

PRIVATE POWER & INFRASTRUCTURE BOARD

PAKISTAN COUNTRY PRESENTATION



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- Overview of Pakistan Power Sector
- PPIB Role in Power Sector
- PPIB Functions and Mandate
- Future Energy Mix as per IGCEP 2025-35
- Pakistan renewable power ecosystem
- Policy evolution: from incentives to competitive procurement
- Pakistan renewable power project experience
- Financial modelling framework for renewable IPPs
- Pakistan Experience - Transferable lessons for SAARC

Installed Generation Capacity

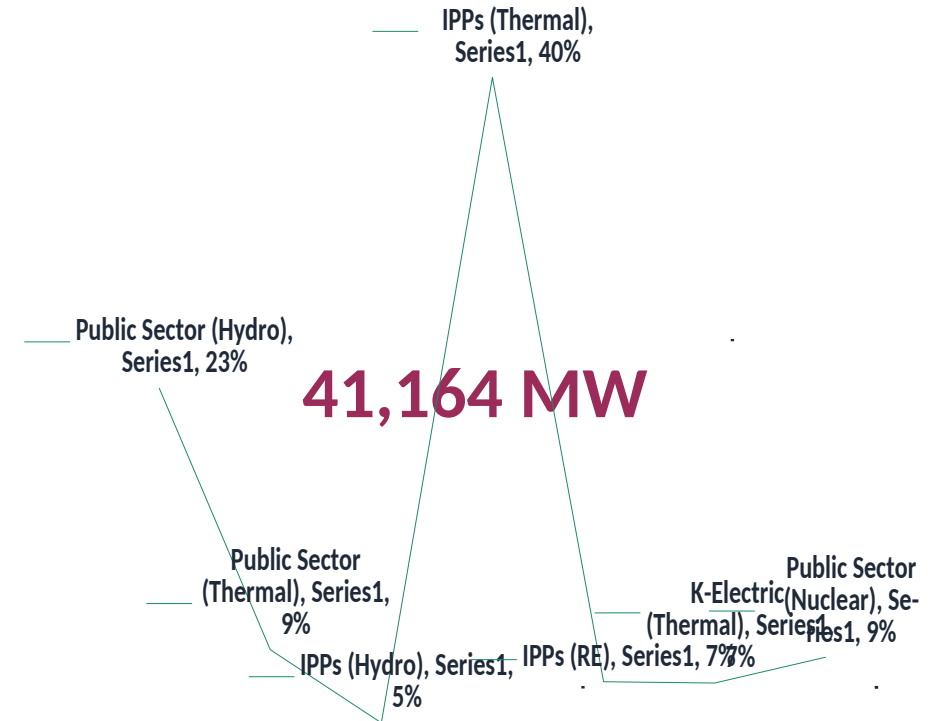
Public Sector - MW		Private Sector - MW	
Hydro:	9,619 (23%)	Hydro IPPs:	2,084 (5%)
Thermal:	3,727 (9%)	Thermal IPPs:	16,339 (40%)
Nuclear:	3,530 (9%)	RE incl. KE:	2,884 (7%)
		KE (Oil/Gas):	2,981 (7%)
Total (Public)	16,876 (41%)	Total (Private)	24,288 (59%)
NTDC System	38,083 MW	K-Electric	3,081 MW

Total Generation Capacity: 41,164 MW

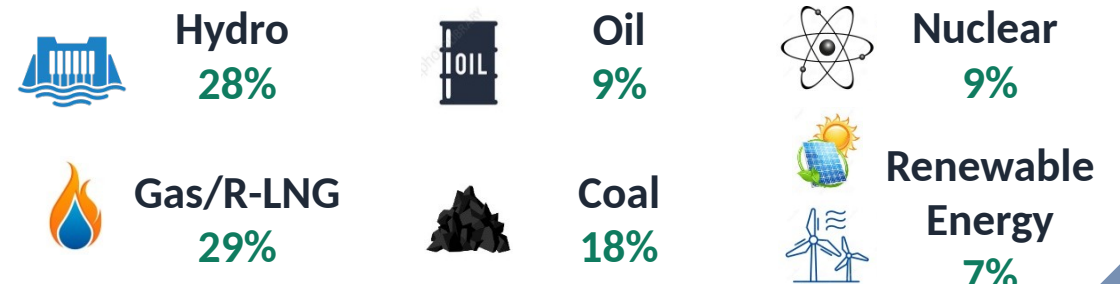
Capacities exclude 2,463 MW recently shut down IPPs

