

PV Solar Power for Telecom BTS in India

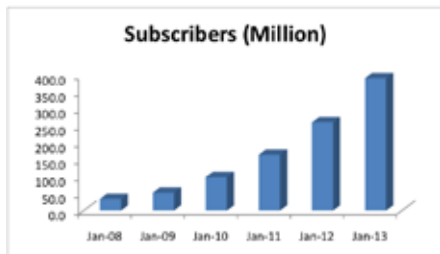
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Indian Telecom Industry Growth Story

India has emerged as the fastest growing telecom market in the world. The successful growth of the industry has been a catalyst for the growth story of India in other sectors.



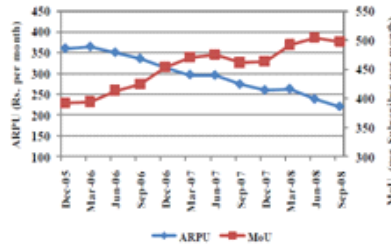
The operators have reported additions of approximately 15 million subscribers every month leading to an overall teledensity that has crossed 43.5 percent, with urban areas approaching 100 percent teledensity.



Source: Frost & Sullivan

The focus now is increasing penetration in rural areas to drive the next phase of growth. All stakeholders including the government, the regulator and the private players have taken significant initiatives to promote rural penetration and contribute to inclusive growth.

The growth is not without its challenges. In an



Source: TRAI

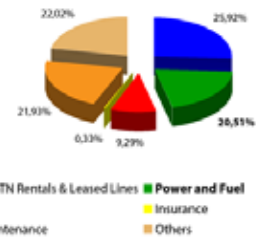
industry which measures sustainable profitability by Average Revenue Per User (ARPU), India has one of the lowest ARPU in the world ranging from INR 150 in the Circle 'C' states to INTR 350 in metros. The ARPU has been declining as the Minutes of Usage (MOU) have increased. This puts intense pressure on the operating infrastructure cost.

Tower and BTS Infrastructure

Underlying the growth of these subscribers is the country's Telecom Tower and Base Transceiver System (BTS) infrastructure. India has more than 250,000 telecom towers and this population is growing rapidly to keep up with the growth in additional subscribers and rural expansion. The BTS and tower infrastructure has gone through a transition-- from operator-owned to spun off independent companies using tower sharing models, with both passive and active tower sharing, in an effort to reduce costs in this highly competitive market. The industry is now increasing tenancy per tower and this concept has gained industry acceptance. The leading companies

engaged in this model have attracted a lot of venture capital investment, and there is a zealous fervor to reduce operating cost at each BTS site to survive margin pressures and deliver rural growth.

IDEA | Network operating costs



Source: IDEA Annual Report 2006-2007

The Power Problem

A quick analysis of telecom network operating costs indicates power and fuel are the primary operating costs, comprising over 30% of total operating cost. The primary reason is that in India, grid power (Electricity Board or EB power) is highly unreliable and, in a lot of cases, not available in rural areas. BTS sites require constant and uninterrupted power for the safe running and



Diesel Generator example, India

operations of the network. As a result, BTS sites have utilized onsite diesel generators (DG sets) to either provide backup or primary power in the absence of EB power. Uninterrupted operation is achieved through a battery bank. The typical configuration of DG set is 15-20KVA with fuel burn rate of 2-3 litres per hour (depending on full or half load operations). Assuming seven hours of DG operations in urban areas and 20 hours in rural areas, estimated usage of diesel fuel is 2-4 billion litres per year across the 250,000+ tower BTS sites in India. Fuel demand is increasing with each new tower.

India, with its excellent irradiance, has the opportunity to exploit Photovoltaic (PV) solar power to meet this challenge of onsite power generation. Coupled with a battery backup, PV systems are a viable and

exciting alternative to reduce the correlation between power cost and total operating expenditure (OPEX), thereby providing a sustainable and reliable strategic solution to the fuel problem. While the capital expenditure (CAPEX) to implement a PV system is greater than setting up DG sets, this is more than offset through a reduction in operating expenditure.

