

JICA Knowledge Co-Creation Program (Group & Region Focus)

Energy Policy

Country Report

PAKISTAN



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Alternative Energy Development Board

Government of Pakistan



Country Profile

Country Profile



Population: 212 million (5th)

Area: 796,000 sq km (33rd)

Capital: Islamabad

Provinces: 4

Literacy Rate: 57%

Neighbours: China, India, Iran, Afghanistan

Climate: Hot, dry, desert in south, arctic in North

Government: Federal Parliamentary
Constitutional republic

Currency: Pakistani Rupee
(1 US \$ = 120 Pak Rs.)



Economic Indicators

GDP:

Total: USD 304.4 billion

Per Capita: USD 1,641

GDP Rank: 42nd

Growth Rate: 5.79%

Exports: US \$ 22.003 (FY 2017)

Imports: US \$ 48.683 (FY 2017)

No. of households: 32,205,111

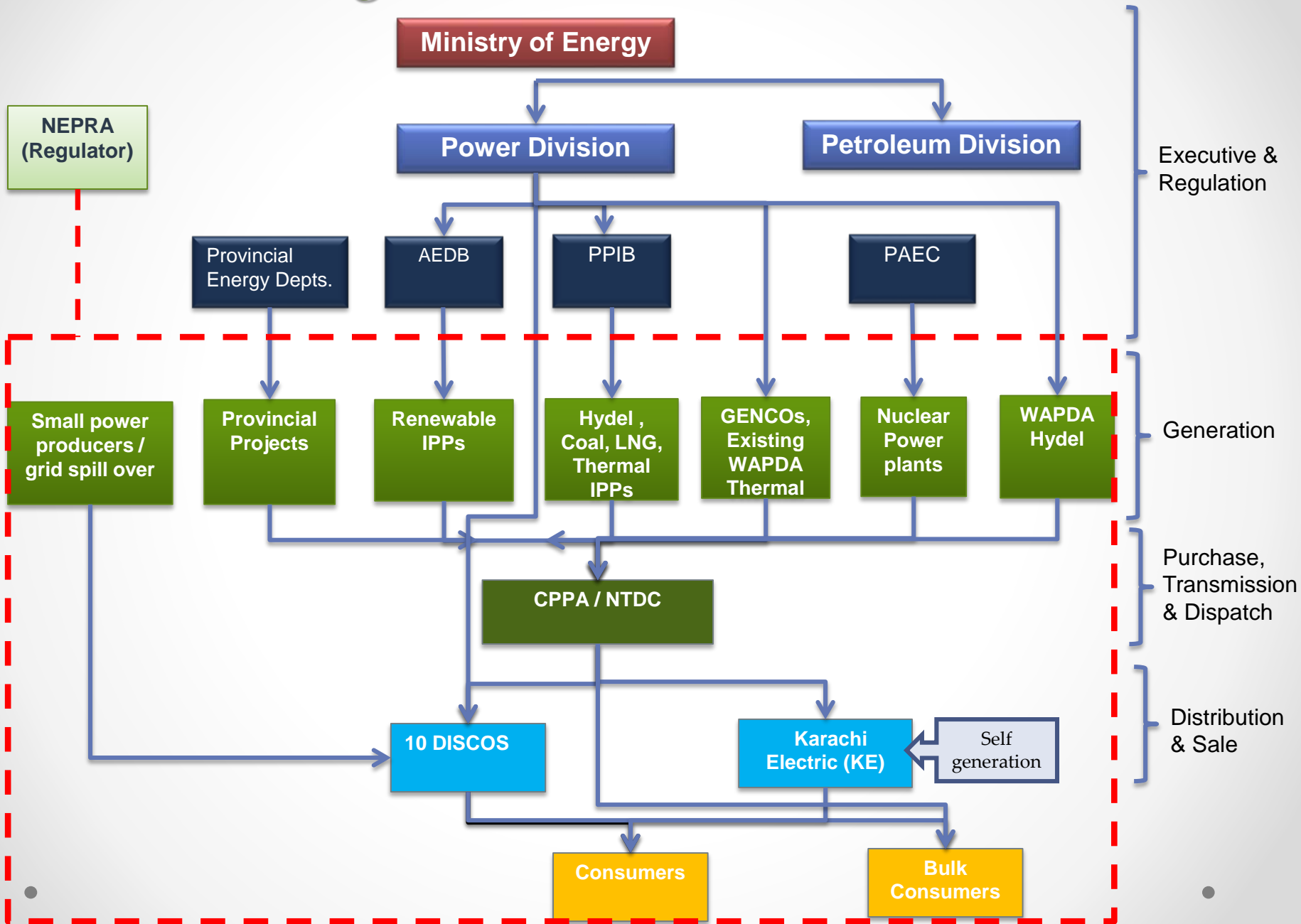
Labour Force: 61.04 million

People Employed: 57.42 million

Natural Resources: Agriculture, Natural Gas, Copper, Gold, Coal, Iron ore

Main industries: Textiles and apparel, food processing, pharmaceuticals, cement, software, paper products, fertilizers, defence products