Transmission Capacity – NTDC Network

High Voltage AC				High Voltage DC			
Voltage Level	No. of Grid Stations	Length (km)	Capacity (MVA)	Voltage Level	No. of Converter Stations	Length (km)	Capacity (MW)
500 kV	19	8,825	25,950	±660 kV	2	886	4,000
220 kV	50	11,633	37,190				
	69	20,458	63,140		2	886	4,000



Fuel Mix:



PPIB ROLE IN POWER SECTOR

**ONE-WINDOW
FACILITATOR**
on behalf of GoP to
promote, encourage,
facilitate and safeguard
private investment

COORDINATION
with
public and private sector
stakeholders



POLICY
Assist in policy
formulation

Policy implementation

**INDEPENDENT AUCTION
ADMINISTRATOR**
Support competitive
procurement of generation
capacity and facilitate
execution of security-
package documents

1994 - Created through
a notification

2012 - Statutory Status
Private Power and
Infrastructure Board Act

2015 - Role Expanded to
Public Sector Projects in
IPP mode

2023 - AEDB merged
with PPIB, through PPIB
Amendment Act 2022

2024 - Registered
with NEPRA as IAA



PPIB FUNCTIONS AND MANDATE (1/2)

One Stop Organization:

On behalf of GoP to promote, encourage, facilitate and safeguard private investment in power sector

Power Policies:

- Recommends and facilitates development of Power Policies
- Implementation of Power Policies

Coordination:

- Provincial / Local Governments and Regulatory Bodies in implementation of power policies
- Acts as Agent - Projects in GB and AJ&K
- Work in close coordination with power sector entities
- Liaising with local and international banks and multilateral agencies

Project Development:

- Development of IPPs and Transmission Projects in private - public private partnership – specified public sectors

Certifications:

- Certification of Installers of Solar and Wind Projects

National Strategy for RE Utilization & Monitoring

- Development of national strategy and plans for ARE utilization
- Evaluation of proposals and monitoring of ARE
- Create awareness and motivation among general public for ARE projects
- Technical & Financial Evaluation of Concepts & Technologies
- Legislative proposals to enforce installation of equipment utilizing ARE
- Coordination for commercial application of ARE technology
- Interaction with international and national agencies for promotion and development of ARE

Off-grid electrification:

- Assistance in development / implementation of plans with authorities for off-grid electrification



PPIB FUNCTIONS AND MANDATE (2/2)

Conduct of Feasibility Studies and Surveys

- To conduct feasibility studies to identify opportunities for power generation and other applications through conventional & ARE resources

Setting up of ARE Projects for Awareness

- To set up alternate or renewable energy projects on its own or joint venture with public / private entities for awareness and benefit of the general public

