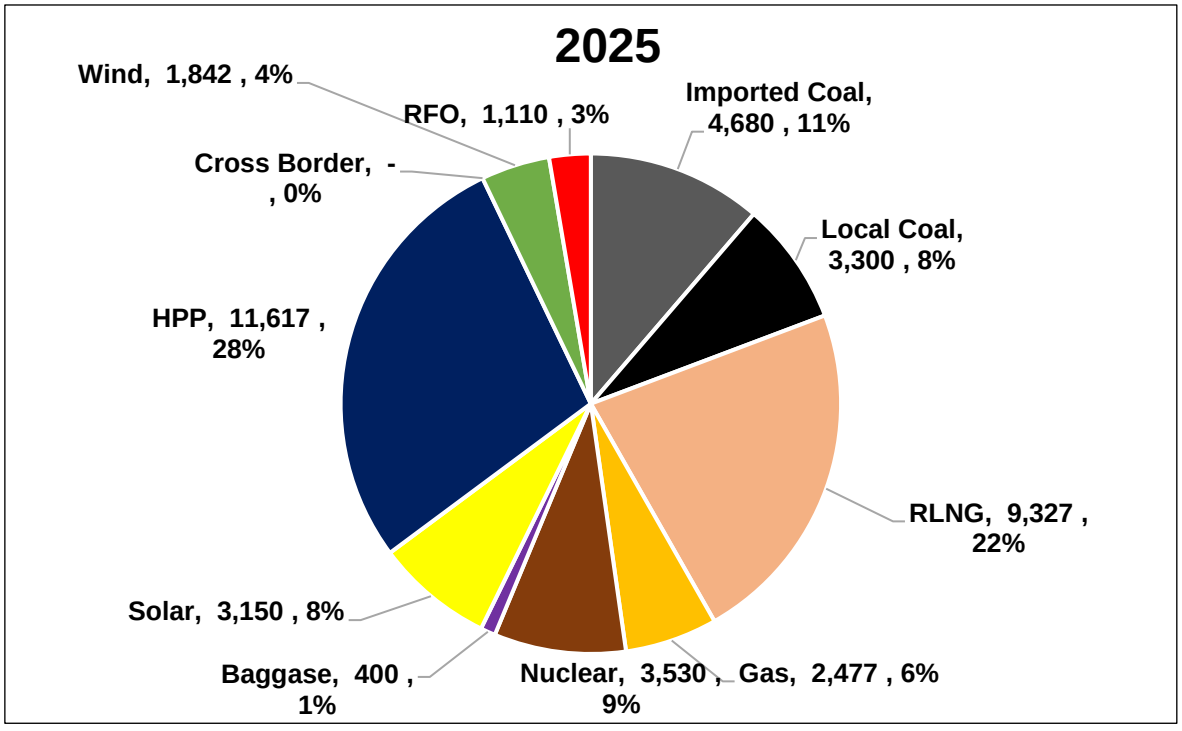


Chart F-4: IGCEP Capacity Mix 2025 (MW)

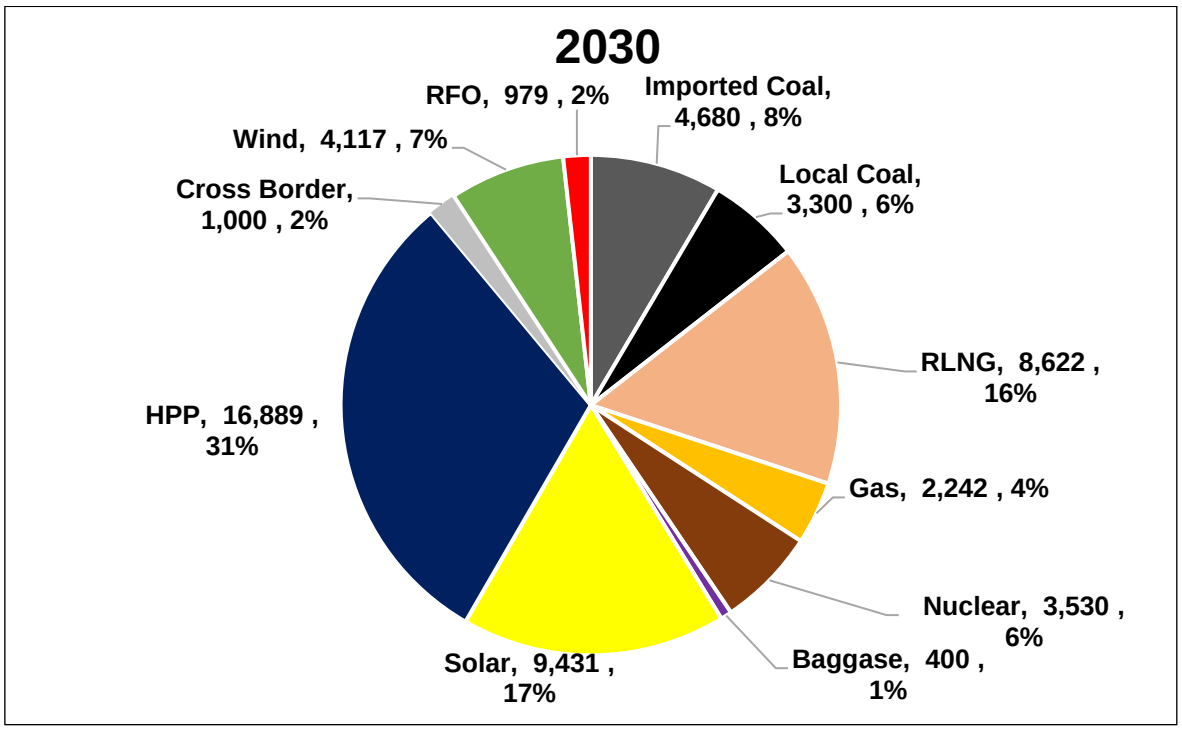


Chart F-5: IGCEP Capacity Mix 2030 (MW)

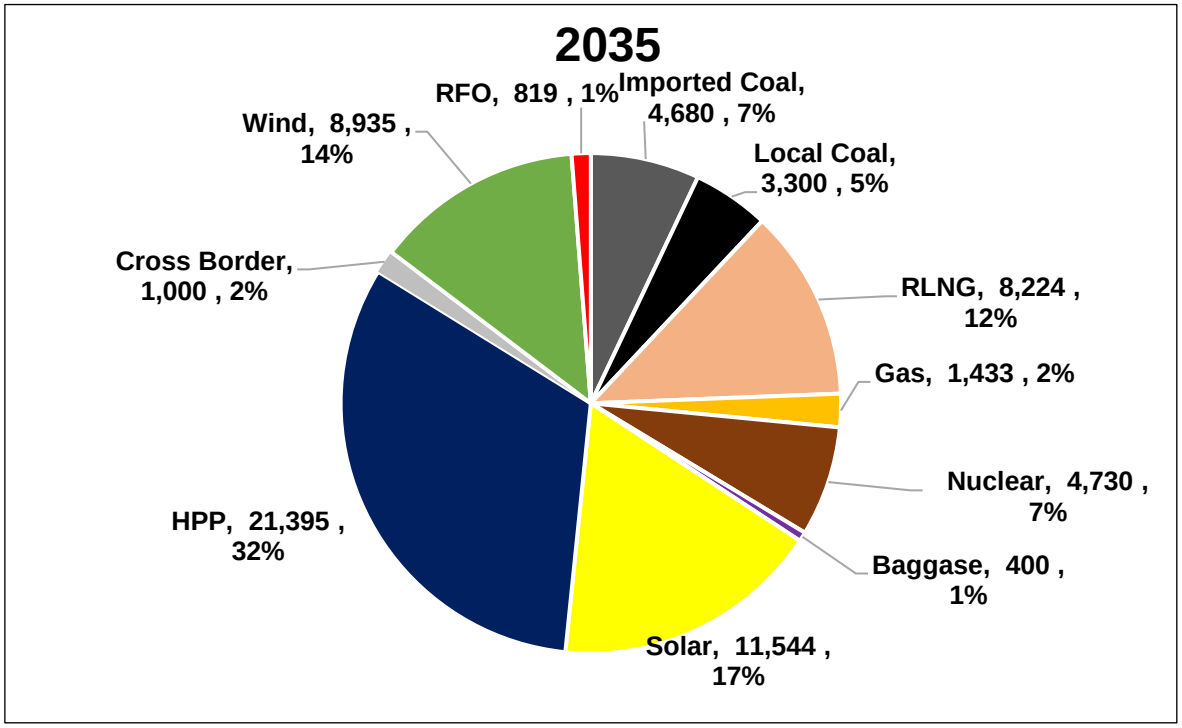


Chart F-6: IGCEP Capacity Mix 2035 (MW)

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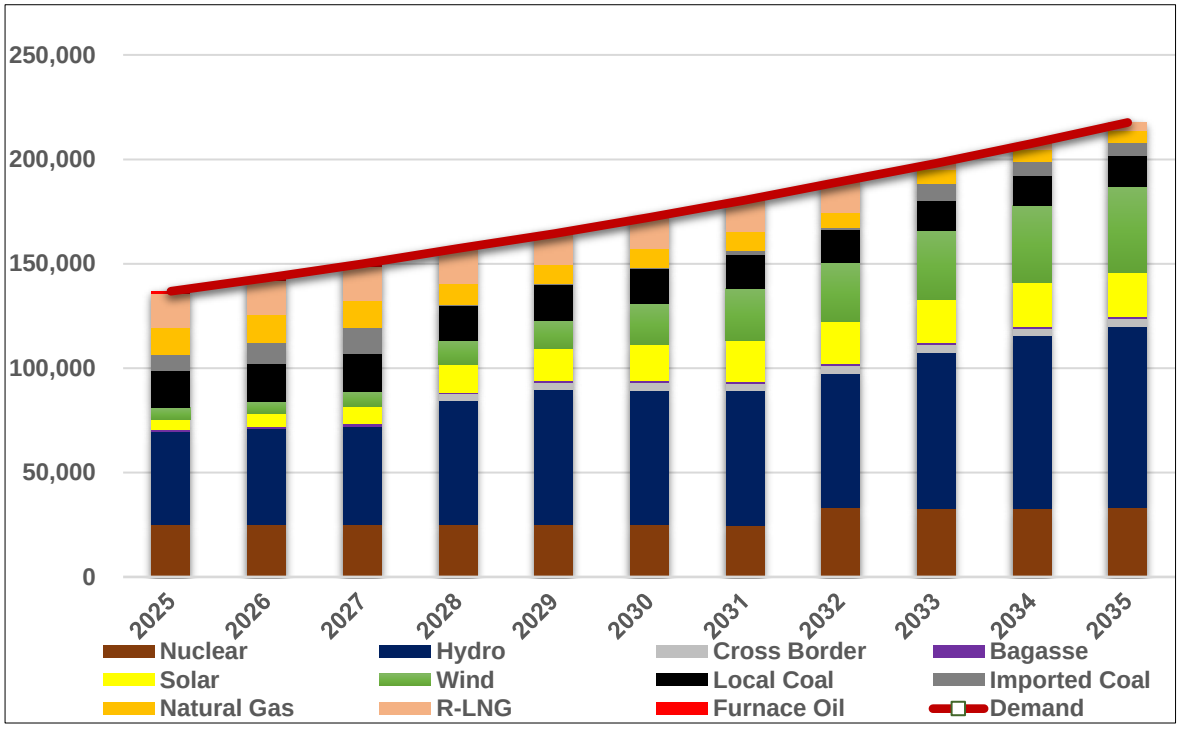
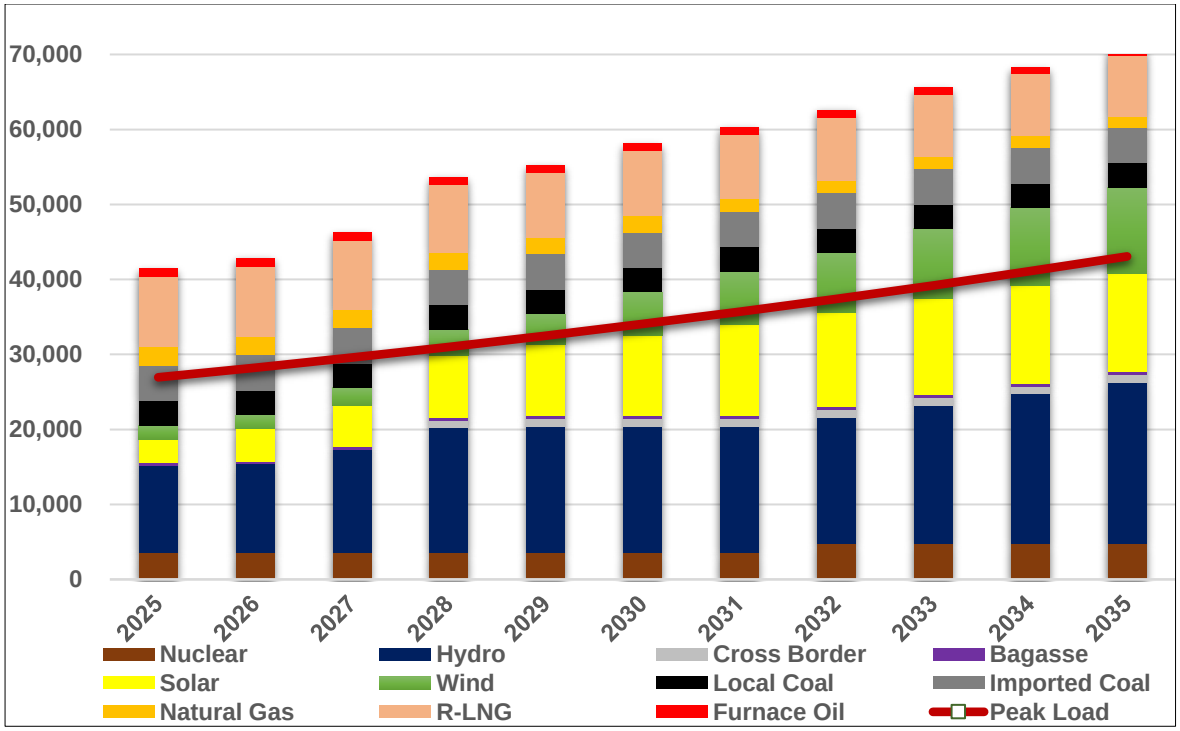
Annexure G. RCA with High Demand

G-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



G-2.Installed Capacity Vs Peak Demand (MW) - Country



G-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Solar Utility MW_p	Net Meter MW_p*	Solar KE MW_p	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	-	2,400	-	-	-	2,400	2,400
2026	-	-	-	1,200	-	-	-	1,200	3,600
2027	-	-	-	900	11	-	400	1,311	4,911
2028	-	-	1,300	800	-	1,000	100	3,200	8,111
2029	-	-	-	700	-	323	100	1,123	9,234
2030	-	-	-	600	-	1,530	100	2,230	11,464
2031	-	5	325	500	-	1,147	100	2,077	13,541
2032	1,200	-	-	400	-	771	100	2,471	16,012
2033	-	1,582	-	300	-	1,229	100	3,211	19,223
2034	-	1,500	-	200	-	1,000	100	2,800	22,023
2035	-	1,500	-	120	-	1,000	100	2,720	24,743
Total	**1,200**	**4,587**	**1,625**	**8,120**	**11**	**8,000**	**1,200**	**24,743**	

**Net Metering is committed*

G-4.List of Projects (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CDO
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
24	KE_New_Solar	Solar	11	11	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,622**	**3,622**			
Cumulative Addition up till 2027 (MW)			**7,587**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CDO
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
39	New_Wind	Wind	586	586	NGC	Optimised	Jul-27
40	New_Solar	Solar	1300	1300	NGC	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**7,376**	**7,376**			
Cumulative Addition up till 2028 (MW)			**14,963**	**14,952**			
2028-29							
40	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
41	Net Meter	PV	700	700	NGC	Committed	Jul-28
42	PV_Market	PV	593	593	Market	Committed	Jul-28
43	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
44	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-28
45	New_Wind	Wind	323	323	NGC	Optimised	Jul-28
Generation Additions in 2028-29 (MW)			**1,843**	**1,843**			
Cumulative Addition up till 2029 (MW)			**16,806**	**16,795**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-29
47	New_Wind	Wind	1530	1530	NGC	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**2919.7**	**2919.7**			
Cumulative Addition up till 2030 (MW)			**19,725**	**19,714**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-30
51	New_Wind	Wind	1308	1308	NGC	Optimised	Jul-30
52	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
53	New_Solar	PV	5.2	5.2	NGC	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**2,928**	**2,928**			
Cumulative Addition up till 2031 (MW)			**22,653**	**22,642**			
2031-32							
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
56	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-31
57	New_Wind	Wind	771	771	NGC	Optimised	Jul-31

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CDO
Generation Additions in 2031-32 (MW)			**2,471**	**2,388**			
Cumulative Addition up till 2032 (MW)			**25,124**	**25,030**			
2032-33							
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
55	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-32
56	New_Wind	Wind	1229	1229	NGC	Optimised	Jul-32
57	Turtonas Uzghor	Hydro	82.25	82.25	PPIB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**3,211**	**3,211**			
Cumulative Addition up till 2033 (MW)			**28,336**	**28,242**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-33
61	New_Wind	Wind	1000	1000	NGC	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**2,800**	**2,800**			
Cumulative Addition up till 2034 (MW)			**31,136**	**31,042**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-34
64	New_Wind	Wind	1000	1000	NGC	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**2,720**	**2,720**			
Cumulative Addition up till 2035 (MW)			**33,856**	**33,762**			

G.5. Annual Capacity Factors

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	6.16	0.00	0.10	0.10	5.19	0.10	1.79	1.49	1.39
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.73	18.45	17.96	17.42	17.75	18.42	18.73
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	18.36	18.18	17.66	17.62	17.58	17.80	18.18
14	Best	PV	18.57	18.53	18.57	18.13	17.80	17.56	17.73	18.26	18.57
15	Crest	PV	18.82	18.78	18.82	18.56	18.06	17.76	17.75	18.25	18.82
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.71	16.71	16.70	16.71	16.67	16.71	16.71	16.71
20	New_Solar_North/Center	PV	0.00	22.93	22.95	22.95	22.61	22.81	22.75	22.79	22.95
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.22	16.72	16.52	16.24	16.43	16.68	17.02
24	Gharo	KE_PV	22.03	21.82	21.85	21.35	20.21	20.48	20.73	20.73	21.35
25	KE_New_Solar	KE_PV	21.66	21.54	21.54	21.02	20.01	20.26	20.52	20.52	21.02
26	Oursun	KE_PV	20.96	20.91	20.90	20.50	19.70	19.91	20.02	20.02	20.50
27	Act	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.92
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.82	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.85	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.85	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.99
37	Gul_Electric	Wind	37.94	37.89	37.94	37.74	37.94	37.89	37.94	37.94	37.84
38	Hawa	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.77
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Indus_Energy	Wind	37.94	37.89	37.94	37.74	37.94	37.89	37.94	37.94	37.87
41	Jhimpir	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.73	38.93	38.88	38.93	38.93	38.93

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.84
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.74	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.84
47	Metro_Power	Wind	31.99	31.94	31.99	31.85	31.99	31.94	31.99	31.99	31.91
48	Metro_Wind	Wind	37.94	37.89	37.94	37.74	37.94	37.89	37.94	37.94	37.84
49	NASDA	Wind	38.93	38.88	38.93	38.73	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
51	Sachal	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.77
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.74	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.77
59	Tricon_B	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.85	30.99	30.95	30.99	30.99	30.92
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.71	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.80	31.85	31.48	31.18	31.22	31.33	31.33	31.69
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.85	41.69	41.39	41.53	41.59	41.59	41.70
68	CASA	Interconnection	0.00	36.38	41.88	41.88	41.35	41.70	41.81	41.85	41.73
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	45.32	43.73	42.05	42.53	42.56
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	52.70	52.26	52.85
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.22	43.70	43.67	43.70	44.19	44.22
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.77	38.77	38.77	38.66	38.77	38.77	38.77
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.08	53.73	52.62	53.36	53.35	53.43	54.01
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.05	9.15	9.07	9.07	9.05	9.04	8.97	8.99
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
121	Jagran-I	Hydro Existing	49.49	49.27	49.49	49.40	49.40	49.04	48.68	48.52	48.52
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.38	45.36	45.44	45.40	45.35	45.25	45.34	45.35	45.35
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.04	39.76	39.65	39.76	40.22	40.22
125	Malakand-III	Hydro Existing	54.04	53.89	53.89	50.83	49.93	48.25	45.79	47.27	48.15
126	Mangla	Hydro Existing	62.49	61.50	55.12	54.34	54.26	54.17	54.32	54.32	54.39
127	Neelum Jehlum	Hydro Existing	53.48	53.33	53.42	53.44	53.39	53.23	53.37	53.39	53.44
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.13	54.88	55.41	55.49	55.49

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	42.80	43.37	43.76	43.76	43.76
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.28	45.37	45.59	45.59	45.59
131	Suki Kinari	Hydro Existing	51.17	51.03	51.10	51.03	50.78	50.77	50.95	51.03	51.03
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	31.23	21.54	14.58	13.02	17.88	10.57	11.37	8.88	5.24
136	Foundation	CCGT_Gas	79.96	68.69	53.66	53.66	69.90	53.66	53.65	53.66	53.66
137	Guddu-V (747)	CCGT_Gas	81.07	64.50	69.80	69.53	68.25	64.95	53.80	39.43	39.82
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	69.36	38.00	38.00	38.00	21.70	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	77.84	78.61	10.44	10.73	70.15	12.69	50.89	34.78	37.89
142	SNPC-II	KE_CCGT_Gas	80.05	79.80	10.56	17.66	70.95	18.80	51.46	35.43	39.21
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.16	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.13	89.95	89.74	89.44	89.60	89.07	89.17	89.30
153	C-2	Nuclear	90.00	90.14	89.95	89.75	89.44	89.60	89.07	89.17	89.30
154	C-3	Nuclear	90.00	90.11	89.95	89.74	89.46	89.62	89.11	89.21	89.33
155	C-4	Nuclear	90.00	90.10	89.95	89.74	89.46	89.63	89.11	89.21	89.33
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	85.76	83.82	85.02	87.58
157	K-2	Nuclear	85.07	85.15	85.00	84.71	84.36	84.35	83.77	83.87	84.04
158	K-3	Nuclear	85.07	85.15	85.00	84.71	84.45	84.35	83.83	83.96	84.09
159	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.45	81.28	82.42	80.24	78.08	76.51	73.73	64.98	69.10
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.90	79.55	80.11	78.43	77.17	75.46	72.13	56.06	59.54
166	Thar TEL	Local Coal	84.93	79.81	80.05	78.59	77.44	75.20	72.31	57.50	62.28
167	Thar-I (SSRL)	Local Coal	84.92	75.93	78.75	76.09	74.44	72.35	65.02	71.60	76.18
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	52.24	2.72	2.80	3.52	7.44	5.55	32.36	24.65	21.80
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
172	Jamshoro Coal	Imported Coal	26.92	0.27	0.27	0.87	4.70	2.22	19.69	10.71	13.36
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	43.18	0.51	0.59	1.41	5.34	3.81	14.26	14.40	11.16
175	Sahiwal Coal	Imported Coal	2.09	0.08	0.07	0.16	1.84	1.70	15.48	17.69	18.54
176	FPCL	KE_Imported Coal	24.80	27.95	2.96	2.95	4.78	3.57	12.71	11.41	9.95
177	Altern	Gas Engine_RLNG	0.57	0.00	3.69	4.51	0.29	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	33.39	37.40	42.53	41.19	37.29	35.94	4.74	4.27	4.45
179	Bhikki	CCGT_RLNG	19.93	24.02	21.56	20.47	25.40	23.01	2.42	2.49	2.95
180	FKPCL	CCGT_RLNG	12.63	12.03	4.06	4.71	0.30	4.39	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	13.52	4.33	5.92	6.84	3.08	8.70	0.62	0.62	0.34
182	Haveli	CCGT_RLNG	58.83	51.80	64.79	65.23	67.35	62.55	12.77	14.96	16.40
183	KAPCO 495	CCGT_RLNG	25.35	25.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.58	1.99	4.44	5.06	0.40	6.93	0.06	0.00	0.00
185	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	13.51	4.32	6.53	7.08	3.43	8.92	0.92	0.70	0.62
188	Saif	CCGT_RLNG	13.20	14.44	5.37	5.86	0.62	8.51	0.31	0.00	0.00
189	Saphire	CCGT_RLNG	13.44	4.34	5.56	6.07	2.39	8.64	0.60	0.35	0.16
190	Trimmu	CCGT_RLNG	7.61	11.31	9.81	10.75	14.33	13.44	7.64	6.78	11.52
191	BQPS2	KE_CCGT_RLNG	6.15	8.12	0.00	0.00	0.00	0.00	0.02	0.01	0.02
192	BQPS3	KE_CCGT_RLNG	17.76	19.53	0.84	0.88	1.57	1.47	3.71	3.46	3.50
193	KCCPP	KE_CCGT_RLNG	2.18	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	KTGTPS	KE_CCGT_RLNG	0.09	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	SGTPS	KE_CCGT_RLNG	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	BQPS1-U5	KE_ST_RLNG	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.93	41.93	41.81	41.93	41.95	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.51	64.43	64.12	64.27	64.48	64.48
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	76.71	67.33	55.72
202	Gorkin Matiltan	Hydro_Committed	44.67	44.37	44.16	43.43	42.25	42.40	42.86	43.14	43.70
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.33	82.27	82.15	82.16	82.25	82.32
204	Jagran-II	Hydro_Committed	50.98	48.56	51.22	48.96	48.96	48.57	47.76	48.38	48.38
205	Karora	Hydro_Committed	71.13	71.70	71.11	70.38	69.22	68.93	69.18	69.16	70.83
206	Koto	Hydro_Committed	58.36	58.59	58.42	57.77	56.21	56.38	56.85	57.42	58.13
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	16.91	16.93	16.93
208	Lawi	Hydro_Committed	48.20	48.78	48.86	48.63	48.33	48.27	48.32	48.53	48.74
209	Mohmand Dam	Hydro_Committed	0.00	56.30	42.69	42.22	41.90	40.77	40.78	40.90	40.42
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.68	54.64	54.79	54.79	54.78	54.60	54.73	54.79	54.76
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

G.6: Year wise Installed Generation Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,662	-	-	-	3,412	46,227
2028	-	2,900	-	-	-	3,890	-235	-131	1,000	7,424	53,651
2029	-	230	-495	-	-	1,813	-	-	-	1,548	55,199
2030	-	-	-	-	-	2,920	-	-	-	2,920	58,118
2031	-	5	-	-	-	2,762	-586	-	-	2,181	60,299
2032	-	-	-188	1,200	-	1,271	-	-	-	2,283	62,582
2033	-	1,582	-210	-	-	1,629	-	-	-	3,001	65,583
2034	-	1,500	-	-	-	1,300	-	-160	-	2,640	68,223
2035	-	1,500	-	-	-	1,220	-223	-	-	2,497	70,720
Total	**3,300**	**21,477**	**8,224**	**4,730**	**4,680**	**25,058**	**1,433**	**819**	**1,000**	**70,720**	

G-7.IGCEP Generation Mix 2025-35 (GWh)

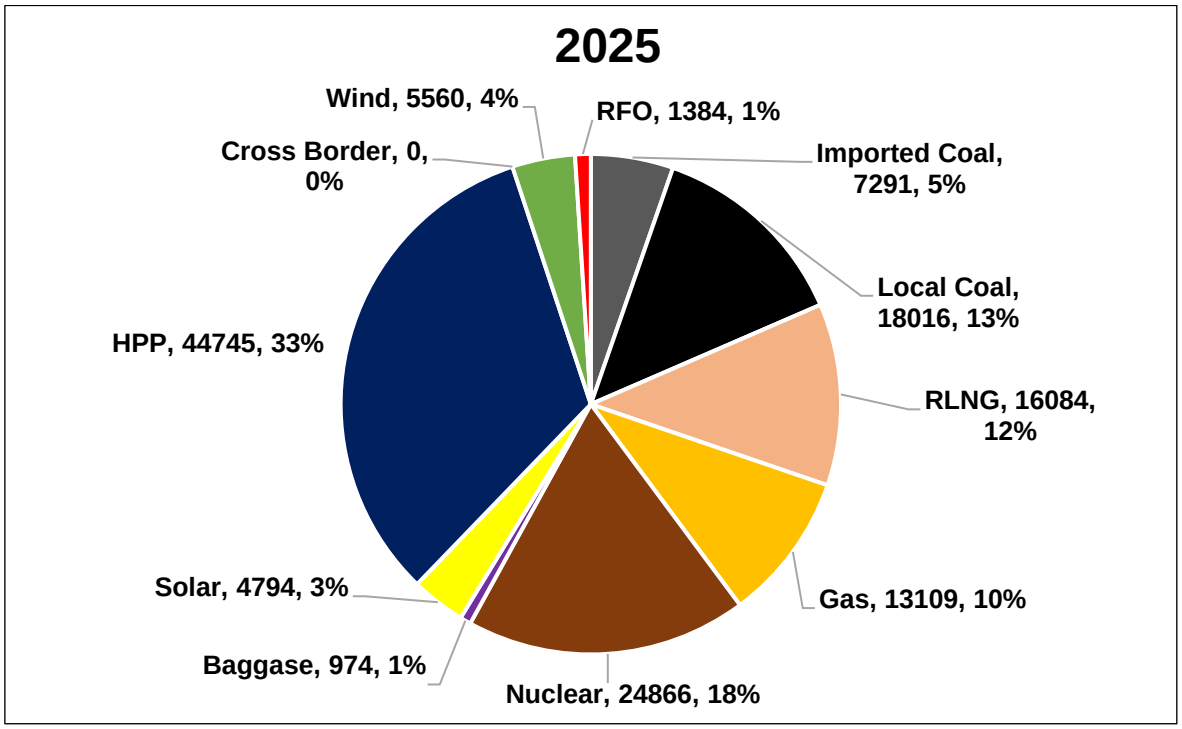


Chart G-4: IGCEP Generation Mix 2025 (MW)