Organizational Structure



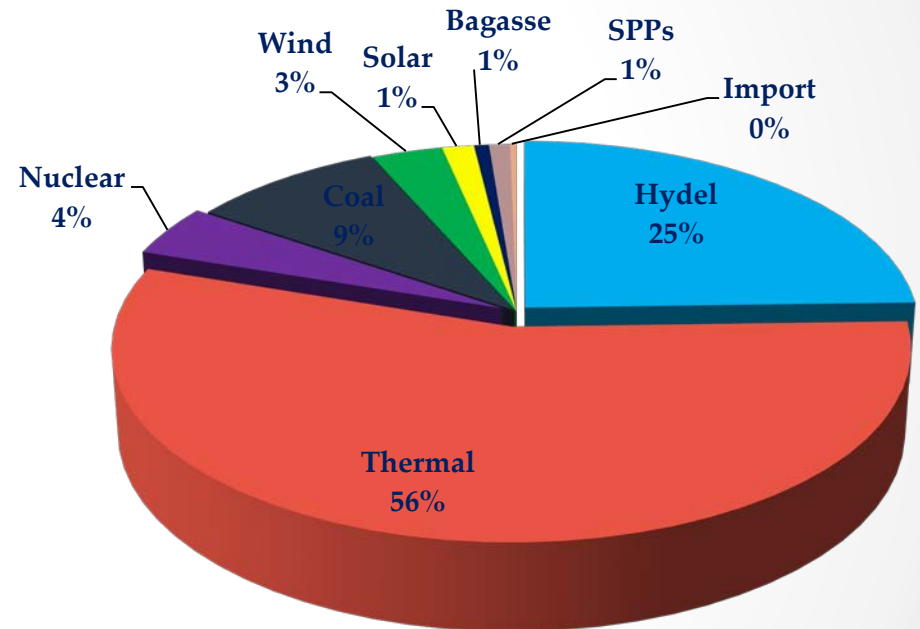


Energy Reserves / Resources

Current Power Generation Installed Capacity

- Total Installed dependable (power): 29,595 MW

Source	Installed Capacity (MW)
Hydel	7270
Thermal GENCOs	4388
Thermal IPPs	12062
Nuclear	1295
Coal	2640
Wind	937
Solar	430
Bagasse	201
SPPs	282
Import	90
	29,595



Mineral / Energy Reserves

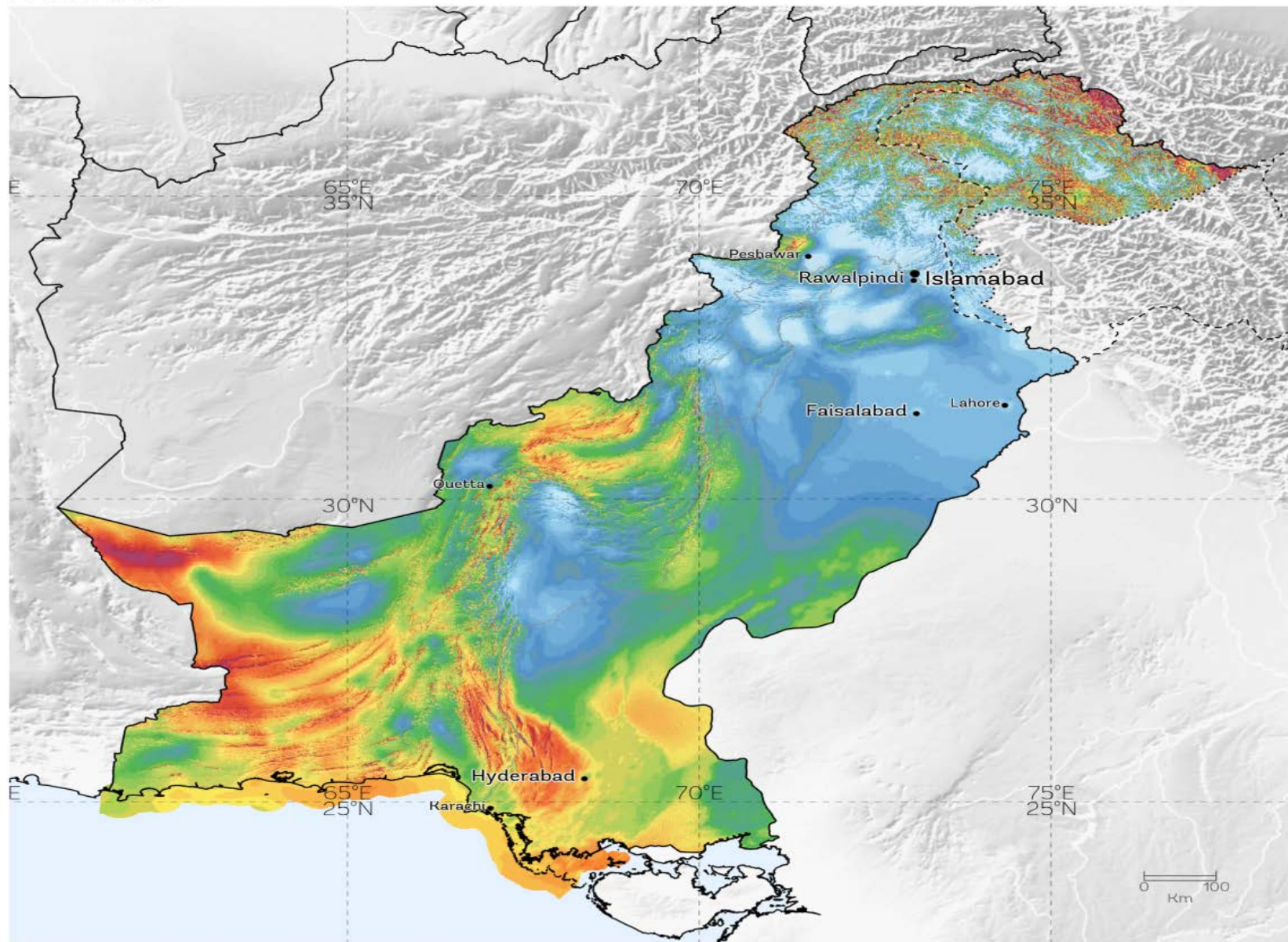
Crude oil reserves:	350.6 million bl
Crude Oil Production:	85,500 bl/day (32 million bl)
Oil production	11.67 million tonnes (2016-17)
Oil consumption	26 million tonnes (2016-17)
Imports	USD 11.1 billion (2016-17)
Natural Gas Reserves:	542.5 billion cu m
Natural Gas Production	39.3 billion cu m
Natural Gas Consumption	48.06 billion cu m
Coal Reserves	185.175 billion tonnes

Renewable Energy Resources

<u>Resource</u>	<u>Potential (MW)</u>
Hydro Power	60,000
Wind Power	60,000-80,000
Solar Power	Vast
Bagasse	1844
Waste to Energy (MSW)	360
Rice Husk	162

WIND SPEED

PAKISTAN



PHOTOVOLTAIC POWER POTENTIAL PAKISTAN

DESCRIPTION

This map provides an estimate of solar photovoltaic (PV) power generation potential. It represents the average daily/yearly sum of electricity production from a 1 kW peak grid-connected solar PV power plant for a period of recent 18 years (1999-2016).

