

Business Conditions and Opportunities for Solar PV in Pakistan

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Outlines

First Part

- ✓ What are the key business conditions ?
- ✓ Are they conducive for investment in solar power generation?

Second Part

- ✓ What are the business opportunities for Solar PV?
- ✓ What is the way forward?

Third Part

Q& A

First Part:

Business Conditions- Extent of conduciveness

- ✓ **Electricity Demand and Supply**
- ✓ **Solar Potential**
- ✓ **Data Reliability**
 - Irradiation Data
 - Grid Integration and Constraints
- ✓ **Policy Framework**
 - Regulatory framework
 - Business Process /Project Development Cycle
 - Regulatory Process
 - Generation Tariff
 - Tariff structure
 - Security Packages

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- Fiscal Incentives
 - *Financial Incentives*
- ✓ Guide Lines for facilitation
- ✓ Replicable model
- ✓ First Part - Conclusion

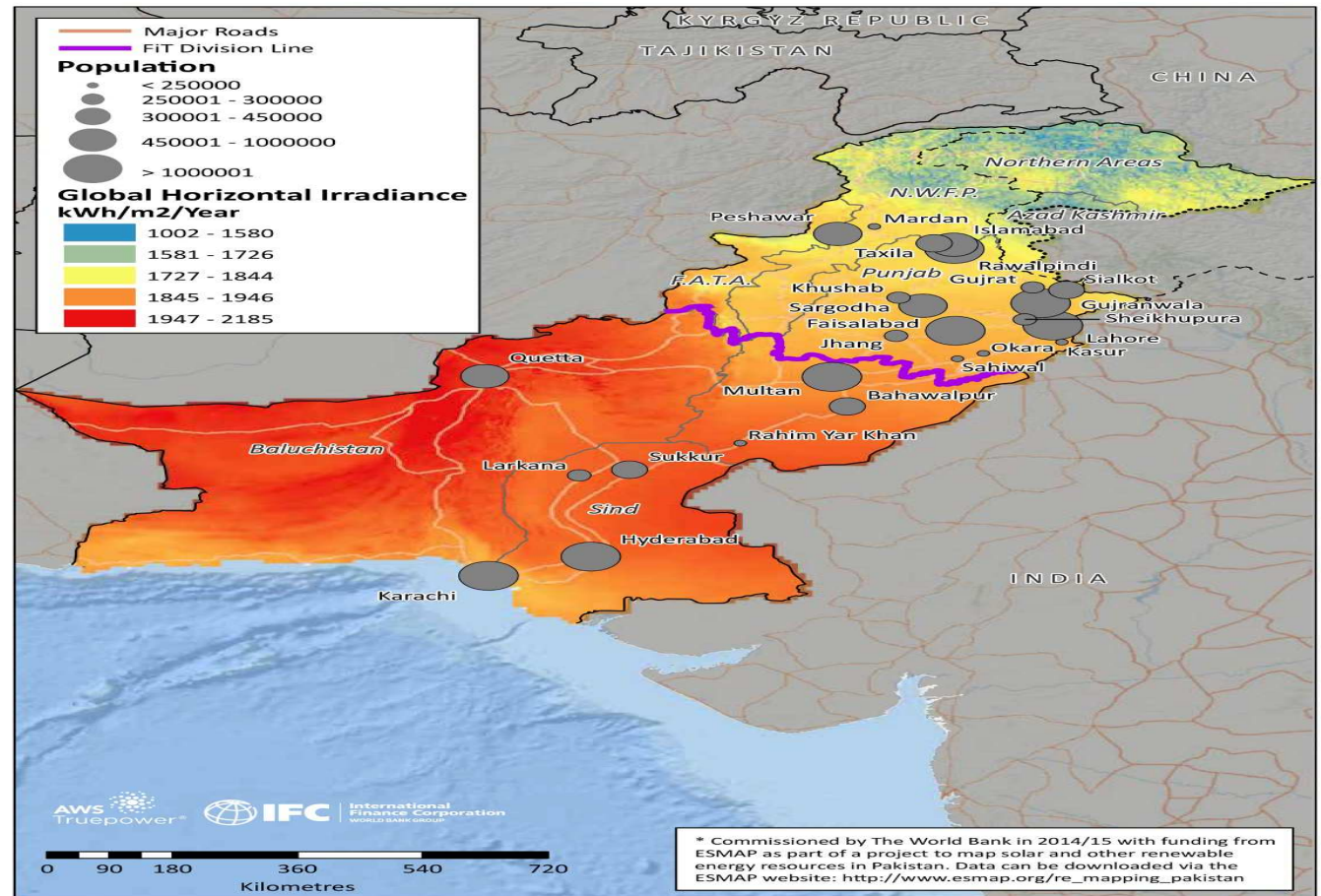
Demand and Supply Projections

Demand growth assumed at 7%

Year	Capability (MW)	Maximum Demand (MW)	Deficit / Surplus (MW)
2017-18	26,135	25,227	908
2018-19	28,357	26,564	1,793
2019-20	29,314	28,423	891
2020-21	34,124	30,413	3,711
2021-22	36,422	32,542	3,880
2022-23	39,345	34,820	4,525
2023-24	41,197	37,257	3,940
2024-25	47,750	39,865	7,885

Solar Potential in Pakistan

Much of Pakistan (Baluchistan, Sind and Southern Punjab) receives over 2MWh/m²/year of solar irradiation & 3000 hours of sunshine



Data Reliability

- ✓ **Irradiation Data**

Pakistan Solar Resource and Photovoltaic Power Potential Study- Bankable Solar Maps

(ESMAP - World Bank)

- ✓ **Grid Capacity and Constraints**

Study to Determine the Limit of Integrating Intermittent Renewable (Wind & Solar) Resources onto Pakistan's National Grid

(GOPA Study- USAID: Nov 2015)

Grid Integration Studies

✓ Comparison of generation expansion : With RE & Without RE

- “The results of the financial comparison of both scenarios are clear: the integration of Wind and PV Power is highly beneficial for the Pakistani Energy Mix and for the end user’s basket price in both the short-term and long-term.”