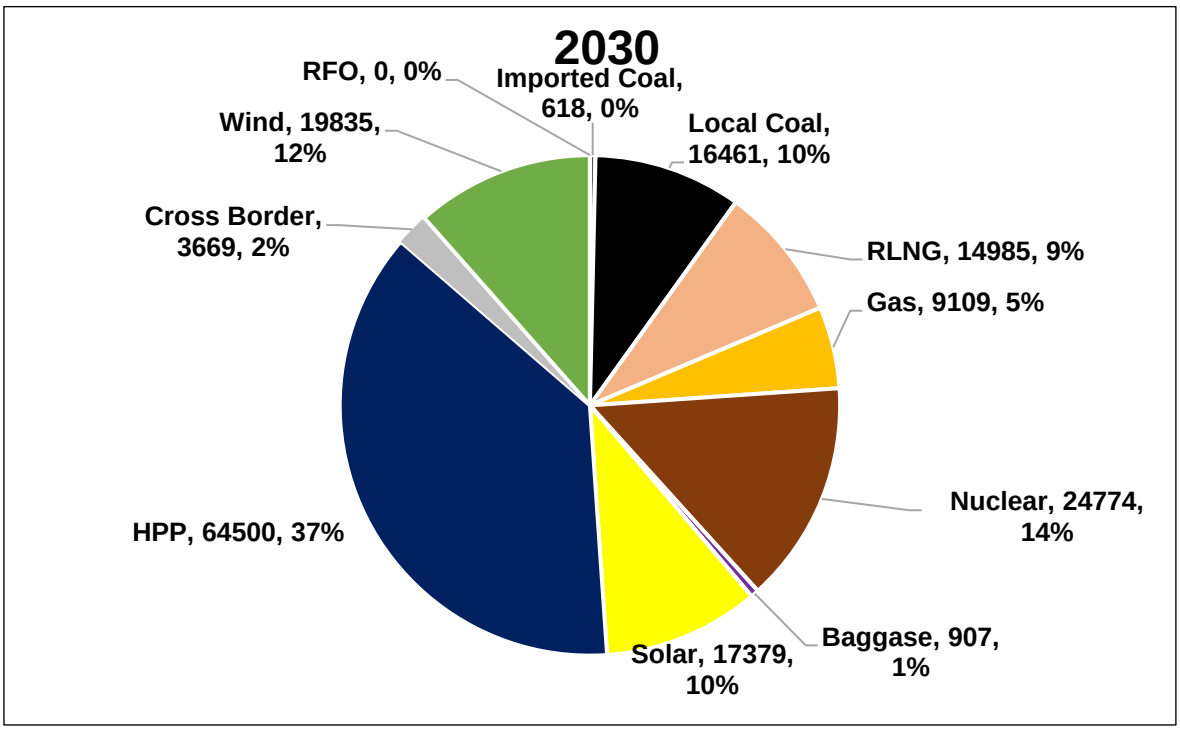


Chart G-5: IGCEP Generation Mix 2030 (MW)

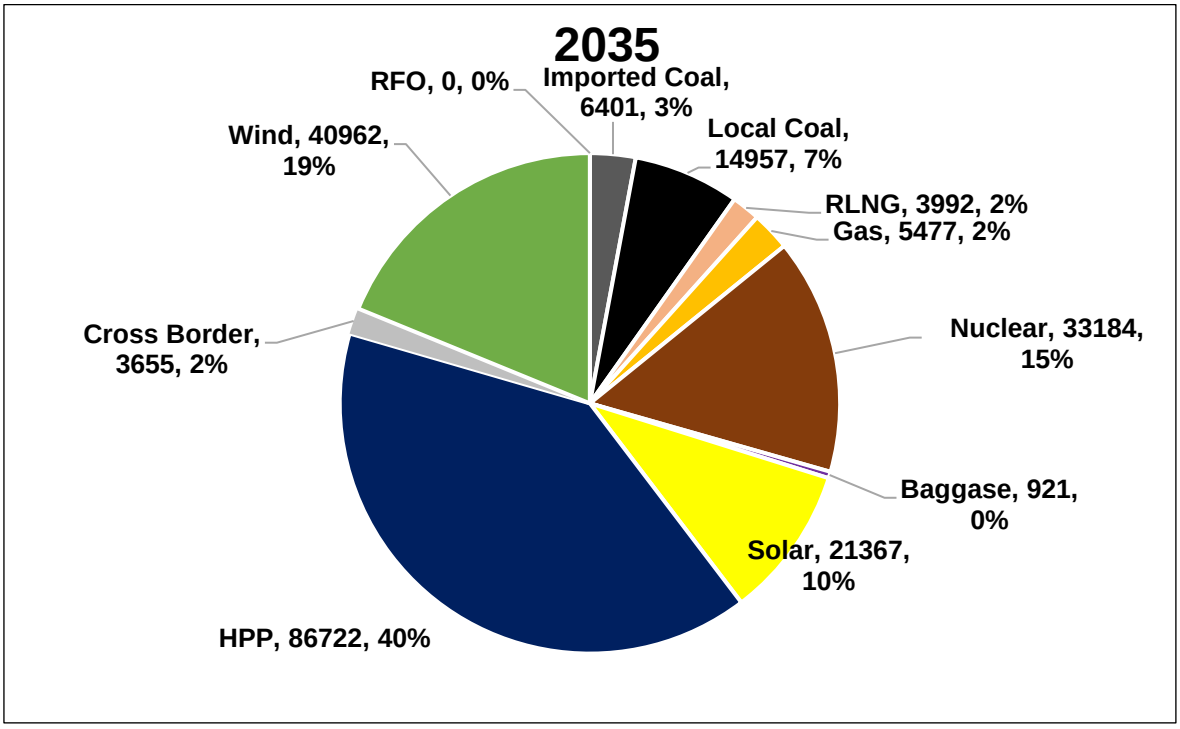


Chart G-6: IGCEP Generation Mix 2035 (MW)

G-8.IGCEP Capacity Mix 2025-35 (MW)

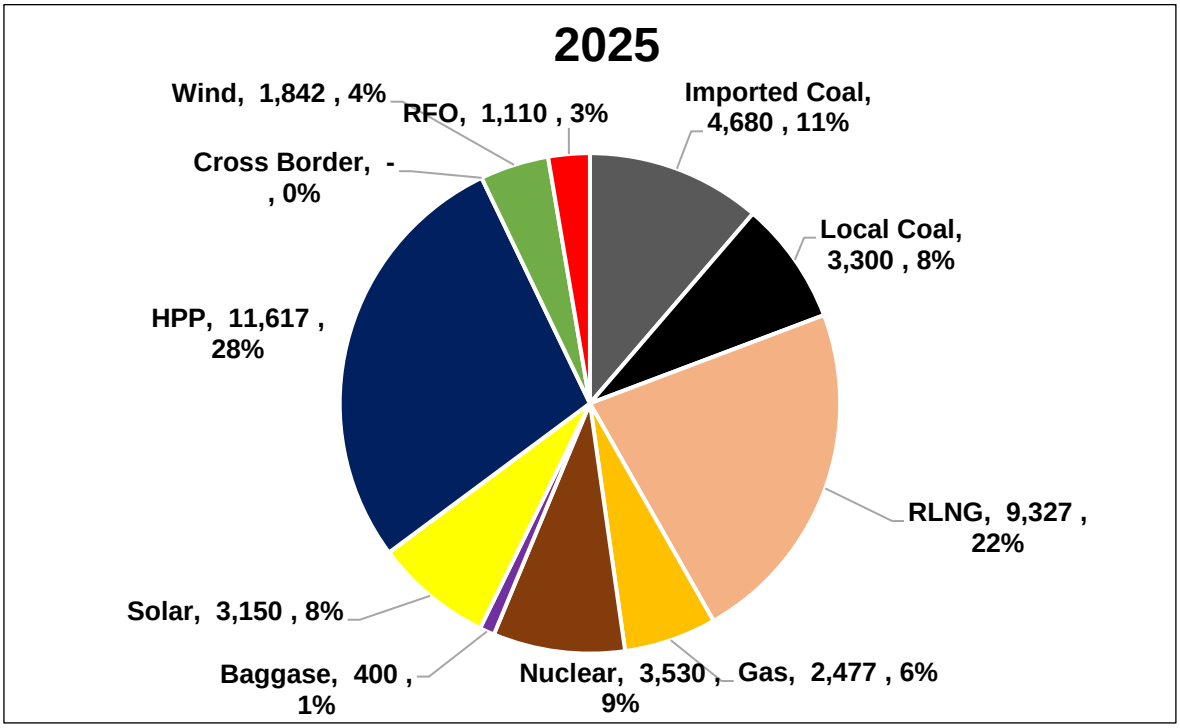


Chart G-7: IGCEP Capacity Mix 2025

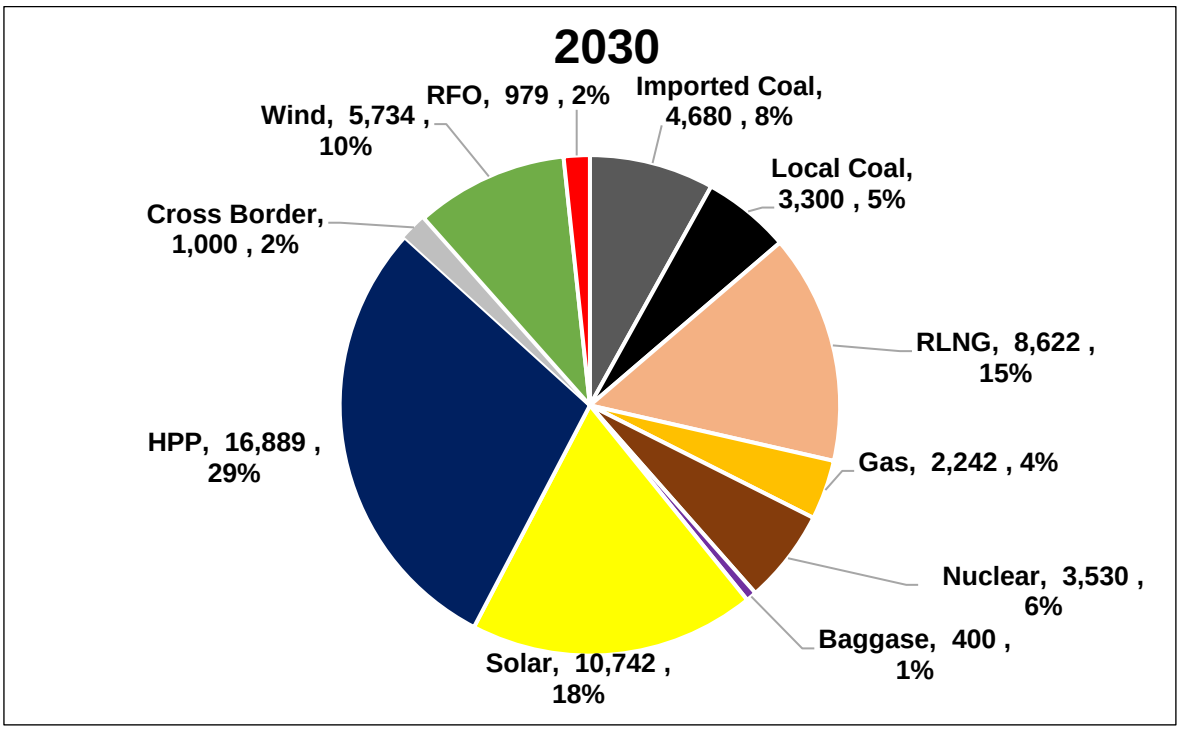


Chart G-8: IGCEP Capacity Mix 2030

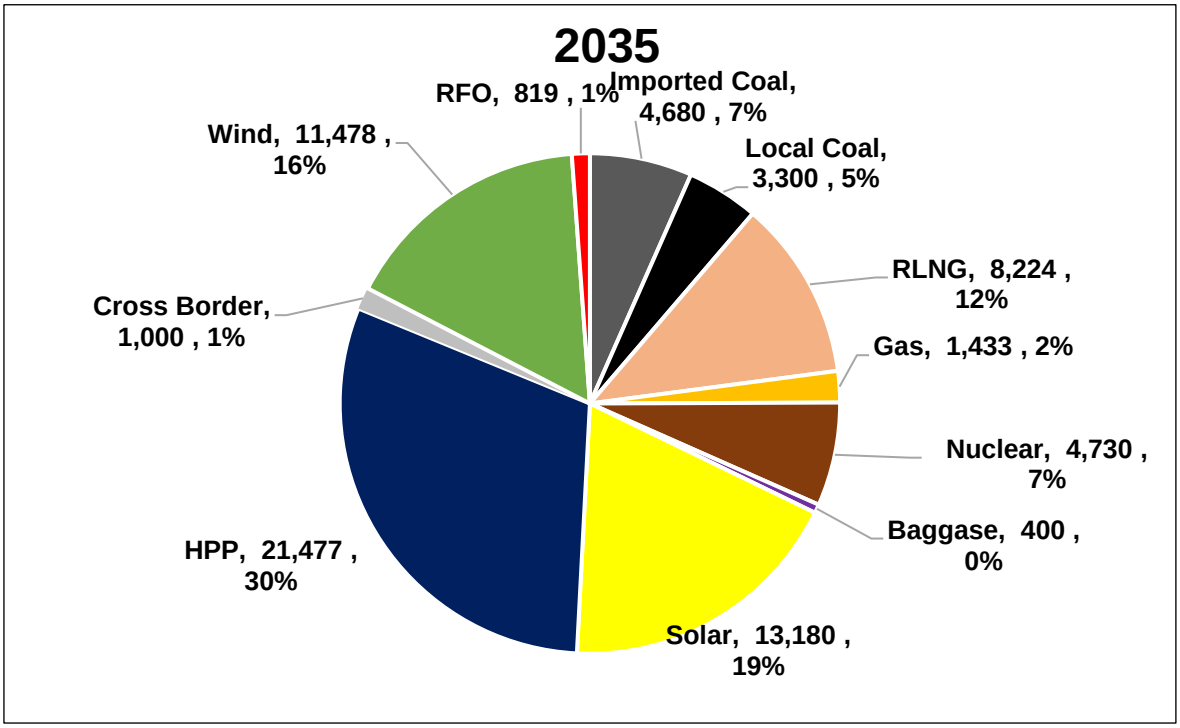
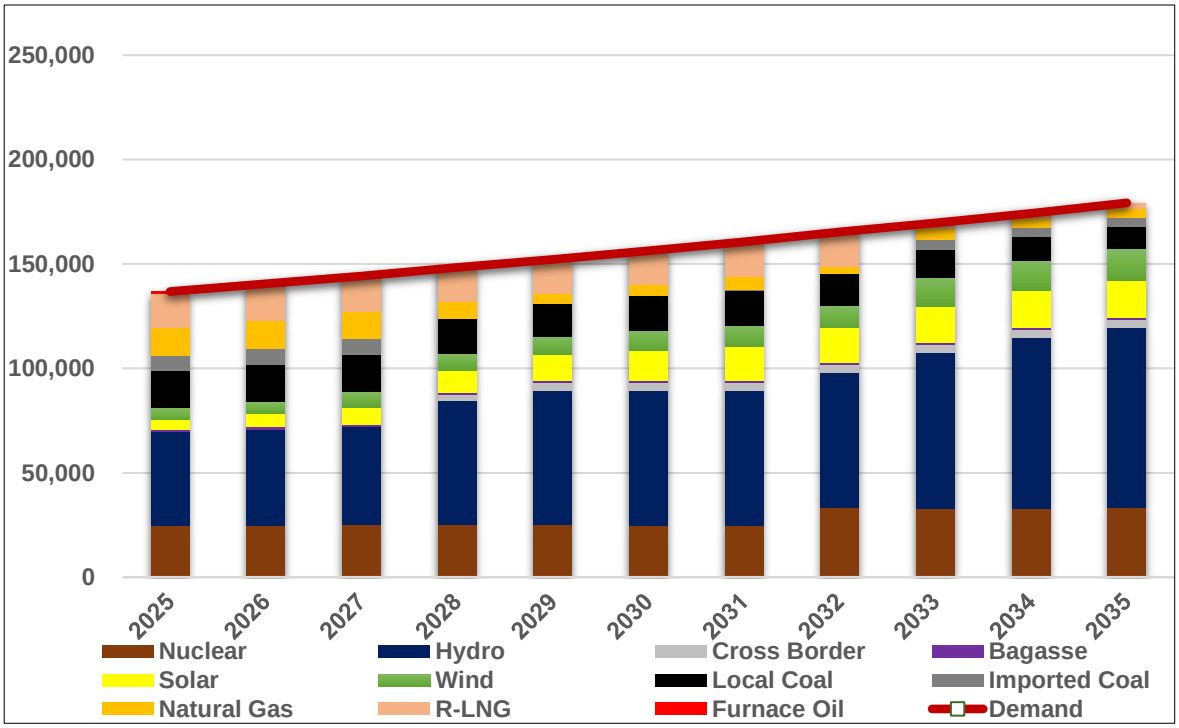


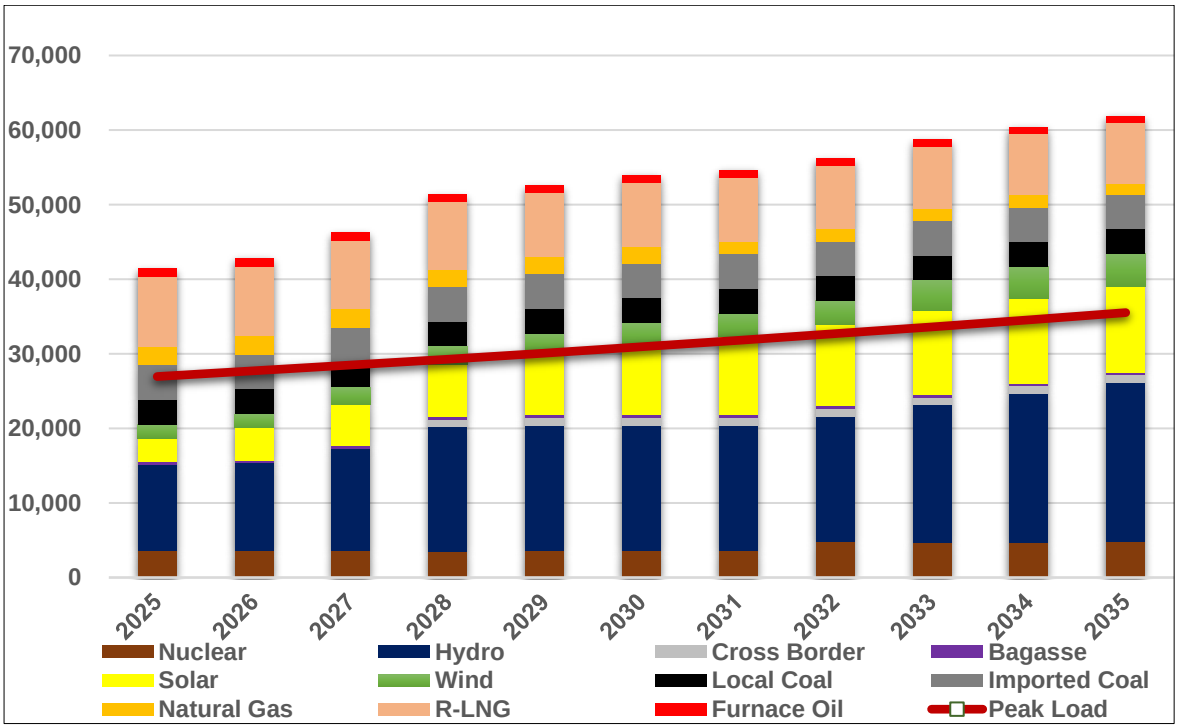
Chart G-9: IGCEP Capacity Mix 2035

Annexure H. RCA with No KE Candidate T/L

H-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



H-2.Installed Capacity Vs Peak Demand (MW) - Country



H-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Net Meter MWp*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	2,400	-	-	2,400	2,400
2026	-	-	1,200	-	-	1,200	3,600
2027	-	-	900	-	400	1,300	4,900
2028	-	-	800	-	100	900	5,800
2029	-	-	700	-	100	800	6,600
2030	-	-	600	-	100	700	7,300
2031	-	-	500	-	100	600	7,900
2032	1,200	-	400	-	100	1,700	9,600
2033	-	1,505	300	842	100	2,747	12,347
2034	-	1,500	200	-	100	1,800	14,147
2035	-	1,500	120	-	100	1,720	15,867
Total	**1,200**	**4,505**	**8,120**	**842**	**1,200**	**15,867**	

**Net Metering is Committed*

H-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	COD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	COD
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
43	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-28
Generation Additions in 2028-29 (MW)			**1,520**	**1,520**			
Cumulative Addition up till 2029 (MW)			**14,586**	**14,586**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**1389.7**	**1389.7**			
Cumulative Addition up till 2030 (MW)			**15,975**	**15,975**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**1,290**	**1,290**			
Cumulative Addition up till 2031 (MW)			**17,265**	**17,265**			
2031-32							
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
56	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,700**	**1,617**			
Cumulative Addition up till 2032 (MW)			**18,965**	**18,882**			
2032-33							
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
55	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-32
56	New_Wind	Wind	842	842	NGC	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**2,747**	**2,747**			

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	COD
Cumulative Addition up till 2033 (MW)			**21,712**	**21,629**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**1,800**	**1,800**			
Cumulative Addition up till 2034 (MW)			**23,512**	**23,429**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,720**	**1,720**			
Cumulative Addition up till 2035 (MW)			**25,232**	**25,149**			

H-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.81	0.00	0.00	0.00	0.10	0.08	1.14	1.19	0.13
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.68	18.73	18.42	18.41	18.35	18.45	18.73
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	18.21	18.21	17.98	18.15	17.98	18.18	18.36
14	Best	PV	18.57	18.53	18.52	18.57	18.08	18.29	18.26	18.25	18.57
15	Crest	PV	18.82	18.78	18.77	18.82	18.25	18.52	18.51	18.52	18.82
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.71	16.71	16.71	16.70	16.71	16.71	16.71	16.71
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.18	17.18	16.68	16.94	17.09	17.08	17.22
24	Gharo	KE_PV	22.03	22.00	22.03	22.03	21.53	21.50	21.53	21.76	22.03
25	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Oursun	KE_PV	20.96	20.97	20.96	20.96	20.56	20.57	20.56	20.83	20.96
27	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
37	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
38	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
41	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
48	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
51	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.80	31.85	31.85	31.69	31.64	31.69	31.69	31.99
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
68	CASA	Interconnection	0.00	36.38	41.88	41.92	41.88	41.80	41.88	41.92	41.92
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	43.49	39.90	39.66
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.43	44.35	44.22	44.02	44.35	44.43
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.77	38.77	38.77	38.66	38.77	38.77	38.77
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.37	54.08	54.08	53.93	53.86	53.86	54.37
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.12	9.15	9.07	9.07	9.05	9.01	8.17	8.17
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
121	Jagran-I	Hydro Existing	49.49	49.35	49.49	49.40	49.40	49.27	48.88	46.76	46.70
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.37	45.36	45.48	45.44	45.41	45.25	45.37	45.36	45.40
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.22	40.11	40.04	40.22	40.22

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
125	Malakand-III	Hydro Existing	54.04	53.89	53.89	53.89	51.99	50.00	48.06	44.38	44.35
126	Mangla	Hydro Existing	62.49	61.50	55.12	54.51	54.44	54.34	54.44	54.51	54.51
127	Neelum Jehlum	Hydro Existing	53.48	53.30	53.48	53.48	53.48	53.33	53.44	53.48	53.48
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.49	55.34	55.49	55.49	55.49
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.59
131	Suki Kinari	Hydro Existing	51.17	51.03	51.17	51.12	51.03	50.90	51.03	51.07	51.17
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	28.01	14.87	5.32	9.61	10.94	4.02	9.18	7.16	4.12
136	Foundation	CCGT_Gas	76.27	53.66	53.66	53.66	53.66	53.66	53.65	53.66	53.65
137	Guddu-V (747)	CCGT_Gas	78.47	47.86	0.52	2.23	49.03	4.42	39.71	22.94	22.47
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	67.90	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	69.38	34.11	34.02	34.61	35.07	34.84	50.24	43.92	43.82
142	SNPC-II	KE_CCGT_Gas	71.92	37.05	36.56	36.68	37.32	37.66	51.29	44.82	46.25
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.24	89.97	89.78	89.76	89.84	89.26	87.91	89.26
153	C-2	Nuclear	90.00	90.24	89.97	89.78	89.76	89.84	89.26	87.91	89.26
154	C-3	Nuclear	90.00	90.23	89.97	89.79	89.77	89.78	89.17	87.82	88.70
155	C-4	Nuclear	90.00	90.23	89.97	89.79	89.77	89.85	89.22	87.82	88.81
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	87.84	85.48	87.03	88.50
157	K-2	Nuclear	85.07	85.29	85.03	84.75	84.75	84.70	84.02	83.49	84.40
158	K-3	Nuclear	85.07	85.29	85.03	84.82	84.75	84.70	84.05	83.06	84.54
159	NEW_Nuclear_North /Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_Sout h	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.44	82.80	82.03	81.40	80.90	79.52	68.52	48.77	40.56
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.54	81.18	80.87	79.76	79.58	76.50	65.64	37.27	37.32

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
166	Thar TEL	Local Coal	84.49	81.25	80.85	79.87	79.76	76.96	65.94	37.70	37.87
167	Thar-I (SSRL)	Local Coal	84.92	74.55	63.37	75.88	75.93	63.85	56.91	65.15	64.08
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	46.69	0.61	0.29	0.47	1.42	1.75	18.93	17.02	16.07
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.02	0.27	0.27	10.18	6.14	10.31
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	18.70	0.23	0.00	0.18	0.25	0.40	8.67	9.19	7.56
175	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.00	0.04	8.33	7.72	9.33
176	FPCL	KE_Imported Coal	21.87	23.54	24.06	24.83	24.56	24.88	27.03	27.60	28.42
177	Altern	Gas Engine_RLNG	0.19	0.86	1.04	1.04	3.96	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	38.75	33.92	17.00	20.26	40.57	18.61	0.32	0.19	0.02
179	Bhikki	CCGT_RLNG	14.30	20.62	39.54	41.89	17.02	38.68	0.05	0.00	0.00
180	FKPCL	CCGT_RLNG	12.24	12.63	0.94	0.95	4.13	3.23	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	13.20	3.31	2.57	4.95	5.35	5.56	0.00	0.00	0.00
182	Haveli	CCGT_RLNG	61.98	61.63	79.88	69.69	71.76	69.95	4.96	3.57	2.40
183	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.29	1.76	4.04	4.50	4.45	5.64	0.00	0.00	0.00
185	NEW_CCGT_North/ Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	13.20	3.47	4.64	5.44	6.08	7.41	0.00	0.00	0.00
188	Saif	CCGT_RLNG	12.89	13.82	1.25	3.92	5.06	5.22	0.00	0.00	0.00
189	Saphire	CCGT_RLNG	13.13	2.76	1.99	4.65	5.26	5.56	0.00	0.00	0.00
190	Trimmu	CCGT_RLNG	5.24	9.21	6.33	8.81	9.56	11.32	1.09	0.49	0.68
191	BQPS2	KE_CCGT_RLNG	4.29	4.82	5.47	6.14	6.91	7.87	8.64	9.72	10.96
192	BQPS3	KE_CCGT_RLNG	14.22	14.64	15.20	15.86	16.71	17.59	19.41	20.66	22.11
193	KCCPP	KE_CCGT_RLNG	0.27	0.66	1.24	1.92	2.50	2.71	2.93	3.47	3.96
194	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.07	0.53	1.55	2.15	2.59	2.75
195	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.23	0.84	1.71	2.15
196	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.96	41.85	41.96	41.96	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.52	64.17	64.25	63.94	63.87
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	77.35	67.49	55.72
202	Gorkin Matiltan	Hydro_Committed	44.70	44.37	44.49	44.21	44.06	43.94	43.64	43.74	44.47
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.36	82.23	82.33	82.28	82.38
204	Jagran-II	Hydro_Committed	50.98	51.08	51.22	48.96	48.96	48.82	48.22	46.67	45.36
205	Karora	Hydro_Committed	71.09	71.77	71.68	71.21	71.04	70.95	70.37	70.65	71.10
206	Koto	Hydro_Committed	58.36	58.59	58.68	58.42	58.42	58.26	57.90	58.10	58.42