The PV system configuration, considered in this calculation, includes ground-based, free-standing structures with crystalline silicon PV modules mounted at a fixed position, with optimum tilt to maximize yearly energy yield. The optimum tilt ranges from 20° to 35°, facing towards the equator. Use of high efficiency inverters is assumed. The solar electricity calculation is based on high-resolution data and PV modeling software developed and operated by Solargis. The calculation takes into account solar radiation, air temperature, and terrain, to simulate the energy conversion and losses in the PV modules and other components of a PV power plant. The cumulative effect of losses due to dirt, snow and ice on the PV modules, and the losses from cables, inverters and transformers, is 9%. The power plant availability is considered to be 100%.

The underlying solar resource database is calculated from the atmospheric and satellite data with a 30-minute time step, and a spatial resolution of 250 m. The uncertainty of the solar resource data has been reduced by regional model adaptation based on ground measurements collected at nine solar meteorological stations in Pakistan, commissioned by The World Bank over the years 2014 to 2017.

DATA SOURCES

This map was prepared by Solargis for Alternative Energy Development Board (AEDB), Ministry of Water and Power, Government of Pakistan. The solar resource data, used for calculating this map, is obtained from the World Bank via their Global Solar Atlas, following a solar resource mapping project carried out in Pakistan in collaboration with AEDB. The project was funded by the Energy Sector Management Assistance Program (ESMAP), and the solar resource data is provided by Solargis under the contract to the World Bank. Users of this data should refer to the Global Solar Atlas website for further information, including terms of use and data copyright details.

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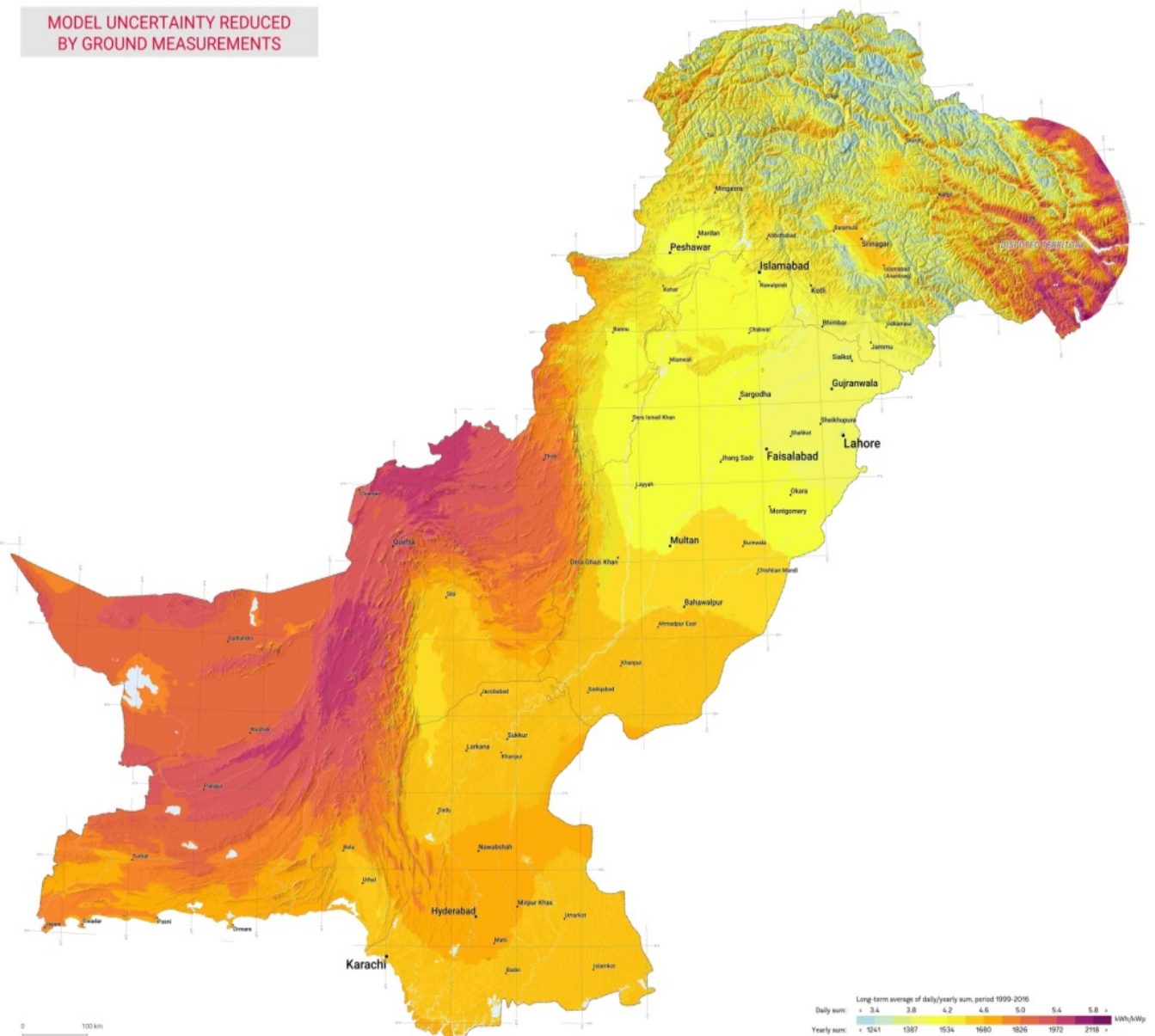
DISCLAIMER

Considering the nature of climate fluctuations, interannual and long term changes, as well as the uncertainty of measurements and applied methods, Solargis does not take any responsibility whatsoever, and does not give any warranty on the accuracy of the data that were used to produce this map. Solargis has done its utmost to make an assessment of climate conditions and performance of solar power systems based on the best available data, software and knowledge. It is recommended that this map be used as a guideline, rather than an instrument to build the solar power systems.