Security Agreements

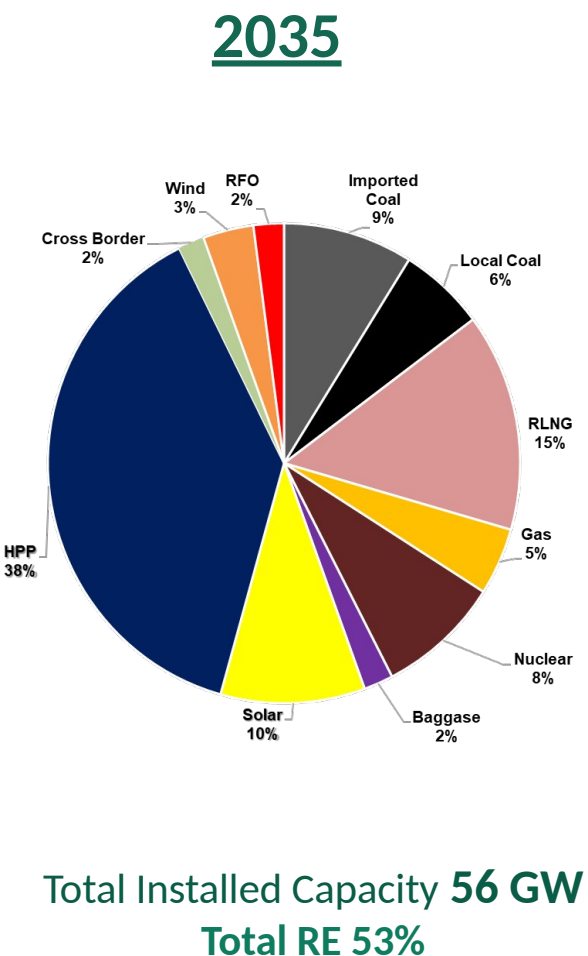
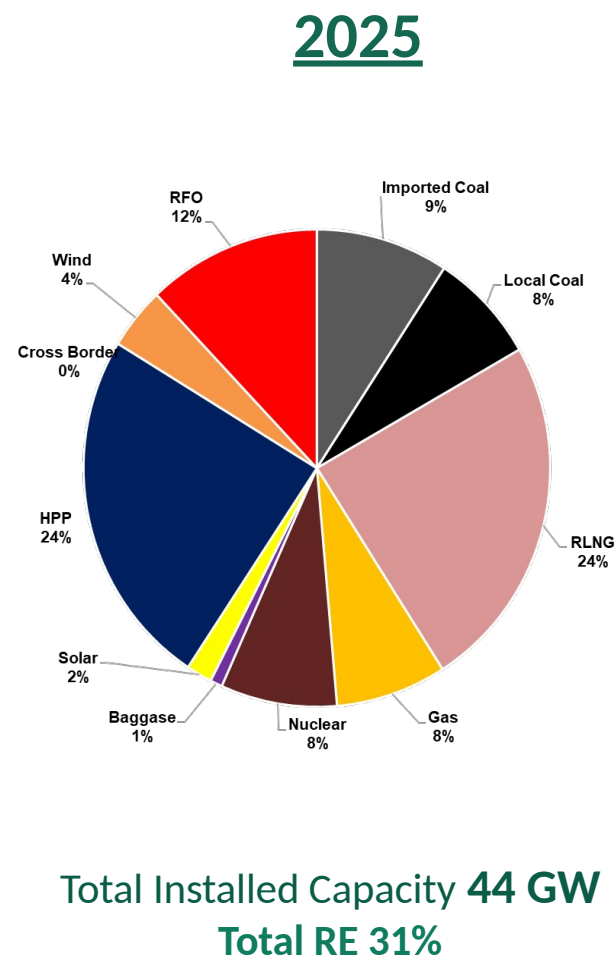
- Draft, negotiate and sign Security Package Documents
- Guarantee contractual obligations of entities
- Execute, administer and monitor contracts
- Commence, conduct, continue and terminate litigation, arbitration or alternate dispute resolution mechanisms

Independent Auction Administrator (IAA):

- Act as IAA under CTBCM

FUTURE ENERGY MIX (Based on IGCEP 2025 - 2035)

Fuel	2025		2035	
Hydro	24%	10,690	38%	21,485
Solar PV	2%	750	10%	5,539
Wind	4%	1,842	3%	1,942
Bagasse	1%	368	2%	1,130
RFO	12%	5,273	2%	1,165
RLNG	24%	10,596	15%	8,238
Gas	8%	3,359	5%	2,538
Nuclear	8%	3,530	8%	4,730
Local Coal	8%	3,300	6%	3,300
Imported Coal	9%	4,020	9%	4,980
Cross Border	0%	-	2%	1,000



Note: IGCEP figures are planning-scenario values; actual additions will depend on system requirements, procurement, financing, grid readiness and policy decisions.

PPIB's PORTFOLIO – COMMISSIONED GENERATION & TRANSMISSION PROJECTS

	Number of Projects	Capacity (MW)	Investment (Mln US\$)
Project prior to 1994 Power Policy	1	1,292	1,608
Projects under 1994 Power Policy	15	3,101	3,490
Project Privatized from Public Sector	1	1,638	1,583
Project under 1995 Hydel Policy	1	84	215
Projects under 2002 Power Policy	17	4,787	7,610
Projects under 2015 Power Policy	12	12,156	13,849
IPPs (Hydropower and Conventional Fuels)	47	23,058	28,355
RE Projects under 2006 & 2013 Policy	54	2,784	4,891
Transmission Project under 2015 TL Policy	1	4,000	1,658
TOTAL	101+1	25,842 + 4,000	34,904