Government Policies

The Indian governments new policy direction provides incentives for using renewable energy on one hand and decreasing subsidies on petroleum fuels and a move towards market pricing in this regard.

The Ministry of Renewable Energy has issued Guidelines for Off-Grid and Decentralized Solar Applications

under the Jawaharlal Nehru Solar Mission. This provides capital subsidy of up to 30% of capital cost for such systems, to a maximum subsidy of INR 90 per watt peak (EUR 1.5) for systems using battery backup and INR 70 per watt peak (EUR 1.1) for systems without battery backup for projects implemented in the current financial year. Alternatively, there is an offer of soft loans at 5% interest rate subsidized by IREDA for these projects. There are other benefits such as accelerated depreciation on the balance of the project in the first year.

On the fossil fuel front, the government recently deregulated the price of petrol as India's fuel subsidy bill rose to USD 3.2 billion in 2009/10 (0.3% of GDP). India's Prime Minister Mr. Manmohan Singh recently stated the government would explore similar

Type of BTS	Characteristics	Typical Load (KWh)
Rooftop Based Outdoor BTS	<ul style="list-style-type: none"> • TOWER - The Tower is mounted on top of a roof of a house/building. • EQUIPMENT - The BTS equipment – Rectifier, Battery Bank etc. is also mounted on the roof in the open in individual casings • SITE – The site is on the roof of a house/building. Typically there are people living on various floors in the house except the roof. There is very tight access to the site and the site is very dense in its layout • Airconditioning – None 	1.2 to 1.5 KWh per operator
Ground Outdoor BTS	<ul style="list-style-type: none"> • TOWER - The tower is mounted on the ground. • EQUIPMENT - The BTS equipment – Rectifier, Battery Bank etc. is also mounted on the ground in the site in individual casings • SITE – The site is plot – in suburban area – about 150 sq yards (125 sq yards). • Airconditioning – none 	1.2 to 1.5 KWh per operator
Ground Based Sheltered BTS	<ul style="list-style-type: none"> • TOWER - The Tower is mounted on top of a roof of a house/building. • EQUIPMENT - The BTS equipment – Rectifier, Battery Bank etc. inside a cabin mounted on the roof • SITE – The site is plot – in suburban area – about 150 sq yards (125 sq yards). There is a boundary wall/fence around the site and typically onsite security person with a small cabin/shade • Airconditioning – Yes 	1.2 to 1.5 KWh per operator 2.5 KWh per airconditioner (maximum 2 airconditioners in hot weather conditions)

Table: Relative load required per BTS station

market pricing for diesel. When this occurs, it will likely cause a sharp increase in the price of diesel over and above the regulated price increases the government has made the past few years.

These policies create a strong incentive for BTS operators to move to solar power, since the "Do Nothing" approach has an increasing risk on significantly higher operational expenditure.

Technical Study

Across various operators and infrastructure service providers in India, from a power load perspective there are essentially three types of BTS stations (see table, p.2):

BTS loads vary from 1.2 KWh to 8 KWh per site, depending on the number of operators supported by the tower and the use of air conditioning.

Assume a site with a single base station operating in a rural area with the following specifications:

- Operating Voltage: -48V DC
- Battery: 600Ah Tubular Gel
- Constant DC Load of 1200 watts
- 15 KVA DG set

Such a site converted into a solar site using a meeco standard 4 KWp sun2com installation would yield savings in excess of INR 45 Lakhs (EUR 75,000) over a period of 10 years, with a breakeven of 3-4 years.



meeco sun2com installation -Battery & inverter room

sun2com by The meeco Group

The meeco Group's sun2com solution is based on a high availability Swiss/German design. Built using best in class components, sun2com projects are highly bankable and generate a lower total cost of ownership.

The key benefit of meeco's sun2com technology for BTS sites in India is providing much needed step-reductions in operating cost. Highly customizable, sun2com can meet the requirements of both low and high consumption BTS sites.

To learn more about our telecommunication solutions, please visit us on www.meeco.net/oursun or contact us by email at info@meeco.net.



meeco sun2com installation