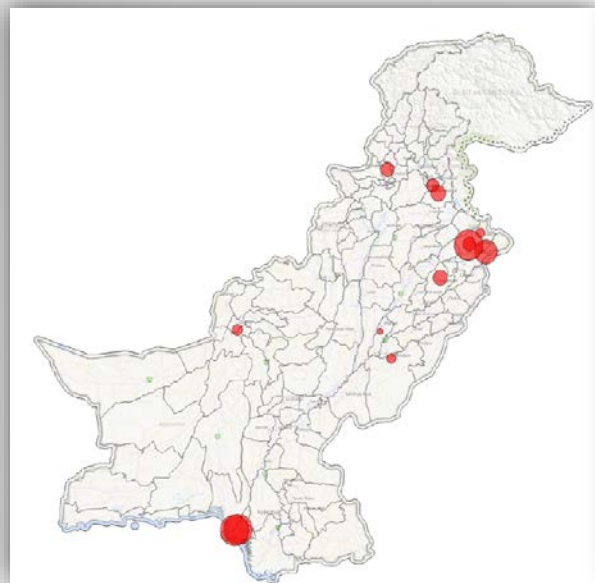
The boundaries, colours, denominations, and other information shown in this map do not imply any judgment on the part of Solargis concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Solargis database version: 2.1 • Map issue date: 2017-05-09

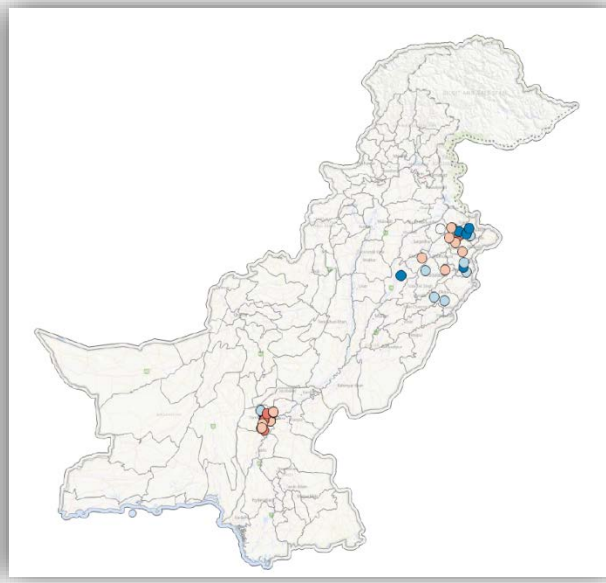
MODEL UNCERTAINTY REDUCED
BY GROUND MEASUREMENTS



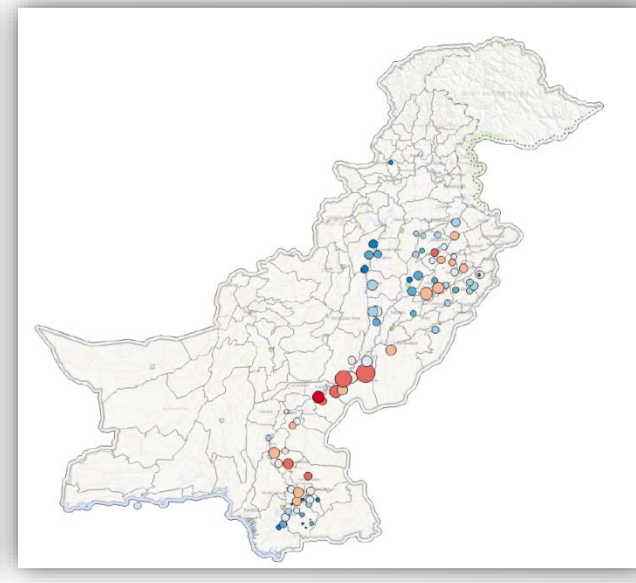
SOLARGIS



16 MSW landfill sites;
360 MW Potential



Rice Husk;
162 MW Potential



Bagasse Cogeneration
from Sugar Mills;
1844 MW Potential



Energy Policies & Current Initiatives / Measures

Policies

Previous Policies

1. Power Policy 1994 – **First IPP policy**
2. Hydel Power Policy 1995
3. Transmission Policy 1995
4. Power Policy 1998
5. Power Policy 2002

Existing Policies

1. Renewable Energy Policy 2006
2. Power Generation Policy 2015
3. Transmission Line Policy 2015

Salient Features of Existing Policies

- Determines scope and the role of different stakeholders throughout project cycle.
- Lays down Procedures, Roadmap, Engaging Mechanism for the development of RE projects
- Provides for two modes of Project Development;
 - Solicited projects
 - Unsolicited projects
- Different tariff options;
 - Cost-plus / Negotiated tariff
 - Upfront Tariff
 - Competitive bidding

INCENTIVES OFFERED

- ❖ Grid provision is the responsibility of the power purchaser
- ❖ No customs duty or sales tax on import of equipment for RE projects
- ❖ No Income Tax / withholding tax / turnover tax
- ❖ Repatriation of Equity along with dividends freely allowed
- ❖ Convertibility of PKR into USD
- ❖ Non-Muslims and non-residents exempted from payment of Zakat on dividends
- ❖ Government's Sovereign Guarantee
- ❖ Protection against change in law and political risks
- ❖ Mandatory purchase of electricity from RE projects

Recent Power Policy Measures

- Initial policies were tailored to attract private investment with prime emphasis on thermal power generation.
- Recent policy measures targeted towards lessening dependence on oil based generation and exploiting local coal and hydro resources.
- Addition of generation capacity through integrated energy planning – on the basis of least cost generation planning
- Increasing share of renewables
- Development of wind & solar projects through competitive bidding instead of Upfront Tariffs.
- Demand side management – lessening the load on national grid through distributed generation
- Conversion of electricity run tube wells to solar power

New Electricity Policy

National Electricity Policy & National Electricity Plan under development.

