Power & Energy Generation

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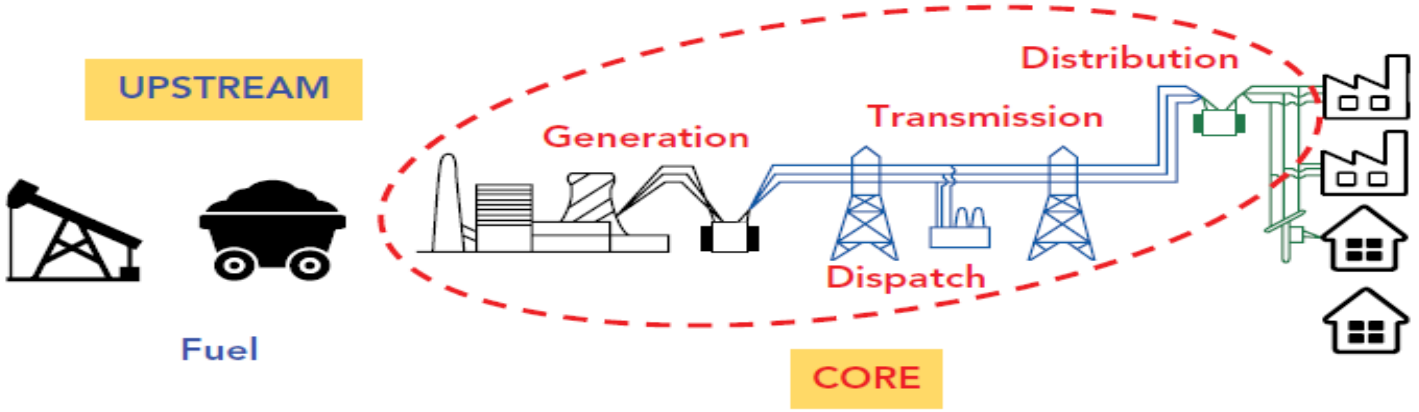
January 2019

Power Supply Chain



Pakistan's Power Structure

Generation			Transmission	Distribution	Consumption
Thermal	Furnace Oil	Independent Power Plants, Generations Companies, and K-Electric	National Transmission and Dispatch Company	FESCO	
	Gas/RLNG			GEPCO	Domestic
	Coal			HESCO	
	Nuclear			IESCO	Industrial
Renewable	Water	Dams		LESCO	
	Solar	Independent Power Plants		MEPCO	Commercial
	Wind			PESCO	
	Bagasse			QESCO	Agriculture
	Hydel IPPs			TESCO	
				SEPCO	
			K-Electric	K-Electric	Others

Capacity & Generation

Energy Source		Dependable Capacity (MW)									
		Sep-18	Mix %	Jun-18	Mix %	Jun-17	Mix %	Jun-16	Mix %	Jun-15	Mix %
Thermal	RFO	4,354	13.3%	4,783	14.7%	4,211	15.2%	4,888	20.5%	4,624	19.9%
	RLNG	5,193	15.9%	5,203	16.0%	3,480	12.6%	1,420	6.0%	-	0.0%
	Gas	2,063	6.3%	1,860	5.7%	1,954	7.1%	1,710	7.2%	3,341	14.4%
	Coal	2,640	8.1%	2,640	8.1%	1,320	4.8%	-	0.0%	-	0.0%
	GENCOs	4,331	13.3%	4,337	13.3%	4,762	17.2%	4,676	19.6%	4,669	20.1%
	K-Electric	2,267	6.9%	2,267	7.0%	2,267	8.2%	2,247	9.4%	2,247	9.7%
	Others (CPPs/SPPs)	353	1.1%	353	1.1%	282	1.0%	282	1.2%	285	1.2%
	Sub-Total	*21,201*	65.0%	*21,443*	65.7%	*18,276*	66.0%	*15,222*	64.0%	*15,166*	65.2%
Hydel	WAPDA	6,902	21.2%	6,902	21.2%	6,902	24.9%	6,902	29.0%	6,902	29.7%
	IPPs	1,337	4.1%	1,337	4.1%	213	0.8%	213	0.9%	213	0.9%
	Sub-Total	*8,239*	25.3%	*8,239*	25.3%	*7,115*	25.7%	*7,115*	29.9%	*7,115*	30.6%
Nuclear	Nuclear plants	*1,295*	4.0%	*1,295*	4.0%	*955*	3.4%	*615*	2.6%	*615*	2.6%
Renewable	Wind	1,185	3.6%	836	2.6%	732	2.6%	304	1.3%	205	0.9%
	Solar	388	1.2%	487	1.5%	352	1.3%	400	1.7%	100	0.4%
	Bagasse	313	1.0%	313	1.0%	273	1.0%	139	0.6%	76	0.3%
	Sub-Total	*1,886*	5.8%	*1,636*	5.0%	*1,357*	4.9%	*843*	3.5%	*381*	1.6%
Total		***32,621***	***100%***	***32,613***	***100%***	***27,703***	***100%***	***23,796***	***100%***	***23,277***	***100%***