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	17.05	16.93	16.93
208	Lawi	Hydro_Committed	48.20	48.84	48.96	48.96	48.75	48.73	48.63	48.68	48.93
209	Mohmand Dam	Hydro_Committed	0.00	56.74	42.76	42.76	42.53	41.48	41.04	41.13	42.43
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.66	54.64	54.79	54.79	54.79	54.64	54.78	54.63	54.63
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

H-6.Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	1,490	-	-	-	1,225	52,565
2030	-	-	-	-	-	1,390	-	-	-	1,390	53,954
2031	-	-	-	-	-	1,290	-586	-	-	704	54,658
2032	-	-	-188	1,200	-	500	-	-	-	1,512	56,170
2033	-	1,505	-210	-	-	1,242	-	-	-	2,537	58,707
2034	-	1,500	-	-	-	300	-	-160	-	1,640	60,347
2035	-	1,500	-	-	-	220	-223	-	-	1,497	61,844
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**16,264**	**1,433**	**819**	**1,000**	**61,844**	

H-7.IGCEP Generation Mix 2025-2035 (GWh)

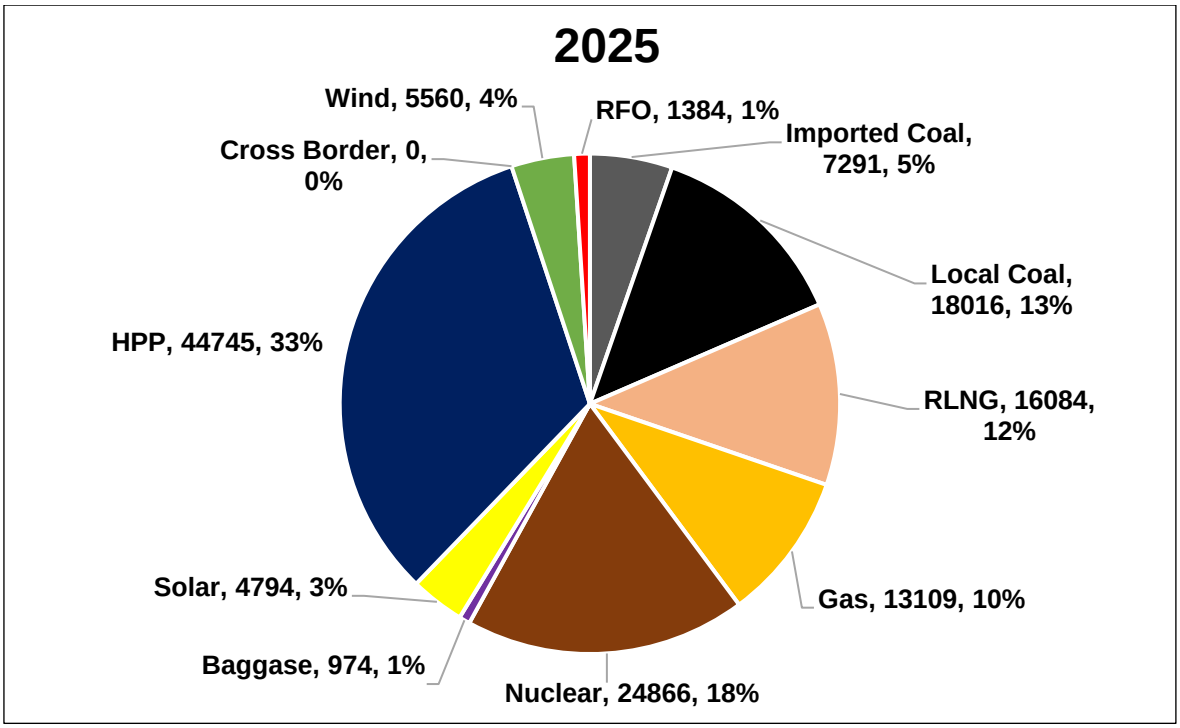


Chart H-1: IGCEP Generation Mix 2025 (GWh)

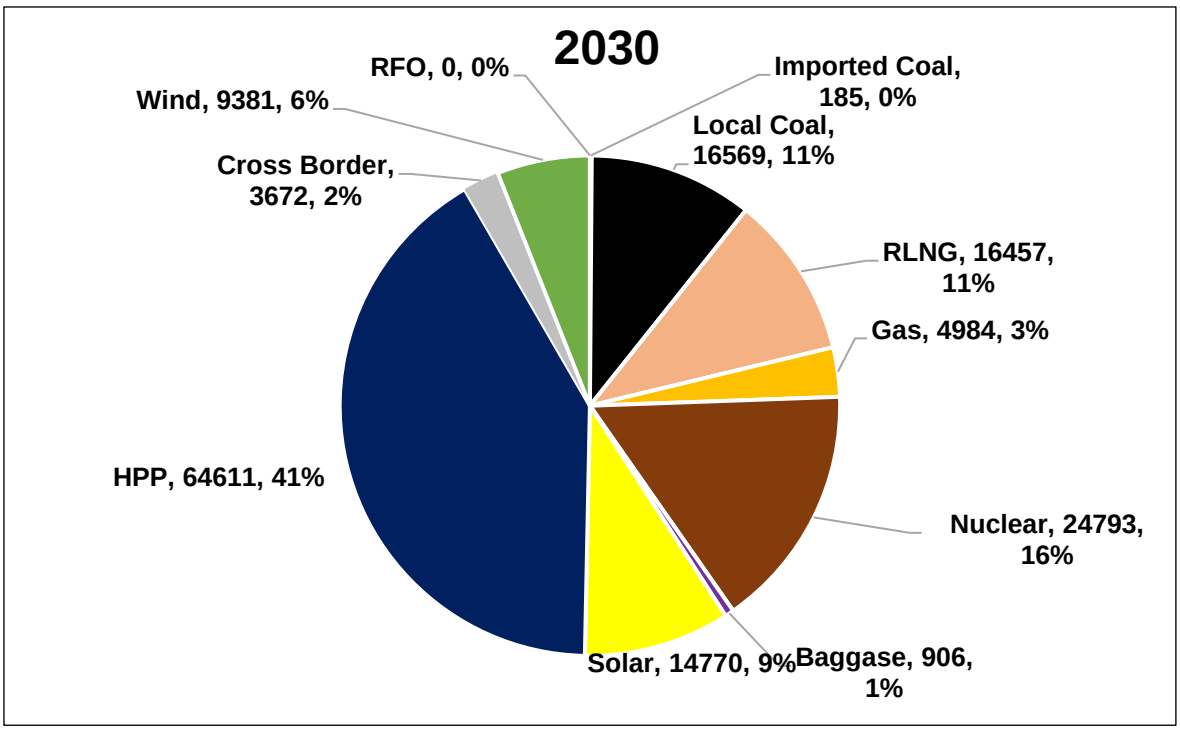


Chart H-2: IGCEP Generation Mix 2030 (GWh)

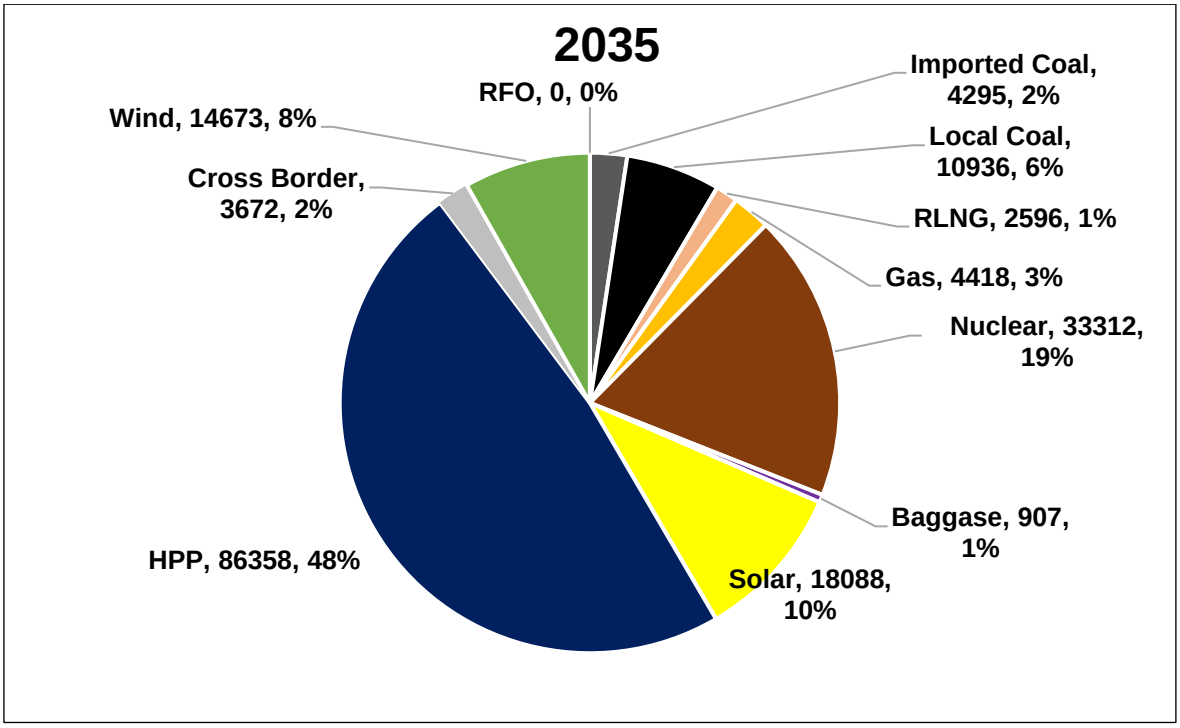


Chart H-3: IGCEP Generation Mix 2035 (GWh)

H-8.IGCEP Capacity Mix 2025-35 (MW)

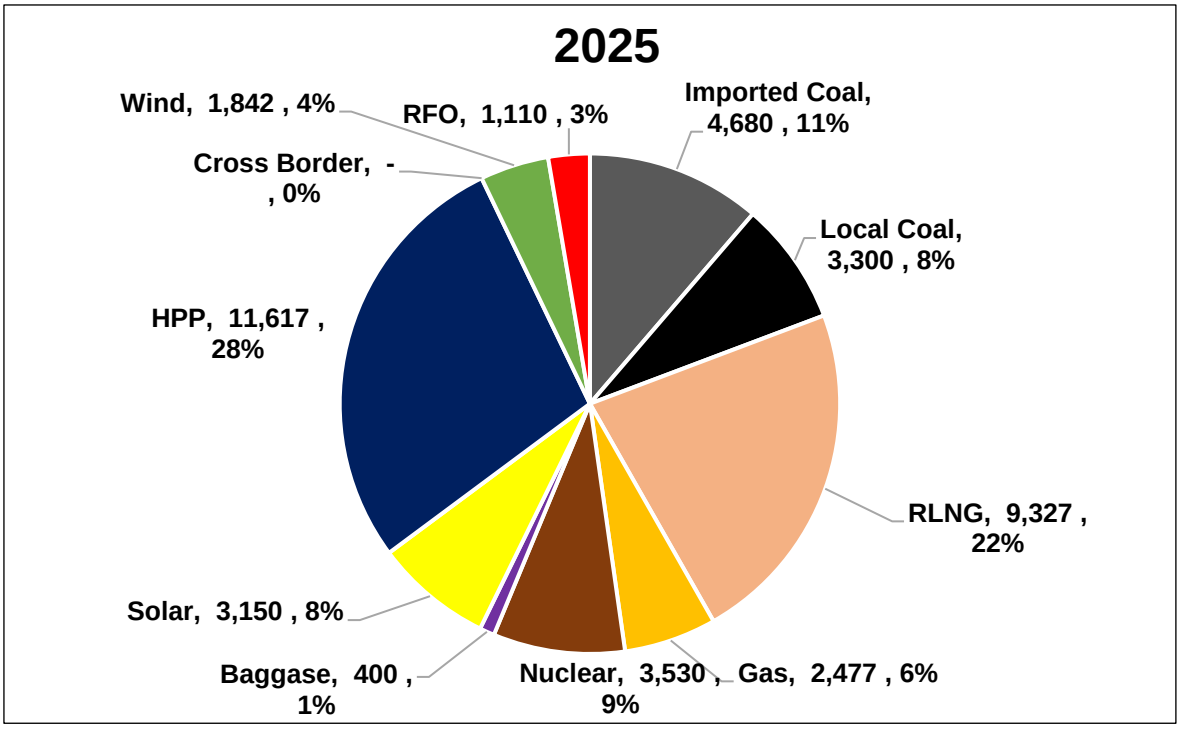


Chart H-4: IGCEP Capacity Mix 2025 (MW)

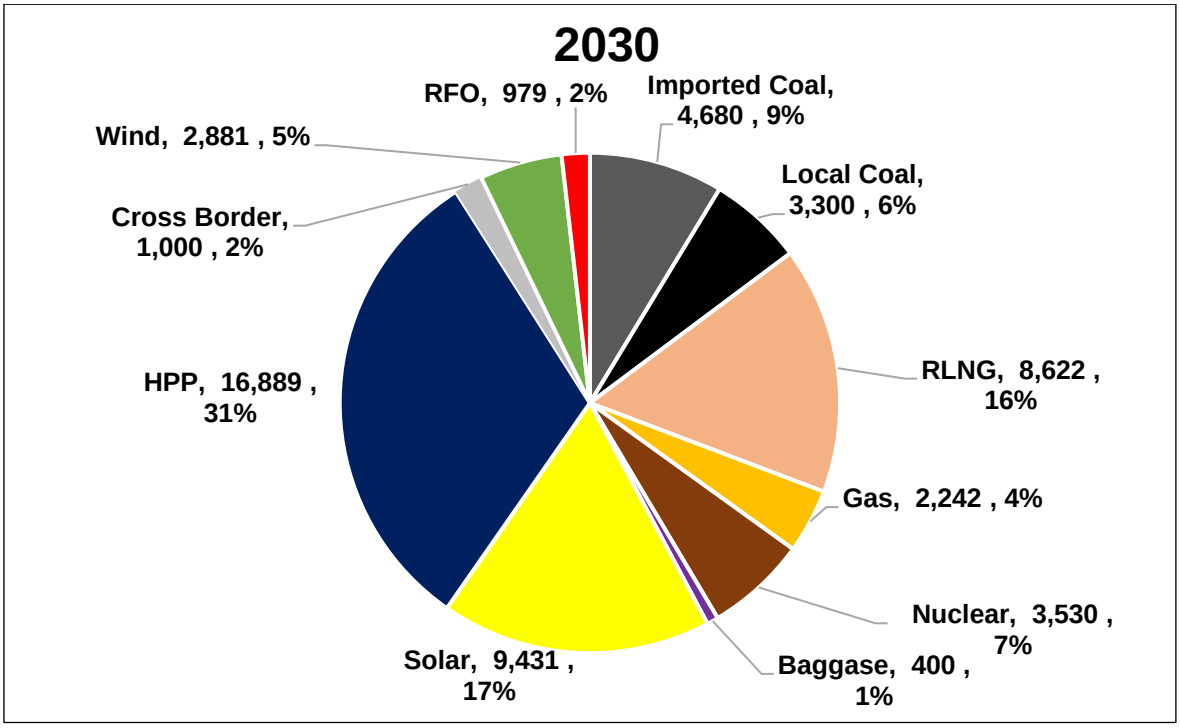


Chart H-5: IGCEP Capacity Mix 2030 (MW)

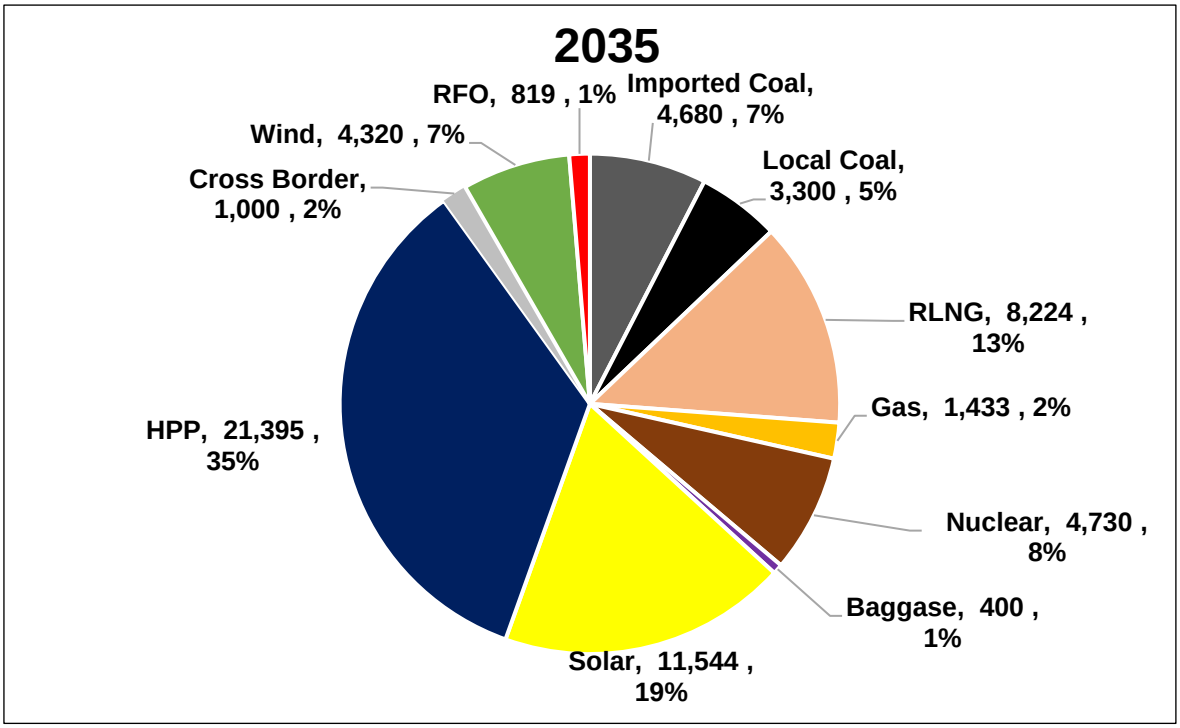


Chart H-6: IGCEP Capacity Mix 2035 (MW)

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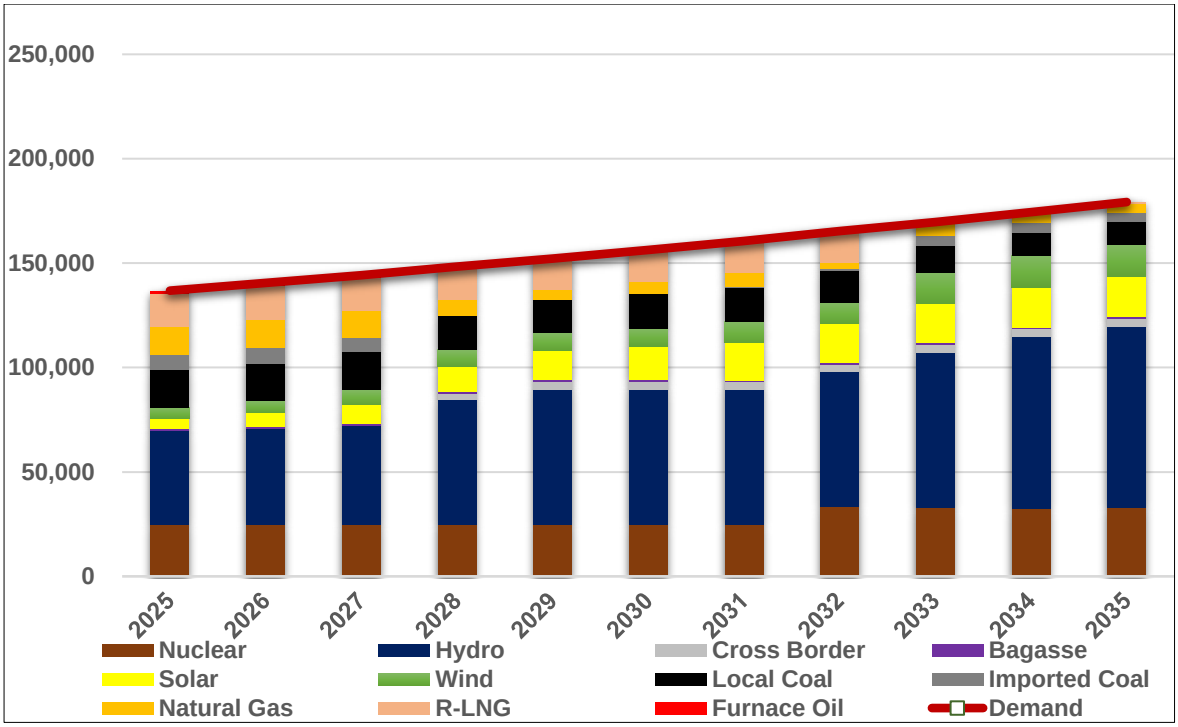
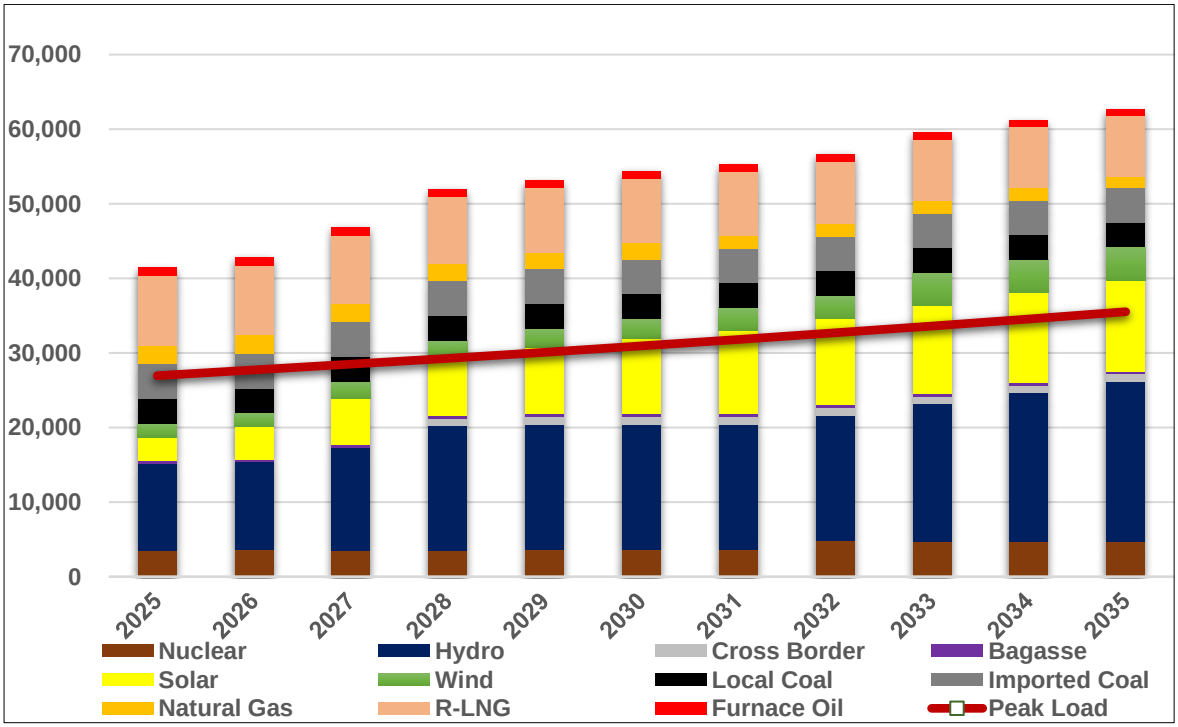
Annexure I. RCA with KE 620 MW of REs as committed

I-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



I-2.Installed Capacity Vs Peak Demand (MW) - Country



I-3. Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	2,400	-	-	2,400	2,400
2026	-	-	1,200	-	-	1,200	3,600
2027	-	-	900	-	400	1,300	4,900
2028	-	-	800	-	100	900	5,800
2029	-	-	700	-	-	700	6,500
2030	-	-	600	-	-	600	7,100
2031	-	-	500	-	286	786	7,886
2032	1,200	-	400	-	-	1,600	9,486
2033	-	1,505	300	1,077	214	3,096	12,582
2034	-	1,500	200	-	36	1,736	14,318
2035	-	1,500	120	-	88	1,708	16,026
Total	**1,200**	**4,505**	**8,120**	**1,077**	**1,124**	**16,026**	

**Net Metering is Committed*

I-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	KE_Solar_Committed	PV	420	420	KE	Committed	Jan-27
19	KE_Hybrid_Committed	PV	200	200	KE	Committed	Jan-27
20	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
21	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
22	Net Meter	PV	900	900	NGC	Committed	Jul-26
23	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
24	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
25	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**4,231**	**4,231**			
Cumulative Addition up till 2027 (MW)			**8,196**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
	Generation Additions in 2027-28 (MW)		**5,490**	**5,490**			
	Cumulative Addition up till 2028 (MW)		**13,686**	**13,066**			
			2028-29				
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
	Generation Additions in 2028-29 (MW)		**1,420**	**1,420**			
	Cumulative Addition up till 2029 (MW)		**15,106**	**14,486**			
			2029-30				
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
	Generation Additions in 2029-30 (MW)		**1289.7**	**1289.7**			
	Cumulative Addition up till 2030 (MW)		**16,395**	**15,775**			
			2030-31				
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	286	286	KE	Optimised	Jul-30
	Generation Additions in 2030-31 (MW)		**1,476**	**1,476**			
	Cumulative Addition up till 2031 (MW)		**17,871**	**17,251**			
			2031-32				
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	1200	PAEC	Optimized	Jul-31
	Generation Additions in 2031-32 (MW)		**1,600**	**1,600**			
	Cumulative Addition up till 2032 (MW)		**19,471**	**18,851**			
			2032-33				
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
55	KE_New_Wind	Wind	214	214	KE	Optimised	Jul-32

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
56	New_Wind	Wind	1077	1077	NGC	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**3,096**	**3,096**			
Cumulative Addition up till 2033 (MW)			**22,567**	**21,947**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	36	36	KE	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**1,736**	**1,736**			
Cumulative Addition up till 2034 (MW)			**24,303**	**23,683**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	88	88	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,708**	**1,708**			
Cumulative Addition up till 2035 (MW)			**26,011**	**25,391**			

I-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.76	0.00	0.00	0.03	0.10	0.10	1.16	1.19	0.15
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.68	18.42	18.15	18.15	18.15	18.15	18.41
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	18.21	17.80	17.80	17.77	17.80	17.80	17.83
14	Best	PV	18.57	18.53	18.52	17.99	17.99	18.03	17.97	17.99	17.99
15	Crest	PV	18.82	18.78	18.77	18.50	18.25	18.26	18.02	18.25	18.52
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.70	16.70	16.70	16.66	16.68	16.66	16.68	16.70
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.18	16.68	16.68	16.69	16.68	16.68	16.93
24	Gharo	KE_PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
25	KE_Hybrid Committed	KE_PV	44.45	37.40	37.44	37.44	37.44	37.40	37.44	37.44	37.44
26	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	KE_PV Committed	KE_PV	23.56	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
28	Oursun	KE_PV	20.96	20.97	20.96	20.96	20.96	20.97	20.96	20.96	20.96
29	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
30	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
32	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
34	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
35	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
37	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
38	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
39	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
41	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
43	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
44	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
45	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
46	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
48	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
50	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
51	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
52	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
53	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
55	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
56	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
57	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
58	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
60	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
62	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
63	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
65	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
66	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
67	Zorlu_Wind	Wind	31.99	31.80	31.85	31.69	31.33	31.64	31.33	31.69	31.69
68	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
70	CASA	Interconnection	0.00	36.38	41.88	41.88	41.88	41.77	41.88	41.88	41.92
71	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	40.97	40.19	40.64
73	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.35	44.27	44.22	43.70	44.35	44.35
117	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
118	Daral Khwar	Hydro Existing	38.77	38.66	38.76	38.76	38.77	38.66	38.77	38.76	38.76
119	Dubair Khwar	Hydro Existing	54.44	54.22	54.08	54.08	53.57	53.93	53.57	53.64	54.08
120	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
121	Golen Gol	Hydro Existing	9.15	8.98	9.15	9.15	9.15	9.05	8.85	8.23	8.24

