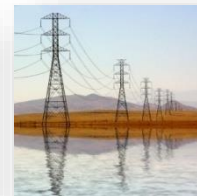
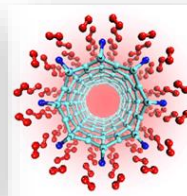
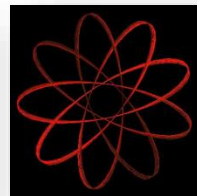


Benefits and Commercial Viability of Rooftop Solar Photovoltaic (PV) Programme for Jharkhand

12 February, 2018



Outline

- ▶ Introduction to rooftop solar photovoltaics (RTPV)
- ▶ Benefits of RTPV to Consumer
- ▶ Financials & Payback





Benefits of RTPV to Consumer

- ▶ Benefit of cheaper power
 - ▶ Assuming: Cost of power purchase: Rs. 4.0 /unit, cost of recovery: Rs. 3.5 /unit.
 - ▶ Hence, benefit from self-generation: Rs. 0.5 /unit
 - ▶ 1 kW Solar → Generation: 1460 kWh/ yr → Saving: Rs. 5400/ kW/yr
- ▶ Upto 50% Subsidy on Installation
- ▶ Subsidy Available till 02 May 2018.
- ▶ Payback in 5 years
- ▶ Free Electricity after payback period
- ▶ Apply Online at JREDA (Web: www.jreda.com)
- ▶ Mobile App for Consumers
 - ▶ AHA Solar at Google Play Store & App Store



Subsidy Availability

Plant Capacity (kWp)	Rate (INR/kWp)	Subsidy for Residential (INR/kWp)	Subsidy for Social Sector (INR/kWp)	Subsidy for Industrial/ Commercial (INR/kWp)
Without Battery				
1 to 5	72,000	35,000	21,000	7,000
>5 to 10	70,000	35,000	21,000/	7,000
>10 to 50	70,000	32,500	19,500	6,500
>50 to 100	61,000	30,500	18,300	6,100
Above 100	61,000	30,000	18,000	6,000
With Battery				
1 to 5	1,20,000	35,000	21,000	7,000
>5 to 10	1,10,000	35,000	21,000	7,000
>10 to 50	1,10,000	32,500	19,500	6,500
>50 to 100 k	1,05,000	30,500	18,300	6,100
Above 100	1,05,000	30,000	18,000	6,000



Benefit of RTPV to Consumer

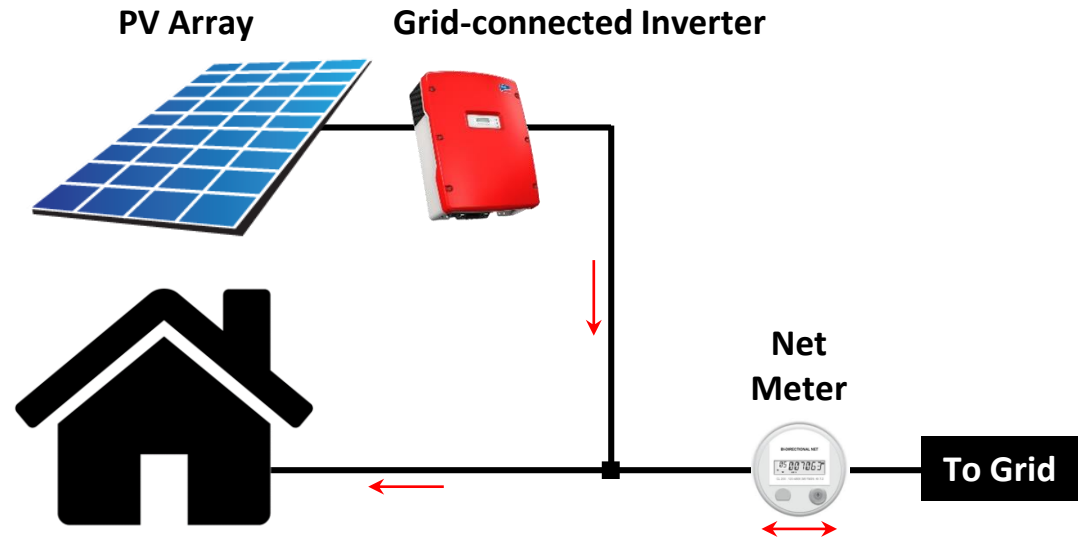
Particulars		Case 1	Case 2	Case 3
Customer Type		Residential/ Social Sector	Residential/ Social Sector	Residential/ Social Sector
Depreciation		NA	NA	NA
Capacity	kW	3	20	60
Base Rate	Rs. Lacs/ kW	0.72	0.70	0.61
Base Cost	Rs. Lacs	2.16	14.00	36.00
Subsidy	Rs. Lacs	1.05	6.50	7.20
Project Cost	Rs. Lacs	1.11	7.50	4.80
CUF	%	17.25%	17.25%	17.25%
Consumer Tariff	Rs./ kWh	3.7	3.7	3.7
Results		Case 1	Case 2	Case 3
IRR	%	19.82%	19.58%	24.10%
RoE	%	19.82%	19.58%	24.10%
Payback	Years	5.12	5.19	4.25