Generation (Actual)

Description	*Sep-18*	*Jun-18*	*Jun-17*	*Jun-16*	*Jun-15*
Dependable Generation Capacity (MW)	32,621	32,613	27,703	23,796	23,277
Actual Generation (MW)	21,636	16,900	13,012	12,827	12,034
Average Capacity Factor (Utilization)	70%	60%	52%	54%	52%
Actual Generation (GWh)	47,383	148,042	113,989	112,362	105,420
Growth (%)-SPLY	12.6%	29.9%	1.4%	6.6%	1.5%

- Thermal (65%)– the largest source of electricity generation followed by Hydel (25.2%), Renewable (5.8%) and Nuclear (4%).
- DGC increased to ~18% during FY18 in comparison with the corresponding year, mainly owing to added RLNG, Coal and Wind projects.
- Actual generation up by ~30% during FY18 in comparison with the corresponding year.

Generation Mix (Fuel) and Cost

Source	3MFY19			FY18			FY17			FY16		
	Generation (%)	Energy Cost (%)	Cost/Unit (PKR/KWh)	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/KWh)	Generation (%)	Energy Cost (%)	Cost/Unit (PKR/KWh)	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/KWh)
RFO	10%	27%	14.5	18.9%	37.9%	10.3	31.7%	55.6%	8.9	31.1%	55.0%	7.9
HSD	0%	0%	14.3	0.7%	1.8%	13.8	1.4%	3.8%	13.7	1.3%	3.7%	13.0
Import	0%	1%	11.6	0.5%	1.0%	11.0	0.4%	0.9%	10.6	0.4%	1.0%	10.5
Gas	38%	58%	8.0	35.9%	45.8%	6.6	30.6%	36.5%	6.0	32.1%	37.5%	5.2
Mixed	0%	1%	6.9	0.6%	0.7%	6.8	0.2%	0.3%	6.8	0.2%	0.4%	7.1
Coal	10%	12%	6.3	9.8%	10.3%	5.4	0.9%	0.6%	3.3	0.1%	0.1%	4.5
Bagasse	1%	1%	6.2	0.9%	1.0%	6.1	0.7%	0.8%	5.5	0.5%	0.6%	5.8
Nuclear	5%	1%	1.0	7.2%	1.4%	1.0	5.0%	1.0%	1.0	3.4%	0.9%	1.2
Hydel	31%	0	-	23.4%	0.0%	-	27.2%	0.0%	-	30.5%	0.0%	-
Wind	3%	0%	-	1.8%	0.0%	-	1.2%	0.0%	-	0.2%	0.0%	-
Solar	0%	0%	-	0.6%	0.0%	-	0.6%	0.0%	-	0.2%	0.0%	-
Total	***100%***	***100%***	***6.6***	***100%***	***100%***	***5.8***	***100%***	***100%***	***5.1***	***100%***	***100%***	***4.5***

- Reliance on RFO generation gradually on a declining trend from 32% to 10% with aim to have better energy mix through addition of RLNG and Coal power projects, hence to curb growing circular debt and import bill.
- HSD & RFO – most expensive source of generation.
- Hydel, Wind and Solar are among – cheapest source of generation.