Key guiding principles;

- Ensuring energy security and increasing access to all
- Moving towards a cleaner energy path – renewables
- Reforming and modernizing electricity market
- Enhanced governance at national level
- Integrating least cost generation plans
- Environmental responsibility / Integrating responses to climate change
- Promoting electricity trade



Energy Demand & Supply

Primary Energy Supplies

Fiscal Year	Unit	Gas	Oil	LNG Import	LPG	Coal	Hydro Electricity	Nuclear Electricity	Renewable Electricity	Imported Electricity	Total	Annual Growth Rate (%)
2006-07	MTOE	29.32	18.19	-	47	4.43	7.63	0.55	-	0.04	60.62	4.42
	% share	48.37	30	-	0.78	7.3	12.58	0.9	-	0.07	100	
2007-08	MTOE	29.87	19.21	-	0.42	5.78	6.85	0.73	-	0.05	62.92	3.78
	% share	47.78	30.53	-	0.67	9.19	10.89	1.17	-	0.08	100	
2008-09	MTOE	30.25	20.1	-	0.4	4.73	6.63	0.39	-	0.05	62.55	-0.58
	% share	48.36	32.13	-	0.64	7.56	10.6	0.62	-	0.08	100	
2009-10	MTOE	30.81	19.81	-	0.39	4.62	6.7	0.69	-	0.06	63.08	0.85
	% share	48.84	31.4	-	0.62	7.32	10.62	1.09	-	0.1	100	
2010-11	MTOE	30.68	20.67	-	0.34	4.35	7.59	0.82	-	0.06	64.52	2.27
	% share	47.55	32.04	-	6.74	6.74	11.77	1.27	-	0.1	100	
2011-12	MTOE	32.03	19.96	-	4.29	4.29	6.81	1.26	-	0.07	64.73	32
	% share	49.49	30.83	-	6.62	6.62	10.52	1.94	-	0.1	100	
2012-13	MTOE	31.14	20.97	-	3.86	3.86	7.13	1.09	-	0.09	64.59	-0.21
	% share	48.22	32.47	-	5.98	5.98	11.03	1.68	-	0.14	100	
2013-14	MTOE	30.96	23.01	-	3.59	3.59	7.61	1.22	-	0.1	66.85	3.5
	% share	46.32	34.42	-	5.37	5.37	11.38	1.82	-	0.15	100	
2014-15	MTOE	29.98	24.97	0.47	4.95	4.95	7.75	1.39	0.19	0.11	70.26	5.11
	% share	42.66	35.54	0.67	7.05	7.05	11.03	1.97	0.27	0.15	100	
2015-16	MTOE	32.86	22.84	2.4	0.91	5.06	8.26	1.09	0.37	0.11	73.9	5.18
	% share	44.47	30.91	3.25	1.23	6.85	11.18	1.47	0.50	0.15	100	

Primary Energy Consumption

Fiscal Year	Unit	Gas	Oil	LPG	Coal	Electricity	Total	Annual Growth Rate (%)
2006-07	MTOE	14.7	10.58	0.66	4.15	5.92	36.01	6.07
	% share	40.83	29.33	1.83	11.52	16.45	100	
2007-08	MTOE	15.88	11.53	0.62	5.4	5.98	39.41	9.46
	% share	40.3	29.35	1.57	13.71	15.17	100	
2008-09	MTOE	16.31	10.84	0.57	3.89	5.73	37.34	-5.26
	% share	43.68	29.03	1.53	10.42	15.35	100	
2009-10	MTOE	17.02	10.83	0.58	4.28	6.05	38.76	3.8
	% share	43.91	27.94	1.5	11.04	15.61	100	
2010-11	MTOE	16.78	11.25	0.5	4.03	6.28	38.84	0.19
	% share	43.2	28.97	1.3	10.36	16.17	100	
2011-12	MTOE	17.62	11.62	0.48	4.06	6.25	40.03	3.05
	% share	44.02	29.03	1.2	10.14	15.62	100	
2012-13	MTOE	17.52	12.22	0.53	3.66	6.25	40.18	0.4
	% share	43.6	30.41	1.31	9.11	15.56	100	
2013-14	MTOE	16.28	12.72	0.59	3.45	6.79	39.82	-0.91
	% share	40.88	31.94	1.47	8.65	17.06	100	
2014-15	MTOE	15.76	13.85	0.76	4.63	6.99	41.98	5.44
	% share	37.53	32.99	1.8	11.03	16.65	100	
2015-16	MTOE	15.54	16.29	1.21	4.98	7.36	45.38	8.09
	% share	34.24	35.89	2.66	10.97	16.21	100	

Primary Energy Consumption (Sector Wise)

Energy Consumption by Sector (MTOE)							
Sector	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	ACGR
Domestic	8.72	9.36	10.12	9.88	10.29	10.51	3.80%
	22.46%	23.39%	25.19%	24.82%	24.52%	23.16%	
Commercial	1.52	1.59	1.64	1.66	1.66	1.82	3.60%
	3.91%	3.97%	4.08%	4.17%	3.96%	4.01%	
Industrial	14.96	15.03	14.25	13.77	14.84	15.93	1.30%
	38.53%	37.56%	35.47%	34.59%	35.36%	35.10%	
Agriculture	0.77	0.72	0.66	0.72	0.69	0.71	-1.70%
	1.98%	1.80%	1.64%	1.81%	1.64%	1.56%	
Transport	12.01	12.56	12.71	12.93	13.58	15.28	4.90%
	30.93%	31.38%	31.64%	32.48%	32.36%	33.67%	
Other Govt.	0.85	0.76	0.79	0.85	0.91	1.13	5.90%
	2.19%	1.90%	1.97%	2.14%	2.17%	2.49%	
Total	38.83	40.02	40.17	39.81	41.97	45.38	3.20%

Electricity Distribution Companies



Electricity – Surplus / Deficit in Demand and Supply

NTDC System			
Financial Year ending 30 th June	Generation Capability (MW)	Demand During NTDC'S System Peak Hours (MW)	Surplus / (Deficit)(MW)
2008	12,442	16,838	-4,396
2009	13,637	17,852	-4,215
2010	12,751	18,467	-5,716
2011	13,193	18,521	-5,328
2012	12,320	18,940	-6,620
2013	14,600	18,827	-4,227
2014	16,170	20,576	-4,406
2015	16,500	21,701	-5,201
2016	17,261	22,559	-5,298
2017	20,106	23,816	-3,710
2018	24,640	25,140	-500
2019	26,663	26,439	224
2020	29,059	27,725	1,334
2021	33,776	29,082	4,694