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
123	Jagran-I	Hydro Existing	49.49	49.10	49.40	49.49	49.49	49.27	48.26	46.88	46.70
124	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
125	Karot	Hydro Existing	45.35	45.36	45.48	45.42	45.37	45.25	45.30	45.35	45.35
126	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.04	40.11	39.76	40.22	40.22
127	Malakand-III	Hydro Existing	54.04	50.53	53.89	52.88	52.51	49.57	44.85	44.54	45.43
128	Mangla	Hydro Existing	62.49	61.50	55.12	54.44	54.32	54.22	54.32	54.37	54.46
129	Neelum Jehlum	Hydro Existing	53.48	53.33	53.48	53.48	53.42	53.30	53.44	53.44	53.48
130	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.24	55.34	55.30	55.49	55.49
131	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
132	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.58	45.46	45.59	45.59	45.59
133	Suki Kinari	Hydro Existing	51.17	51.03	51.07	51.03	50.99	50.90	51.00	51.03	51.03
134	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
135	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
136	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
137	Engro_Qadirpur	CCGT_Gas	28.01	14.87	6.03	11.48	11.80	8.97	9.56	7.41	4.12
138	Foundation	CCGT_Gas	74.02	53.66	53.66	53.66	53.65	53.66	53.65	53.66	53.66
139	Guddu-V (747)	CCGT_Gas	77.49	36.31	1.10	18.80	59.24	7.85	39.67	22.96	23.83
140	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
141	Uch	CCGT_Gas	65.63	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
142	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
143	SNPC-I	KE_CCGT_Gas	68.35	28.17	3.39	9.11	9.87	11.44	36.20	24.75	22.97
144	SNPC-II	KE_CCGT_Gas	68.80	29.50	4.02	9.63	10.16	12.22	36.52	25.50	23.53
145	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
154	C-1	Nuclear	90.00	90.10	89.93	89.83	89.73	89.81	88.94	87.98	89.29
155	C-2	Nuclear	90.00	90.10	89.93	89.83	89.73	89.81	88.94	87.98	89.29
156	C-3	Nuclear	90.00	90.10	89.91	89.84	89.74	89.82	88.98	88.03	89.23
157	C-4	Nuclear	90.00	90.10	89.92	89.84	89.74	89.82	88.98	88.03	89.31
158	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	86.66	83.82	85.10	87.37
159	K-2	Nuclear	85.07	85.15	84.98	84.82	84.67	84.67	83.50	83.19	84.06
160	K-3	Nuclear	85.07	85.15	84.97	84.82	84.67	84.68	83.53	82.85	84.09
161	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
162	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
163	Engro Thar	Local Coal	85.05	82.04	81.65	80.93	80.36	77.71	69.34	49.11	40.69
164	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
167	Thal Nova	Local Coal	84.22	79.86	80.21	79.28	78.43	76.39	65.21	38.56	37.18
168	Thar TEL	Local Coal	84.32	79.80	79.79	79.47	78.98	76.84	65.18	41.54	37.88
169	Thar-I (SSRL)	Local Coal	84.81	72.51	70.55	75.81	74.98	69.82	54.79	62.71	63.75
170	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
171	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	China HUBCO	Imported Coal	44.02	0.61	0.41	0.89	2.73	3.29	19.31	17.94	16.82
173	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.25	0.29	0.27	10.71	7.37	11.59
175	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
176	Port Qasim	Imported Coal	18.70	0.23	0.09	0.20	0.48	0.74	9.31	10.18	8.46
177	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.04	0.15	9.22	8.31	10.43
178	FPCL	KE_Imported Coal	19.46	19.13	2.37	2.89	2.49	3.21	8.60	8.77	8.37
179	Altern	Gas Engine_RLNG	0.19	0.86	2.80	2.23	4.51	0.00	0.00	0.00	0.00
180	Balloki	CCGT_RLNG	38.60	34.19	18.73	43.87	39.63	40.96	0.39	0.24	0.14
181	Bhikki	CCGT_RLNG	14.23	19.64	42.27	19.21	18.07	20.62	0.08	0.00	0.00
182	FKPCL	CCGT_RLNG	12.24	12.63	3.20	2.36	4.71	3.23	0.00	0.00	0.00
183	Halmore	CCGT_RLNG	13.20	3.32	4.13	4.87	6.16	6.51	0.00	0.00	0.00
184	Haveli	CCGT_RLNG	62.20	63.27	71.92	70.20	69.42	64.50	5.26	4.79	3.88
185	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	Nandipur	CCGT_RLNG	0.29	1.71	4.40	3.38	4.88	4.82	0.00	0.00	0.00
187	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
188	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
189	Orient	CCGT_RLNG	13.20	3.47	5.01	4.96	7.05	6.92	0.00	0.00	0.00
190	Saif	CCGT_RLNG	12.89	13.82	3.71	4.05	5.64	5.56	0.00	0.00	0.00
191	Saphire	CCGT_RLNG	13.13	2.70	3.74	4.53	6.13	5.89	0.00	0.00	0.00
192	Trimmu	CCGT_RLNG	5.24	8.33	7.89	7.35	10.74	12.24	2.51	1.41	1.30
193	BQPS2	KE_CCGT_RLNG	3.70	3.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
194	BQPS3	KE_CCGT_RLNG	13.07	12.24	0.37	0.73	0.49	0.90	0.89	0.99	0.93
195	KCCPP	KE_CCGT_RLNG	0.03	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.93	41.85	41.93	41.96	41.96
201	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
202	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.51	64.26	64.29	64.08	64.13
203	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	76.86	67.37	55.72

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
204	Gorkin Matiltan	Hydro_Committed	44.67	44.37	44.21	44.06	43.02	43.86	43.20	43.49	43.99
205	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.33	82.23	82.30	82.25	82.38
206	Jagran-II	Hydro_Committed	50.98	48.52	48.96	50.81	50.81	48.82	47.27	46.77	47.64
207	Karora	Hydro_Committed	71.02	71.74	71.68	70.95	69.48	70.38	68.86	70.19	71.03
208	Koto	Hydro_Committed	58.36	58.59	58.42	58.42	56.98	57.85	57.18	57.65	58.42
209	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	16.93	16.93	16.93
210	Lawi	Hydro_Committed	48.16	48.81	48.96	48.87	48.62	48.66	48.56	48.59	48.78
211	Mohmand Dam	Hydro_Committed	0.00	56.46	42.66	42.39	41.92	41.67	40.71	41.07	41.29
212	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50

I-6.Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	2,271	-	-	-	4,021	46,836
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,960
2029	-	230	-495	-	-	1,390	-	-	-	1,125	53,085
2030	-	-	-	-	-	1,290	-	-	-	1,290	54,374
2031	-	-	-	-	-	1,476	-586	-	-	890	55,264
2032	-	-	-188	1,200	-	400	-	-	-	1,412	56,676
2033	-	1,505	-210	-	-	1,591	-	-	-	2,886	59,562
2034	-	1,500	-	-	-	236	-	-160	-	1,576	61,138
2035	-	1,500	-	-	-	208	-223	-	-	1,485	62,623
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**17,043**	**1,433**	**819**	**1,000**	**62,623**	

I-7.IGCEP Generation Mix 2025-2035 (GWh)

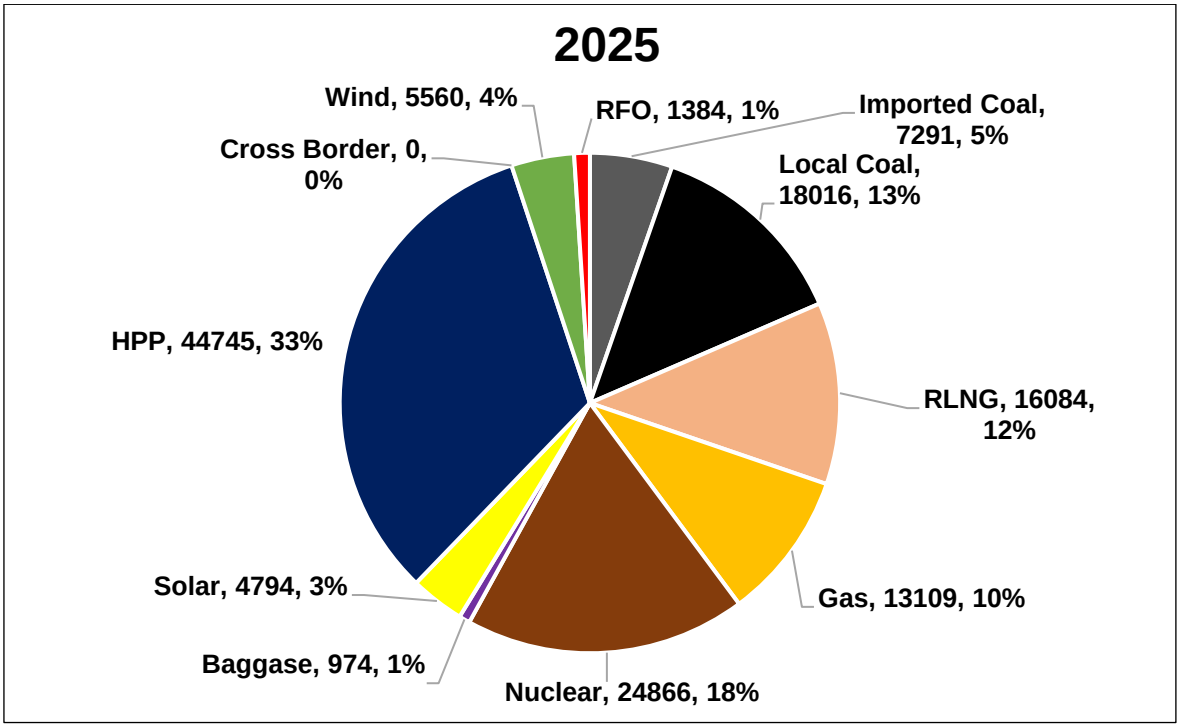


Chart I-1: IGCEP Generation Mix 2025 (GWh)

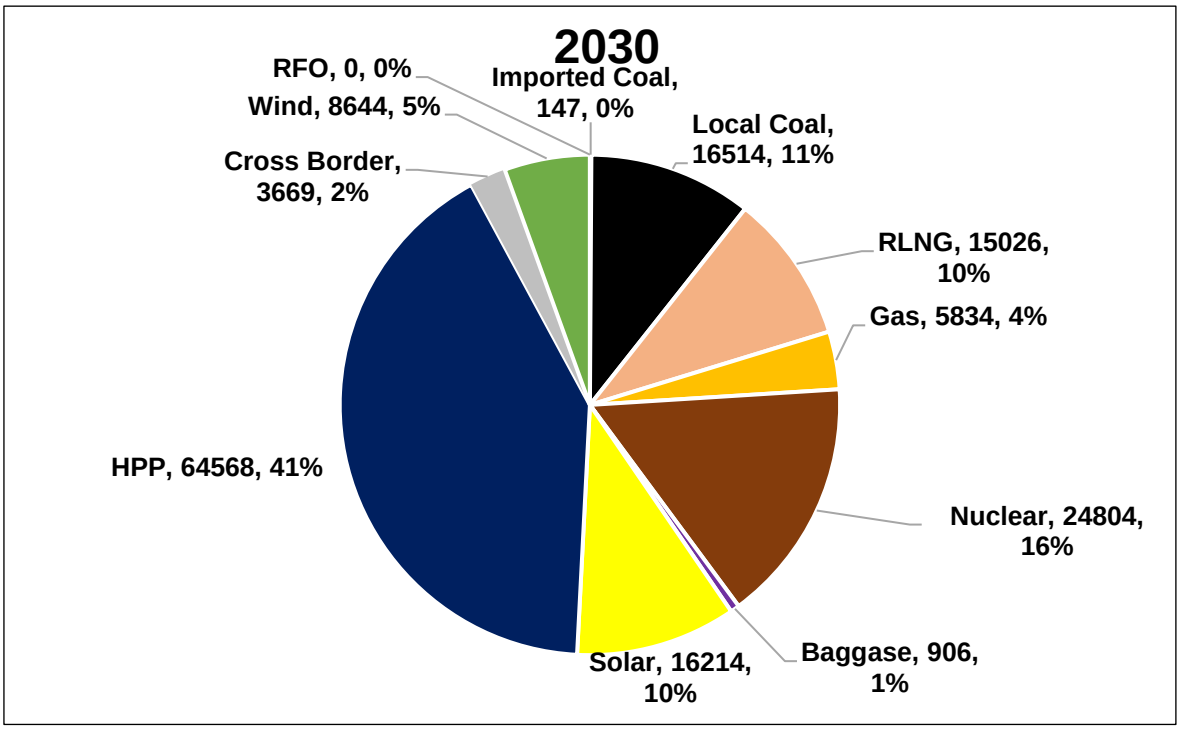


Chart I-2: IGCEP Generation Mix 2030 (GWh)

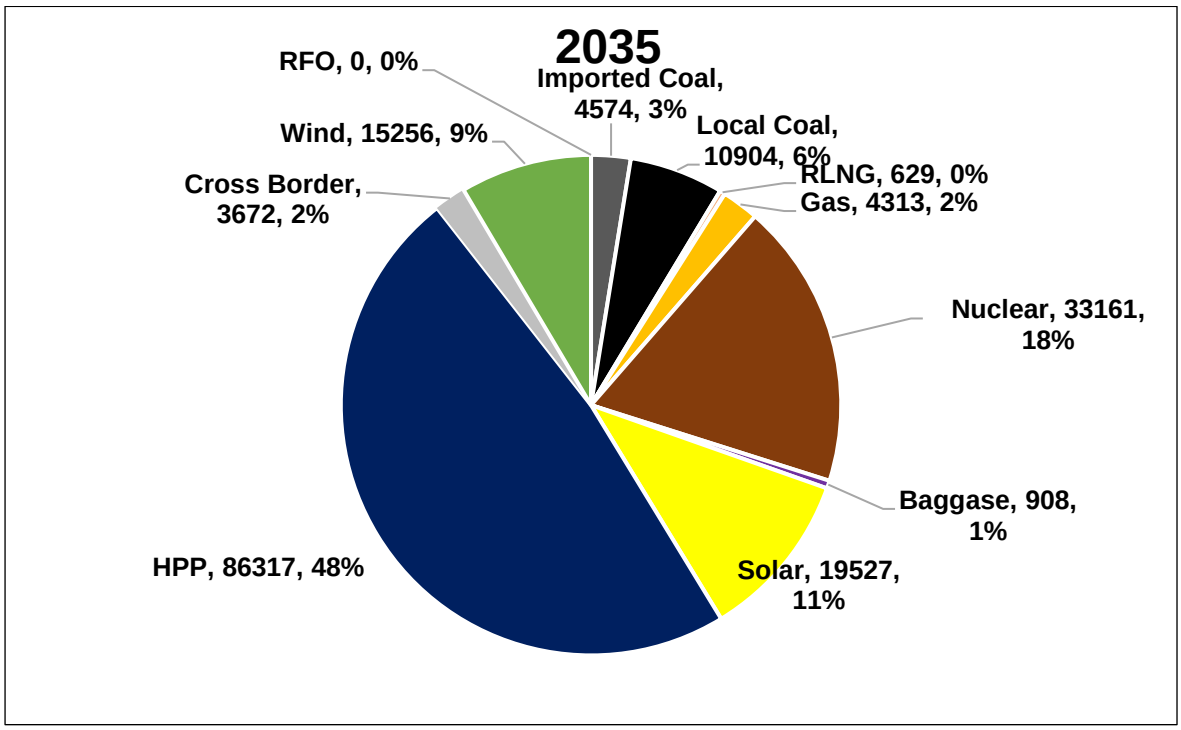


Chart I-3: IGCEP Generation Mix 2035 (GWh)

I-8.IGCEP Generation Mix 2025-35 (MW)

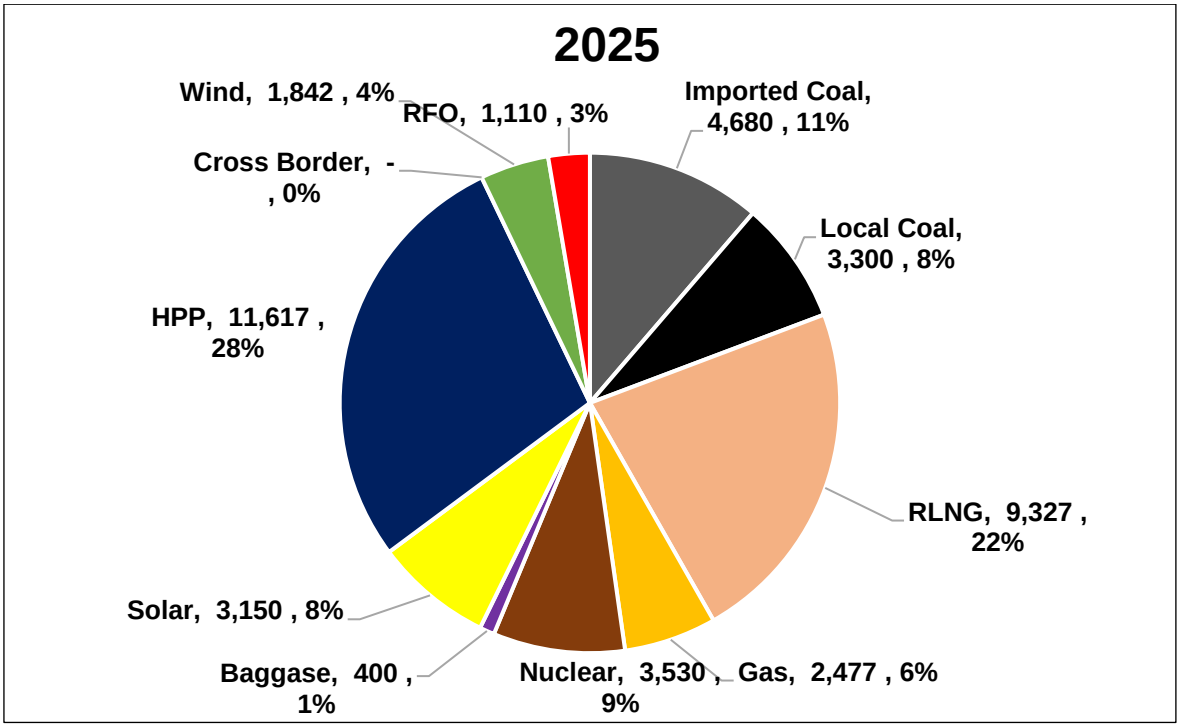


Chart I-4: IGCEP Capacity Mix 2025 (MW)

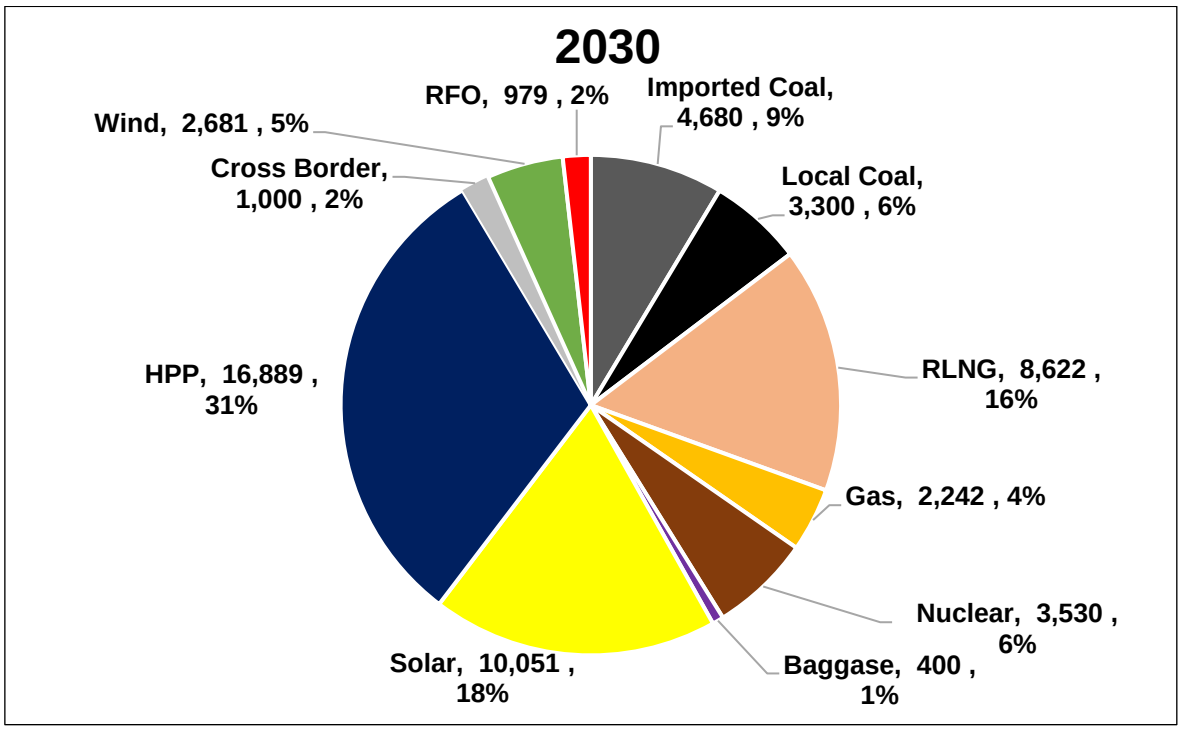


Chart I-5: IGCEP Capacity Mix 2030 (MW)

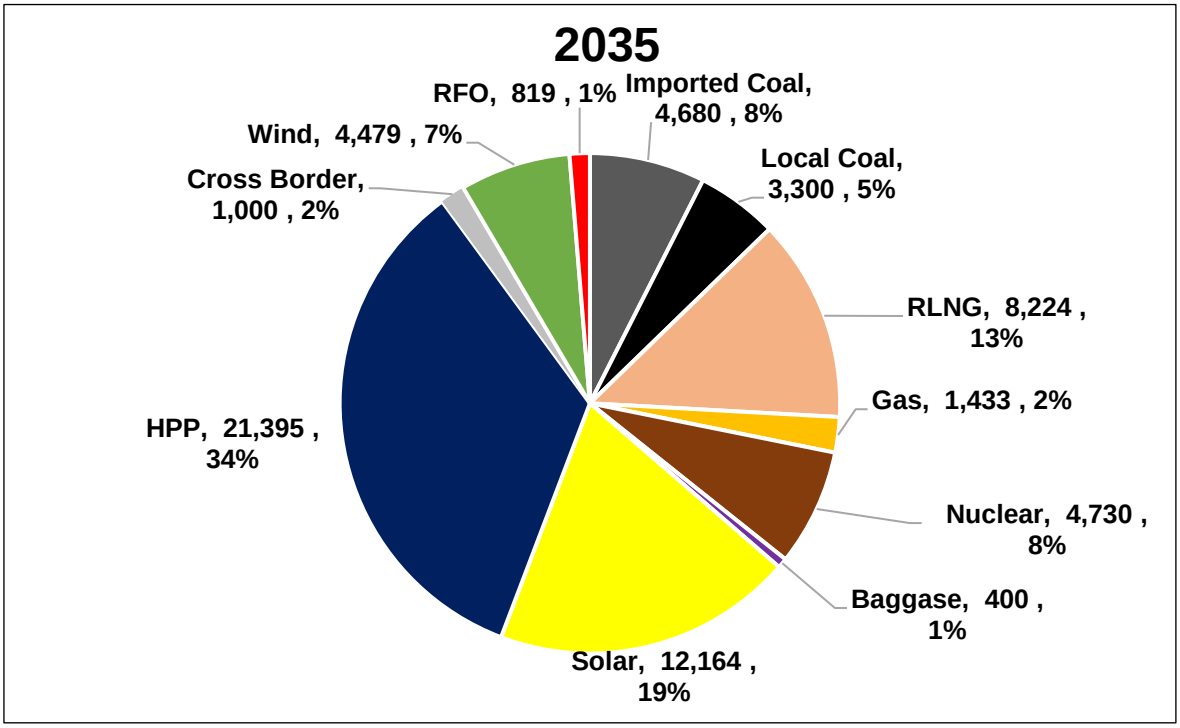


Chart I-6: IGCEP Capacity Mix 2035 (MW)

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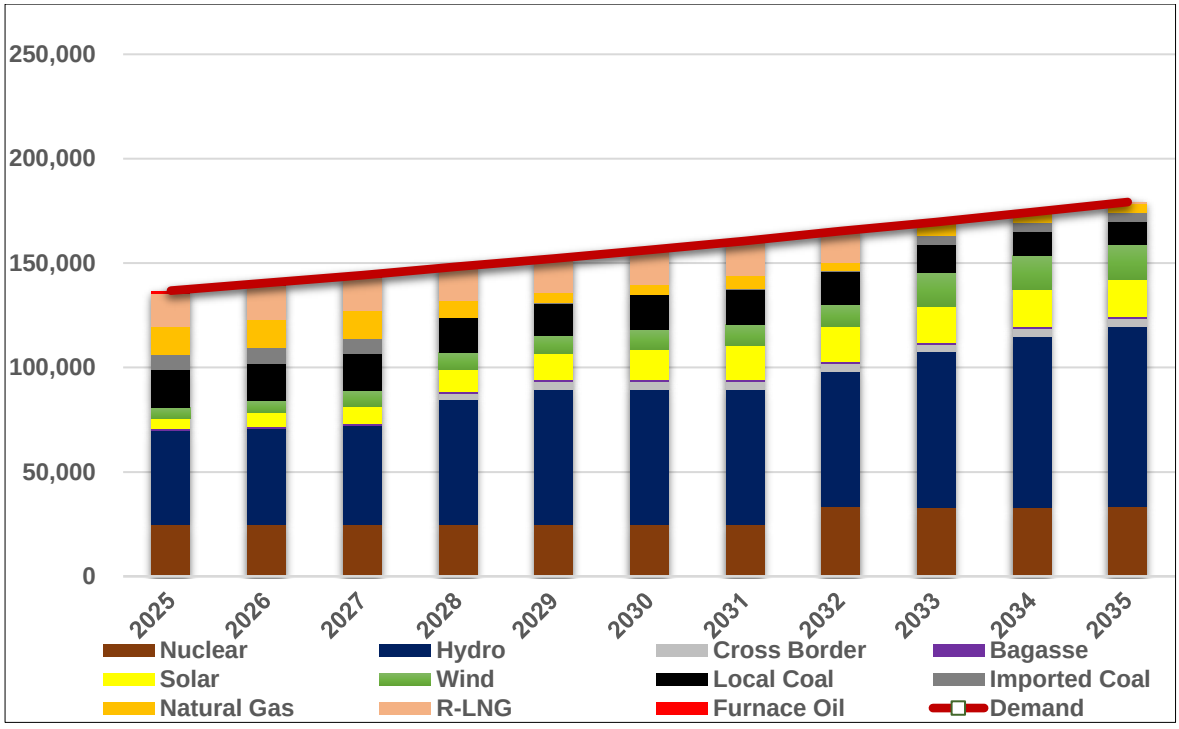
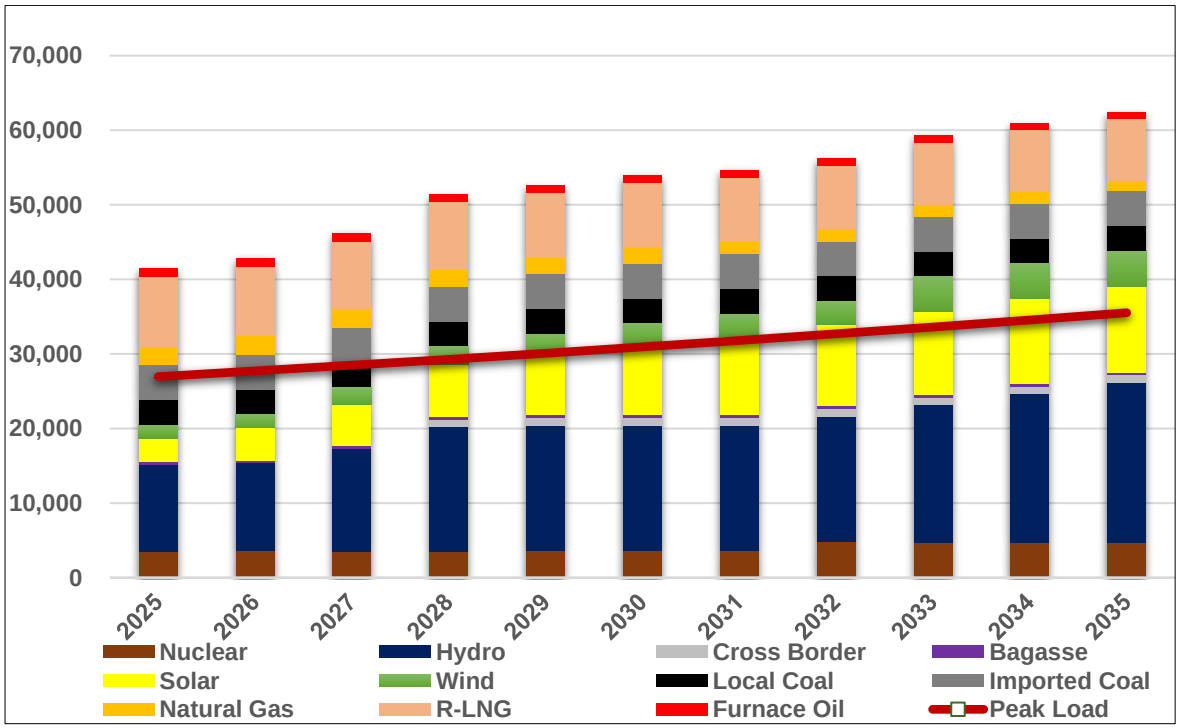
Annexure J. RCA with KE Candidate T/L in 2031