✓ Investment in Wind and PV is less risky

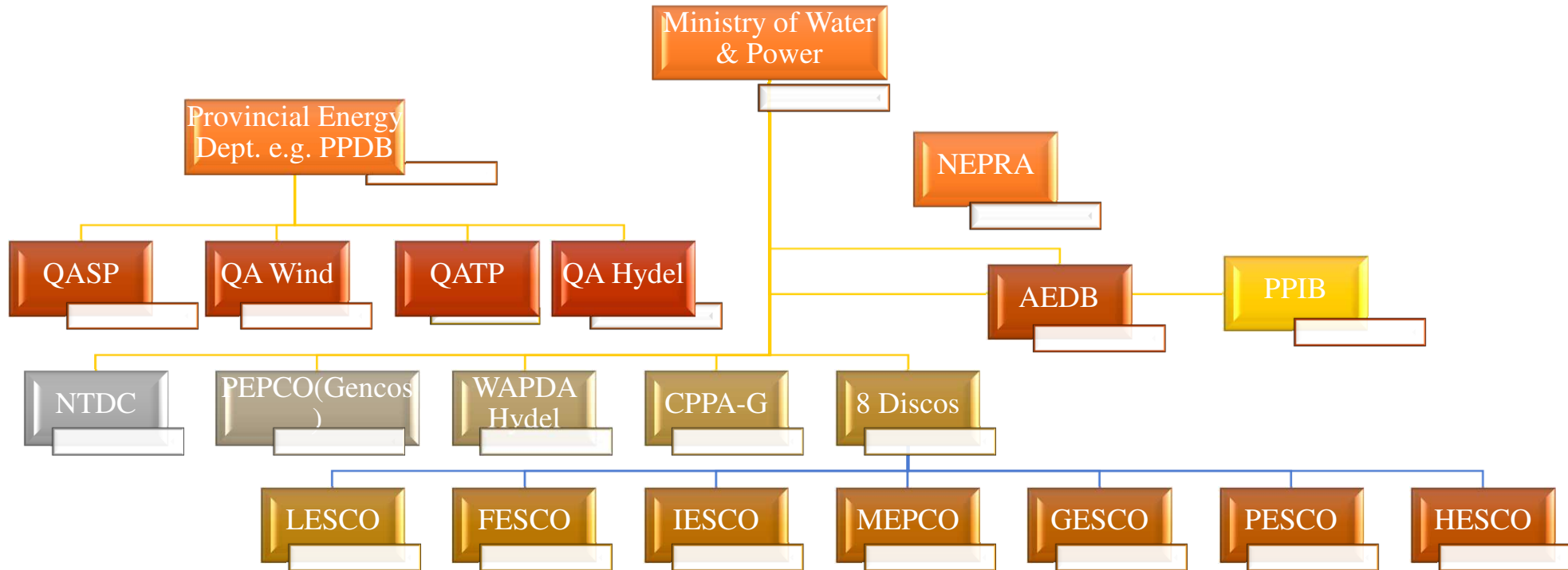
✓ Grid strength- Evacuation Capacity

- “...the studies show that until 2016/2017 a total amount of 2,2GW of wind and PV generation can be integrated into the national power system of Pakistan without any major grid upgrade. Until 2021/2022 it is possible to integrate all of the planned 9,4GW of wind and PV generation. In order to do this, numerous grid reinforcements at 500kV, 220kV and 132kV will be required...”