Note: On an average 1 hour power back-up from Diesel is considered

What is Rooftop Solar Photovoltaics (RTPV)?

Grid-connected PV System

Capacity	Rate
1-5 kW	Rs. 72,000 /kW
>5-10 kW	Rs. 70,000 /kW
>10-50 kW	Rs. 70,000 /kW
>50-100 kW	Rs. 61,000 /kW
>100-500 kW	Rs. 61,000 /kW

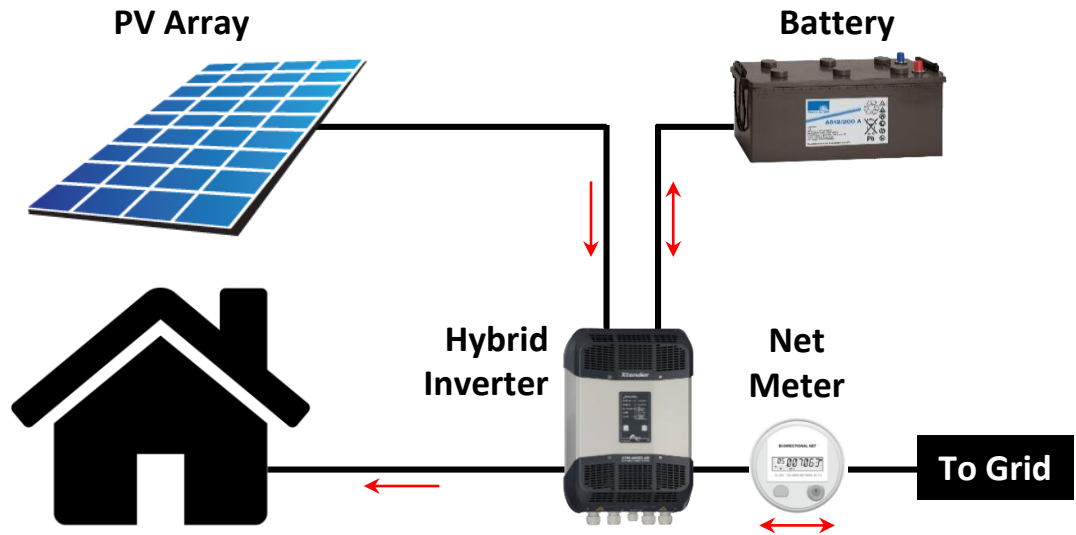


- ▶ Solar Photovoltaic (PV) modules are installed on roof/ terrace.
- ▶ Instantaneously generate DC electricity proportional to Sun's intensity.
- ▶ Grid-tie inverter converts DC to AC and injects AC electricity into the grid.
- ▶ Solar electricity is utilized by the load, and surplus is exported into the grid.
- ▶ The net-meter is bi-directional, and accounts for import and export of electricity.

What is Rooftop Solar Photovoltaics (RTPV)?