J-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



J-2.Installed Capacity Vs Peak Demand (MW) - Country



J-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	2,400	-	-	2,400	2,400
2026	-	-	1,200	-	-	1,200	3,600
2027	-	-	900	-	400	1,300	4,900
2028	-	-	800	-	100	900	5,800
2029	-	-	700	-	100	800	6,600
2030	-	-	600	-	100	700	7,300
2031	-	-	500	-	100	600	7,900
2032	1,200	-	400	-	100	1,700	9,600
2033	-	1,505	300	1,409	100	3,314	12,914
2034	-	1,500	200	-	43	1,743	14,657
2035	-	1,500	120	-	87	1,707	16,364
Total	**1,200**	**4,505**	**8,120**	**1,409**	**1,130**	**16,364**	

**Net Metering is Committed*

J-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
43	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-28
Generation Additions in 2028-29 (MW)			**1,520**	**1,520**			
Cumulative Addition up till 2029 (MW)			**14,586**	**14,586**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
46	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-29
Generation Additions in 2029-30 (MW)			**1389.7**	**1389.7**			
Cumulative Addition up till 2030 (MW)			**15,975**	**15,975**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**1,290**	**1,290**			
Cumulative Addition up till 2031 (MW)			**17,265**	**17,265**			
2031-32							
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	117	PAEC	Optimized	Jul-31
56	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,700**	**617**			
Cumulative Addition up till 2032 (MW)			**18,965**	**17,882**			
2032-33							
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
55	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-32
56	New_Wind	Wind	842	842	NGC	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimised	Jul-32
Generation Additions in 2032-33 (MW)			**2,747**	**2,747**			
Cumulative Addition up till 2033 (MW)			**21,712**	**20,629**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-33
Generation Additions in 2033-34 (MW)			**1,800**	**1,800**			
Cumulative Addition up till 2034 (MW)			**23,512**	**22,429**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,720**	**1,720**			
Cumulative Addition up till 2035 (MW)			**25,232**	**24,149**			

J-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.81	0.00	0.00	0.00	0.10	0.10	1.16	1.19	0.15
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.68	18.68	18.45	18.41	18.33	18.41	18.73
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	18.21	18.34	18.18	18.15	18.03	18.03	18.18
14	Best	PV	18.57	18.53	18.52	18.52	18.03	18.25	18.25	18.25	18.52
15	Crest	PV	18.82	18.78	18.82	18.77	18.52	18.57	18.25	18.38	18.82
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.71	16.71	16.71	16.70	16.71	16.69	16.70	16.71
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
23	QA_Solar	PV	17.22	17.18	17.18	17.18	16.93	16.94	16.93	16.93	17.22
24	Gharo	KE_PV	22.03	21.82	22.03	22.03	21.53	21.50	21.35	21.35	22.03
25	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Oursun	KE_PV	20.96	20.91	20.96	20.96	20.56	20.57	20.50	20.50	20.96
27	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
28	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
29	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
30	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
31	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
32	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
33	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
34	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
37	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
38	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
39	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
41	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
42	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
43	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
44	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
46	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
47	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
48	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
49	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
50	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
51	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
52	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
55	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
56	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
58	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
59	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
62	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
63	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
64	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
65	Zorlu_Wind	Wind	31.99	31.80	31.85	31.85	31.69	31.64	31.69	31.69	31.69
66	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
68	CASA	Interconnection	0.00	36.38	41.88	41.92	41.88	41.80	41.88	41.88	41.92
69	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	41.52	40.19	40.92
71	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Allai Khwar	Hydro Existing	44.43	44.31	44.43	44.43	44.35	44.22	43.70	44.35	44.35
115	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
116	Daral Khwar	Hydro Existing	38.77	38.66	38.76	38.76	38.76	38.66	38.76	38.76	38.76
117	Dubair Khwar	Hydro Existing	54.44	54.22	54.37	54.08	54.08	53.93	53.86	53.68	54.08
118	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
119	Golen Gol	Hydro Existing	9.15	9.12	9.15	9.07	9.07	9.05	8.91	8.23	8.24
120	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92
121	Jagran-I	Hydro Existing	49.49	49.35	49.49	49.40	49.40	49.27	48.43	46.88	46.83

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
123	Karot	Hydro Existing	45.37	45.36	45.48	45.44	45.41	45.25	45.37	45.35	45.37
124	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.22	40.22	40.11	39.76	40.22	40.22
125	Malakand-III	Hydro Existing	54.04	53.89	53.89	53.89	51.99	49.96	45.41	44.54	45.43
126	Mangla	Hydro Existing	62.49	61.50	55.12	54.51	54.44	54.34	54.38	54.45	54.51
127	Neelum Jehlum	Hydro Existing	53.48	53.30	53.44	53.48	53.44	53.33	53.44	53.44	53.44
128	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.49	55.34	55.49	55.49	55.49
129	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	43.76	43.64	43.76	43.76	43.76
130	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.59	45.46	45.59	45.59	45.59
131	Suki Kinari	Hydro Existing	51.17	51.03	51.17	51.12	51.03	50.90	51.03	51.03	51.09
132	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
133	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
134	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
135	Engro_Qadirpur	CCGT_Gas	28.01	14.87	5.32	9.61	10.94	9.33	9.54	7.34	4.12
136	Foundation	CCGT_Gas	76.27	53.66	53.66	53.66	53.66	53.66	53.65	53.66	53.66
137	Guddu-V (747)	CCGT_Gas	78.47	47.86	0.52	2.23	49.03	16.83	39.99	22.75	23.81
138	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Uch	CCGT_Gas	67.90	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
140	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
141	SNPC-I	KE_CCGT_Gas	69.38	34.11	34.02	34.61	35.07	11.24	36.57	25.01	23.28
142	SNPC-II	KE_CCGT_Gas	71.92	37.05	36.56	36.68	37.32	12.73	37.35	25.42	23.78
143	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	C-1	Nuclear	90.00	90.24	89.97	89.78	89.76	89.84	88.97	88.03	89.34
153	C-2	Nuclear	90.00	90.24	89.97	89.78	89.76	89.84	89.05	88.03	89.34
154	C-3	Nuclear	90.00	90.23	89.97	89.79	89.77	89.85	88.98	88.08	89.37
155	C-4	Nuclear	90.00	90.23	89.97	89.79	89.77	89.85	88.98	88.09	89.37
156	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	87.84	84.80	86.15	88.19
157	K-2	Nuclear	85.07	85.29	85.03	84.75	84.75	84.69	83.71	82.91	84.09
158	K-3	Nuclear	85.07	85.29	85.03	84.82	84.75	84.76	83.73	83.68	84.14
159	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	Engro Thar	Local Coal	85.44	82.80	82.03	81.40	80.90	79.32	69.70	49.19	41.56
162	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
163	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	Thal Nova	Local Coal	84.54	81.11	80.87	79.63	79.58	77.46	65.33	38.97	37.68
166	Thar TEL	Local Coal	84.49	81.32	80.85	80.00	79.76	77.61	65.79	43.14	38.17
167	Thar-I (SSRL)	Local Coal	84.92	74.55	63.37	75.88	75.93	71.35	55.53	64.01	64.84
168	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	China HUBCO	Imported Coal	46.69	0.61	0.29	0.47	1.42	3.35	19.10	17.59	16.46
171	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
172	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.02	0.27	0.27	10.05	6.89	11.45
173	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174	Port Qasim	Imported Coal	18.70	0.23	0.00	0.18	0.25	0.72	9.13	9.89	8.14
175	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.00	0.15	8.96	8.20	10.24
176	FPCL	KE_Imported Coal	21.87	23.54	24.06	24.83	24.56	2.93	9.34	8.00	7.83
177	Altern	Gas Engine_RLNG	0.19	0.86	1.04	1.04	3.96	0.00	0.00	0.00	0.00
178	Balloki	CCGT_RLNG	38.75	33.92	17.00	20.26	40.57	41.82	0.34	0.19	0.05
179	Bhikki	CCGT_RLNG	14.30	20.62	39.54	41.89	17.02	21.06	0.03	0.00	0.00
180	FKPCL	CCGT_RLNG	12.24	12.63	0.94	0.95	4.13	3.23	0.00	0.00	0.00
181	Halmore	CCGT_RLNG	13.20	3.31	2.57	4.95	5.35	6.53	0.00	0.00	0.00
182	Haveli	CCGT_RLNG	61.98	61.63	79.88	69.69	71.76	66.37	5.01	4.42	3.47
183	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	Nandipur	CCGT_RLNG	0.29	1.76	4.04	4.50	4.45	4.69	0.00	0.00	0.00
185	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	Orient	CCGT_RLNG	13.20	3.47	4.64	5.44	6.08	7.10	0.00	0.00	0.00
188	Saif	CCGT_RLNG	12.89	13.82	1.25	3.92	5.06	5.64	0.00	0.00	0.00
189	Saphire	CCGT_RLNG	13.13	2.76	1.99	4.65	5.26	5.86	0.00	0.00	0.00
190	Trimmu	CCGT_RLNG	5.24	9.21	6.33	8.81	9.56	9.18	2.19	1.16	1.17
191	BQPS2	KE_CCGT_RLNG	4.29	4.82	5.47	6.14	6.91	0.00	0.00	0.00	0.00
192	BQPS3	KE_CCGT_RLNG	14.22	14.64	15.20	15.86	16.71	0.82	1.11	0.93	0.90
193	KCCPP	KE_CCGT_RLNG	0.27	0.66	1.24	1.92	2.50	0.00	0.00	0.00	0.00
194	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.07	0.53	0.00	0.00	0.00	0.00
195	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.96	41.85	41.96	41.96	41.96
199	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
200	Dasu	Hydro_Committed	99.00	69.82	64.52	64.52	64.52	64.27	64.32	64.06	64.30
201	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	77.22	67.45	55.72
202	Gorkin Matiltan	Hydro_Committed	44.70	44.37	44.49	44.21	44.06	43.94	43.64	43.45	43.99
203	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.36	82.23	82.33	82.25	82.38

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
204	Jagran-II	Hydro_Committed	50.98	51.08	51.22	48.96	48.96	48.82	47.31	46.77	47.73
205	Karora	Hydro_Committed	71.09	71.77	71.68	71.21	71.04	70.83	69.91	70.41	71.07
206	Koto	Hydro_Committed	58.36	58.59	58.68	58.42	58.42	58.26	57.63	57.78	58.42
207	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	17.05	16.93	16.93
208	Lawi	Hydro_Committed	48.20	48.84	48.96	48.96	48.75	48.58	48.62	48.60	48.77
209	Mohmand Dam	Hydro_Committed	0.00	56.74	42.76	42.76	42.53	41.81	40.85	41.31	41.98
210	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
211	Riali-II	Hydro_Committed	54.66	54.64	54.79	54.79	54.79	54.64	54.77	54.63	54.63
212	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

J-6.Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	1,490	-	-	-	1,225	52,565
2030	-	-	-	-	-	1,390	-	-	-	1,390	53,954
2031	-	-	-	-	-	1,290	-586	-	-	704	54,658
2032	-	-	-188	1,200	-	500	-	-	-	1,512	56,170
2033	-	1,505	-210	-	-	1,809	-	-	-	3,104	59,274
2034	-	1,500	-	-	-	243	-	-160	-	1,583	60,857
2035	-	1,500	-	-	-	207	-223	-	-	1,484	62,341
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**16,761**	**1,433**	**819**	**1,000**	**62,341**	

J-7.IGCEP Generation Mix 2025-2035 (GWh)

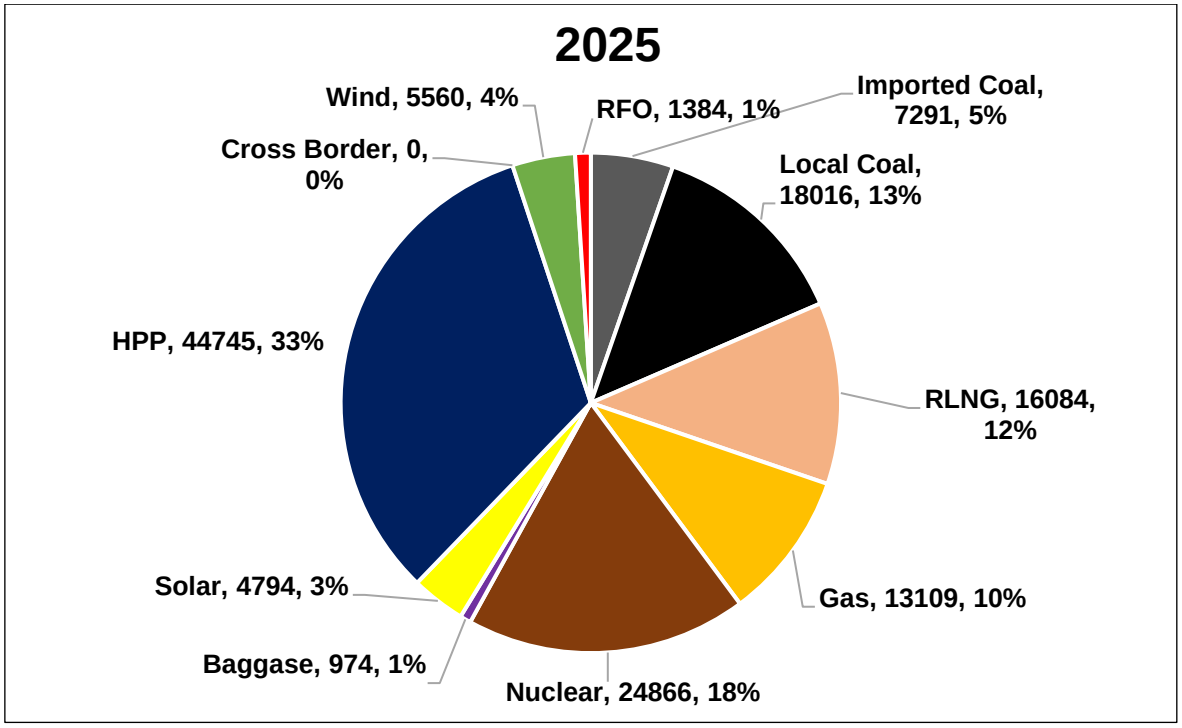


Chart J-1: IGCEP Generation Mix 2025 (GWh)

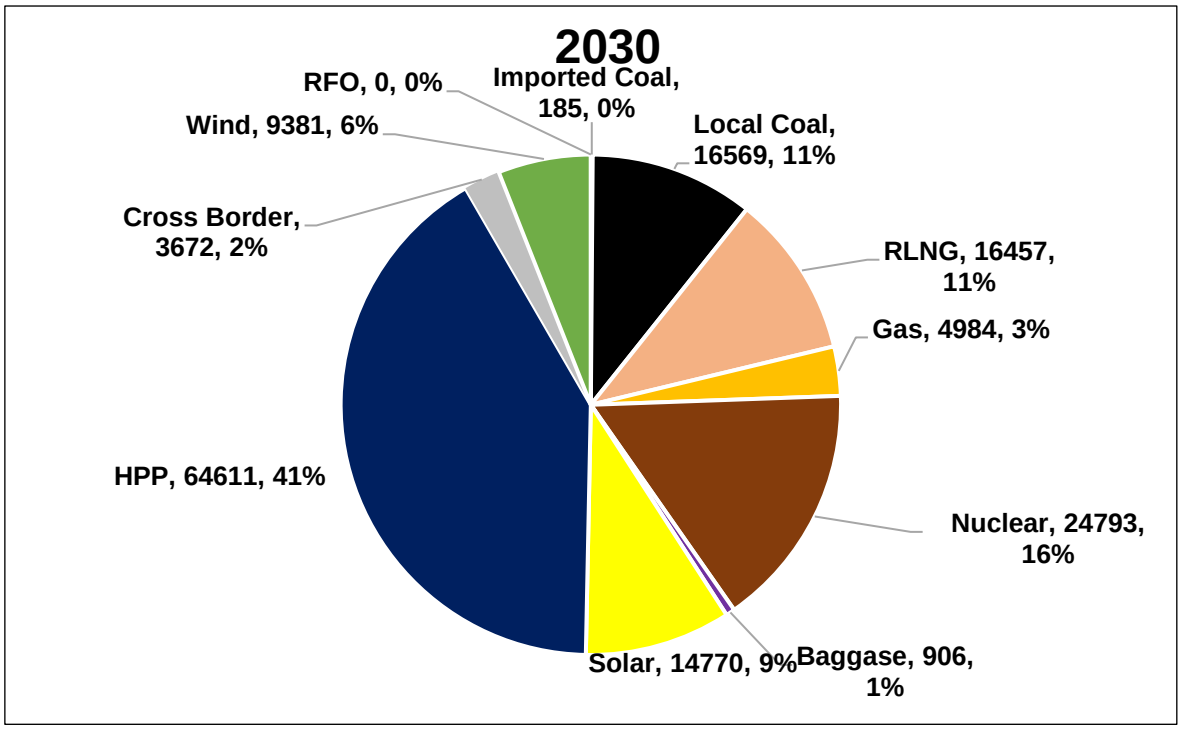


Chart J-2: IGCEP Generation Mix 2030 (GWh)

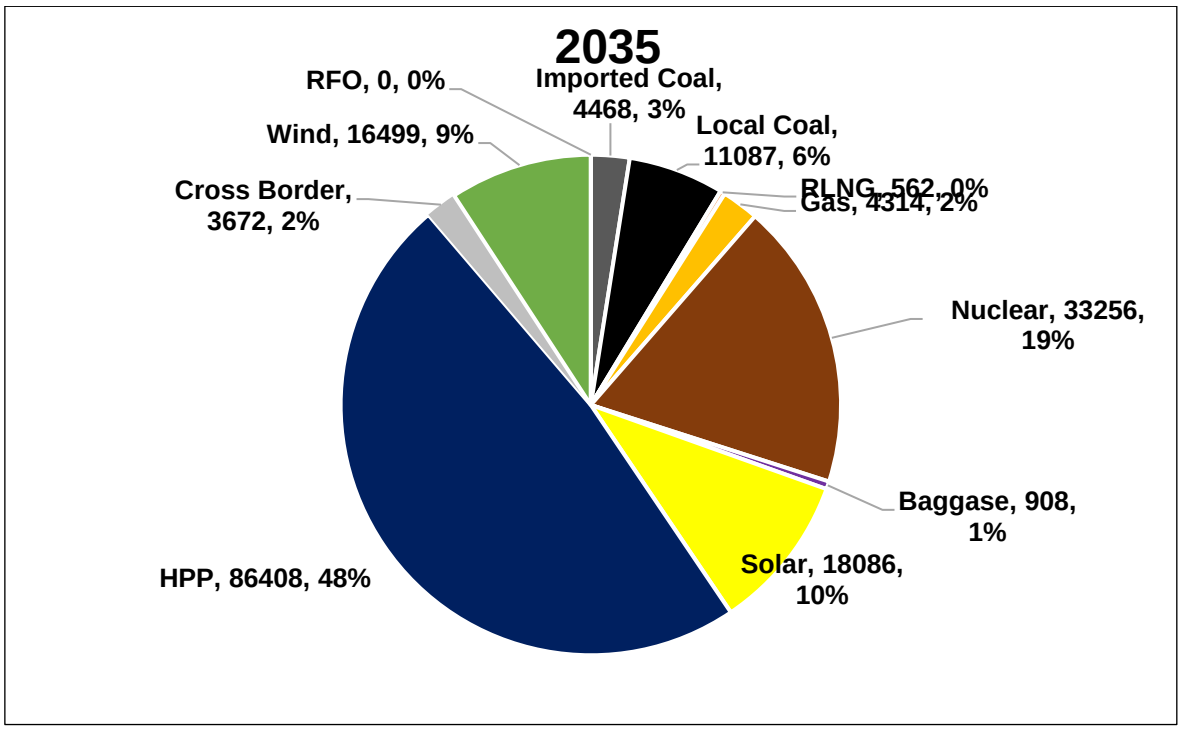


Chart J-3: IGCEP Generation Mix 2035 (GWh)

J-8.IGCEP Capacity Mix 2025-35 (MW)

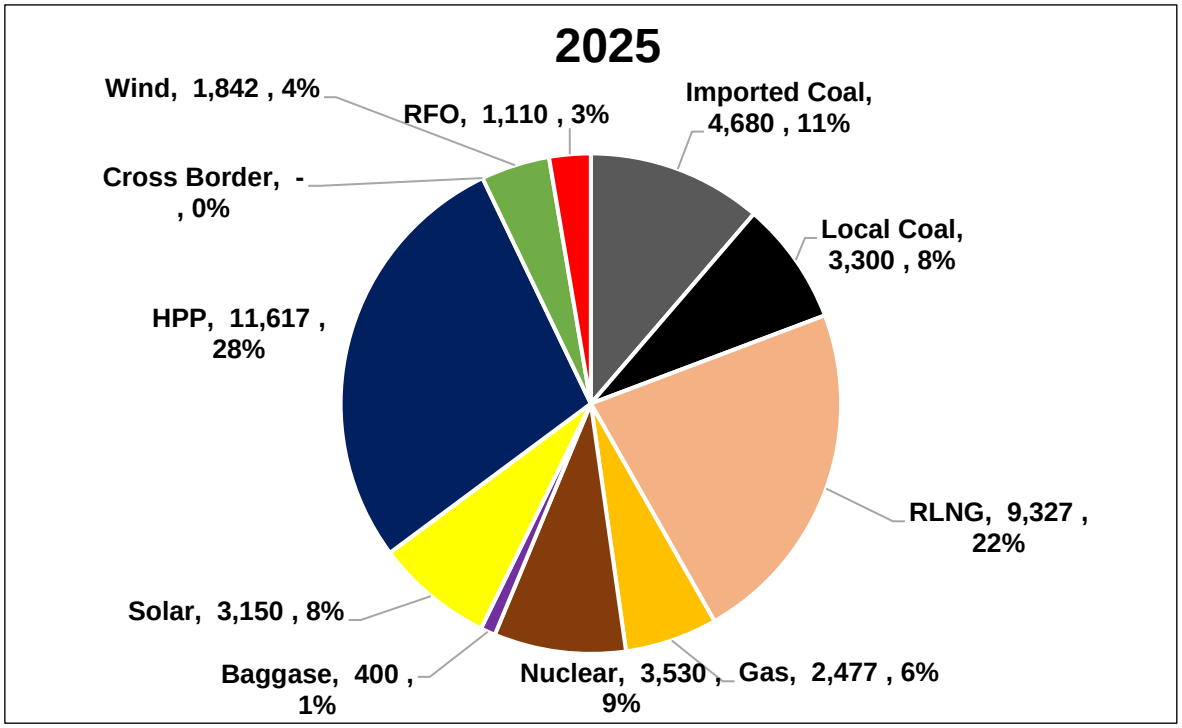


Chart J-4: IGCEP Capacity Mix 2025 (MW)

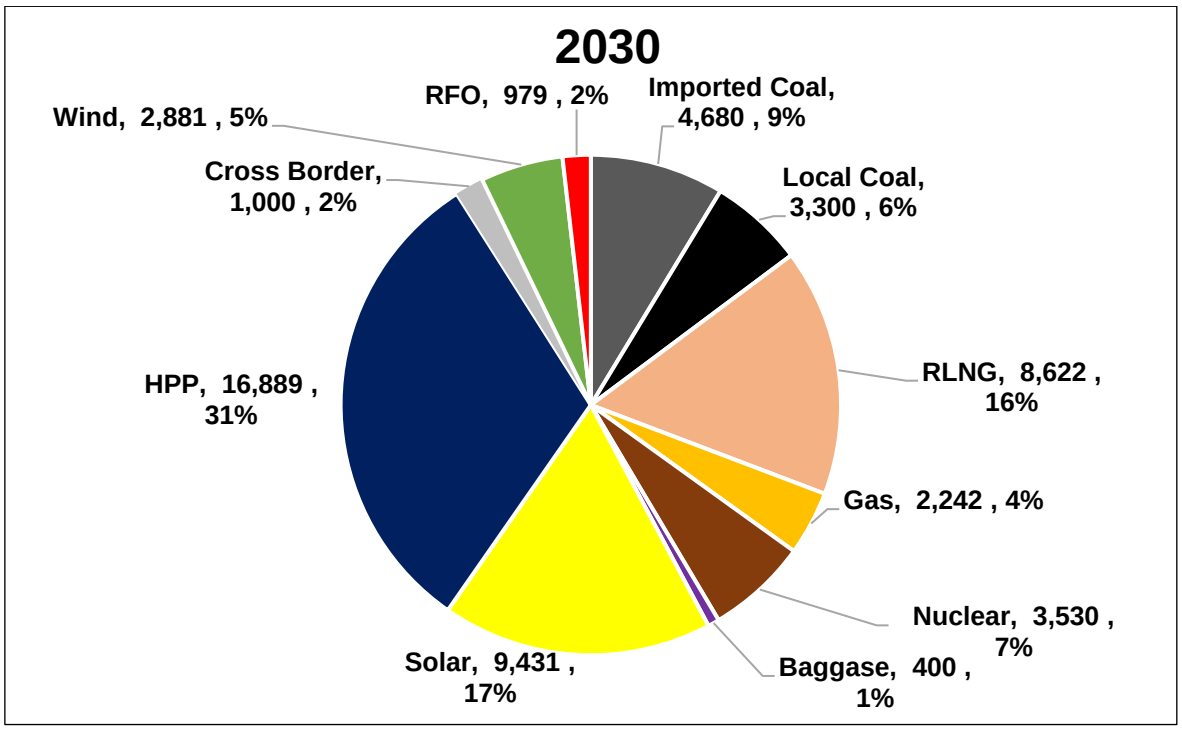


Chart J-5: IGCEP Capacity Mix 2030 (MW)

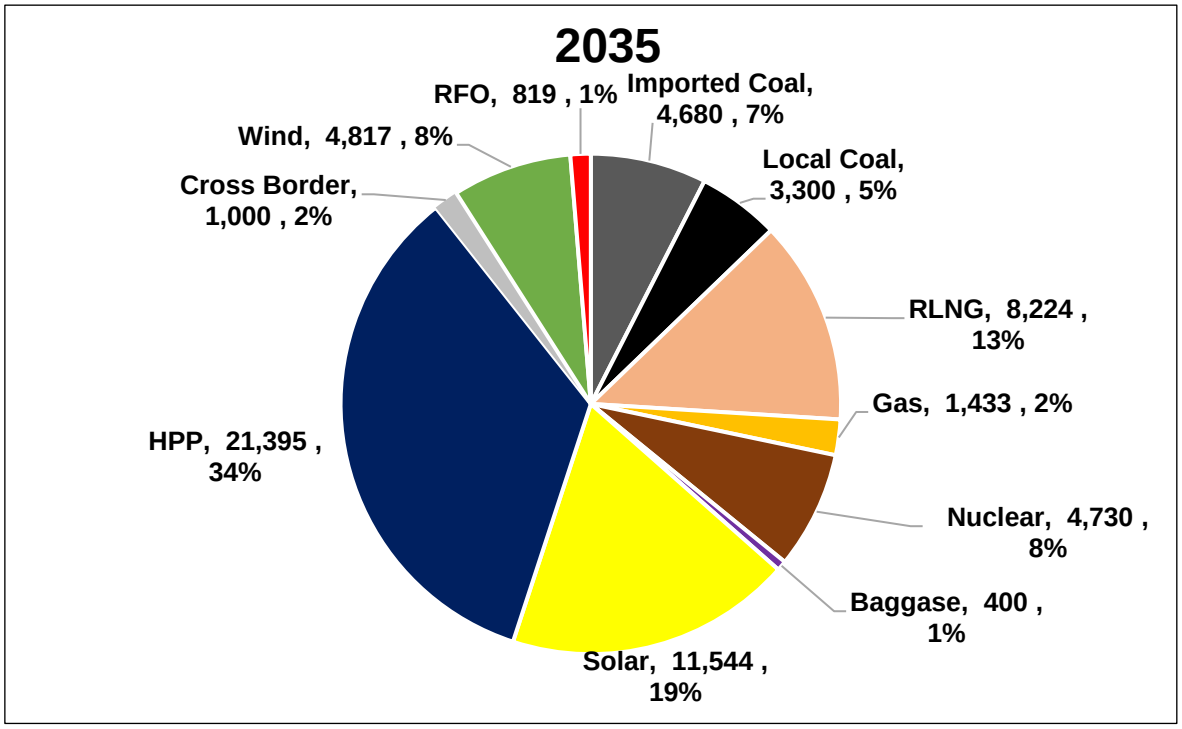


Chart J-6: IGCEP Capacity Mix 2035 (MW)