Electricity – Surplus / Deficit in Demand and Supply

KE System			
Financial Year ending 30 th June	Generation Capability (MW)	Demand During KESC'S System Peak Hours (MW)	Surplus / (Deficit)(MW)
2008	2,265	2,443	-178
2009	2,403	2,462	-59
2010	2,393	2,562	-169
2011	2,237	2,565	-328
2012	2,163	2,596	-433
2013	2,246	2,778	-532
2014	2,601	2,929	-328
2015	2,632	3,056	-424
2016	2,860	3,195	-335
2017	3,128	3,359	-231
2018	3,666	3,528	138
2019	4,146	3,699	447
2020	5726	3,894	1,832

Electricity Generation (GWh)

Source	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Hydro	28,667	28,183	28,492	31,990	28,643	30,033	32,239	32,594	34,554
Coal	136	113	116	66	66	40	112	102	148
Oil	14,160	15,795	18,678	21,387	20,007	20,188	22,376	20,559	19,956
Gas	51,466	48,924	49,659	43,780	45,471	43,846	45,697	49,160	51,259
Renewables	0	0	0	0	6	32	272	811	1549
Nuclear	2,832	1,486	2,668	3,130	4,872	4,181	4,695	5,349	4,216
Import	199	227	249	269	296	375	419	443	463
	97,460	94,728	99,862	100,622	99,361	98,695	105,810	109,018	112,145

Reasons for Power Demand Supply Gap

- Transmission & distribution constraints
- Lower dependable capacity (inefficiencies in GENCOs)
- Reduced natural gas supply to power sector
- Avoiding costly generation from oil based power plants
- Liquidity constraints due to circular debt
- Higher dependence on imported fuels

CO₂ Emissions

- Pakistan's vulnerability to adverse impacts of climate change is well established and widely recognized
- Despite Pakistan's diminutive contribution to global GHG emissions, it is among the top ten most climate-affected countries of the world
- The year 2015 was set as the base year for quantification of GHG emissions under the Pak-INDC in response to the Paris Agreement.

Inventory of GHG Emissions (in MT CO₂ Equivalent)				
Sectors	1994	2008	2012	2015
Energy	85.8	168.47	171.44	185.97
Agriculture	71.63	125.97	162.86	174.56
Industrial Processes	13.29	18.54	19.59	21.85
Land Use Change & Forestry	6.52	9.29	9.67	10.39
Waste	4.45	7.24	10.55	12.29
	181.69	329.51	374.11	405.06

Electricity Tariffs (Generation)

Source	Levellized Tariff (US Cents / kWh)
Coal	8.3 - 8.5
Hydel	3.5 – 9.8
RLNG	6.11 *
Wind	6.67 **
Solar	5.3
Bagasse	7.59
Nuclear	11

* Reference tariff, subject to fuel price and exchange rate variations

** Reference tariff announced in 2017 for competitive bidding

Electricity Prices (For Consumers)

(For Ref: 1 US\$ = Rs. 105)

Particulars	May 2012- Aug 2013		Aug 2013-Nov 2013		Oct 2013 - Oct 2014		Oct 2014 - Jun 2015		Jun 2015 ~	
	Fixed	Variable	Fixed	Variable	Fixed	Variable	Fixed	Variable	Fixed	Variable
RESIDENTIAL										
Upto 50 Units		2.00		2.00		2.00		2.00		2.00
Exceeding 50 Units										
01-100 Units		5.79		5.79		5.79		5.79		5.79
101-200 Units						8.11		8.11		8.11
201-300 Units		8.11		8.11		12.09		12.09		10.20
301-700 Units		12.33		12.33		16.00		16.00		16.00
TOU - Peak		13.99		13.99		18.00		18.00		18.00
TOU - Offpeak		8.22		8.22		12.50		12.50		12.50
COMMERCIAL										
TOU - Peak		13.20		18.00		18.00		18.00		18.00
	400.00	8.01	400.00	12.50	400.00	12.50	400.00	12.50	400.00	12.50
INDUSTRIAL										
BI up to 25 kW (at 400/230 volts)		10.51		14.50		14.50		14.50		14.50
B2 25-500 kW (at 400 Volts)	400.00	9.14	400.00	14.00	400.00	14.00	400.00	14.00	400.00	18.00
B1 - TOU (Peak)		13.99		18.00		18.00		18.00		12.50
B1 - TOU (Off-peak)		8.22		12.50		12.50		12.50		14.00
B2 - TOU (Peak)		12.77		18.00		18.00		18.00		18.00
B2 - TOU (Off-peak)	400.00	8.01	400.00	12.30	400.00	12.30	400.00	12.30	400.00	12.29
B3 - TOU (peak) (Up to 5000 kW)		12.68		18.00		18.00		18.00		18.00
B3 - TOU (Off-peak)	380	7.75	380	12.20	380	12.20	380	12.20	380	12.20
BULK SUPPLY										
C1 - TOU (Peak)		13.01		18.00		18.00		18.00		18.00
C1 - TOU (Off-peak)	400	8.01	400	12.50	400	12.50	400	12.50	400	12.50
C2 - TOU (Peak)		12.60		18.00		18.00		18.00		18.00
C2 - TOU (Off-peak)	380	7.75	380	12.30	380	12.30	380	12.30	380	12.30
C3 - TOU (Peak)		12.18		18.00		18.00		18.00		18.00
C3 - TOU (Off-Peak)	360	7.35	360	12.20	360	12.20	360	12.20	360	12.20
AGRICULTURE										
SCARP		10.00		10.00		13.01		13.01		12.00
Agriculture Tubewells	120	6.77	200	6.77	200	10.35	200	11.51	200	15.00



Future Outlook

Generation Addition

Capacity Additions	MW	Cumulative Capacity
Existing Installed Capacity	-	31,744
2017-18	1777.7	33,521
2018-19	3,322	36,844
2019-20	2,434	39,278
2020-21	5,076	44,353
2021-22	5,204	49,557
2022-23	5,720	55,277
2023-24	1,625	56,902
2024-25	2,167	59,069
Total Additions	27,325	

Generation Addition by 2025 (Source Wise)

Source	MW
Hydro	9,744
Bagasse	1,052
Dom. Coal	4,620
Imp. Coal	4,423
Imp. LNG	1,250
Nuclear	2,200
Solar	1,200
Wind	1,572
Import	1,000

