

*Harnessing Public-Private
Partnerships for the Promotion,
Development and Financing of Solar
Energy Projects*

**Dr Arvind Mayaram
Former Finance Secretary
Government of India**

Financing Solar Power

- Solar power has emerged as next major source of energy
- Large percentage of global population has no or inadequate access to power
- The total financing need for developing power generation and distribution is beyond financial capacity of governments especially in developing countries
- Market based pricing of power not feasible in most power short countries due to capacity to pay constraints
- Public Private Partnership (PPP) are alternate source of financing and managing affordable power
- Although drop in solar power prices is rapid, it is still more expensive than thermal power and PPP an effective framework for bridging the gap

What are PPP?

- PPP project is a public asset or service provided by private sector
- Funded and operated through partnership of public sector and one or more private partners
- Involves a “contract” between a public authority and a private entity in which private entity provides public assets and/or services and assumes largely financial, technical and operational risks
- Revenue flows come largely from user fee
- User fee could be fully paid by consumers (toll), fully paid by public authority (annuities) or shared between consumers and public authority (toll+VGF)

...PPPs

- Public authority gets into a “contract” with private entity, an individual private entity or a consortium, to provide an asset and/or services for a pre-determined fee on agreed to service level standards
- Public authority may also transfer an existing asset for upgrading and/or maintenance which reduces capital requirement and hence incidence of user fee
- Where affordability is adversely impacted by market pricing, user fee is moderated by bringing down capital requirement through VGF
- In some cases instead of VGF as grants, tax breaks given to reduce project cost

Why PPPs?

- Two compelling reasons:
 - Harness private sector expertise and efficiencies in creation and/or management of public asset and delivery of public services
 - Shifting expenditure on public assets and services “off” public sector balance sheet
 - Private equity reduces pressure on government budget for up-front capital
 - Private debt (through project recourse) reduces the debt burden on debt stressed public finances

Indian experience with PPP

- India has globally largest PPP market
- Scale of infrastructure development through private investment largely PPP has risen sharply
 - 12th five year plan, out of total infrastructure spend of USD500 billion, about USD 150 billion private investment
 - 13th five year plan, out of total infrastructure spend of USD1 trillion, USD500 estimated private sector investment

Solar Power & PPP

Following factors make solar power amenable to PPP

1. Government budgets are short on resources and this equally impacts solar power
2. Solar power is more costly than thermal and affordability issue invites active government intervention
3. There is need for substantial government support for creating conducive eco-system for private investment, including FDI, in solar power

Chinese Experience with Solar PPP

- China world's largest manufacturer of solar photovoltaic(PV) having close to 65% of global market share
- In 2009, government announced two initiatives to assist private sector to partner in solar power:
 - A. BIPV (Building Integrated Photo-Voltaics) Subsidy Programme
 - B. Golden Sun Demonstration Project (GSDP)

...China

- GSDP to facilitate growth and expand scale of PV power generation industry
- Government subsidised 50% of investment for solar projects
- Subsidy also for free power transmission and distribution systems that connected solar power to grid
- Higher subsidy of 70% for independent PV generating systems for remote areas
- Grid companies mandated to buy all surplus electricity output from captive solar power units
- Purchase tariff benchmarked on-grid tariffs set for thermal power

...China

- By 2013 due to various factors including delayed realisation of subsidies, poor implementation of projects and poor grid standards, large number of projects abandoned
- To revive these government began to purchase power enhancing effectiveness of solar power systems instead of providing subsidies

India

- India has estimated 5000 trillion kWh per year energy incident over India's land area, with most parts receiving 4-7 kWh per sqm per day
- India's National Solar Mission (2013) aims to expand solar capacity to 20 gigawatts(GW) by 2020 and 200GW by 2050
- Estimated USD20 billion required to implement it

...India

- Solar power generation can be rapidly scaled up largely with PPP if cost of producing power not more than thermal power unit cost to give expected rate of return to private investor
- Solar power rates dropping with VGF: Between 2011-15 solar power prices fell by 61%
- Madhya Pradesh, in 2015, recorded lowest tariff at INR 6.5 a unit compared to INR 5.5 for thermal power
- Over time the level of VGF sought would decrease considerably with technology changes and drop in costs

...India

- PPP in solar power is in form of a firm long term Power Purchase Agreement (PPA)
- Government resorts to “reverse bidding” model
- Bids are invited from interested solar power developers for a predetermined capacity for different batches
- The lowest bid is declared as the Feed in Tariff (FiT) for the batch.
- Winning FiT applies to the selected solar project PPA for 25 years
- Reverse bidding mechanism is fair, transparent and predictable strengthening investor confidence

PPP Strategy

Three pronged PPP strategy

- Solar Power Parks (for large size projects)
 - Demarcated zone of development for solar generation units (single or multiple)
 - Investor gets area with proper infrastructure and access to amenities
 - Construction and preoperative regulatory risks substantially mitigated

Solar Parks

Central Government

- Regulatory framework
- VGF grant of up to INR 2 million/MW or 30% of the cost (including Grid connectivity), whichever is lower

Role of the States

- Provision of government land where required; at minimum price
- Parks to be close to Central Transmission Utility (CTU) for easy Grid access
- To have minimum 5 acres per MW
- All link infrastructure outside Park-connecting road, construction electricity, water supply etc.-to be provided

Solar Services Model (SSM)

Arrangement between owners of premises (“owners”)
and Solar Service Provider (SPP)

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Arrangement between “owners” and power utility

...SSM

- SPP enters into SPPA (Solar Power Purchase Agreement) with “owner” to instal and maintain over life cycle “roof top” (including open spaces within premises) solar power system
- “Owner” agrees to purchase system’s electricity output for the contracted period at a negotiated price
- “Owner” gets clean predictable power without high capital investment and system performance risk
- SPP gets income and tax breaks
- Power utility serving the “owner” provides PV system connectivity to the grid and continues to provide power either partially or fully depending on arrangement

...SSM

- In partial use model, part of solar power is used directly by owner, rest “sold” to the Grid; in full use model, utility sells power to “owner”, the latter sells power to utility...accounting is done through “NET METERING” in both cases
- This is a more complex as it involves a private-private partnership combined with and PPP

Going Forward

- About 1.2 billion people or 17% of world's population have no access to electricity
- About 79% of people in developing countries-50 poorest nations-are without access to electricity
- More than 95% without electricity in countries in sub-Saharan Africa and developing Asia, predominantly in rural areas

If in foreseeable future the power deficit has to be eliminated, more sophisticated PPP models and equity and debt instruments for solar power must be developed

Thank You