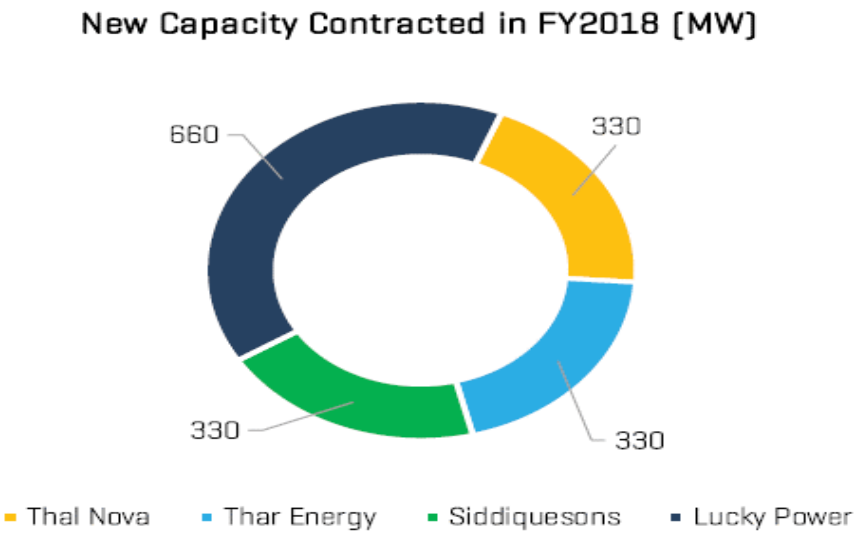
Generation Mix (Entity) and Cost

Source	3MFY19			FY18			FY17			FY16		
	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/ KWh)	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/ KWh)	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/ KWh)	Generation (%)	Energy Cost (%)	Cost/ Unit (PKR/ KWh)
IPPs	50.0%	75.2%	9.9	53.4%	73.6%	8.1	39.3%	60.1%	7.8	40.6%	62.0%	6.8
WAPDA (Hydel)	22.8%	0.2%	0.1	18.1%	0.27%	0.1	27.0%	0.7%	0.1	29.5%	0.6%	0.1
GENCOs	8.7%	12.1%	9.2	11.5%	14.2%	7.2	16.2%	25.0%	7.9	15.2%	22.7%	6.7
K-Electric	6.2%	10.4%	11.1	6.5%	8.3%	7.5	8.2%	10.6%	6.6	8.3%	11.9%	6.4
Nuclear plants	4.3%	0.7%	1.0	5.9%	1.0%	1.0	5.1%	1.1%	1.1	3.4%	0.9%	1.2
Wind\ IPPs	2.6%	0.0%	0.0	1.4%	0.3%	1.1	1.2%	0.1%	0.6	0.2%	0.0%	0.0
Hydel IPPs	3.9%	0.1%	0.1	1.3%	0.1%	0.3	0.9%	0.1%	0.5	1.0%	0.2%	1.1
Bagasse	0.5%	0.6%	6.8	0.7%	0.8%	6.8	0.8%	0.9%	5.8	0.1%	0.1%	6.5
Solar	0.4%	0.0%	-	0.5%	0.2%	2.1	0.6%	0.2%	2.1	0.0%	0.0%	0.7
Others (CPPs/SPPs)	0.4%	0.4%	6.9	0.5%	0.6%	7.1	0.2%	0.3%	6.8	1.2%	0.6%	2.4
Mainly from Iran	0.3%	0.5%	11.6	0.4%	0.7%	10.8	0.4%	0.9%	10.6	0.4%	1.0%	10.6
Total	***100%***	***100%***	***6.6***	***100%***	***100%***	***5.8***	***100%***	***100%***	***5.1***	***100%***	***100%***	***4.5***

- IPPs continue to contribute significant share in generation followed by WAPDA
- GENCOs inefficient source

Contracted Capacity – CPPA-G

Sr No.	Technology	Contracted Capacity (MW)	
		FY17	FY18
1	Wind	448	-
2	Bagasse	132	-
3	Solar	12	-
4	Nuclear	340	-
5	Hydel	720	-
6	Coal	1,980	1,650
7	RLNG	3,563	-
Total		***7,195***	***1,650***



- During FY18, CPPA-G signed four PPAs/EPAs on behalf of DISCOs, all with the coal power plants, with a total 1,650MW of contracted capacity.
- Magnitude of these PPAs/EPAs when compared with the agreements signed last year i.e. 21 agreements with 7,196 MW.
- This because the country is gradually moving towards energy adequacy and the gap between supply & demand is steadily narrowing.