IPPs Latest Tariff on Various Technologies

Particulars	RFO	GAS BASED	RLNG BASED	HYDRO	IMPORTED COAL	THAR COAL	WIND	SOLAR	BAGASS
Project Name	Nishat Power	Foundation Power	Bhikki Power Project	Karot HPP	PORT QASIM	THAR ENERGY	FFC ENERGY	APPOLO SOLAR	JDW SUGAR MILLS
Size	200 MW	170 MW	1320 MW	720 MW	1320 MW	330 MW	50 MW	100 MW	26.60 MW
Energy Purchase Price Rs/kWh	48.888	10.801	18.450	0.793	15.891	6.927	-	-	-
Capacity Purchase Price Rs/kw/h	3.7658	2.3716	2.865	12.546	9.8341	11.341	-	-	-
Total Tariff Rs/kWh	52.6538	13.1726	21.398	13.339	25.725	18.268	14.37	19.879	15.173
Total Tariff US Cents/kWh	18.805	4.705	7.691	4.764	9.188	6.524	5.132	7.100	5.419

Pakistan renewable power ecosystem

Who does what — and where the financial model fits

Policy / planning / facilitation

Ministry of Energy (Power Division): policy direction

PPIB: facilitation and implementation support under applicable power policies

Provincial / local authorities: land, permits and local interfaces

ISMO / planning entities: integrated generation & transmission planning

Regulation / market / revenue

NEPRA: generation licensing and tariff / regulatory decisions

ISMO / relevant market & agency arrangements: market operation and legacy contractual interfaces

National Grid / system entities: system operation, interconnection and transmission

Lenders & sponsors: financial close, debt/equity and risk allocation

Policy evolution: from incentives to competitive procurement

Stage	Policy / approach	Financial-modelling implication
2006	RE Policy 2006 – early wind/solar market development	Cost-plus / upfront structures; higher policy support
2019	Alternative & Renewable Energy Policy 2019	Competitive procurement, wider technology scope, distributed generation
2021+	National Electricity Policy / planning framework	Least-cost planning, system integration and market evolution
2025–26	Greater emphasis on competitive renewable procurement and grid integration	Bid discipline, merchant/contracted risk and transmission constraints become more important

Pakistan's renewable project experience

Illustrative PPIB portfolio

Technology / example	Capacity	Commercial structure / modelling lesson
Solar PV – commissioned portfolio	680 MW PPIB commissioned portfolio	Yield, degradation, CAPEX, FX and tariff indexation are core drivers
Wind – commissioned portfolio	1,845.47 MW PPIB commissioned portfolio	Wind resource / P50-P90, capacity factor, availability and curtailment matter
Hydropower – commissioned portfolio including CPEC	Lariab 84MW, Patrind 140 MW, Gulpure 100MW, Karot 720 MW; Suki Kinari 884 MW	Long-tenor debt, hydrology, construction risk and sovereign / contractual support
Upcoming solar / wind examples	PPIB portfolio includes new 100 MW solar and 50 MW wind projects	Current projects increasingly depend on competitive pricing and system planning

Pakistan case example: wind IPP economics

Item	Illustrative PPIB project data	Modelling relevance
Gross capacity	50 MW	Installed capacity input
Net capacity factor	~38%	Primary generation driver
Debt / equity	80:20	Financing structure
Project cost	~US\$63.9m	CAPEX / debt sizing
Contract term	25 years	Revenue horizon
Reference tariff	~US¢4.78/kWh	Revenue / bid-price benchmark
Financial close	2019	Demonstrates full project-finance cycle

Financial Model Architecture for Renewable IPPs

Pakistan case may translated into a framework applicable across SAARC

1. Technical assumptions

Resource → P50/P90 yield → capacity factor → availability → degradation → curtailment

2. CAPEX & development

EPC / equipment → development costs → IDC → contingencies → replacement CAPEX

3. Revenue

PPA / bid price → generation profile → indexation → FX treatment → market exposure

4. OPEX & taxes

Fixed + variable O&M → insurance → land → taxes / duties → working capital

5. Financing

Debt/equity → drawdown → interest → tenor → debt servicing → refinancing

6. Returns & decision metrics

Project IRR / Equity IRR → ROE → ROEDC → sensitivities → downside cases

Recent direction: competitive renewable procurement

- I. Pakistan is moving toward competitive procurement and market-based arrangements, alongside NEPRA's regulatory and tariff functions.
- II. The transition from cost-plus / upfront tariff structures to competitive procurement changes the financial modeller's task from cost justification to bid-bankability and downside resilience.
- III. The modeller's role shifts from proving a cost-plus tariff to determining the minimum sustainable bid price consistent with financing and risk.
- IV. Bid strategy must therefore integrate technical assumptions, financing terms, taxes and contingencies.