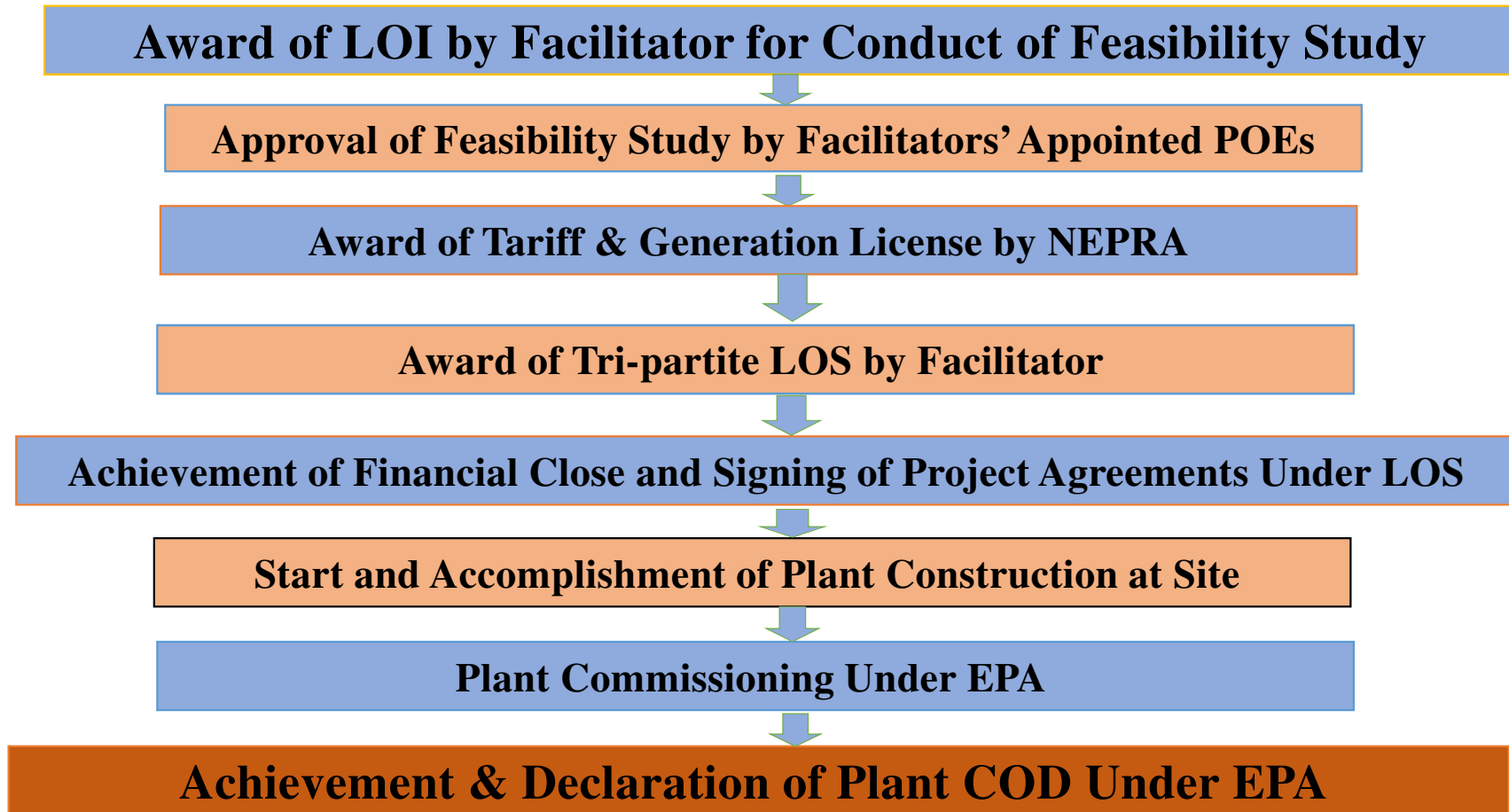
Policy Framework

- Policy Framework provided under Federal Policy for Development of Renewable Energy for Power Generation, 2006 (the “RE Policy”)
- Besides, AEDB at federal level, Provincial agencies empowered to play role of facilitator
- Role of Provincial facilitators under the RE Policy demarked- A Tri-partite Letter of Support regime established

Policy Framework- Regulatory Framework



Policy Framework - Project Development Cycle



Policy Framework – Regulatory Process

- NEPRA initiates regulatory process for an IPP subject to approved FS, and consents for Power Evacuation and Purchase by NTDC and CPPA respectively**
- Grant of Generation License**
- Determination of Tariff on any one of the following modes;**
 - Cost Plus Tariff
 - Upfront Tariff
 - Competitive Bidding Tariff
- Notification of NEPRA Determined Tariff by MoW&P**

Regulatory Process- Components of Generation Tariff for Solar IPPs

- ✓ Variable Cost Component (Local and Foreign)
- ✓ Fixed Cost Component (Local and Foreign)
- ✓ Insurance Cost Component
- ✓ Return on Equity Component
- ✓ Debt Repayment Component