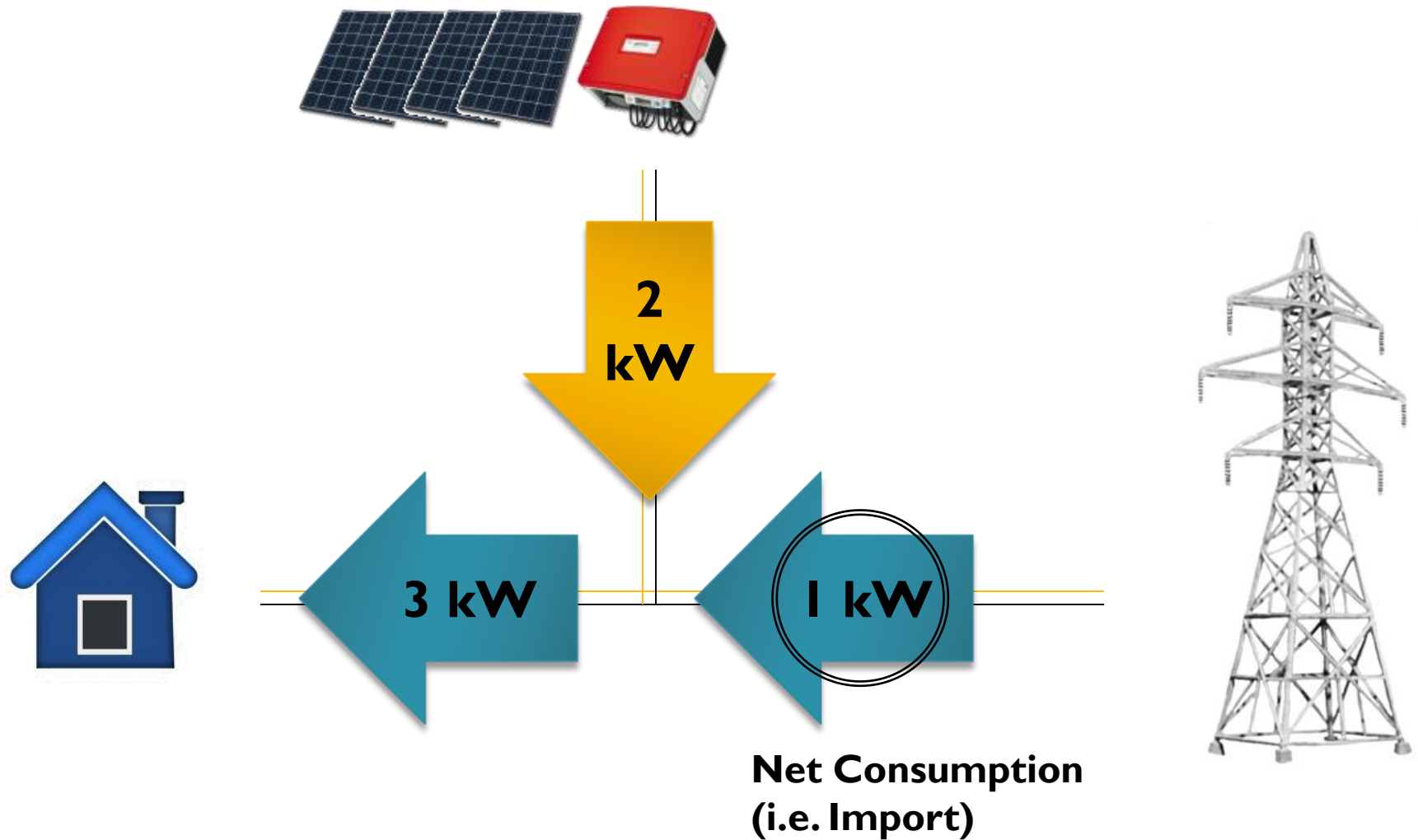
Hybrid PV System

Capacity	Rate
1-5 kW	Rs. 1,20,000 /kW
>5-10 kW	Rs. 1,10,000 /kW
>10-50 kW	Rs. 1,10,000 /kW
>50-100 kW	Rs. 1,05,000 /kW
>100-500 kW	Rs. 1,05,000 /kW