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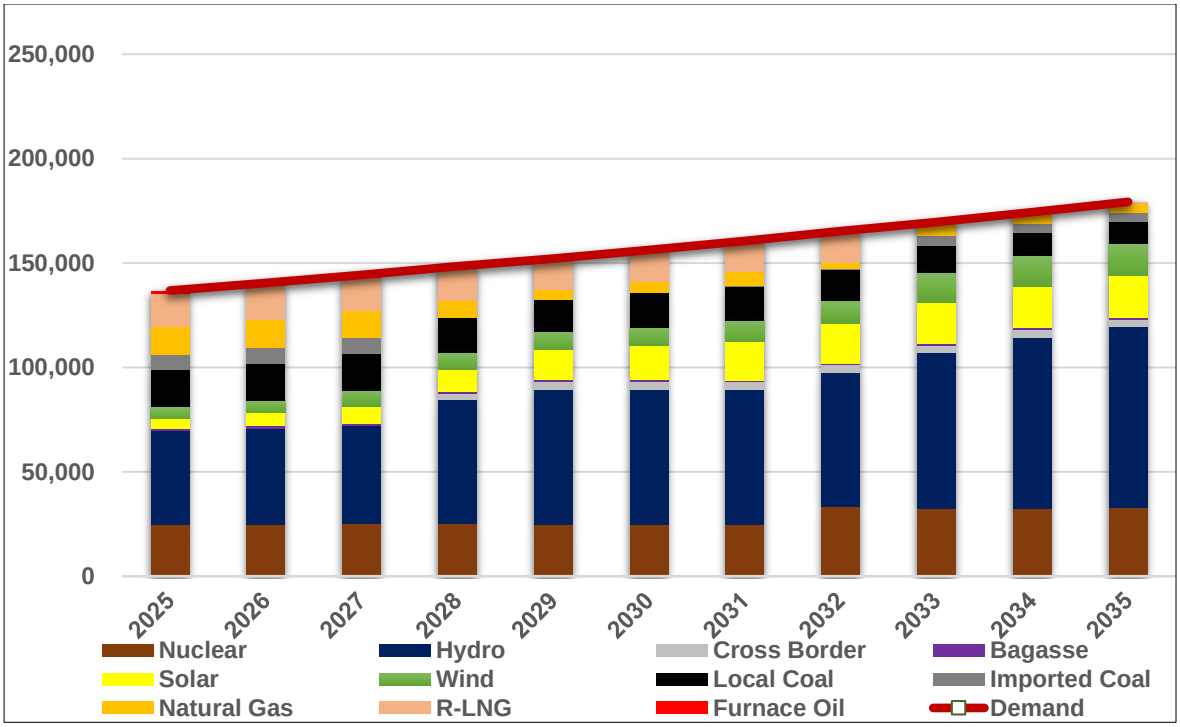
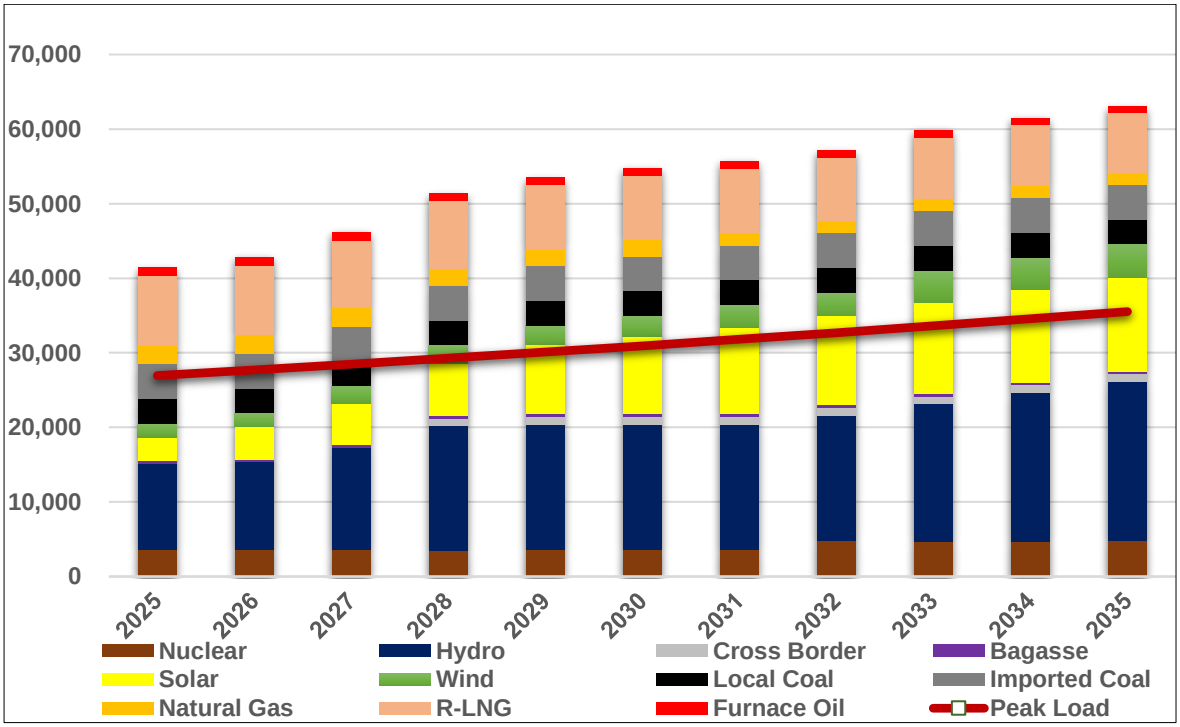
Annexure K. RCA with ACWA 1000 MW Solar

K-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



K-2.Installed Capacity Vs Peak Demand (MW) - Country



K-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Solar Utility MWp	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	-	2,400	-	-	2,400	2,400
2026	-	-	-	1,200	-	-	1,200	3,600
2027	-	-	-	900	-	400	1,300	4,900
2028	-	-	-	800	-	100	900	5,800
2029	-	-	1,000	700	-	-	1,700	7,500
2030	-	-	-	600	-	-	600	8,100
2031	-	-	-	500	-	300	800	8,900
2032	1,200	-	-	400	-	65	1,665	10,565
2033	-	1,505	-	300	1,024	135	2,964	13,529
2034	-	1,500	-	200	-	37	1,737	15,266
2035	-	1,500	-	120	-	163	1,783	17,049
Total	**1,200**	**4,505**	**1,000**	**8,120**	**1,024**	**1,200**	**17,049**	

**Net Metering is Committed*

K-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
44	PV_SIFC_1000	PV	1000	1000	SIFC	Committed	Jul-28
Generation Additions in 2028-29 (MW)			**2,420**	**2,420**			
Cumulative Addition up till 2029 (MW)			**15,486**	**15,486**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
Generation Additions in 2029-30 (MW)			**1289.7**	**1289.7**			
Cumulative Addition up till 2030 (MW)			**16,775**	**16,775**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	300	300	KE	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**1,490**	**1,490**			
Cumulative Addition up till 2031 (MW)			**18,265**	**18,265**			
2031-32							
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
56	KE_New_Wind	Wind	65	65	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,665**	**1,582**			
Cumulative Addition up till 2032 (MW)			**19,930**	**19,847**			
55	KE_New_Wind	Wind	135	135	KE	Optimised	Jul-32
56	New_Wind	Wind	1024	1024	NGC	Optimised	Jul-32
57	Batdara	Hydro	5.2	5.2	AJK-HEB	Optimized	Jul-32
Generation Additions in 2032-33 (MW)			**2,959**	**2,964**			
Cumulative Addition up till 2033 (MW)			**22,889**	**22,811**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
60	KE_New_Wind	Wind	135	135	KE	Optimised	Jul-33

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
Generation Additions in 2033-34 (MW)			**1,835**	**1,835**			
Cumulative Addition up till 2034 (MW)			**24,724**	**24,646**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	163	163	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,783**	**1,783**			
Cumulative Addition up till 2035 (MW)			**26,507**	**26,429**			

K-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.81	0.00	0.00	0.03	0.10	0.10	1.10	1.22	0.15
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	18.47	18.15	18.15	17.92	17.68	18.15	18.15
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	17.94	17.80	17.49	17.77	17.60	17.80	17.94
14	Best	PV	18.57	18.53	18.30	17.99	17.52	17.92	17.50	18.02	17.99
15	Crest	PV	18.82	18.78	18.33	18.25	17.64	18.13	18.19	18.21	18.29
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.70	16.71	16.68	16.66	16.68	16.71	16.71	16.68
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_SIFC_1000	PV	0.00	0.00	22.95	22.89	22.64	22.63	22.26	22.46	22.88
23	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
24	QA_Solar	PV	17.22	17.18	17.22	16.68	16.45	16.68	16.48	16.73	16.72
25	Gharo	KE_PV	22.03	21.82	21.53	21.53	21.12	21.50	21.12	21.35	21.53
26	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Oursun	KE_PV	20.96	20.91	20.56	20.56	20.37	20.57	20.37	20.50	20.56
28	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
29	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
30	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
31	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
32	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
33	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
34	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
37	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
38	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
39	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
42	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
43	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
44	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
46	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
47	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
48	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
49	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
50	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
51	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
52	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
55	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
56	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
58	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
59	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
62	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
63	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
64	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
65	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
66	Zorlu_Wind	Wind	31.99	31.80	31.69	31.69	31.18	31.22	31.18	31.46	31.69
67	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
69	CASA	Interconnection	0.00	36.38	41.88	41.88	41.81	41.77	41.81	41.88	41.88
70	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	41.26	39.67	38.50
72	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	Allai Khwar	Hydro Existing	44.43	44.31	44.35	44.06	43.70	43.84	43.05	44.02	44.07
116	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.91	48.78	48.91	48.91	48.91
117	Daral Khwar	Hydro Existing	38.77	38.66	38.76	38.76	38.77	38.66	38.77	38.77	38.76
118	Dubair Khwar	Hydro Existing	54.44	54.22	54.08	54.08	53.29	53.66	52.94	53.64	54.08
119	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
120	Golen Gol	Hydro Existing	9.15	9.12	9.07	9.15	9.15	9.05	8.91	8.23	8.24
121	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Jagran-I	Hydro Existing	49.49	49.35	49.40	49.49	49.49	49.17	48.39	46.88	45.68
123	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
124	Karot	Hydro Existing	45.37	45.36	45.42	45.39	45.36	45.25	45.27	45.38	45.36
125	Khan Khwar	Hydro Existing	40.22	40.11	40.22	40.04	39.76	39.65	39.21	40.04	40.04
126	Malakand-III	Hydro Existing	54.04	53.89	53.34	52.88	52.34	48.63	45.74	43.78	43.18
127	Mangla	Hydro Existing	62.49	61.50	55.12	54.36	54.32	54.17	54.32	54.32	54.39
128	Neelum Jehlum	Hydro Existing	53.48	53.33	53.46	53.48	53.41	53.30	53.40	53.44	53.44
129	New Bong	Hydro Existing	55.49	55.34	55.49	55.49	55.13	55.26	55.12	55.41	55.49
130	Patrind	Hydro Existing	43.76	43.64	43.76	43.76	42.91	43.64	43.32	43.76	43.76
131	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.59	45.28	45.45	45.28	45.59	45.59
132	Suki Kinari	Hydro Existing	51.17	51.03	51.05	51.03	50.91	50.90	50.96	51.03	51.03
133	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
134	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
135	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
136	Engro_Qadirpur	CCGT_Gas	28.01	14.87	6.03	11.48	11.93	4.88	9.71	7.48	4.12
137	Foundation	CCGT_Gas	76.27	53.66	53.66	53.66	53.65	53.65	53.65	53.66	53.65
138	Guddu-V (747)	CCGT_Gas	78.47	47.86	1.28	13.62	53.87	5.01	39.62	24.01	24.34
139	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	Uch	CCGT_Gas	67.90	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
141	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
142	SNPC-I	KE_CCGT_Gas	69.38	34.11	3.36	9.53	9.94	8.45	37.21	25.49	23.39
143	SNPC-II	KE_CCGT_Gas	71.92	37.05	4.09	9.89	10.33	9.51	37.48	25.84	25.83
144	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	C-1	Nuclear	90.00	90.24	89.76	89.78	89.60	89.59	88.88	87.84	89.20
154	C-2	Nuclear	90.00	90.24	89.76	89.78	89.60	89.60	88.88	87.85	89.20
155	C-3	Nuclear	90.00	90.23	89.77	89.74	89.62	89.61	88.93	87.90	89.14
156	C-4	Nuclear	90.00	90.23	89.77	89.75	89.62	89.61	88.93	87.90	89.14
157	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	85.82	82.89	84.03	86.36
158	K-2	Nuclear	85.07	85.29	84.74	84.74	84.53	84.41	83.47	82.55	83.98
159	K-3	Nuclear	85.07	85.29	84.75	84.74	84.56	84.41	83.59	83.26	83.92
160	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
162	Engro Thar	Local Coal	85.44	82.80	80.87	79.87	79.53	76.79	68.77	47.95	38.65

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
163	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	Thal Nova	Local Coal	84.54	81.09	79.30	78.52	77.53	75.06	64.55	37.79	35.22
167	Thar TEL	Local Coal	84.49	81.34	79.33	78.65	77.64	75.37	64.62	40.99	37.42
168	Thar-I (SSRL)	Local Coal	84.92	74.55	66.72	75.47	74.46	68.64	53.24	60.74	61.16
169	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
171	China HUBCO	Imported Coal	46.69	0.61	0.43	0.97	2.97	3.40	19.60	18.39	17.06
172	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
173	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.27	0.31	0.27	11.38	7.76	11.74
174	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	Port Qasim	Imported Coal	18.70	0.23	0.11	0.23	0.48	0.75	9.58	10.72	8.81
176	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.06	0.15	9.04	7.43	9.46
177	FPCL	KE_Imported Coal	21.87	23.54	2.37	2.95	2.36	2.74	8.75	8.68	8.04
178	Altern	Gas Engine_RLNG	0.19	0.86	3.38	2.94	4.51	0.00	0.00	0.00	0.00
179	Balloki	CCGT_RLNG	38.75	33.92	17.67	43.13	38.79	20.55	0.42	0.28	0.18
180	Bhikki	CCGT_RLNG	14.30	20.62	41.78	21.50	17.90	40.95	0.12	0.00	0.00
181	FKPCL	CCGT_RLNG	12.24	12.63	3.52	2.57	4.71	3.51	0.00	0.00	0.00
182	Halmore	CCGT_RLNG	13.20	3.31	4.55	4.95	6.34	8.18	0.00	0.00	0.00
183	Haveli	CCGT_RLNG	61.98	61.63	73.17	68.18	70.15	62.35	5.42	5.00	4.11
184	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185	Nandipur	CCGT_RLNG	0.29	1.76	4.44	3.54	4.95	7.73	0.00	0.00	0.00
186	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
188	Orient	CCGT_RLNG	13.20	3.47	5.24	5.19	7.24	8.59	0.00	0.00	0.00
189	Saif	CCGT_RLNG	12.89	13.82	3.71	4.35	5.84	6.16	0.00	0.00	0.00
190	Saphire	CCGT_RLNG	13.13	2.76	3.93	4.68	6.16	6.74	0.00	0.00	0.00
191	Trimmu	CCGT_RLNG	5.24	9.21	7.92	7.57	10.85	12.33	2.87	1.74	1.40
192	BQPS2	KE_CCGT_RLNG	4.29	4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
193	BQPS3	KE_CCGT_RLNG	14.22	14.64	0.43	0.79	0.52	0.70	0.87	0.98	0.84
194	KCCPP	KE_CCGT_RLNG	0.27	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Balakot	Hydro_Committed	0.00	36.84	41.96	41.96	41.93	41.85	41.93	41.96	41.96
200	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
201	Dasu	Hydro_Committed	99.00	69.82	64.52	64.51	64.51	64.26	64.33	64.13	64.15
202	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	76.28	67.19	55.72
203	Gorkin Matiltan	Hydro_Committed	44.70	44.37	44.06	43.72	42.52	42.96	42.10	43.14	43.95

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
204	Jabori	Hydro_Committed	82.38	82.23	82.38	82.38	82.28	82.21	82.25	82.25	82.38
205	Jagran-II	Hydro_Committed	50.98	51.08	48.96	50.81	50.81	48.73	47.37	46.77	46.13
206	Karora	Hydro_Committed	71.09	71.77	71.18	70.25	69.42	69.63	68.46	69.36	70.76
207	Koto	Hydro_Committed	58.36	58.59	58.42	57.81	56.54	57.04	55.60	57.14	58.42
208	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	17.05	16.93	16.93
209	Lawi	Hydro_Committed	48.20	48.84	48.87	48.83	48.48	48.50	48.28	48.46	48.68
210	Mohmand Dam	Hydro_Committed	0.00	56.74	42.72	42.04	41.92	41.60	40.54	41.24	40.97
211	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
212	Riali-II	Hydro_Committed	54.66	54.64	54.79	54.79	54.79	54.64	54.77	54.58	54.63
213	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

K-6.Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	2,390	-	-	-	2,125	53,465
2030	-	-	-	-	-	1,290	-	-	-	1,290	54,754
2031	-	-	-	-	-	1,490	-586	-	-	904	55,658
2032	-	-	-188	1,200	-	465	-	-	-	1,477	57,135
2033	-	1,505	-210	-	-	1,459	-	-	-	2,754	59,889
2034	-	1,500	-	-	-	237	-	-160	-	1,577	61,466
2035	-	1,500	-	-	-	283	-223	-	-	1,560	63,026
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**17,446**	**1,433**	**819**	**1,000**	**63,026**	

K-7.IGCEP Generation Mix 2025-2035 (GWh)

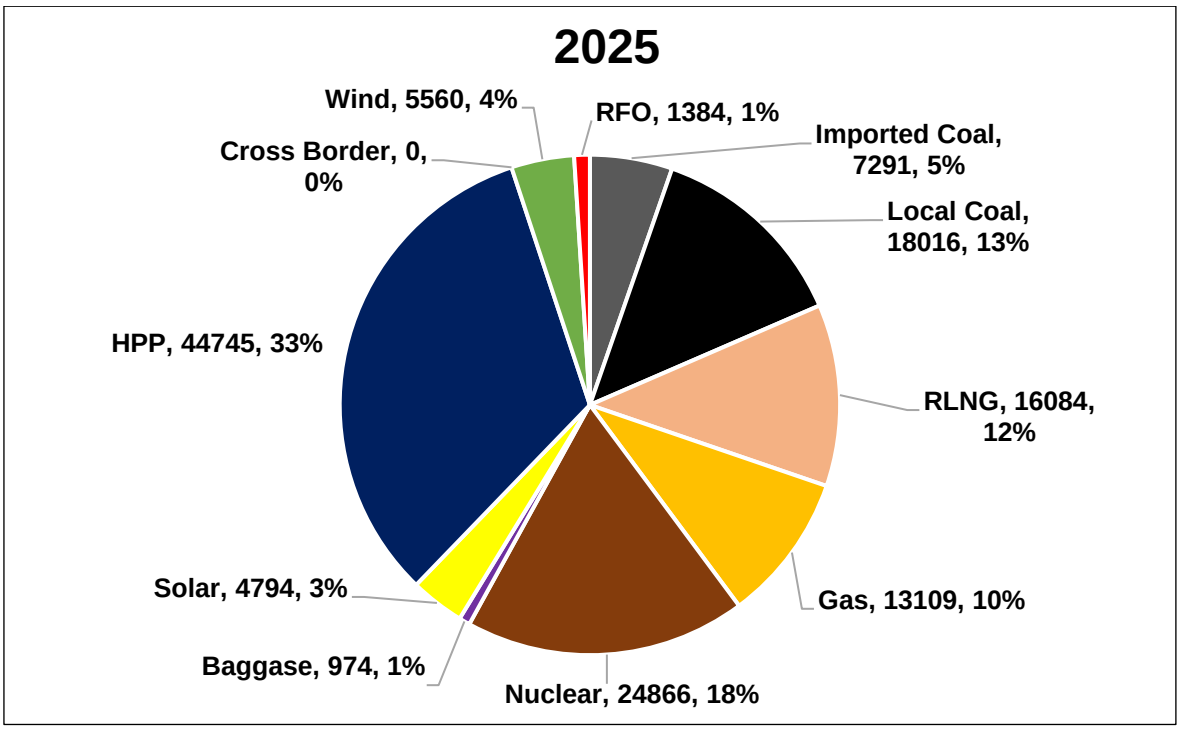


Chart K-1: IGCEP Generation Mix 2025 (GWh)

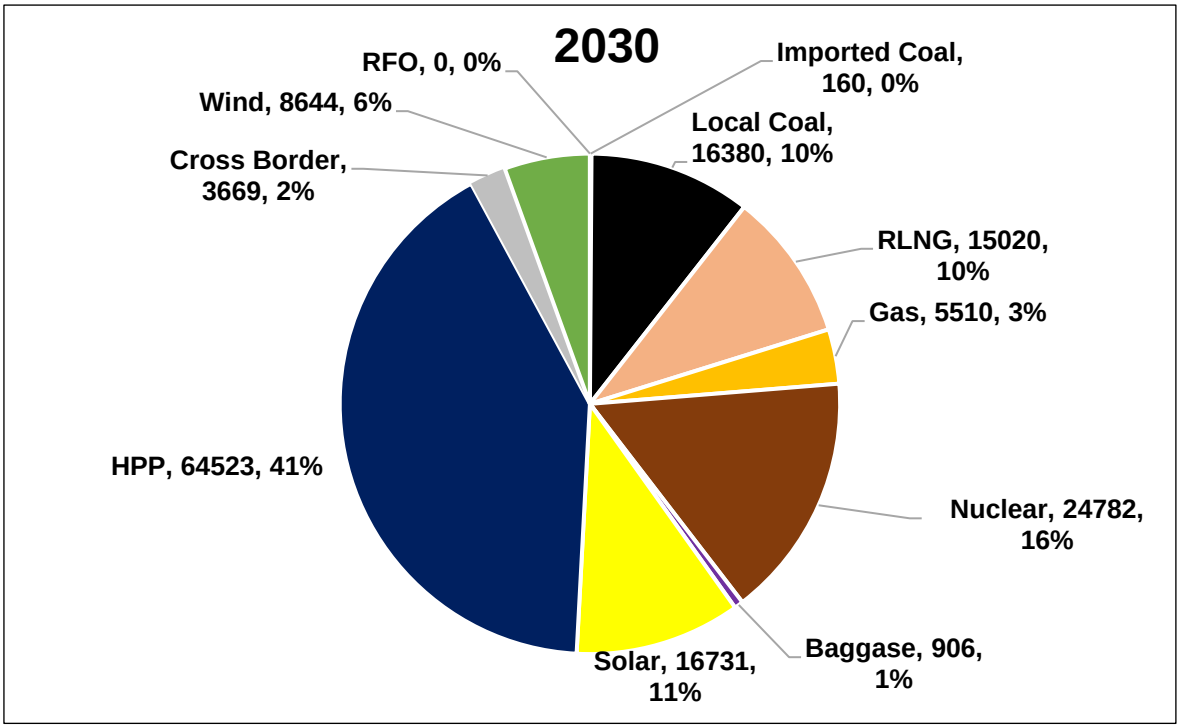


Chart K-2: IGCEP Generation Mix 2030 (GWh)

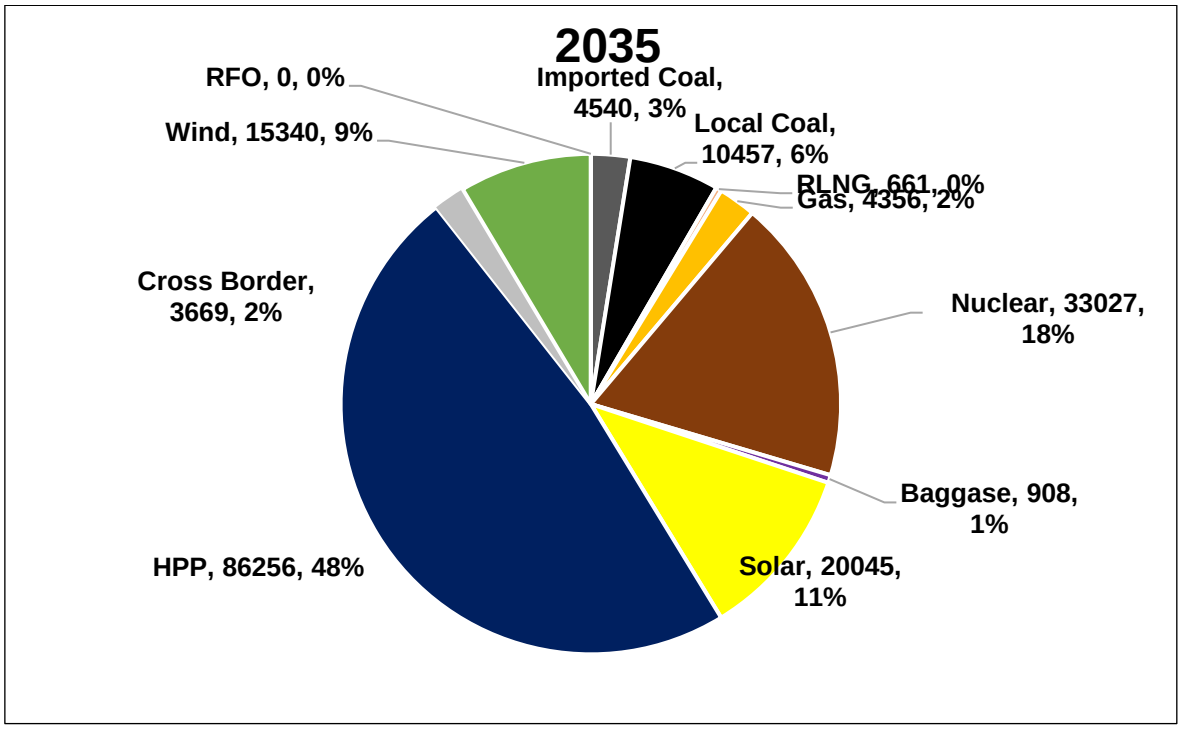


Chart K-3: IGCEP Generation Mix 2035 (GWh)

K-8.IGCEP Generation Mix 2025-35 (MW)

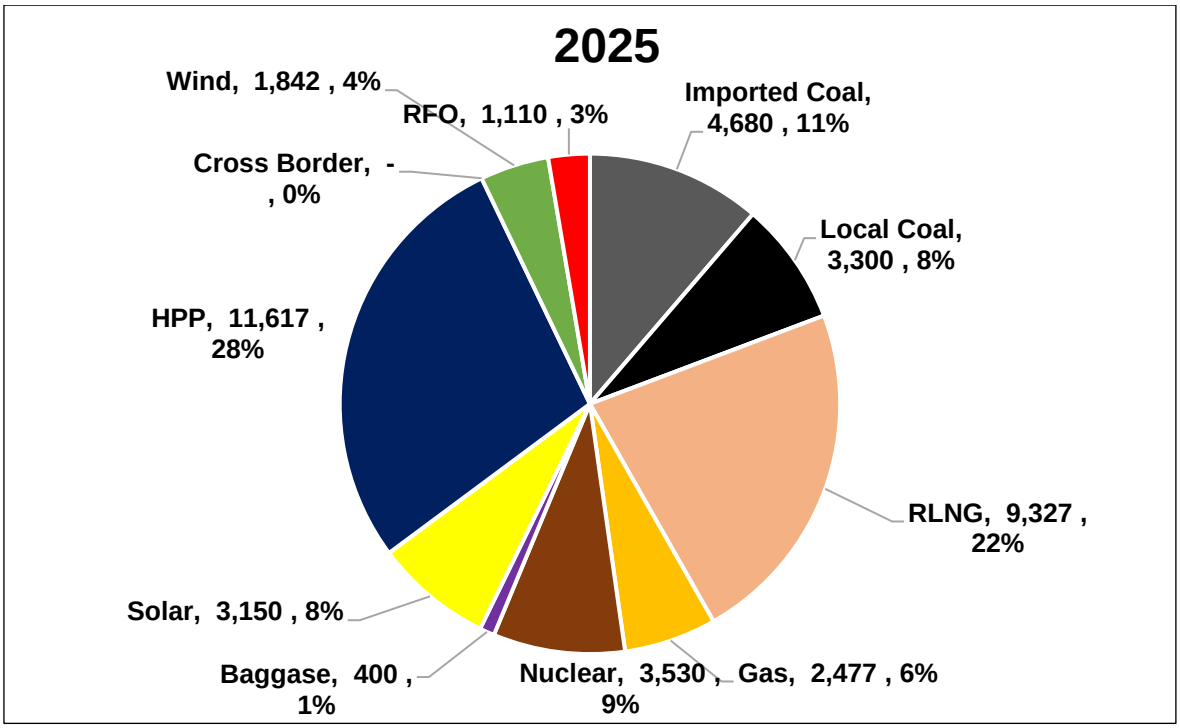


Chart K-4: IGCEP Generation Mix 2025 (MW)