- ✓ Interest Expense Component

Regulatory Process – Solar IPP Tariff Structure

- ✓ Tariff is structured on ‘**Take & Pay Basis**’
- ✓ Single Part Tariff, Pricing Mechanism
- ✓ Generation Tariff, in terms of Rs./kWh, linked with Net Electrical Output actually Despatched or made available for Despatch by the Power Producer during a specified time period
- ✓ Dispatch of the Solar Plant is on **Must Run** basis

Regulatory Process– Security Package

✓ Energy Purchase Agreement (EPA)

- Current Regime – EPA with NTDC/CPPA
- Revised Regime (under consideration) – Tri-partite EPA; specifying IPP, CPPA and NTDC as parties

✓ Implementation Agreement (IA)

- IPPs enter into IA with GoP through AEB
- IA, inter alia, also guarantees payment obligations of NTDC/CPPA

Policy Framework – Fiscal Incentives

- ✓ No Customs Duty or Sales Tax on Import of Machinery, Equipment & Spares
- ✓ Exemption from Income Tax, Turnover Rate Tax and with-holding Tax on Imports
- ✓ Repatriation of equity along with dividends allowed
- ✓ Parties may raise local and foreign finance
- ✓ Non-Muslims and non-residents exempted from payment of *Zakat* on dividends paid by the company.

