

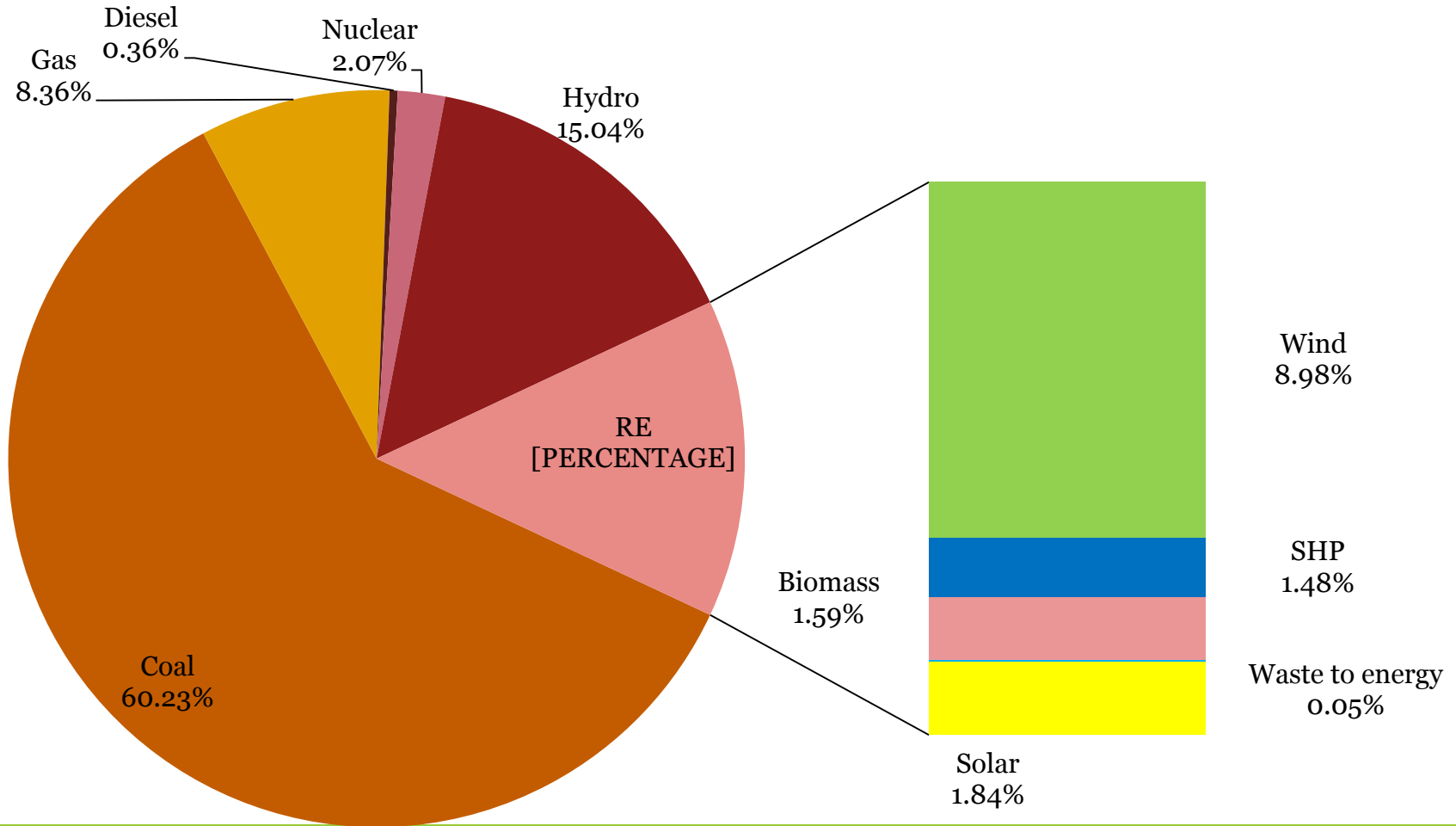
PRESENTATION ON FINANCING SOLAR PROJECTS IN INDIA – IREDA'S EXPERIENCE



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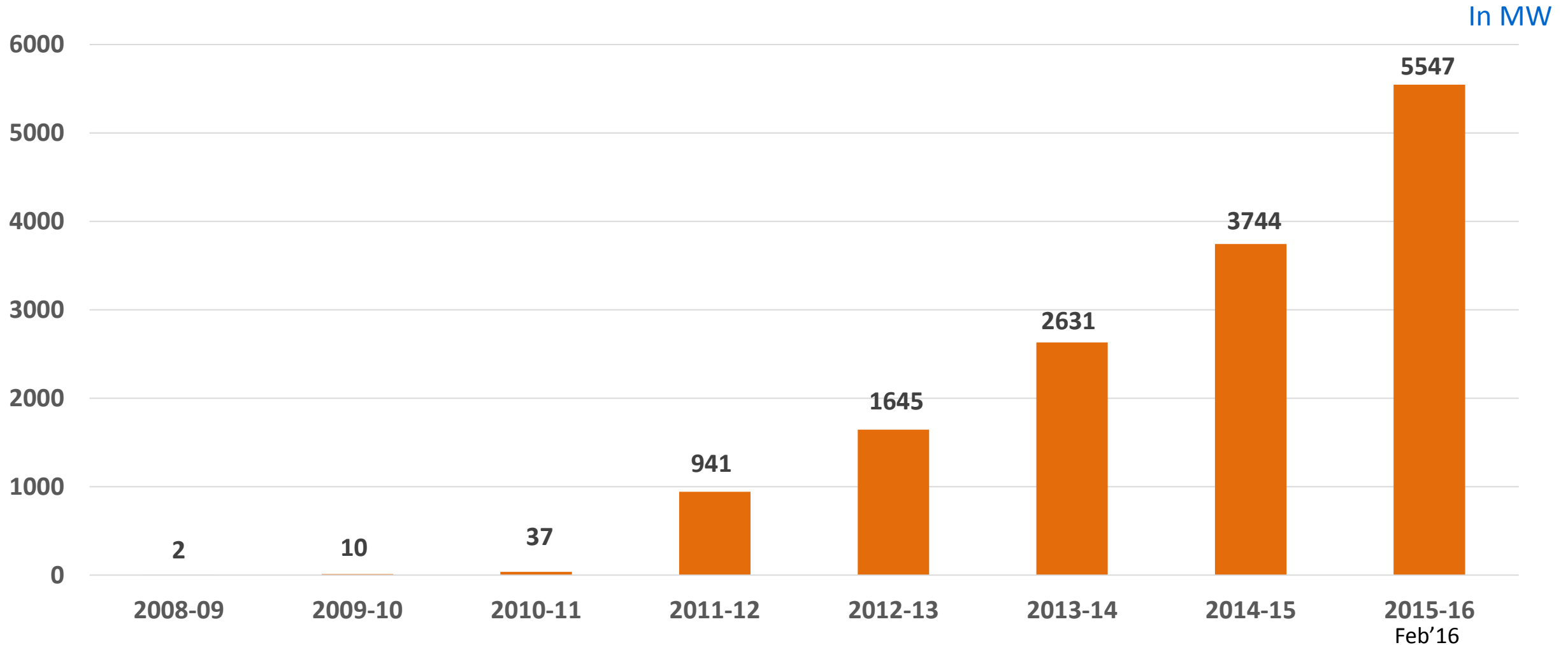
Power Scenario in India

Installed capacity of 288 GW, of which RE capacity is over **39 GW** (as on Feb 2016)



Solar Power Installed Capacity

Total Solar installed capacity in the country is **5547 MW** as on 29.02.2016 with over 1800 MW installed during 2015-16



Year-wise Targets to scale-up 100 GW Solar by 2022

Year	Rooftop (MW)	Ground Mounted(MW)	Total (MW)
2015-16	200	1800	2000
2016-17	4800	7200	12000
2017-18	5000	10000	15000
2018-19	6000	10000	16000
2019-20	7000	10000	17000
2020-21	8000	9500	17500
2021-22	9000	8500	17500
Total	40000	57000	97000(*)

(*) 3,743 MW Commissioned upto 2014-15

Reducing cost of power from Solar

Bidding tariffs for solar projects have been declining due to drop in capital costs and competitive bidding

Tariffs evolved in FIT - Competitive bid process (INR/kWh)