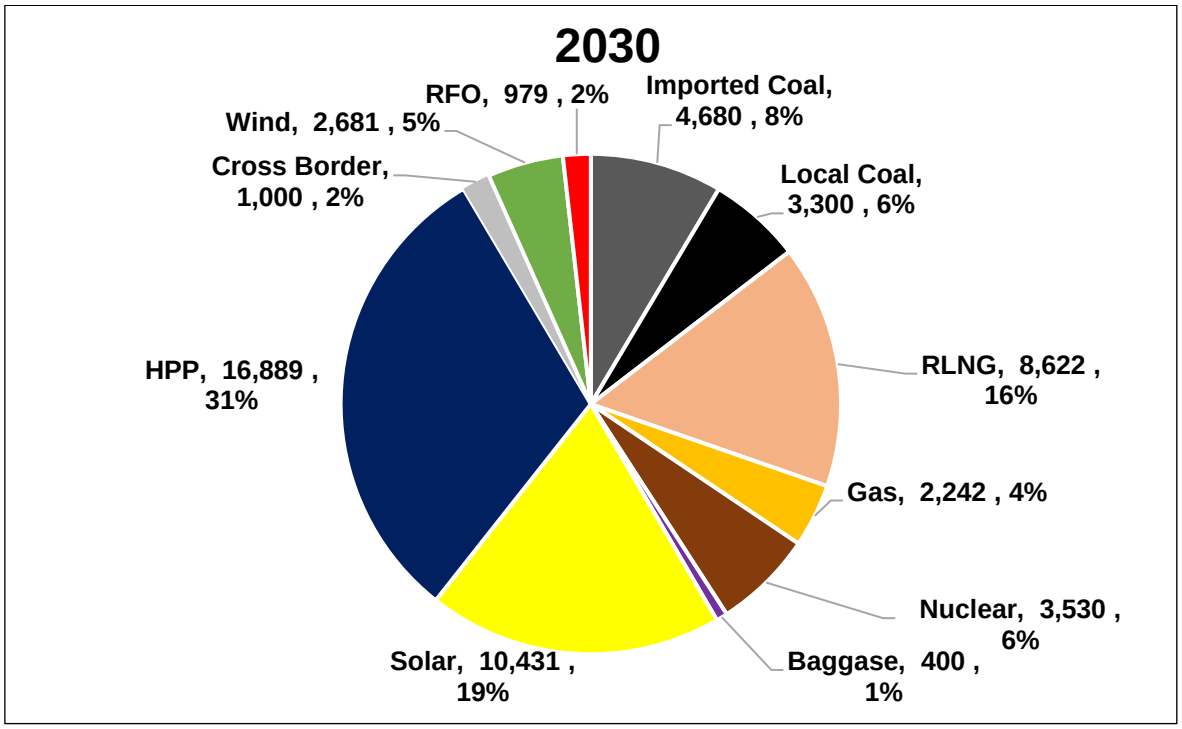


Chart K-5: IGCEP Generation Mix 2030 (MW)

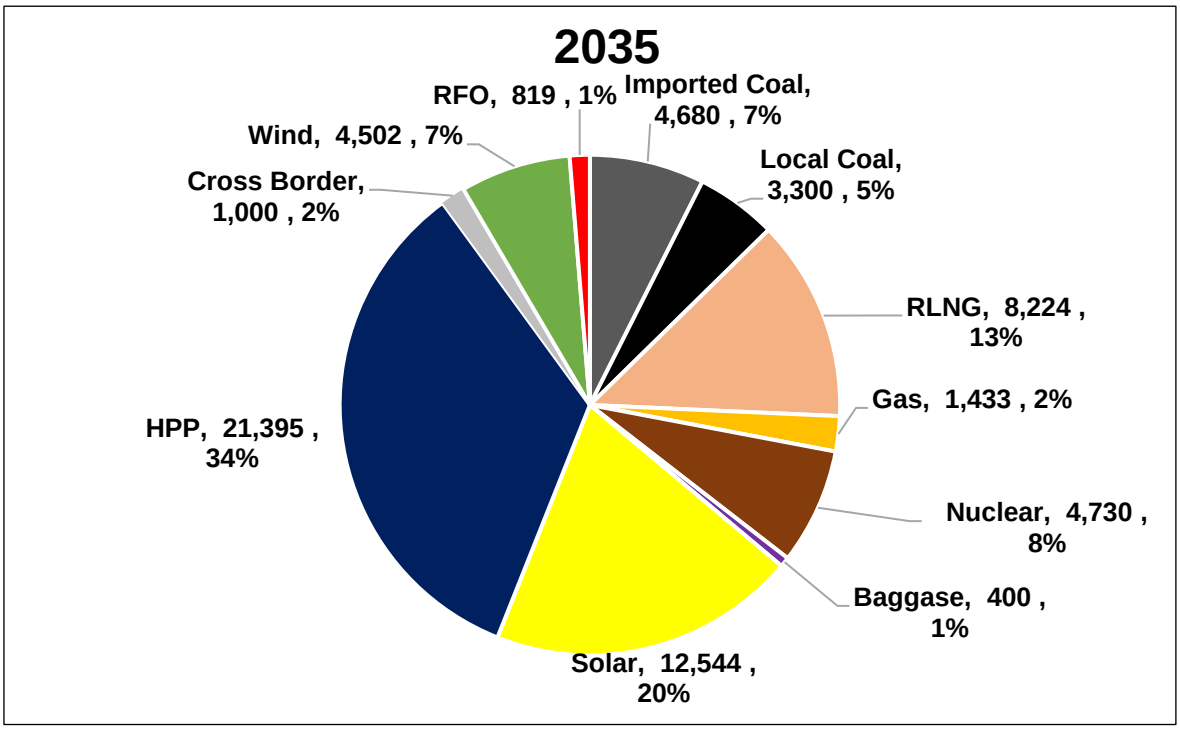


Chart K-6: IGCEP Generation Mix 2035 (MW)

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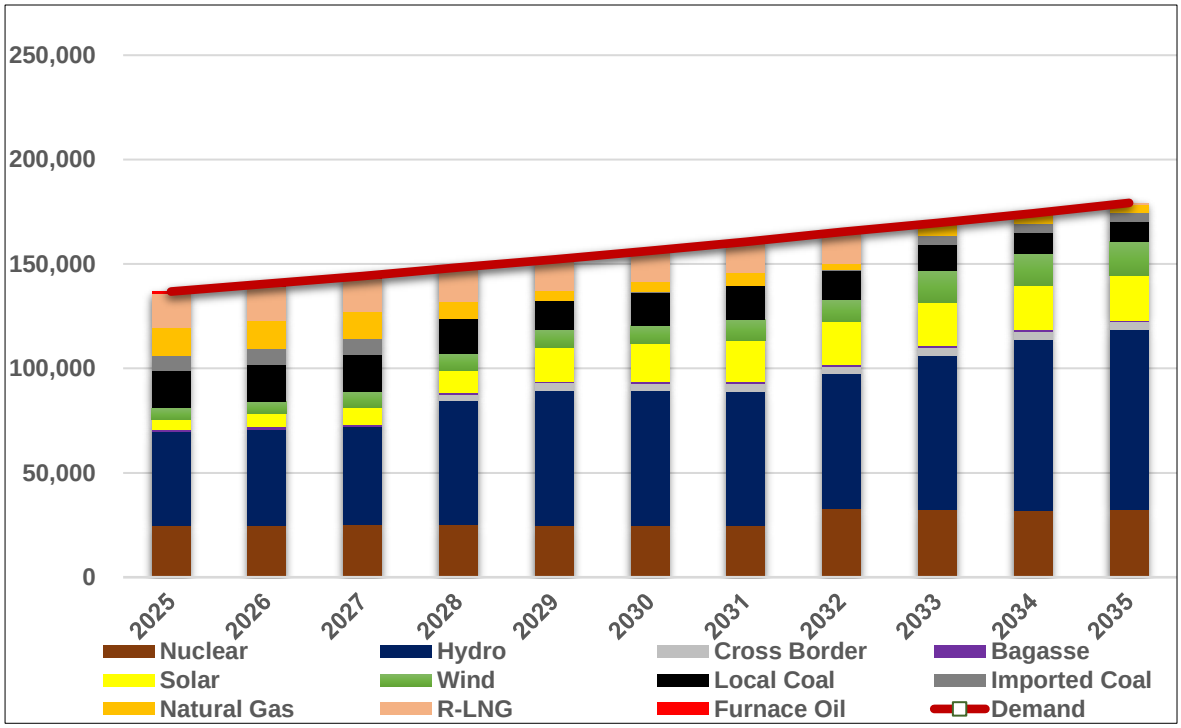
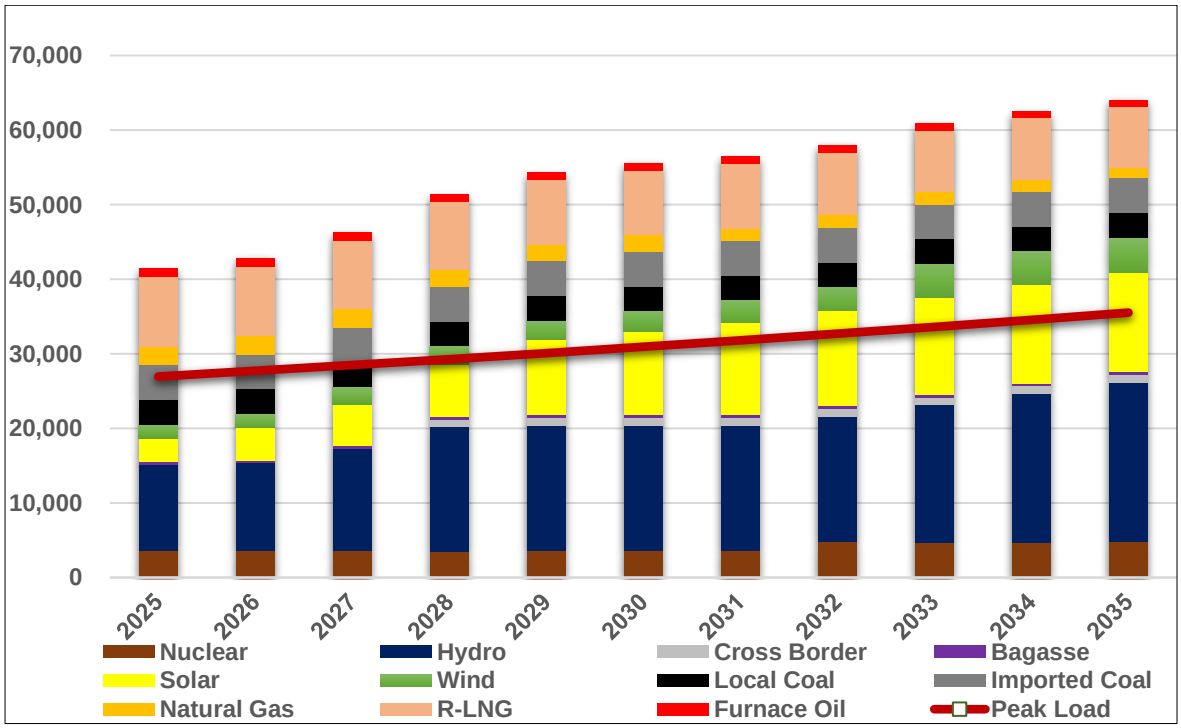
Annexure L. RCA with ACWA 1800 Solar

L-1.Annual Energy Generation Vs Annual Energy Demand (GWh) - Country



L-2.Installed Capacity Vs Peak Demand (MW) – Country



L-3.Optimized Generation Capacity Additions (MW)

Fiscal Year	Nuclear	HPP	Solar Utility MWp	Net Meter MW_p*	Wind NGC	Wind KE	Per Year Capacity Addition	Cumulative Capacity Addition
2025	-	-	-	2,400	-	-	2,400	2,400
2026	-	-	-	1,200	-	-	1,200	3,600
2027	-	-	-	900	-	400	1,300	4,900
2028	-	-	-	800	-	100	900	5,800
2029	-	-	1,800	700	-	-	2,500	8,300
2030	-	-	-	600	-	-	600	8,900
2031	-	-	-	500	-	281	781	9,681
2032	1,200	-	-	400	-	119	1,719	11,400
2033	-	1,505	-	300	1,233	100	3,138	14,538
2034	-	1,500	-	200	-	-	1,700	16,238
2035	-	1,500	-	120	-	200	1,820	18,058
Total	**1,200**	**4,505**	**1,800**	**8,120**	**1,233**	**1,200**	**18,058**	

**Net Metering is Committed*

L-4.List of Projects uptill 2035 (Committed + Optimized)

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
2024-25							
1	Lawi	Hydro	69	69	GoKPK	Committed	May-25
2	Jagran-II	Hydro	48	48	AJK-HEB	Committed	May-25
3	Koto	Hydro	40.8	40.8	GoKPK	Committed	May-25
4	Jabori	Hydro	10.2	10.2	GoKPK	Committed	May-25
5	Chamfall	Hydro	3.22	3.22	AJK-HEB	Committed	May-25
6	Karora	Hydro	11.8	11.8	GoKPK	Committed	May-25
7	Riali-II (U#1)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
8	Riali-II (U#2)	Hydro	3.5	3.5	PPIB	Committed	Jun-25
9	Kurram Tangi	Hydro	18	18	WAPDA	Committed	Jun-25
10	Net Meter	PV	2400	2400	NGC	Committed	Jul-24
Generation Additions in 2024-25 (MW)			**2,608**	**2,608**			
Cumulative Addition up till 2025 (MW)			**2,608**	**2,608**			
2025-26							
11	Gorkin Matiltan	Hydro	84	84	GoKPK	Committed	Aug-25
12	Nardagian	Hydro	3.22	3.22	AJK-HEB	Committed	Dec-25
13	Mangla Refurshbiment (U#1&2)	Hydro	70	70	WAPDA	Committed	Feb-26
14	Net Meter	PV	1200	1200	NGC	Committed	Jul-25
Generation Additions in 2025-26 (MW)			**1,357**	**1,357**			
Cumulative Addition up till 2026 (MW)			**3,965**	**3,965**			
2026-27							
15	Tarbela_Ext_5 (U#1)	Hydro	510	510	WAPDA	Committed	Sep-26
16	Tarbela_Ext_5 (U#2)	Hydro	510	510	WAPDA	Committed	Nov-26
17	Tarbela_Ext_5 (U#3)	Hydro	510	510	WAPDA	Committed	Dec-26
18	Dasu (U#1)	Hydro	360	360	WAPDA	Committed	May-27
19	Mangla Refurshbiment (U#9&10)	Hydro	70	70	WAPDA	Committed	Jun-27
20	Net Meter	PV	900	900	NGC	Committed	Jul-26
21	PV_Market	PV	301.9	301.9	Market	Committed	Jul-26
22	Wind_Market	Wind	49.2	49.2	Market	Committed	Jul-26
23	KE_New_Wind	Wind	400	400	KE	Optimised	Jul-26
Generation Additions in 2026-27 (MW)			**3,611**	**3,611**			
Cumulative Addition up till 2027 (MW)			**7,576**	**7,576**			
2027-28							
24	Dasu (U#2)	Hydro	360	360	WAPDA	Committed	Jul-27
25	CASA	Hydro	1000	1000	NGC	Committed	Aug-27
26	Dasu (U#3)	Hydro	360	360	WAPDA	Committed	Aug-27
27	Dasu (U#4)	Hydro	360	360	WAPDA	Committed	Nov-27
28	Mohmand Dam (U#1)	Hydro	200	200	WAPDA	Committed	Nov-27
29	Balakot	Hydro	300	300	GoKPK	Committed	Dec-27
30	Mohmand Dam (U#2)	Hydro	200	200	WAPDA	Committed	Dec-27

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
31	Mohmand Dam (U#3)	Hydro	200	200	WAPDA	Committed	Jan-28
32	Dasu (U#5)	Hydro	360	360	WAPDA	Committed	Feb-28
33	Mohmand Dam (U#4)	Hydro	200	200	WAPDA	Committed	Mar-28
34	Dasu (U#6)	Hydro	360	360	WAPDA	Committed	May-28
35	Net Meter	PV	800	800	NGC	Committed	Jul-27
36	PV_Market	PV	593.1	593.1	Market	Committed	Jul-27
37	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-27
38	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-27
Generation Additions in 2027-28 (MW)			**5,490**	**5,490**			
Cumulative Addition up till 2028 (MW)			**13,066**	**13,066**			
2028-29							
39	Mangla Refurshbiment (U#7&8)	Hydro	30	30	WAPDA	Committed	Aug-28
40	Net Meter	PV	700	700	NGC	Committed	Jul-28
41	PV_Market	PV	593	593	Market	Committed	Jul-28
42	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-28
44	PV_SIFC_1800	PV	1800	1800	SIFC	Committed	Jul-28
Generation Additions in 2028-29 (MW)			**3,220**	**3,220**			
Cumulative Addition up till 2029 (MW)			**16,286**	**16,286**			
2029-30							
43	Net Meter	PV	600	600	NGC	Committed	Jul-29
44	PV_Market	PV	593.1	593.1	Market	Committed	Jul-29
45	Wind_Market	Wind	96.6	96.6	Market	Committed	Jul-29
Generation Additions in 2029-30 (MW)			**1289.7**	**1289.7**			
Cumulative Addition up till 2030 (MW)			**17,575**	**17,575**			
2030-31							
47	Net Meter	PV	500	500	NGC	Committed	Jul-30
48	PV_Market	PV	593.1	593.1	Market	Committed	Jul-30
49	Wind_Market	Wind	96.7	96.7	Market	Committed	Jul-30
50	KE_New_Wind	Wind	281	281	KE	Optimised	Jul-30
Generation Additions in 2030-31 (MW)			**1,471**	**1,471**			
Cumulative Addition up till 2031 (MW)			**19,046**	**19,046**			
2031-32							
54	Net Meter	PV	400	400	NGC	Committed	Jul-31
55	C-5	Nuclear	1200	1117	PAEC	Optimized	Jul-31
56	KE_New_Wind	Wind	119	119	KE	Optimised	Jul-31
Generation Additions in 2031-32 (MW)			**1,719**	**1,636**			
Cumulative Addition up till 2032 (MW)			**20,765**	**20,682**			
2032-33							
53	Net Meter	PV	300	300	NGC	Committed	Jul-32
54	Diamer Bhasha (U#1-4)	Hydro	1500	1500	WAPDA	Optimized	Jul-32
55	KE_New_Wind	Wind	100	100	KE	Optimised	Jul-32
56	New_Wind	Wind	1233	1233	NGC	Optimised	Jul-32

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	CoD
57	Batdara	Hydro	Hydro	5.2	5.2	AJK-HEB	Optimized
Generation Additions in 2032-33 (MW)			**3,133**	**3,138**			
Cumulative Addition up till 2033 (MW)			**23,898**	**23,820**			
2033-34							
58	Net Meter	PV	200	200	NGC	Committed	Jul-33
59	Diamer Bhasha (U#5-8)	Hydro	1500	1500	WAPDA	Optimized	Jul-33
Generation Additions in 2033-34 (MW)			**1,700**	**1,700**			
Cumulative Addition up till 2034 (MW)			**25,598**	**25,520**			
2034-35							
61	Net Meter	PV	120	120	NGC	Committed	Jul-34
62	Diamer Bhasha (U#9-12)	Hydro	1500	1500	WAPDA	Optimized	Jul-34
63	KE_New_Wind	Wind	200	200	KE	Optimised	Jul-34
Generation Additions in 2034-35 (MW)			**1,820**	**1,820**			
Cumulative Addition up till 2035 (MW)			**27,418**	**27,340**			

L-5.Annual Capacity Factors (%age)

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
1	Almoiz	Bagasse	26.17	26.25	26.17	26.17	26.17	26.25	26.17	26.17	26.17
2	Chanar	Bagasse	35.97	36.09	35.97	35.97	35.97	36.09	35.97	35.97	35.97
3	Chiniot	Bagasse	41.44	41.58	41.44	41.44	41.44	41.58	41.44	41.44	41.44
4	Fatima	Bagasse	5.81	0.00	0.00	0.03	0.10	0.10	1.01	1.09	0.15
5	Hamza	Bagasse	41.63	41.77	41.63	41.63	41.63	41.77	41.63	41.63	41.63
6	JDW-II	Bagasse	42.19	42.33	42.19	42.19	42.19	42.33	42.19	42.19	42.19
7	JDW-III	Bagasse	42.26	42.40	42.26	42.26	42.26	42.40	42.26	42.26	42.26
8	New_Bagasse	Bagasse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Ryk_Mills	Bagasse	31.52	31.62	31.52	31.52	31.52	31.62	31.52	31.52	31.52
10	Shahtaj	Bagasse	32.64	32.75	32.64	32.64	32.64	32.75	32.64	32.64	32.64
11	Thal_Layyah	Bagasse	40.89	41.02	40.89	40.89	40.89	41.02	40.89	40.89	40.89
12	Appolo	PV	18.73	18.69	17.99	17.69	16.73	17.17	16.90	17.57	17.80
13	Atlas_Solar(Zhenfa)	PV	18.36	18.19	17.62	17.43	16.37	16.56	16.28	17.38	17.40
14	Best	PV	18.57	18.53	17.99	17.47	16.82	16.84	16.62	17.34	17.47
15	Crest	PV	18.82	18.78	18.02	17.66	17.17	17.11	16.63	17.62	17.79
16	Helios	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
17	HNDS	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
18	Meridian	PV	22.03	22.00	22.03	22.03	22.03	22.00	22.03	22.03	22.03
19	Net_Meter_8000	PV	16.71	16.70	16.66	16.62	16.65	16.67	16.58	16.62	16.61
20	New_Solar_North/Center	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	New_Solar_South	PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	PV_SIFC_1800	PV	0.00	0.00	22.87	22.80	22.12	22.37	22.40	22.57	22.88
23	PV_Market	PV	21.01	20.98	21.01	21.01	21.01	20.98	21.01	21.01	21.01
24	QA_Solar	PV	17.22	17.18	16.68	15.94	15.52	15.53	15.22	15.85	16.19
25	Gharo	KE_PV	22.03	21.82	21.35	21.12	20.03	20.25	19.73	20.28	20.89
26	KE_New_Solar	KE_PV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Oursun	KE_PV	20.96	20.91	20.50	20.37	19.45	19.71	19.19	19.70	20.11
28	Act	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
29	Act_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
30	Artistic_wind	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
31	Artistic_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
32	Dawood	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
33	Din	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
34	FFC	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
35	FWEL-I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
36	FWEL-II	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
37	Gul Ahmed	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
38	Gul_Electric	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
39	Hawa	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
40	Hybrid_NGC	Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	Indus_Energy	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
42	Jhimpir	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
43	Lakeside	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
44	Liberty_Wind_1	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
45	Liberty_Wind_2	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
46	Master	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
47	Master_Green	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
48	Metro_Power	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
49	Metro_Wind	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
50	NASDA	Wind	38.93	38.88	38.93	38.93	38.93	38.88	38.93	38.93	38.93
51	New_Wind	Wind	0.00	0.00	0.00	0.00	0.00	0.00	41.98	41.98	41.98
52	Sachal	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
53	Sapphire_Wind	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
54	Tenaga	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
55	Three_Gorges_I	Wind	31.99	31.94	31.99	31.99	31.99	31.94	31.99	31.99	31.99
56	Three_Gorges_II	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
57	Three_Gorges_III	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
58	Tricom	Wind	37.94	37.89	37.94	37.94	37.94	37.89	37.94	37.94	37.94
59	Tricon_A	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
60	Tricon_B	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
61	Tricon_C	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
62	UEP	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
63	Wind_Market	Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
64	Yunus	Wind	30.99	30.95	30.99	30.99	30.99	30.95	30.99	30.99	30.99
65	Zephyr	Wind	34.86	34.82	34.86	34.86	34.86	34.82	34.86	34.86	34.86
66	Zorlu_Wind	Wind	31.99	31.80	31.49	31.07	30.86	30.92	30.79	30.96	31.07
67	Hybrid_KE	KE_Wind	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68	KE_New_Wind	KE_Wind	41.98	41.92	41.98	41.98	41.98	41.92	41.98	41.98	41.98
69	CASA	Interconnection	0.00	36.42	41.88	41.85	41.85	41.73	41.81	41.81	41.84
70	Balkani	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	Batdara	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	40.97	39.42	37.12
72	Daral Khwar-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	Ghail	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	Jhing-II	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	Nandihar	Hydro Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	Arkari Gol	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	Artistic-I	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	Artistic-II	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	Ashkot	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	Asrit Kedam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
81	Athmuqam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	Azad Pattan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	Bankhwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	Bata Kundi	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	Chakoti Hatian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	CJ	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	Dowarian	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	Gabral Kalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	Gabral Utror	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	Gumat Nar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	Harigehl-Majeedgala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	Jagran-III	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	Jagran-IV	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
94	Kaigah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	Kalam Asrit	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
96	Keyal Khwar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
97	Kohala	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	Lower Spat Gah	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99	Luat	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	Madyan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	Mahl	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Mastuj	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Nagdar	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	Naran	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Nila Da Katha	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
106	Qadirabad	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
107	Rajdhani	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
108	Shalfalam	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
109	Sharmai	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	Shigo Kas	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	Shounter	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112	Soan	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	Taunsa	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
114	Turtonas Uzghor	HPP Candidate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	Allai Khwar	Hydro Existing	44.43	44.31	44.02	43.70	42.97	43.23	42.63	43.68	43.70
116	Chashma	Hydro Existing	48.91	48.78	48.91	48.91	48.71	48.62	48.71	48.91	48.91
117	Daral Khwar	Hydro Existing	38.77	38.66	38.76	38.77	38.77	38.66	38.77	38.77	38.77
118	Dubair Khwar	Hydro Existing	54.44	54.22	53.77	53.29	52.47	52.57	52.37	52.36	53.49
119	Ghazi Brotha	Hydro Existing	52.78	52.63	52.78	52.78	52.78	52.63	52.78	52.78	52.78
120	Golen Gol	Hydro Existing	9.15	9.12	9.07	9.07	9.07	9.05	8.85	8.23	8.23
121	Gulpur	Hydro Existing	28.92	28.84	28.92	28.92	28.92	28.84	28.92	28.92	28.92