Demand & Supply during Peak Hours

Year	Dependable Generation Capacity	Generation Capability (MW)	Demand during Peak Hours (MW)	Surplus / (Deficit) (MW)
Actual				
FY12		12,320	18,940	(6,620)
FY13		14,600	18,827	(4,227)
FY14	21,372	16,170	20,576	(4,406)
FY15	23,277	16,500	21,701	(5,201)
FY16	23,796	17,261	22,559	(5,298)
FY17	27,703	20,106	23,816	(3,710)
FY18	32,613	26,135	25,227	908
Projected				
FY19	37,633	28,357	26,348	2,009
FY20	39,821	29,314	27,420	1,894
FY21	45,622	34,124	28,601	5,523
FY22	50,156	36,422	29,822	6,600
FY23	54,556	39,345	31,095	8,250
FY24	58,881	41,197	32,429	8,768
FY25	62,184	47,750	33,816	13,934

- As per NEPRA's state of industry report, Pakistan has achieved electricity surplus in FY18.

Future Capacity

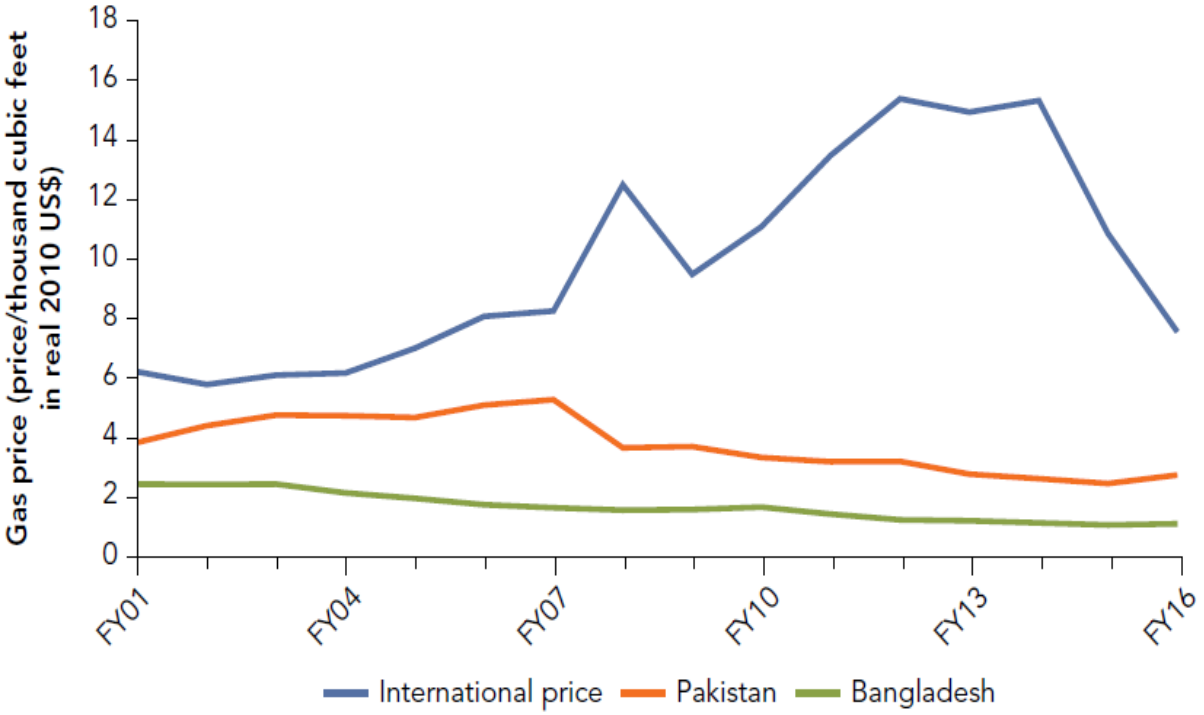
Future Capacity - MWs										
Year	Thermal		Hydel		Alternative IPPs				Nuclear (Govt.)	Grand Total
	IPPs RLNG	IPPs Coal	WAPDA	IPPs	WIND	SOLAR	BAGASSE	Total		
CY18	800	660	-	-	50			50	-	1,510
CY19	463	1,320	83	102	165	525	750	1,440	-	3,408
CY20	-	163	128	-		-		-	-	291
Total	**1,263**	**2,143**	**211**	**102**	**215**	**525**	**750**	**1,490**	**-**	**5,209**
CY21 & Beyond	-	4,590	10,540	5,010		-	-	-	2,200	22,340
Grand Total	***1,263***	***6,733***	***10,751***	***5,112***	***215***	***525***	***750***	***1,490***	***2,200***	***27,549***