Demand Vs Supply Analysis (PMS Based)

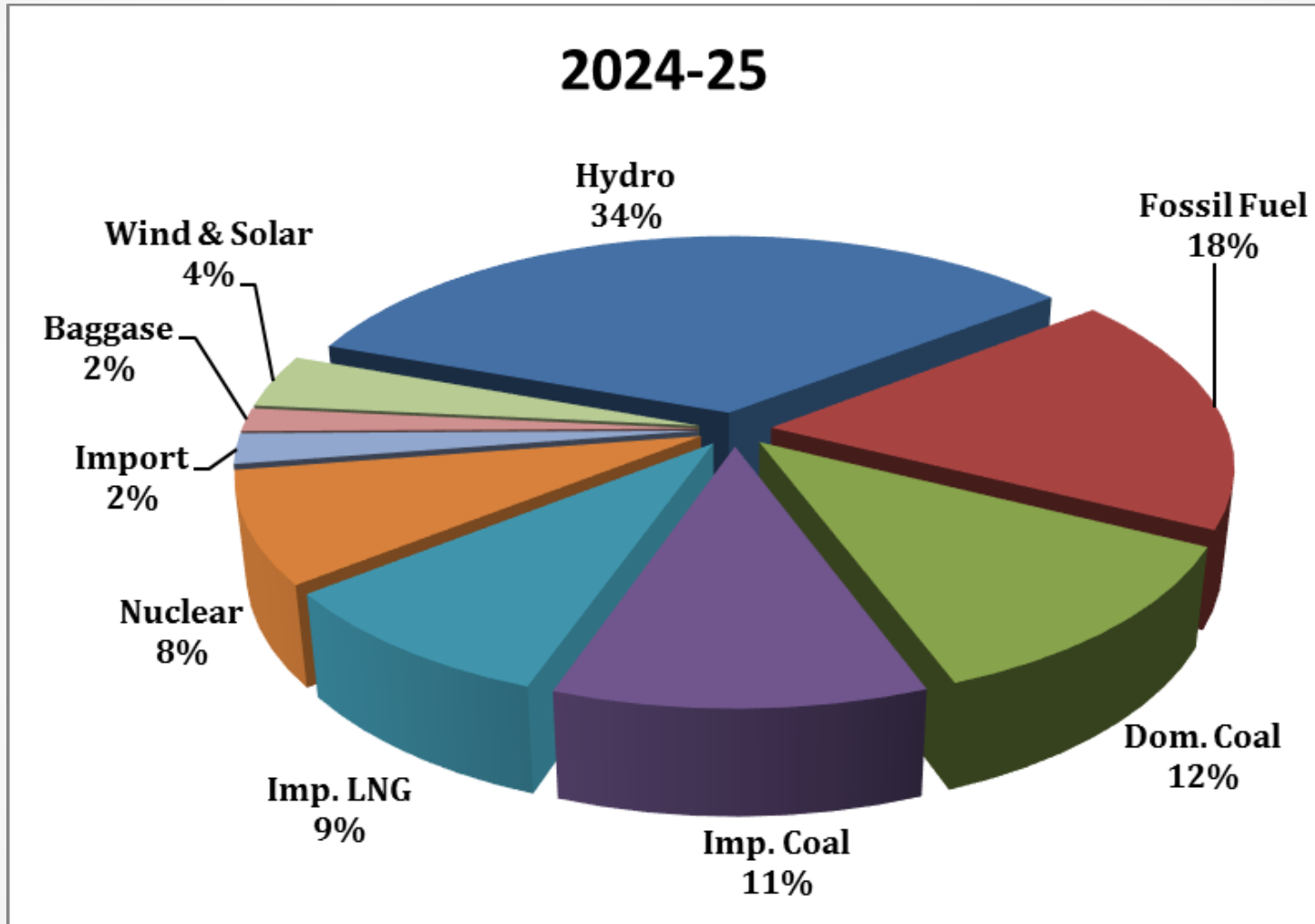
Year	Demand – MW (PMS)	Installed Capacity (MW)	Available Capacity (MW)	Surplus/Deficit (MW)
2018-19	26,859	36,844	26,608	-251
2019-20	28,098	39,278	27,795	-303
2020-21	29,496	44,353	31,839	2,343
2021-22	30,908	49,557	34,790	3,882
2022-23	32,396	55,277	37,547	5,151
2023-24	33,957	56,902	39,934	5,977
2024-25	35,611	59,069	44,011	8,400

Note: Supply / Demand based on values for month of June as demand is maximum in June.

Summary of Power Balance

Year	Description	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2018-19	Capability	24114	24926	24261	22485	18242	18904	19049	18605	20305	22382	24680	26608
	Demand*	25516	25516	25247	23636	17727	17727	17190	16921	19607	22562	24710	26859
	Surplus/Deficit	-1402	-590	-987	-1151	515	1177	1859	1684	698	-180	-30	-251
2019-20	Capability	27552	28144	28245	25622	21062	19373	22278	20503	21454	24386	26365	27795
	Demand*	26693	26693	26412	24726	18545	18545	17983	17702	20512	23602	25850	28098
	Surplus/Deficit	859	1451	1833	896	2518	829	4295	2802	942	784	515	-303
2020-21	Capability	29459	29885	29303	26207	21552	21615	21379	22017	24483	26640	29005	31839
	Demand*	28021	28021	27726	25956	19467	19467	18877	18582	21532	24777	27136	29496
	Surplus/Deficit	1438	1864	1577	251	2085	2147	2502	3435	2951	1863	1869	2343
2021-22	Capability	32239	32176	31663	29987	27856	26934	29367	27686	27827	30854	33907	34790
	Demand*	29363	29363	29054	27199	20399	20399	19781	19472	22563	25963	28435	30908
	Surplus/Deficit	2877	2813	2609	2788	7456	6535	9586	8214	5264	4891	5472	3882
2022-23	Capability	36068	35844	34386	33288	28790	25656	29327	28325	27709	31820	35582	37547
	Demand*	30776	30776	30452	28508	21381	21381	20733	20409	23649	27213	29804	32396
	Surplus/Deficit	5292	5068	3934	4779	7409	4274	8594	7915	4060	4607	5778	5151
2023-24	Capability	38939	37748	36429	34477	28661	25886	27785	28541	28688	31898	35771	39934
	Demand*	32259	32259	31920	29882	22412	22412	21732	21393	24789	28524	31240	33957
	Surplus/Deficit	6680	5489	4509	4595	6249	3474	6053	7148	3899	3374	4530	5977
2024-25	Capability	41298	41634	39292	36019	30078	27738	30508	30085	30279	33663	39732	44011
	Demand*	33830	33830	33474	31338	23503	23503	22791	22435	25996	29913	32762	35611
	Surplus/Deficit	7468	7804	5818	4682	6575	4235	7717	7650	4283	3749	6970	8400