Pakistan Experience: Transferable Lessons for SAARC

The objective is knowledge sharing; each country should adapt the framework to its own market, regulation and resource conditions

Resource first

Start with bankable resource assessment and energy-yield assumptions before setting a tariff or bid price.

Risk allocation

Allocate construction, resource, FX, offtake, curtailment and change-in-law risks to the party best able to manage them.

Market design

Move from administrative price setting toward transparent procurement and clearly defined contractual / market exposure.

Financing discipline

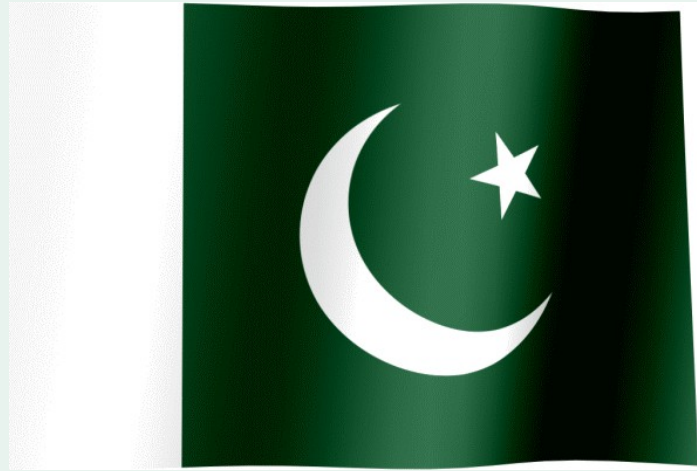
Size debt from cash flow and DSCR; test downside cases before finalizing leverage.

Grid readiness

Transmission availability, interconnection and curtailment are financial-model variables other than the other engineering issues.