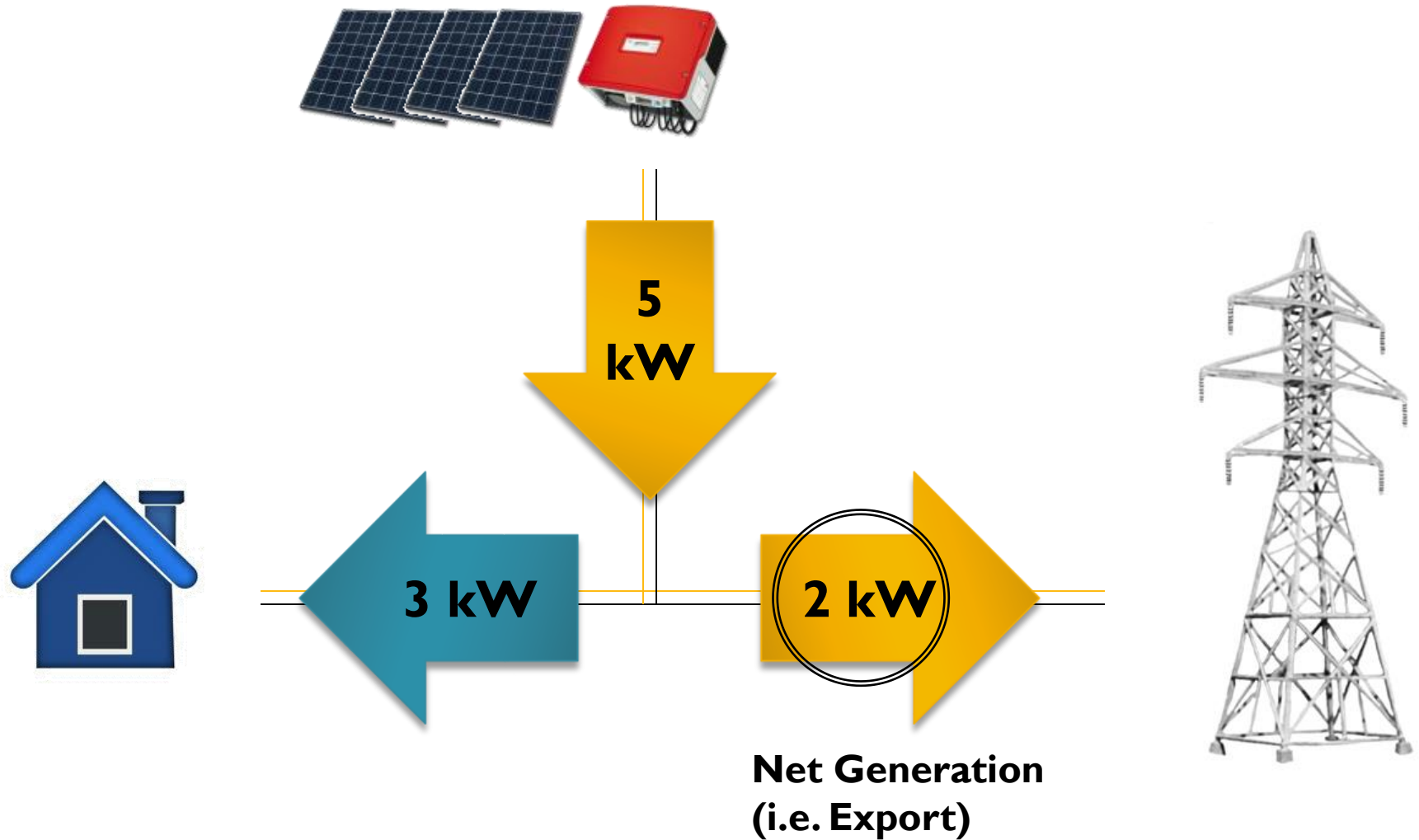


- ▶ Typical 'Grid-connected' PV systems are required to shut down in case of grid outage for safety reasons (anti-islanding feature).
- ▶ 'Hybrid' PV systems with battery backup can be used to keep the system 'ON'.
- ▶ The 'Hybrid Inverter' disconnects the entire PV system (including the load) from the grid.
- ▶ However, hybrid systems are more expensive (complex inverters, battery cost).

Function of Net-Metered System: Case 1



Function of Net-Metered System: Case 2



Thank You.