Generation Mix by 2025



Projected GHG Emissions (Sector Wise)

(MT CO₂ Equivalent)

Sectors	1994	2015	2030
Energy	85.8	185.97	898
Agriculture	71.63	174.56	130
Industrial Processes	13.29	21.85	457
Land Use Change & Forestry	6.52	10.39	29
Waste	4.45	12.29	89
Total	181.69	405.06	1,603



CURRENT STATUS OF ARE PROJECTS

WIND POWER

- 18 projects (937.27 MW) are operational
 - 6 projects (296.1 MW) have achieved Financial Close and are under construction
-
- ❑ **Competitive Bidding to be carried out for new wind power projects**
 - Bidding to be carried out for approx. 1224 MW capacity based on evacuation space communicated by NTDC



SOLAR POWER

- 06 solar PV power projects (430 MW) are operational
 - 05 solar projects (42.52 MW) at LOS stage
-
- ❑ **Competitive Bidding to be carried out for new solar power projects**



BIOMASS

Bagasse Cogeneration projects are being developed through the sugar mills under Framework for Power Cogeneration (Bagasse / Biomass) 2013.

- 06 Bagasse projects (201.1MW) are operational.
- 03 projects (132.4 MW) have signed project agreements (IA & EPA) and are under construction
- 16 projects (514.6 MW) have acquired tariff and generation license and are at LOS stage.



SOLAR GRID HYBRID PROJECTS

- Solar –Wind Grid Hybrid projects have been initiated
- Existing wind power projects to install certain capacity of solar power within their wind project
- Maximum utilization of available infrastructure designed for peak wind capacity

Benefits:

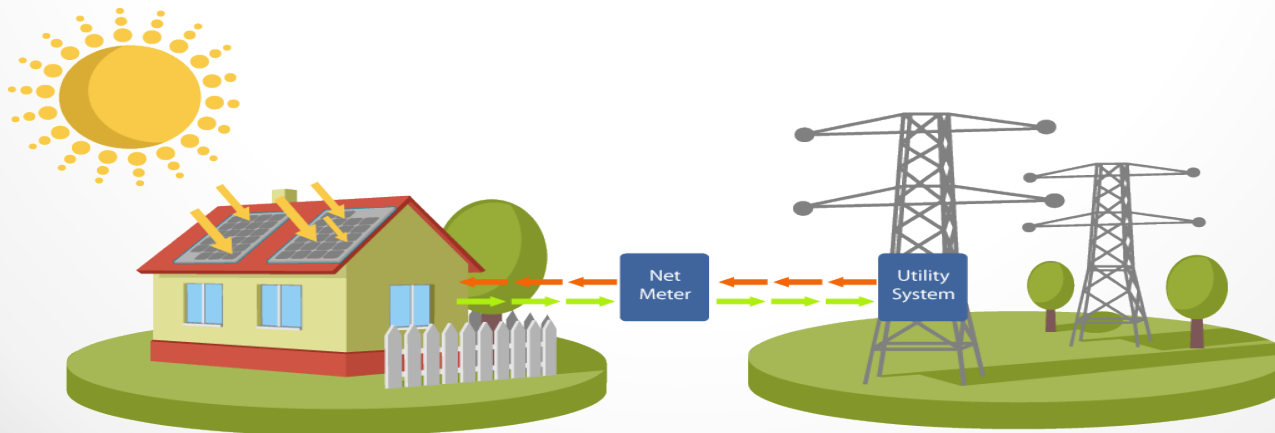
- a) Increased combined plant factor, lesser intermittency
- b) Lesser requirement of spinning reserve
- c) Improved grid utilization factor

Distributed Generation (Key Areas)

- A. Net Metering through Solar and Wind Systems
- B. Off-Grid Lighting Solutions – IFC Lighting
Asia/Pakistan

Net Metering in Pakistan

- NEPRA approved Regulations in **September 2015** to put into effect Net Metering for solar and wind generation of up to 1MW.
- First net metering system of 1 MW capacity installed at Parliament House.
- Prime Minister of Pakistan launched new consumer friendly framework for net metering on 3rd January, 2018
- **444** customers of cumulative **10.2** MW have been issued Generation License for Net Metering as of Jun, 2018.
- Addition of 2000-3000 MW of net metering based installations is envisaged in next 3-4 years.



IFC – Lighting Asia / Pakistan Program

Lighting Asia/Pakistan aims at:

- Addressing lighting needs of off-grid population by giving access to low-cost, high-quality, safe, reliable, and cleaner lighting products.

Target: 1.5 million people get access to modern lighting solutions

Partners: IFC, AEDB, Micro-financing Institutes, international manufacturers and local distribution companies

Progress:

- 150, 000 products sold
- 750,000 people reached
- Five manufacturing associates found local distributors





Major Impediments / Bottlenecks

Major Issues in Power Sector

Planning Issues

- Generation addition not being done through proper planning (no least cost generation planning)
- Adhoc decisions on generation addition in past

Inefficiencies in DISCOs

- Distribution network requires rehabilitation – overloading issues
- High technical and administrative losses
- Pilferage of electricity

Circular Debt

- Major financial issue in power sector
- Essentially created due to lower efficiency levels of GENCOs, higher transmission and distribution losses, lower recoveries by DISCOs.

Areas of Interest

- ❖ Integrated energy planning
- ❖ Demand forecasting
- ❖ Least Cost Generation Planning
- ❖ Off-grid electrification policies



Thank You

