

Large and sustainable solar photovoltaic generators by using the roof-top of industry sheds for energy security during daytime

By Praveen Kumar Kulkarni

Residential Roof top projects with few private EPC companies are being mooted / realised in Gandhi Nagar, Gujarat, which is a welcome initiative with few PILOT cases and their results.

While supporting MNCs in INDIA before, I had envisioned this aspect of the usage of the roof top of these large manufacturing units can be put to best use for solar



Image: Roof-top solar energy system

PV power generation, with the falling prices of PV component, the surface area of roof top of such useful industrial SHEDs (mostly at 11 deg. to 16 deg. inclination) can be used (subject to structural design sustainability with design verification and validation for each location).

Few of large factories like Alstom, Areva, ABB, L & T, ESSAR, Refineries, Ports, Auto giants, Steel plants, etc. in Gujarat / India can even house the PV panels equivalent to 4 MW / single location or more due to such large and useful roof top surface / exposed area.

It would be a good idea to collect the data on available surface area i.e. roof top area of such large factories, steel plants, port or process industries located in GUJARAT / INDIA where solar irradiation can be best utilized with an effective planning to harness solar PV energy generation.

No policy exists as of now to stop them using their own roof for their internal benefits, considering tariff escalation for commercial purpose in the decade to come... However, Government can provide necessary and modest FISCAL incentives to promote Solar PV power generation while allowing the factory for their captive consumption. Thus, promote the idea of Solar Generators!

The difference between INDIA and USA or other Western Country is: Capitalist idea based corporate creates a business opportunity and tries to scale up at fast speed (their Government administration allows quick action, even in Singapore, too) for its FIRST HUGE MARGINS, but, the "NEITHER Socialist nor Capitalist INDIA" (believes in borrowing at low cost through IREDA, but, allows middle men / institutions to make more percentage and charge high interest rate for debt funds which are secured at low costs, which is against socialism !) makes small trial after WEST takes initiative

in a haphazard way and then invests more to correct the flawed system..... thus, we remain as copy cats, instead, my drive is to collect data, bring transparency, allow a business case to be formed with low cost mechanism and insist to adopt that as a POLICY with an open business plan to promote new entrepreneurs, thus, INDIAN citizen gets the benefit of low cost energy generation, instead of allowing only few corporate or industrialist to make money.....

Important: FIT (Feed In Tariff) or letting out roof surface area to third party (as is the case with residential roof top system) or such initiatives will increase or load common man, which must be avoided at all costs.

With a good technology deployment mind set to use the DC power and then judiciously convert to AC power as per the need of the factory between 7 am to 6 pm be planned.

The idea is to replace the consumption of Diesel (reduction in Import of Oil, Subsidy removal, promotion of cleantech) in DG or Gas or Coal during these hours by switching to Solar PV in a phased manner so that Production does not get interrupted during the operation or during the erection of the PV panel above the roof (i.e. no production down time or interruption or no damage to the existing structure of the factory sheds).

Indicative figures (only for reference): The COG of Rs..4 to 5/kwh (Cost of Generation without ROE) with high equity with sample project cost of Rs. 6 Crore and 7.5 Crore/MW can be realized today. Less land usage (Electricity item location only), not much of additional structures, improved cabling through existing Cable trays route / supports, learned maintenance team available will be able to bring down the costs further.

Joint awareness is necessary to promote solar PV power generation on Factory roof top so that Industry owners can come forward in bringing down the carbon emission (not just by buying the certificates or energy like what Torrent is doing, but, need to support them to invest in Solar Generators !), but, with a real participation. This will enable business creation and employment generation within the existing units with a good awareness of CLEAN TECH initiatives on Climate change with a business case (no charity please).

Corporate Social Responsibility: Please note that many industries were given the land at very cheap price by the government (which belongs to public), now, it is the time to ask these industrialists to invest in Solar PV power generation to reduce the pressure on the grid, so that villages can be supplied with power in the day time.

Excess power, if generated, with little mark up price on COG can be sold to Utility companies with good FISCAL incentives as "The business is no charity" and "Common man need not support solar PV generation through his nose" always with high

tariff being supported by Government as it will not be sustainable due to high budget deficit.