- Government has initiated various projects of RLNG, Coal, Hydel and RE. Thus, ailing power generation mix seems to be going in the right direction.
- Gains on improving energy mix to be met with serious work on the recovery, collection, distribution, and financial aspects of the energy chain.
- Till CY20, generation capacity is expected to increase by 5,209MW, leading with Coal and RLNG projects.
- Coal, Hydel and Nuclear projects will add ~22,430MW beyond CY20.

Upcoming Projects - RLNG

IPPs RLNG					
Location	**Company**	**Capacity**	**Gas**	**Status**	**Expected Completion**
Jhang	Punjab Thermal Power Limited	800	RLNG	Under Construction-Open Cycle	Dec-18
Jhang	Punjab Thermal Power Limited	463	RLNG	Combined Cycle	Nov-19
Total		***1,263***			

- Privatization commission's board approved fast track privatization of two RLNG power plants i.e. 1,233MW Balloki Power plant and 1,230MW Haveli Bahadur Shah Power plant.
- RLNG placed at well above the RFO power plants in the Merit Order list for December 2018.
- The price of domestic natural gas is much lower than international price in Pakistan & Bangladesh.



Upcoming Coal Based - IPPs

IPPs COAL					
Location	**Company**	**Capacity**	**Coal**	**Status**	**Expected Completion**
HUB	China Power Hub Generation Co (Pvt.) Ltd.	660	Imported	Under Construction-1st Unit	Dec-18
Thar Block II	Engro Power Gen Thar Limited	330	Thar	Under Construction-1st Unit	Jun-19
Thar Block II	Engro Power Gen Thar Limited	330	Thar	Under Construction-2nd Unit	Jun-19
HUB	China Power Hub Generation Co (Pvt.) Ltd.	660	Imported	Under Construction-2nd Unit	Aug-19
Arifwala, Punjab	Grange Power Limited	163	Imported	FC in progress	Aug-20
Thar	Thar Energy Limited	330	Thar	Under Construction	Mar-21
Thar	Thal Nova Power (Pvt.) Limited	330	Thar	FC in progress	Mar-21
Thar	Thar Coal Block-I Power Generation Co. Ltd.	660	Thar	FC in progress-1st Unit	Mar-21
Port Qasim	Lucky Electric Power Company Ltd.	660	Thar	FC in progress	Mar-21
Thar Block II	Siddiqsons Energy Limited	330	Thar	FC in progress	Mar-22
Gawadar	China Communication Construction Co. Ltd.	300	Imported	Tariff determination in	Mar-22
Thar	Thar Coal Block-I Power Generation Co. Ltd.	660	Thar	FC in progress-2nd Unit	Feb-23
Thar Block VI	Oracle Coal Fields PLC England	1,320	Thar	Issuance of NTP & LOI to Phase-I (700 MW) in process	Jun-23
Total		***6,733***			

- Pakistan is producing only 8.1% of its electricity from coal. However, worldwide 46% of electricity is produced from coal
- Pakistan has total coal reserves of 185 billion tonnes. The Thar coalfield in Sindh has 175 billion tonnes of coal
- Total reserves of Thar block II are sufficient to support 5,000MW energy for 50 years.
- NEPRA has proposed IRR for local coal (17.21%) and imported coal (15.67).
- Tariff dependent on size and capacity of the plant

Upcoming Hydel Projects-WAPDA

WAPDA Projects under Construction					
Sr. #	**Project**	**Location**	**Capacity (MW)**	**Status**	**Expected Completion**
1	Kurram Tangi Dam	32KMs North of Bannu City, FATA	83	Physical progress ~90%	2019
2	Keyal Khwar	Indus River, Kohistan, KPK	128	Physical progress ~90%	2020
3	Tarbela 5th Extension	Indus River, Tarbela, KPK	1,410	PC-1 approved	2021
4	Dasu	Indus River, Kohistan, KPK	4,320	Pre-qualification of contractor completed	2023
5	Mangla Dam Up-gradation	Jhelum River, Punjab	310	In Process	2023
6	Diamer Basha	Indus River, Chilas, KPK	4,500	Ready for construction	2024
Total			***10,751***		

- Pakistan has a Potential of ~60,000 MW of hydel electricity generation.
- Installed capacity – 8,239 MW.
- Currently contributing ~25% to the total national capacity.
- KPK government – PEDO is in the process of constructing 350 micro dams which will generate ~3000 MW.
- KPK has an estimated power potential of generating nearly 30,000 MW.