Project	Capacity on Offer (MW)	Lowest (Rs/KWh)	Year
NSM – Batch I	150	10.95	December, 2010
NSM – Batch - II	350	7.49	December, 2011
Madhya Pradesh	125	7.90	June, 2012
Karnataka	130	5.50	August, 2013
Andhra Pradesh	500	5.25	October, 2014
Madhya Pradesh	300	5.05	June, 2015
Punjab	500	5.09	September, 2015
Andhra Pradesh	350	4.63	December, 2015
Rajasthan	420	4.34	January, 2016

Factors leading to reduction in solar tariffs

De-risked Bidding



Guarantee by Off-takers

- Payment security with NTPC and SECI as the power off-takers in most bids
- Three month payment guarantee in case of delays from the distribution company



Online reverse bidding

- Enables developers to lower their bids in real time
- Promotes competition with transparent lower tariffs



Scale of projects and Solar Parks

- Large scale projects being bid result in economies of scale
- Faster and easier implementation of projects
- Common pool of resources and better network utilisation

Reduction in EPC costs



Reduced technology costs



Strong competition with lower margins for EPC's



Larger pool of investors



Concessional financing

Entry of major foreign players

Investment requirement

- ❖ To achieve 175 GW, RE Sector needs to attract huge investments.
- ❖ Total investment in setting up 100 GW Solar Power will be around Rs. 6,00,000 cr.
- ❖ Requires innovative approach to attract the desired investment to meet the targets.

About IREDA

Dedicated FI for Renewable Financing

- Financing Renewable Energy projects since last 28 years.
- Financed more than 2200 RE projects.
- Supported green capacity addition of more than 6000 MW
- Loan Sanctioned to the tune of ₹ 37,500 Crores & disbursed ₹ 20,633 crores as on date.
- Largest share in RE Project Financing in India
- Catalyzed Market Development
- Profit earning & dividend paying since inception.



Operational Areas

Sectors being financed :

- ❖ Wind Energy
- ❖ Hydro Power
- ❖ Solar Energy
- ❖ Biomass including Bagasse & Industrial Cogeneration
- ❖ Biomass Power Generation
- ❖ Waste to Energy
- ❖ Energy Efficiency & Energy Conservation
- ❖ Bio-fuel / Alternate Fuel
- ❖ Hybrid Projects with RE Technologies
- ❖ New & Emerging Renewable Energy Technologies



IREDA Financing Products / Schemes

Direct Lending

Project & Equipment Financing

Loans for Manufacturing

Take Over Loans from other Banks
/ FIs

Short Term Loan Assistance

Bridge Loans against Capital
Subsidies / VGF / GBI / SDF

Lending through and with Financial Intermediaries

Line of Credit to NBFCs for on-
lending to RE / EEC Projects

Underwriting of Debt / Loan
Syndication

Other Services

Responsible for Disbursement of
GBI by MNRE

Loan against Securitization

Partial Credit Guarantees



Business Evolution

INITIAL MARKET	CURRENT PORTFOLIO
Entire share of RE financing market	Facilitated entry of banks through showcase of successful stories
Support to small size plants	Large grid-tied projects
Balance sheet financing	Financing IPP (non-recourse)
Stand-alone financing	Consortium financing Take-out finance
International Assistance (LoC) under sovereign (Govt) guarantee	Secured International Assistance (LoC) on independent basis

Financing Instruments – Solar Projects

■ Term Financing

- Structured / flexible Repayments(Tapered, Bullet) linking with seasonal generation.
- Longer door-to-door repayment payment periods with more than 10-15 years.
- Higher Debt Equity ratio(3:1) for Solar and Wind Projects.

■ Additional finance through “Securitization of future cash-flows”

- Loan against securitization of future cash flows of existing RE projects which can be used for future business expansion in RE sector.
- Towards providing **seed capital** for new RE projects .
- Higher Debt Equity ratio of 4:1 is allowed with the 8 years repayment.
- The project should be commissioned and running successfully for at least last 3 years.

New Financial Instruments

- Bridge Loan Scheme to Project Developers
- Short term loan assistance to RE Developers/ Suppliers/Contractors
- Underwriting of Debt/Loan Syndication
- Take-Over financing
- Co-financing/Consortium with banks
- Refinancing Banks & FIs – Lines of Credit(LoC)
- Guarantee Assistance Scheme to RE Suppliers/Promoters.