There is always a scope for improvement on business numbers with a good intent and with a positive outlook at the India's foot print on Global climate change in an economical way with long term sustainability for its socio-economic objectives with a clear business plan with increased stake holder participation with a great transparency at all levels with the necessary education.

There is a Large Scope for roof top energy generation by the industries to relieve grid pressure during production hours. Roof top use on RESIDENTIAL ROOF in the other parts of the world are not successful (it may even increase corrupt practice of meter adjustments etc) as the rent to be paid and the real energy generation, non feasibility to connect the generated power to GRID due to Grid failures (in INDIA "No Power in Grid" is very frequent, hence, it may lead to manipulation or corrupt practices) and its monitoring / review are expensive and no transparency and may lead to wrong business practices.....

It is better to collect the data of large and usable roof surfaces of Industry (which will run into 100s of MW solar PV power generation opportunity through Industry roofs) in each state and publish in the MNRE website officially to evolve a good business case, where the industry owner may like to hire good EPC company and maintain it as Solar PV may be their non-core business area.

Please note that we need to use the Land for accommodating the Solar PV wherever possible, with a distributed Generation concept to reduce the oil import..... we can use the day power of Solar PV to the maximum along with day peak requirement, thus, for night power or peaking requirement (when solar PV power is not available), then, we can use other resources.

This can be a good solution along with hybrid power mix with SMART GRID metering to reduce the power theft and to improve the load side demand management very efficiently.

Many Auto Industries are finding their place in Gujarat at a low cost land, which is a welcome point as the Government is a good facilitator.

In order to ensure, future energy security, let the roof of these industry shed be designed (before giving them approval for their structures) to be Solar PV panels mounting compliant, so that in future these industries can deploy solar PV Generators to promote renewable energy, reduce coal or oil import due to grid power usage, thus, contribute to Current account deficit too.

This shall apply to steel plants which are investing CAPEX for their capacity expansion etc. MECON / CET / SAIL / Dastur co. etc, may please be informed accordingly to incorporate in the structural designs in future. Though it may increase the cost of steel a bit, in principle, but it can be cost effectively designed, however for having secured government land (public property), the industry needs to give back to the society in the form of promotion for clean tech energy generation to reduce oil usage and thereby pollution related issues.

It is also an endeavor to use the land for multi-purpose i.e. set up auto / steel industry + Power generation (be it captive or surplus). Let all new Industry sheds (structures) be, as a mandatory, implement structures to house future PV panels, through an ordinance (if need be).

Let the CAPEX for Solar PV generator be provided after the internal accruals, but, we will be reserving the space (most precious land) for future PV energy generation as a sustainable energy development plan.



The author is a Gold Medalist from SLN College of Engineering, Gulbarga University. Industrial work experience over 23 years with PSU, MNCs. He had worked for: Tungabharda Steel Products Ltd, Hospet from 1988 to 1995. Executed engineering of 21 Hydro Mechanical Equipment projects. Deputed to Japan for 5 months as part of UNIDO program to become JICA participant-1994. He introduced CAD in TSPL with software programs for design of Gates, Hoists and Cranes. He was deputed to TSPL Hyderabad branch to assist business development of Steel Plant Equipments.

With SMS Demag India Ltd, German MNC), he engineered Steel Melt Shop equipments of Jindal Vijay Nagar Steel Plant. Apart from being the Head of Secondary refining equipments viz VD, VOD, RH, RHOB, SMS equipments, he supported the pre-bid and business development activities thru ICB of SMS Demag Secondary refining equipments. Visited SMS Demag, Duisburg on company assignments.

ALSTOM Portugal / India (French MNC) hired him as a Consultant and Part of Management team to launch Hydro Mechanical Equipment in India in their Baroda factory. Prepared Business plans, Export support (IME, Owenfalls, Uganda), tendering support to realize and launch Omkareshwar Project. Visited ALSTOM Lisbon, France, Grenoble on assignments and important missions. He was a Project Manager of Omkareshwar HME (24 ME) and as Implementation Manager to rebuild (15ME) Alstom Baroda factory to manufacture Hydro turbines, Generators and HME to cater to their Indian and Export Markets. He visited USA, Russia for special equipment evaluations, purchase and installations. He was the Project Director of Nam Ngum, Laos HME project (10ME).

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