Policy Framework- Financial Incentives

- ✓ Issuance of corporate registered bonds permitted
- ✓ Issuance of shares at discounted prices allowed
- ✓ Foreign banks allowed to underwrite issuance of shares & bonds by IPPs
- ✓ Non-residents allowed to purchase securities issued by IPPs without permission of SBP

Guidelines for Facilitation

- ✓ A Solar Developer's Guide (IFC- World Bank)
- ✓ Net-Metering Reference Guide for Electricity Consumers

Replicable Model: QA Solar – 100 MW | Our Success Story



Rs.6b

(~US\$60 M)
Electricity Sale
(Y1 & Y2)

Rs.2.39b

(~US\$ 23.5 M)
Net Profit
(Y1 & Y2)

378 GWh

5.5 % higher than
target
since inception

AA-

Credit Rating

First Part:

Business Conditions- Extent of conduciveness- **Conclusion**

- ✓ Pakistan Provides a very conducive structure for investments in the solar power generation
- ✓ Growing interest of investors from all over the world in Solar Power Generation Sector is a testimony of their confidence in the Business Conditions in Pakistan

Second Part: Business Opportunities & Way Forward

✓ **Grid Connected**

- 400 MW in operation . Target : 2.2 GW by mid 2018
- Over 3000 MW LOIs issued – Different stages of Project Development
- Numerous applications pending for grant of LOIs
- Grid constraint – RE projects up to 10% of total generation
- Limited availability of state land- Investors may procure project land

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✓ Solar Distributed Generation Projects

(Off- Grid & DISCO Network Connected)

- Huge potential of off-grid and DISCOs Network connected solar projects
 - Business model/ Donor intervention required
- Solar PVs used for tube wells and water filtration plants
- Punjab Project:-Solarization of 20,00 schools
 - First Phase 10,861 schools
 - Completion- before the end of this year
 - Bids received. Evaluation near completion
- Punjab Project : Solarization of 85,739 government buildings
 - Pilot project – 10 high consumption Educational Institutions identified
 - Energy Service Companies (ESCOs) to finance, install and operate.
 - Institutions to pay after third party validation

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✓ Net-Metering

- Pakistan's RE Policy-2006 provides policy coverage to power projects, up to 1 MW capacity, set up for self-use, desiring sale/purchase of electricity with power utility
- NEPRA (Alternative & Renewable Energy) Distributed Generation and Net Metering Regulations-2015 encompasses regulatory requirements
- Net-Metering Reference Guide for Electricity consumer available
- 147 Solar installations approved for Net-Metering till August
 - IESCO,LESCO, FESCO, MEPCO
- Government target:
 - 1000 MWp by 2020-21
 - 4500 MW by 2025

Second Part: Business Opportunities – Way Forward

✓ Grid Connected

- Companies with Existing LOIs should explore possibilities of procurement of land in the light of GOPA Study and other regulatory constraints (IF state land is unavailable)
- Other investors may explore Off-Grid & DISCO Network Connected opportunities or wait for enhancement in base load generation capacity

✓ Off-Grid & DISCOs Network Connected

- Huge potential in public and private sector
- Watch for the emerging opportunities
- Innovate, enterprise and create opportunities-
 - Agriculture Sector; Energy conservation, Net-metering
- Develop business models to harness the business potential
- Seek Government & International Donor partnership /Assistance where required
- Foresee future for Energy Service Companies (ESCOs)

Third Part

Q & A

Thank You for your time