Model governance

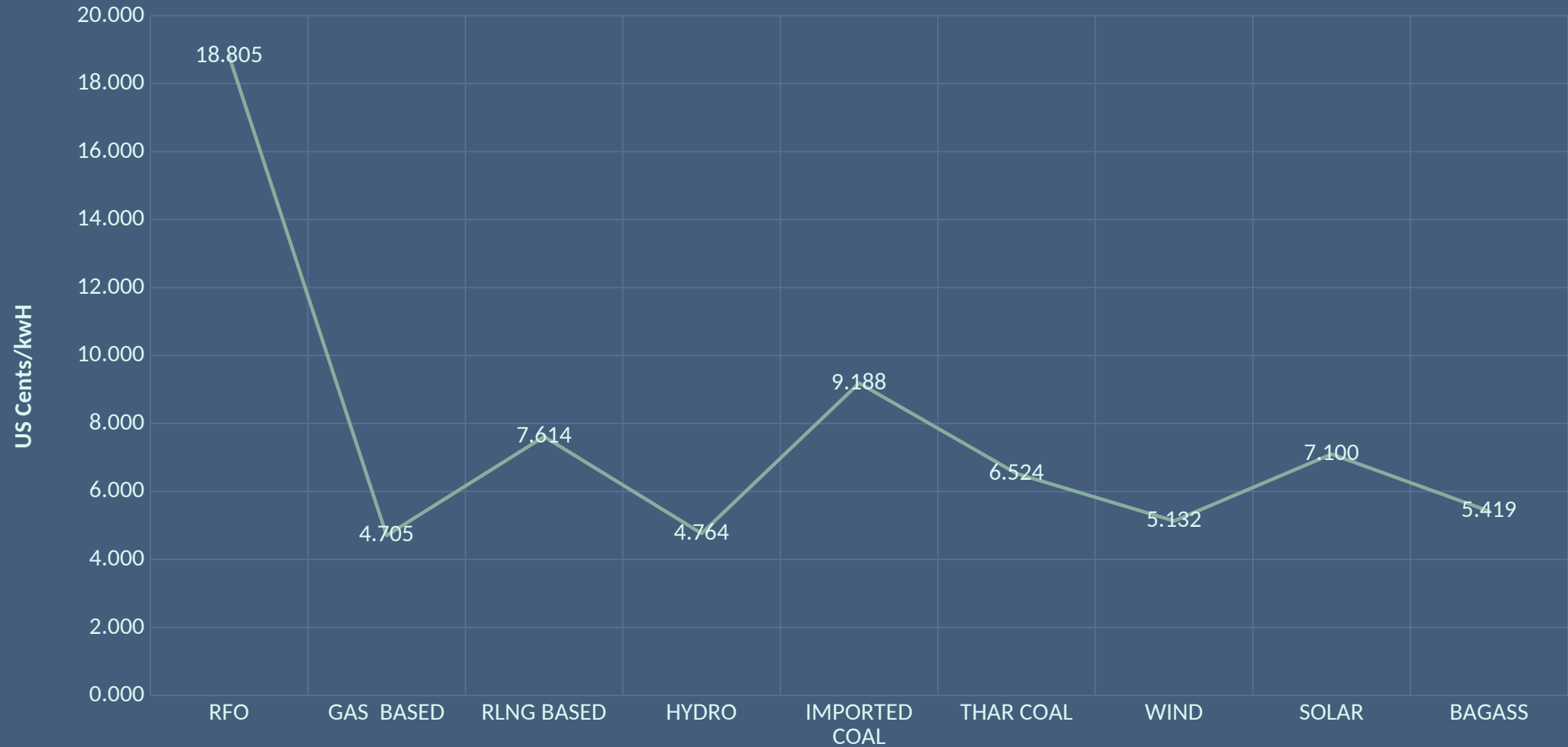
Maintain one auditable model linking assumptions, contracts, calculations, outputs and sensitivities.



THANK YOU



IPPs Tariff on Various Technologies





KEY INCENTIVES UNDER RENEWABLE ENERGY POWER POLICIES

Key Incentives	RE Policy 2006	ARE Policy 2019
Tax & Import Benefits	• Customs duty & sales tax exemption on machinery /equipment/spares • Income tax, turnover tax & withholding tax exemption	• Import duty exemption • Corporate income tax exemption
Foreign Investment	• Free repatriation of equity & dividends • Non-residents allowed to invest in securities	• 100% foreign equity permitted • Repatriation of dividends & disinvestment proceeds • Foreign currency accounts permitted
Financing & Capital Markets	• Local & foreign financing permitted • Corporate bonds & discounted shares allowed • Foreign banks permitted to underwrite shares/bonds	-
Investor / Project Protection	• Zakat exemption for non-Muslims & non-residents on dividends • Independent rating agencies available	• Protection against change in law & expropriation • International dispute resolution • Market-tested contractual framework
Project Facilitation	-	• Project land to be made available by Provinces

A Success Story



47 IPPs - Hydro, Coal, Oil, Gas/R-LNG
23,058 MW



54 RE PPs - Wind, Solar, Bagasse
2,784 MW



56% share in Installed Capacity
1 HVDC TL of **4,000** MW Capability



US\$ 35 Billion FDI

- ✓ Pivotal role in Pakistan's Power Sector
- ✓ Attracted international investors and lenders
- ✓ Supported and coordinated with Stakeholders
- ✓ Active role in projects under CPEC & SIFC

101 Commissioned IPPs - 25, 842 MW

- **47 Conventional Fuel IPPs:** 
23,058 MW
 - 5 Hydro Projects - **1,937 MW**
 - 8 Coal Projects - **7,260 MW**
 - 18 Gas/R-LNG Projects - **8,228 MW**
 - 16 Oil Projects - **5,633 MW**
- **54 Renewable Energy IPPs:** 
2,784 MW
 - 36 Wind Projects - **1,845 MW**
 - 10 Solar Projects - **680 MW**
 - 8 Bagasse Projects - **259 MW**
- **First ever Private Sector TL:**
±660 kV HVDC, 886 km, 4,000 MW



COMMISSIONED IPPs (Conventional Fuels) & TL PROJECT (1/2)