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
122	Jagran-I	Hydro Existing	49.49	49.35	49.40	49.40	49.40	49.17	48.26	46.83	45.55
123	Jinnah	Hydro Existing	25.74	25.67	25.74	25.74	25.74	25.67	25.74	25.74	25.74
124	Karot	Hydro Existing	45.37	45.36	45.39	45.32	45.30	45.17	45.26	45.34	45.35
125	Khan Khwar	Hydro Existing	40.22	40.11	40.04	39.76	39.21	39.38	39.21	39.76	39.76
126	Malakand-III	Hydro Existing	54.04	53.89	50.14	51.13	51.10	48.29	44.85	43.56	41.66
127	Mangla	Hydro Existing	62.49	61.50	54.95	54.32	54.20	54.16	54.17	54.32	54.32
128	Neelum Jehlum	Hydro Existing	53.48	53.30	53.45	53.41	53.40	53.23	53.39	53.38	53.41
129	New Bong	Hydro Existing	55.49	55.34	55.41	55.13	55.12	54.98	55.09	55.13	55.13
130	Patrind	Hydro Existing	43.76	43.64	43.76	42.89	42.80	42.68	42.80	42.13	43.49
131	Small Hydro	Hydro Existing	45.59	45.46	45.59	45.28	45.28	45.15	45.28	45.20	45.51
132	Suki Kinari	Hydro Existing	51.17	51.03	51.03	50.91	50.48	50.50	50.48	50.72	51.03
133	Tarbela 1-14	Hydro Existing	38.23	38.13	38.23	38.23	38.23	38.13	38.23	38.23	38.23
134	Tarbela_Ext_4	Hydro Existing	30.33	30.25	30.33	30.33	30.33	30.25	30.33	30.33	30.33
135	Warsak	Hydro Existing	50.63	50.49	50.63	50.63	50.63	50.49	50.63	50.63	50.63
136	Engro_Qadirpur	CCGT_Gas	28.01	14.87	6.03	4.77	11.55	4.46	9.06	7.45	4.12
137	Foundation	CCGT_Gas	76.27	53.66	53.66	53.66	53.66	53.66	53.65	53.66	53.65
138	Guddu-V (747)	CCGT_Gas	78.47	47.86	1.28	3.70	40.70	5.01	34.22	22.86	23.24
139	Liberty	CCGT_Gas	37.54	9.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	Uch	CCGT_Gas	67.90	38.00	38.00	38.00	9.50	0.00	0.00	0.00	0.00
141	Uch-II	CCGT_Gas	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70	55.70
142	SNPC-I	KE_CCGT_Gas	69.38	34.11	3.21	7.31	9.62	7.69	26.24	24.80	23.39
143	SNPC-II	KE_CCGT_Gas	71.92	37.05	3.34	7.82	10.13	8.49	31.54	25.43	23.68
144	AGL	DG_RFO	14.23	14.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	HuB N	DG_RFO	15.06	15.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	Kohinoor	DG_RFO	13.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	Liberty Tech	DG_RFO	14.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
148	Nishat C	DG_RFO	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	Nishat P	DG_RFO	12.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	GAEL	KE_DG_RFO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
151	NEW OCGT_North/Center	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
152	NEW OCGT_South	OCGT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	C-1	Nuclear	90.00	90.24	89.60	89.54	89.51	89.44	88.47	87.42	88.33
154	C-2	Nuclear	90.00	90.24	89.65	89.54	89.51	89.40	88.46	87.42	88.33
155	C-3	Nuclear	90.00	90.23	89.60	89.56	89.53	89.41	88.48	87.49	87.08
156	C-4	Nuclear	90.00	90.23	89.61	89.56	89.53	89.41	88.48	87.49	87.61
157	C-5	Nuclear	0.00	0.00	0.00	0.00	0.00	84.55	80.15	82.09	83.80
158	K-2	Nuclear	85.07	85.29	84.61	84.39	84.34	84.10	83.01	81.46	83.11
159	K-3	Nuclear	85.07	85.29	84.62	84.39	84.34	84.12	82.96	81.79	82.99
160	NEW_Nuclear_North/Center	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	NEW_Nuclear_South	Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
162	Engro Thar	Local Coal	85.44	82.80	79.38	79.04	77.45	74.99	66.76	44.24	37.43
163	Lucky	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
164	NEW_L.Coal 330	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	NEW_L.Coal 660	Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	Thal Nova	Local Coal	84.54	81.22	77.25	76.28	76.06	72.21	63.58	29.27	29.63
167	Thar TEL	Local Coal	84.49	81.21	77.58	76.55	76.38	72.43	63.81	35.20	29.72
168	Thar-I (SSRL)	Local Coal	84.92	74.55	55.46	72.40	72.58	59.44	48.09	56.33	54.22
169	K.E_NEW_L.Coal 330	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	K.E_NEW_L.Coal 660	KE_Local Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
171	China HUBCO	Imported Coal	46.69	0.61	0.43	0.97	3.01	3.35	17.89	17.78	16.49
172	Gwadar	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
173	Jamshoro Coal	Imported Coal	1.09	0.00	0.00	0.27	0.32	0.27	10.64	7.40	11.51
174	Jamshoro Coal 2	Imported Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	Port Qasim	Imported Coal	18.70	0.23	0.11	0.23	0.48	0.72	9.28	10.22	8.26
176	Sahiwal Coal	Imported Coal	0.85	0.00	0.00	0.00	0.06	0.15	8.69	6.80	8.58
177	FPCL	KE_Imported Coal	21.87	23.54	2.31	2.58	2.36	2.37	8.24	8.56	7.74
178	Altern	Gas Engine_RLNG	0.19	0.86	3.38	4.23	4.51	0.00	0.00	0.00	0.00
179	Balloki	CCGT_RLNG	38.75	33.92	15.45	20.24	38.51	18.90	0.37	0.24	0.09
180	Bhikki	CCGT_RLNG	14.30	20.62	39.54	42.37	18.21	38.02	0.07	0.00	0.00
181	FKPCL	CCGT_RLNG	12.24	12.63	3.52	4.42	4.71	3.51	0.00	0.00	0.00
182	Halmore	CCGT_RLNG	13.20	3.31	4.55	5.56	6.78	8.13	0.00	0.00	0.00
183	Haveli	CCGT_RLNG	61.98	61.63	77.72	65.33	70.00	66.95	5.24	4.76	3.68
184	KAPCO 495	CCGT_RLNG	25.24	25.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185	Nandipur	CCGT_RLNG	0.29	1.76	4.44	5.70	4.97	7.73	0.00	0.00	0.00
186	NEW_CCGT_North/Center	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	NEW_CCGT_South	CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
188	Orient	CCGT_RLNG	13.20	3.47	5.30	7.27	7.35	8.54	0.00	0.00	0.00
189	Saif	CCGT_RLNG	12.89	13.82	3.71	4.84	5.92	6.48	0.00	0.00	0.00
190	Saphire	CCGT_RLNG	13.13	2.76	3.93	4.95	6.16	6.79	0.00	0.00	0.00
191	Trimmu	CCGT_RLNG	5.24	9.21	7.78	10.56	10.84	12.22	2.48	1.45	1.25
192	BQPS2	KE_CCGT_RLNG	4.29	4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
193	BQPS3	KE_CCGT_RLNG	14.22	14.64	0.28	0.61	0.41	0.53	0.76	0.99	0.84
194	KCCPP	KE_CCGT_RLNG	0.27	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195	KTGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	SGTPS	KE_CCGT_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	BQPS1-U5	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
198	BQPS1-U6	KE_ST_RLNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Balakot	Hydro_Committed	0.00	36.84	41.96	41.93	41.93	41.81	41.96	41.96	41.96
200	Chamfall	Hydro_Committed	47.77	47.88	48.01	48.01	48.01	47.88	48.01	48.01	48.01
201	Dasu	Hydro_Committed	99.00	69.82	64.47	64.51	64.51	64.25	64.18	64.10	63.87

#	Plant Name	Fuel	27	28	29	30	31	32	33	34	35
			%								
202	Diamer Bhasha	Hydro_Committed	0.00	0.00	0.00	0.00	0.00	0.00	75.33	66.89	55.70
203	Gorkin Matiltan	Hydro_Committed	44.70	44.37	43.24	42.52	42.10	42.33	42.10	41.40	42.83
204	Jabori	Hydro_Committed	82.38	82.23	82.35	82.35	82.25	82.20	82.19	82.17	82.27
205	Jagran-II	Hydro_Committed	50.98	51.08	48.96	48.96	48.96	48.69	47.27	46.72	44.93
206	Karora	Hydro_Committed	71.09	71.77	70.28	69.12	68.49	68.82	67.24	67.90	68.97
207	Koto	Hydro_Committed	58.36	58.59	57.43	56.36	55.60	55.90	55.11	54.98	56.54
208	Kurram Tangi	Hydro_Committed	17.05	17.01	17.05	17.05	17.05	17.01	16.93	16.91	16.93
209	Lawi	Hydro_Committed	48.20	48.84	48.75	48.62	48.14	48.22	48.03	48.09	48.36
210	Mohmand Dam	Hydro_Committed	0.00	56.74	41.95	41.92	41.92	40.87	40.13	40.21	39.96
211	Nardagian	Hydro_Committed	48.25	48.37	48.50	48.50	48.50	48.37	48.50	48.50	48.50
212	Riali-II	Hydro_Committed	54.66	54.64	54.79	54.79	54.79	54.63	54.74	54.57	54.61
213	Tarbela_Ext_5	Hydro_Committed	5.39	10.02	10.05	10.05	10.05	10.02	10.05	10.05	10.05

L-6.Year-wise Installed Capacity Addition (MW)

Year	Net Capacity Addition Over the Plan Period (2025-35)										
	Local Coal	Hydro	RLNG	Nuclear	Imported Coal	RE	Natural Gas	Furnace Oil	Cross Border	Net Yearly Addition	Cumulative Total
	MW										
Nov-24	3,300	11,564	9,327	3,530	4,680	5,392	2,477	1,246	-	-	41,516
2025	-	53	-	-	-	0	-	-136	-	-83	41,433
2026	-	182	-	-	-	1,200	-	-	-	1,382	42,815
2027	-	1,960	-210	-	-	1,651	-	-	-	3,401	46,216
2028	-	2,900	-	-	-	1,590	-235	-131	1,000	5,124	51,340
2029	-	230	-495	-	-	3,190	-	-	-	2,925	54,265
2030	-	-	-	-	-	1,290	-	-	-	1,290	55,554
2031	-	-	-	-	-	1,471	-586	-	-	885	56,439
2032	-	-	-188	1,200	-	519	-	-	-	1,531	57,970
2033	-	1,505	-210	-	-	1,633	-	-	-	2,928	60,898
2034	-	1,500	-	-	-	200	-	-160	-	1,540	62,438
2035	-	1,500	-	-	-	320	-223	-	-	1,597	64,035
Total	**3,300**	**21,395**	**8,224**	**4,730**	**4,680**	**18,455**	**1,433**	**819**	**1,000**	**64,035**	

L-7.IGCEP Generation Mix 2025-2035 (GWh)

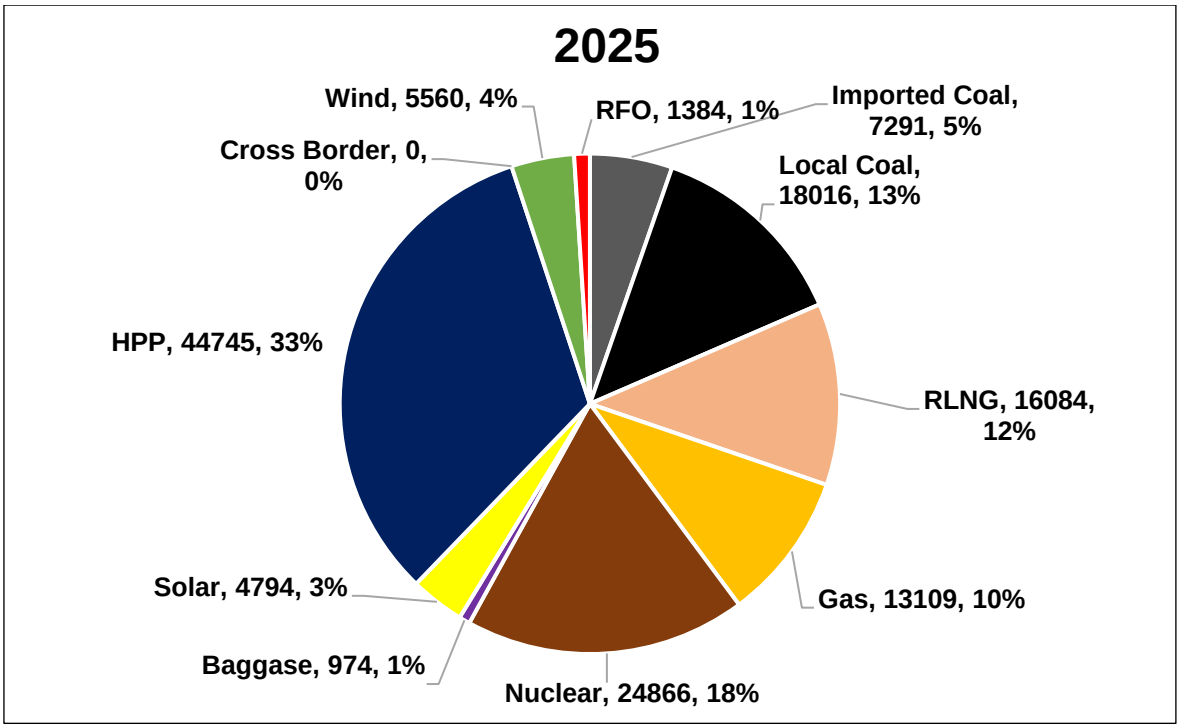


Chart L-1: IGCEP Generation Mix 2025 (GWh)

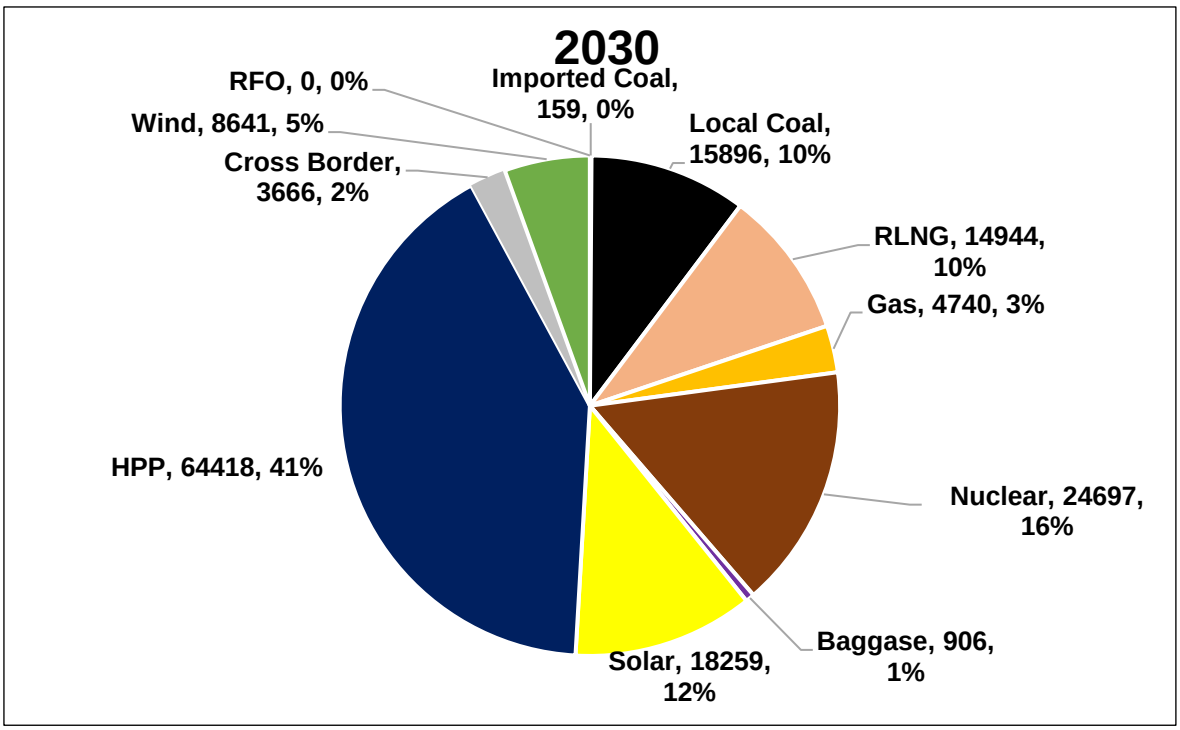


Chart L-2: IGCEP Generation Mix 2030 (GWh)

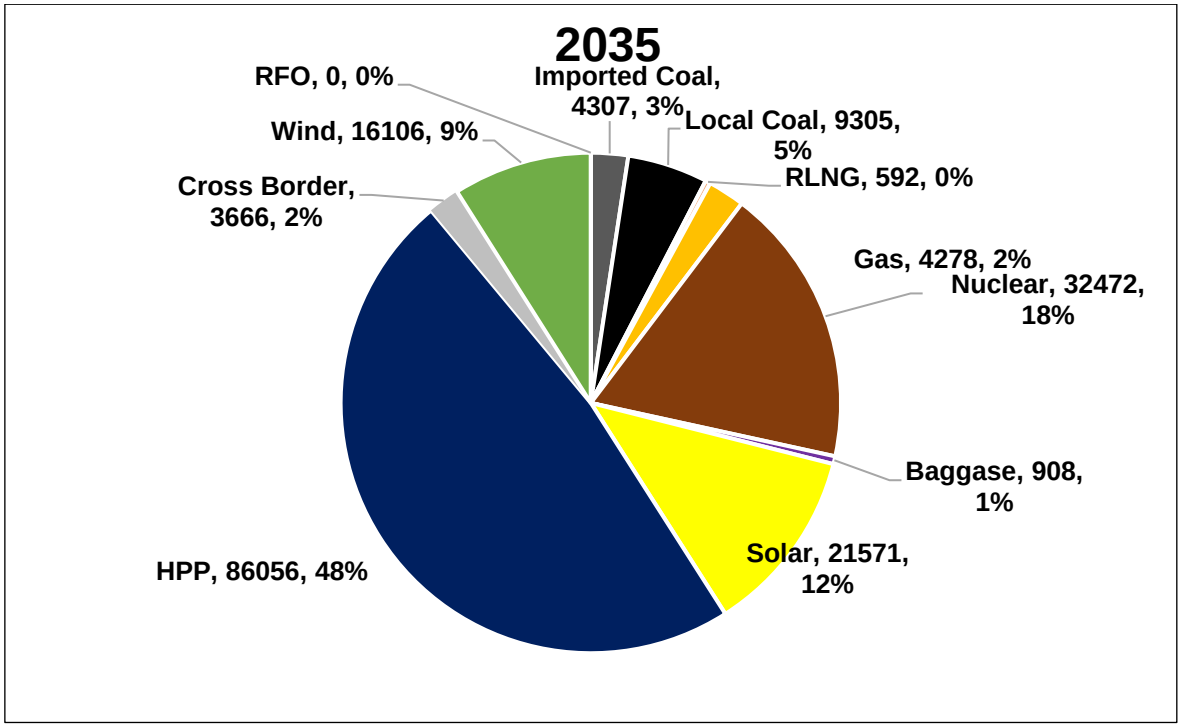


Chart L-3: IGCEP Generation Mix 2035 (GWh)

L-8.IGCEP Generation Mix 2025-35 (MW)

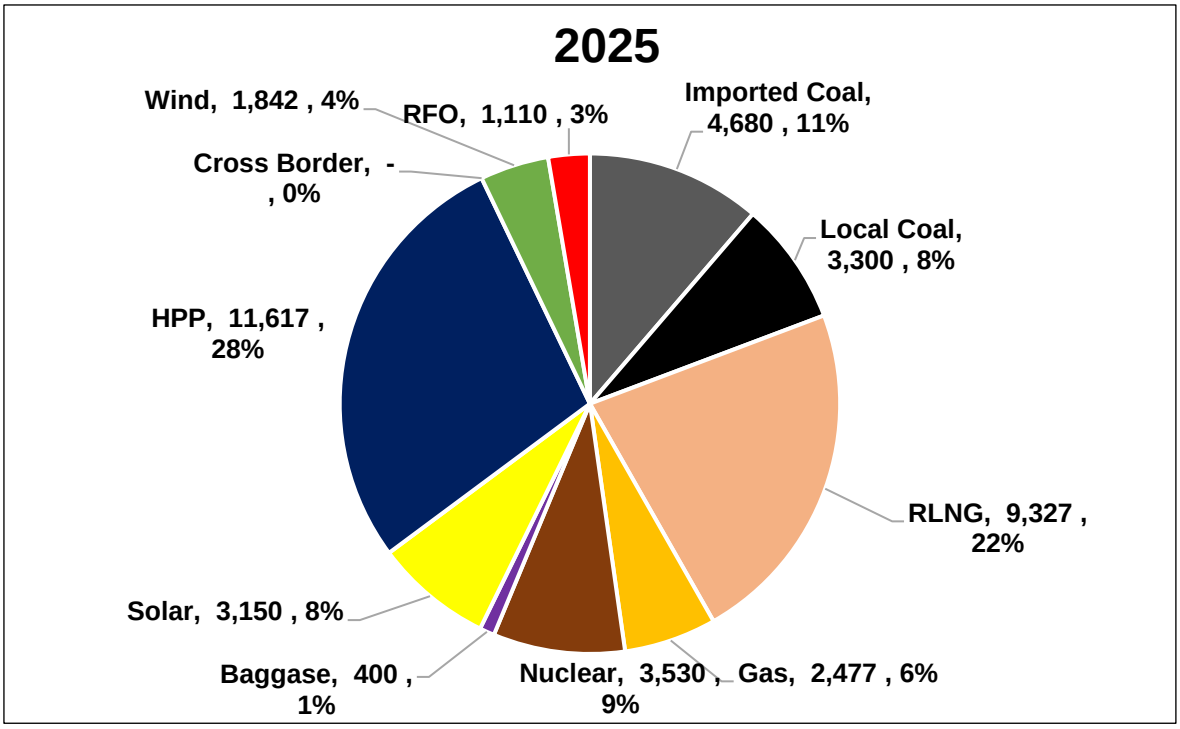


Chart L-4: IGCEP Generation Mix 2025 (MW)

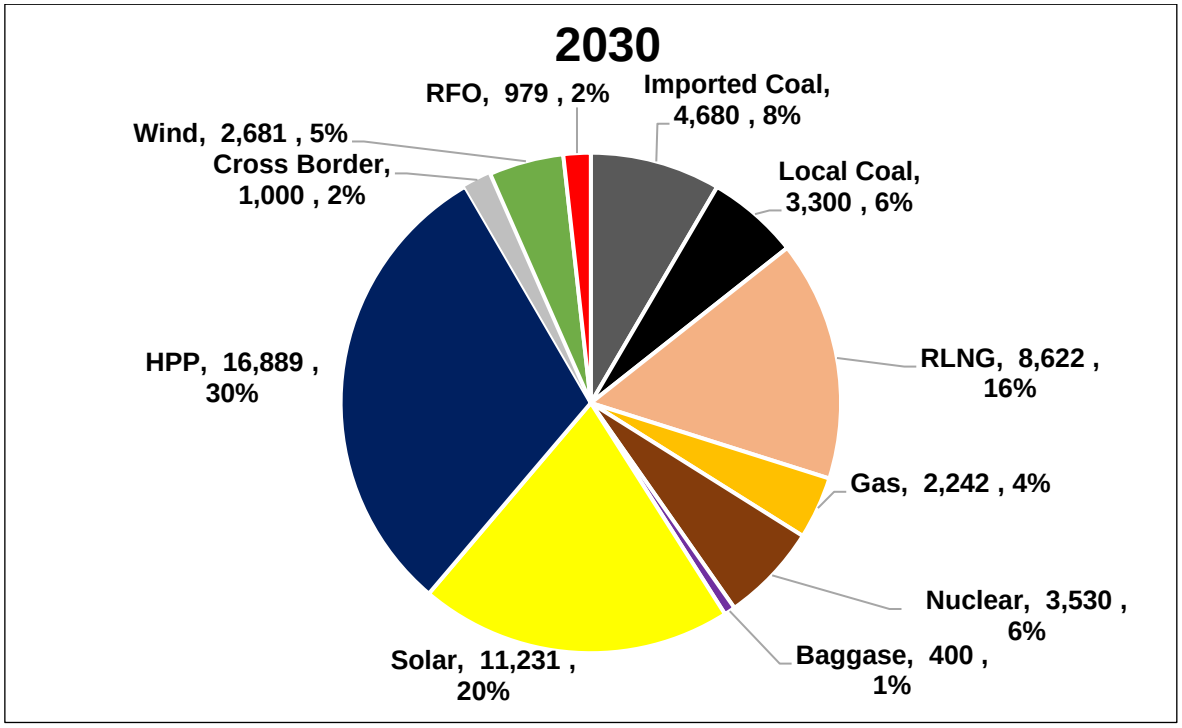


Chart L-5: IGCEP Generation Mix 2030 (MW)

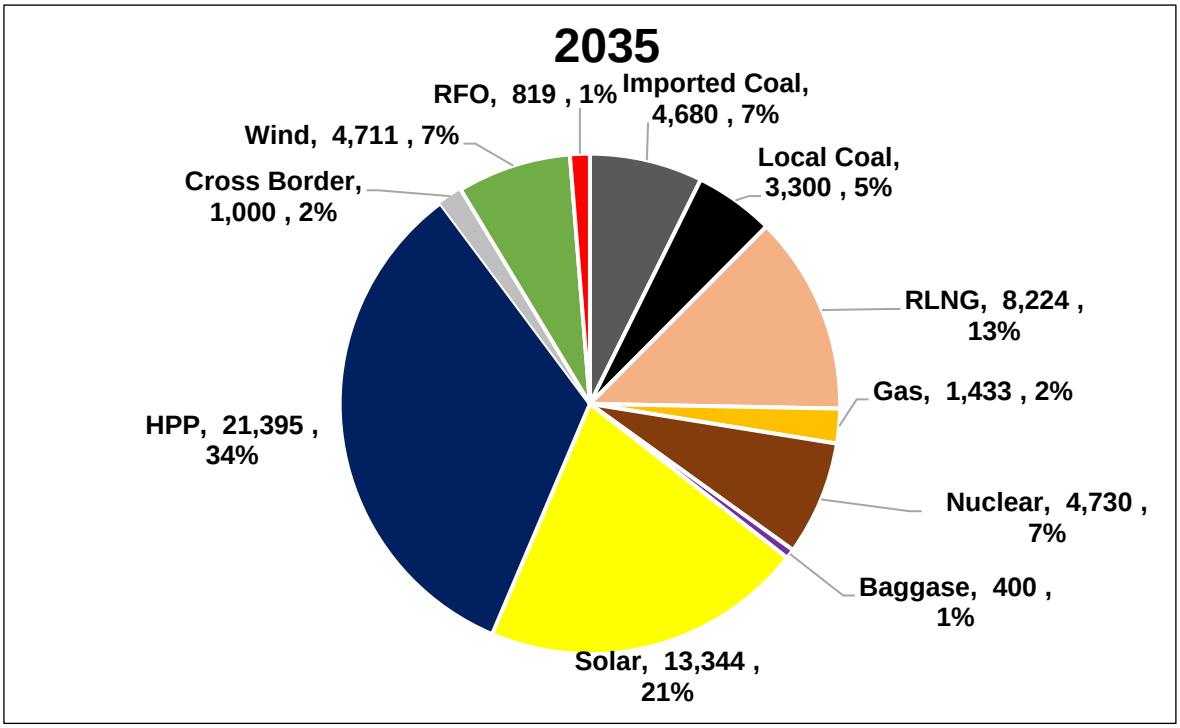


Chart L-6: IGCEP Generation Mix 2035 (MW)

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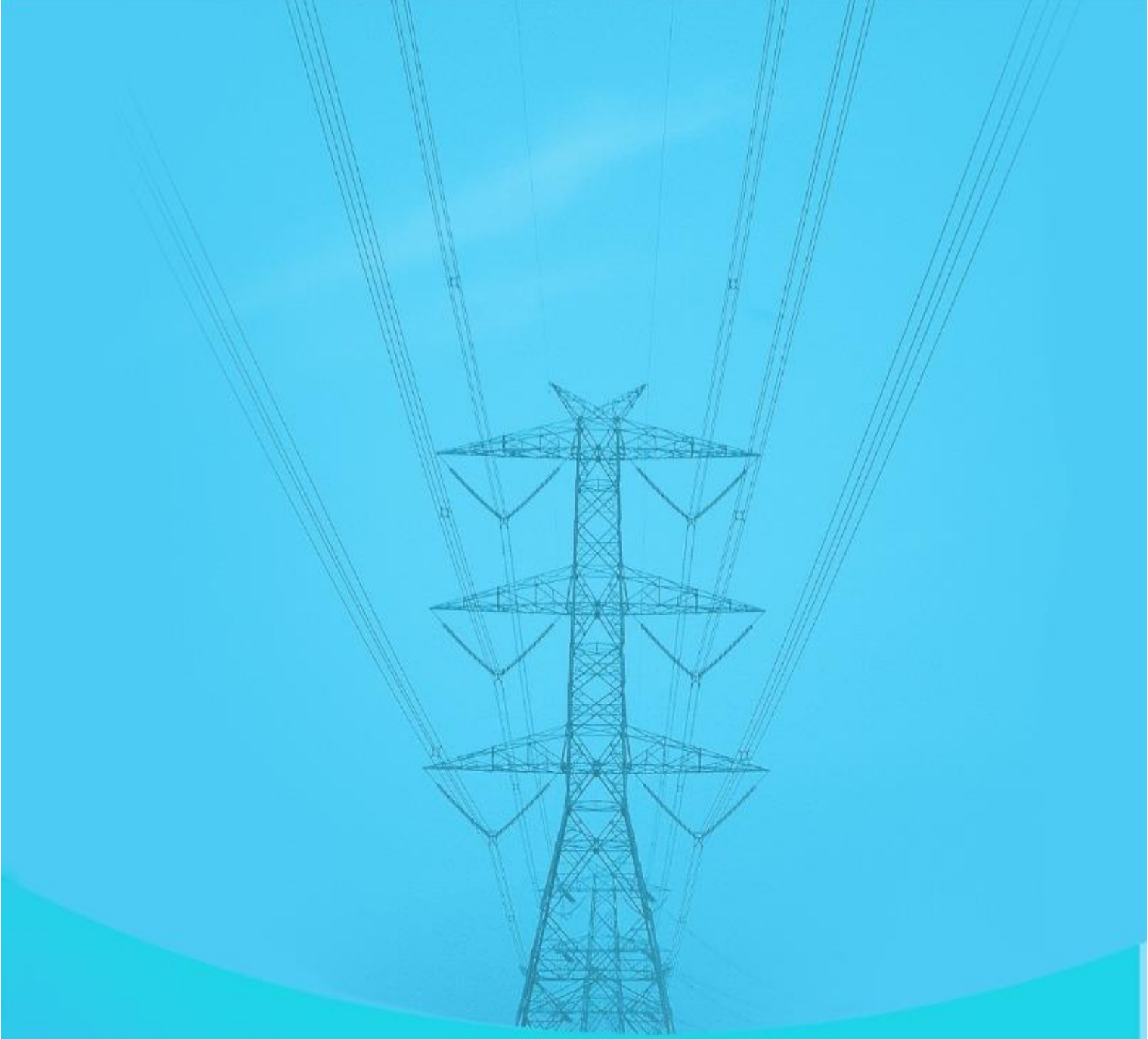

About ISMO

The Independent System & Market Operator of Pakistan (ISMO) is a State - owned Enterprise (S O E) established by the Government of Pakistan. ISMO holds the vision of leading the sustainable energy future of Pakistan. ISMO performs three core functions vital to Pakistan's energy future: System Operations, Long-Term Generation and Transmission Planning, and Competitive Electricity Market Operations. As Pakistan advances toward a resilient and modern energy system, ISMO is central to sectoral reform.

Executive Director (Planning) ISMO, Pitras Bukhari Road, H-8/I, Islamabad