Upcoming Hydel Projects-IPPs

Hydel IPPs					
Sr. #	Project	Location	Capacity (MW)	Status	Expected Completion
1	Gulpur Hydropower	Poonch River, Gulpur, AJ&K	102	FC achieved/Under Construction	Nov-19
2	Karot Hydropower	Jhelum River, Rawalpindi	720	FC achieved/Under Construction	Dec-21
3	Suki Kinari Hydropower	Kunhar River, KPK	870	FC achieved/Under Construction	Dec-22
4	Azad Pattan Hydropower	Jhelum River, AJ&K	700	FC in progress	Jun-25
5	Kohala Hydropower	Jhelum River. Kohala AJ&K	1,124	FC in progress	Jun-26
6	MahI Hydropower	Jhelum River, AJ&K	640	LOI issued	Jun-28
7	Kaigah Hydropower	Kaigah, Indus River, KPK	548	Feaseability study completed	Dec-28
8	Turtonas-Uzghor Hydropower	Golen Gol River, KPK	58	Feaseability study in progress	Dec-28
9	Athmuqam Hydropower	Neelum River, AJ&K	350	Feaseability study in progress	Dec-28
Total			***5,112***		

- Most (84%) of the installed hydro power capacity is owned by Pakistan Water and Power Development Authority (WAPDA) while only 16% is owned by private sector.

Upcoming RE Projects - Wind

IPPs Wind - RE				
Location	**Company**	**Capacity (MW)**	**Status**	**Expected Completion**
Gharo	Zephyr Power Pvt. Limited	50	Achieved finacial close	4QCY18
Jhimpir	Western Energy Pvt. Ltd	50	LOI Stage	1QCY19
Gajju	Burj Wind Energy Pvt. Limitd	14	LOI Stage	1QCY19
Jhimpir	Trans Atlantic Energy (Pvt.) Limited	50	LOI Stage	CY19
Jhimpir	Shaheen Reneable Energy - 1 (Pvt.) Ltd	51	LOI Stage	CY19
Total		***215***		

- Pakistan has the potential to generate more than 50,000 MW electricity through Wind. GoP tasked AEDB to produce 5% of total generation through RE by 2030.
- NEPRA has proposed IRR for Wind projects at 17.21%.
- Assumed capital cost of these projects is in the range of $ 1.5-1.8 million/ MW while worldwide average at the US $ 0.8 million, in India it is less than the US $ 0.7 million.
- AEDB Request for proposal (RFP) for solicitation of renewable energy on competitive terms is on the table for the last three years.

Upcoming RE Projects - Solar

IPPs SOLAR - RE				
Location	**Company**	**Capacity**	**Status**	**Expected Completion**
Bahawalnager	Bukhsh Solar (Pvt.) Ltd.	10	FC achieved	Mar-18
Bahawalnager	Safe Solar Power Pvt. Ltd	10	FC achieved	Apr-18
Jehlum	Blue Star Hydel Pvt. Ltd.	1	FC achieved	Dec-17
Jehlum	Access Solar Pvt. Ltd	11	FC achieved	Mar-18
Nooriabad	Integrated Power Solution	50	FC in progress	Jun-18
Nooriabad	Jafri & Associates	50	FC in progress	Jun-18
Nooriabad	Solar Blue Pvt. Ltd.	50	FC in progress	Jun-18
Jehlum	Access Electric Pvt. Ltd.	10	FC achieved	Mar-18
Dadu	R.E. Solar I Pvt. Ltd.	20	FC in progress	Mar-18
Dadu	R.E. Solar II Pvt. Ltd.	20	FC in progress	Mar-18
Rahim Yar Khan	Janpur Energy Limited SPV: Jan Solar (Pvt.) Ltd	12	FC in progress	Mar-18
Muzafargarh	Janpur Energy Limited SPV:Lalpir Solar Power (Pvt.) Ltd	12	FC in progress	Mar-18
Chakwal	Siddiqsons Solar Ltd	50	FC in progress	Mar-18
Bahawalnager	Adamjee Power Generation Pvt. Ltd.	10	FC in progress	Dec-18
Attock	ET Solar (Pvt.) Ltd.	50	FC in progress	Dec-18
Thatta	ET Solar (Pvt.) Ltd.	25	FC in progress	Dec-18
Sindh	ACT Solar (Pvt.) Ltd.	50	FC in progress	Dec-18
Bahawalnagar	Asia Petrolium Limited	30	FC in progress	Dec-18
Chakwal	First Solar (Pvt.) Ltd.	2	FC in progress	Dec-18
Thatta	Forshine (Pakistan)	50	FC in progress	Jun-19
Sialkot	Crystal Energy (Pvt.) Ltd	2	FC in progress	May-19
Total		***525***		