S. No	Project	Capacity (MW)	Fuel / Technology	COD
Hydro				
1	New Bong Escape HPP	84	Hydro	Jul 2013
2	Patrind Hydro Power	147	Hydro	Nov 2017
3	Gulpur Hydropower Project	102	Hydro	Mar 2020
4	Karot Hydropower Project	720	Hydro	Jun 2022
5	Suki Kinari Hydropower Project	884	Hydro	Sep 2024
Total		1937		
Coal				
6	Engro PowerGen Thar Coal Project	660	Coal	Jul 2019
7	Lucky Electric Project	660	Coal	Mar 2022
8	Thar Energy Project	330	Coal	Oct 2022
9	Shanghai Electric, Thar Block-I (TCB-1)	1320	Coal	Feb 2023
10	Thar Coal Power Project, Thar Block-II	330	Coal	Feb 2023
Total		3300		
Imported Coal				
11	Sahiwal Imp Coal Project	1320	Imported Coal	Oct 2017

S. No	Project	Capacity (MW)	Fuel / Technology	COD
12	Port Qasim Project	1320	Imported Coal	Apr 2018
13	China Power Hub Project	1320	Imported Coal	Aug 2019
Total		3960		
Oil				
14	Kot Addu Power Company Limited (KAPCO)	1638	HSFO, Gas and HSD	Dec 1996
15	Hub Power Project	1292	RFO	Mar 1997
16	Tapal Energy Limited	120	RFO	Jun 1997
17	Kohinoor Energy Limited	131	RFO	Jun 1997
18	AES Lalpir Limited	362	RFO	Nov 1997
19	Gul Ahmed Energy Limited (GAEL)	136	RFO	Nov 1997
20	AES Pak Gen (Pvt) Limited	365	RFO	Feb 1998
21	Southern Electric Power company Limited	119	RFO	Jul 1999
22	Saba Power Company Limited	134	RFO	Dec 1999
23	Japan Power Generation (Pvt) Limited	120	RFO	Mar 2000
24	Attock Gen Limited	165	LSFO	Mar 2009
25	Atlas Power Limited	225	RFO	Dec 2000



COMMISSIONED IPPs (Conventional Fuels) & TL PROJECT (2/2)

S. No	Project	Capacity (MW)	Fuel / Technology	COD
26	Nishat Power Limited	200	RFO	Jun 2010
27	Nishat Chunian Limited	200	RFO	Jul 2010
28	Liberty Power Tech Limited	200	RFO	Jan 2011
29	Hub Power Project Narowal	220	RFO	Apr 2011
Total		5633		
Gas				
30	Habibullah Coastal Power (Pvt) Co	140	Gas	Sep 1999
31	Fauji Kabirwala Power Company	157	Gas	Oct 1999
32	Rousch (Pakistan) Power Limited	450	Gas	Dec 1999
33	Uch Power (Private) Limited	586	Low BTU Gas	Oct 2000
34	Liberty Power Project	235	Gas	Sep 2001
35	Altern Eney Limited	29	Gas	Sep 2008
36	Engro Energy Limited	227	Gas	Mar 2010
37	Saif Power Limited	229	Gas/HSD	Apr 2010
38	Orient Power Company Limited	229	Gas/HSD	May 2010
39	Sapphire Electric Company Limited	225	Gas/HSD	Oct 2010

S. No	Project	Capacity (MW)	Fuel / Technology	COD
40	Foundation Power Company (Dharki) Limited	185	Low BTU Gas	May 2011
41	Halmore Power generation Company Limited	225	Gas/HSD	Jun 2011
42	Davis Energen	10.5	Gas	Jul 2013
43	Uch-II Power (Private) Limited	404	Low BTU Gas	Apr 2014
Total		3331.5		
RLNG				
44	NPPMCL Haveli Bahadur Shah Project	1230	R-LNG	May 2018
45	QATPL Bhikki Project	1180	R-LNG	May 2018
46	NPPMCL Balloki Project	1223	R-LNG	Jul 2018
47	PTPL Trimmu Jhang Project	1263	R-LNG	Jun 2023
Total		4896		
HVDC				
1	±660 kV Matiari-Lahore HVDC Transmission Project	4000	HVDC	Sep 2021
G.Total		23,058 MW IPPs & 4,000 MW TL		