- Pakistan has the potential to generate 2.9mln MW of solar energy potential.
- Projects highlighted in Red were supposed to be completed in 2018.
- Delayed due to Tariff finalization.

Upcoming RE Projects - Bagasse

IPPs BAGASSE				
Location	Company	Capacity	Status	Expected Completio
Ghotki	M/s Alliance Power (Pvt.) Ltd	30	LOI Stage	2018
Chiniot	Safina Sugar Mills Ltd.	30	LOI Stage	2018
Mianwali	Almoiz Industries Ltd.	30	Achieved FC	2018
Rahim Yar Khan	Etihad Power Generation Limited.	30	LOS Stage	2018
Mandi Bahaudin	Shahtaj Sugar Mills Ltd	30	LOS Stage	2018
Faisalabad	Chanar Energy Limited	30	Achieved FC	2018
Muzafargarh	Sheikhoo Power Ltd.	30	LOI Stage	2018
Rajanpur	M/s Indus Energy Limited.	30	LOS Stage	2018
Rahim Yar Khan	M/s Hamza Sugar Mill Ltd (Unit-II)	30	LOI Stage	
Jhang	M/s Hunza Power (Pvt.) Ltd.	30	LOS Stage	2018
Bahawalpur	M/s Bahawalpur Energy Ltd.	30	LOS Stage	2018
Mirpurkhas	M/s Mirpurkhas Energy Ltd.	30	LOI Stage	2018
Tando Muhammad Khan	M/s Faran Power Ltd.	30	LOI Stage	2018
Bahawalpur	M/s Ittefaq Power (Pvt.) Ltd.	30	LOS Stage	2018
Tando Allahyar	M/s Mehran Energy Ltd.	30	LOI Stage	2018
Jhang	M/s Lume Energia (Pvt.) Ltd	30	LOS Stage	2018
D I Khan	M/s Alman Seyyam (Pvt.) Ltd	30	LOI Stage	2019
Rahim Yar Khan	M/s Sadiqabad Power (Pvt) Ltd.	30	LOI Stage	2019
Ghotki	M/s Gotki Power (Pvt) Ltd.	30	LOI Stage	2019
D I Khan	M/s Al-Mughnee Industries (Pvt.) Ltd	30	LOI Stage	2019
Mirpurkhas	M/s Digri Gen Limited	30	LOI Stage	2019
Bhakkar	M/s Darya Khan Power Generation (Pvt.) Ltd	30	LOI Stage	2019
Khairpur	M/s Ranipur Energy (Pvt.) Ltd	30	LOI Stage	2019
Rahim Yar Khan	M/s Hamza Sugar Mills Ltd (Unit-III)	30	LOI Stage	2019
Sargodha	M/s Popular Energy (Private) Limited	30	LOI Stage	2019
Total		***750***		

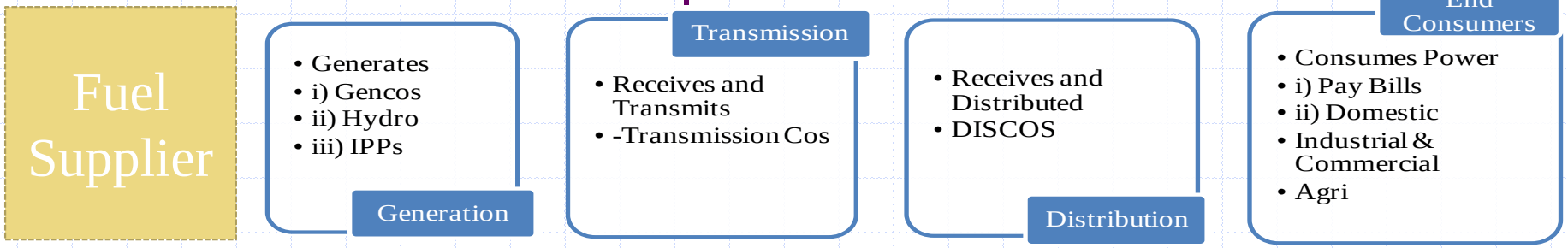
- Pakistan being the fifth largest sugarcane producer in the world has the potential to generate more than 2,000 MW electricity through Co-Generation.
- Projects highlighted in Red were supposed to be completed in early 2018
- Delayed due to Tariff finalization

Rating Universe – PACRA & JCR

Capacity Source	PACRA Universe	Capacity (MW)	Life (years)	Status	Ratings
Hydel	WAPDA-Debt Instruments	6,902	Varies	Running	AAA
K-Electric	K-Electric Limited	2,267	Varies	Running	AA/A1+
Thermal	Hub Power Company Limited	1,292	30	Running	AA+/A1+
	PakGen Power Limited	365	30	Running	AA/A1+
	LalPir Power Limited	362	30	Running	AA/A1+
	Kohinoor Energy Limited	131	30	Running	AA/A1+
	Atlas Power Limited	225	25	Running	AA-/A1+
	Foundation Power Company Daharki Limited	180	25	Running	AA-/A1+
	Sapphire Electric Company Limited	225	30	Running	AA-/A1+
	Narowal Energy Limited	214	25	Running	AA-/A1+
	Nishat Power Limited	200	25	Running	A+/A1
	Nishat Chunian Power Limited	200	25	Running	A+/A1
	Halmore Power Generation Company Limited	225	30	Running	A+/A1
	Saif Power Limited	225	30	Running	A+/A1
	Liberty Power Tech Limited	196	25	Running	A+/A1
	Habibullah Coastal Power Co (Pvt.) Limited	140	30	Running	A/A1
	Engro PowerGen Thar (Pvt.) Limited	660	30	Under construction	A/A1
Wind	Master Wind Energy Limited	52.8	20	Running	A/A1
	ACT Wind (Pvt.) Limited	30	20	Running	A-/A2
Solar	Harappa Solar (Pvt.) Limited	18	25	Running	A-/A1
Bagasse	Chiniot Power Limited	62	30	Running	A+/A1
Total		14,172			

Capacity Source	JCR Universe	Capacity (MW)	Ratings
Thermal	KotAddu Power Company Limited	1,600	AA+/A1+
	FFBL Power Company Limited	118	AA-/A1
	National Parks Power Management Co (Pvt.) Ltd	2,550	AA+/A1+
	Quaid-e-Azam Thermal Power (Pvt.) Limited	1,180	AA/A1+
K-Electric	K-Electric Limited	2,267	AA/A1
Solar	Quaid-e-Azam Solar Power (Pvt.) Limited	1,000	AA-/A1
Wind	Zephyr Power (Pvt) Limited	50	A-/A2
	Artistic Energy (Pvt.) Limited	50	A/A1
	Foundation Wind Energy I Limited	50	A+/A1
	Foundation Wind Energy II Limited	50	A+/A1
Total		8,915	

Risk Bubble | Where to find it?



Circular Debt | Build up over the years

Receivables (PKR bln)						
Entity	**Sep-18**	**Jun-18**	**Jun-17**	**Jun-16**	**Jun-15**	**Jun-14**
PSO	236	246	213	180	181	175
OGDCL	179	164	119	111	121	101
PPL	160	143	99	57	59	50
Attock Petroleum & Shell	22	20	13	9	9	16
Total	***597***	***573***	***444***	***357***	***370***	***342***

- Total amount of circular debt has gone around PKR 1,287bln, with stocks stood at PKR 597bln and flow at PKR 690bln.
- Government has planned to reduce circular debt gradually and will not involve a large one-time as was the case in 2013.
- Incumbent government is devising strategy to avoid pilling of circular debt in the future, which includes rationalization of tariff, plugging leakages, allowing NEPRA to notify and implement determined tariff automatically and improving governance structure.

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