New Financial Models

- IREDA loan/ SDF Scheme for IPP Cogeneration in Co-operative Sugar Mills
- Intermediary Loan Scheme - Financing Farmers for SPV Water Pumps through an Aggregator SPV/Sugar mills.
- IREDA support for Supplier Credit/Letter of Comfort for RE projects
- IREDA scheme for Solar Roof Top through Aggregator(RESCO)
- Direct Discounting of GBI for grid interactive Wind and Solar power projects
- Direct Discounting of Capital Subsidy payable to channel partners / SNAs for their Solar Water Heaters

Key Drivers – Solar Energy

- ❖ Solar Energy is gradually becoming cheaper and in contrast, the prices for electricity from conventional power are climbing.
- ❖ This is helping solar industry segment to become progressively more lucrative.
- ❖ Solar PV offers a profitable, long-term investment with comparatively low risk.
- ❖ Supporting interventions by the Government to meet the aggressive targets.

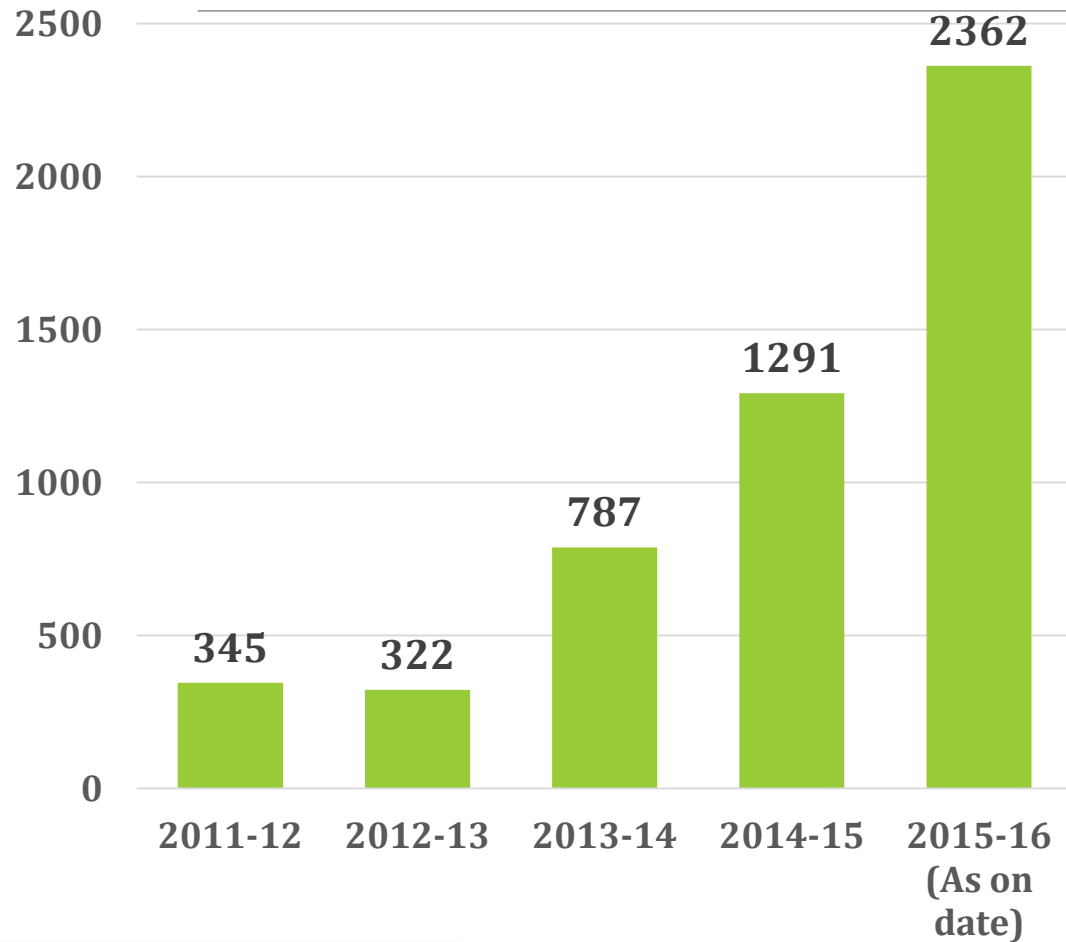
Development of Solar Market in India

IREDA's Experience

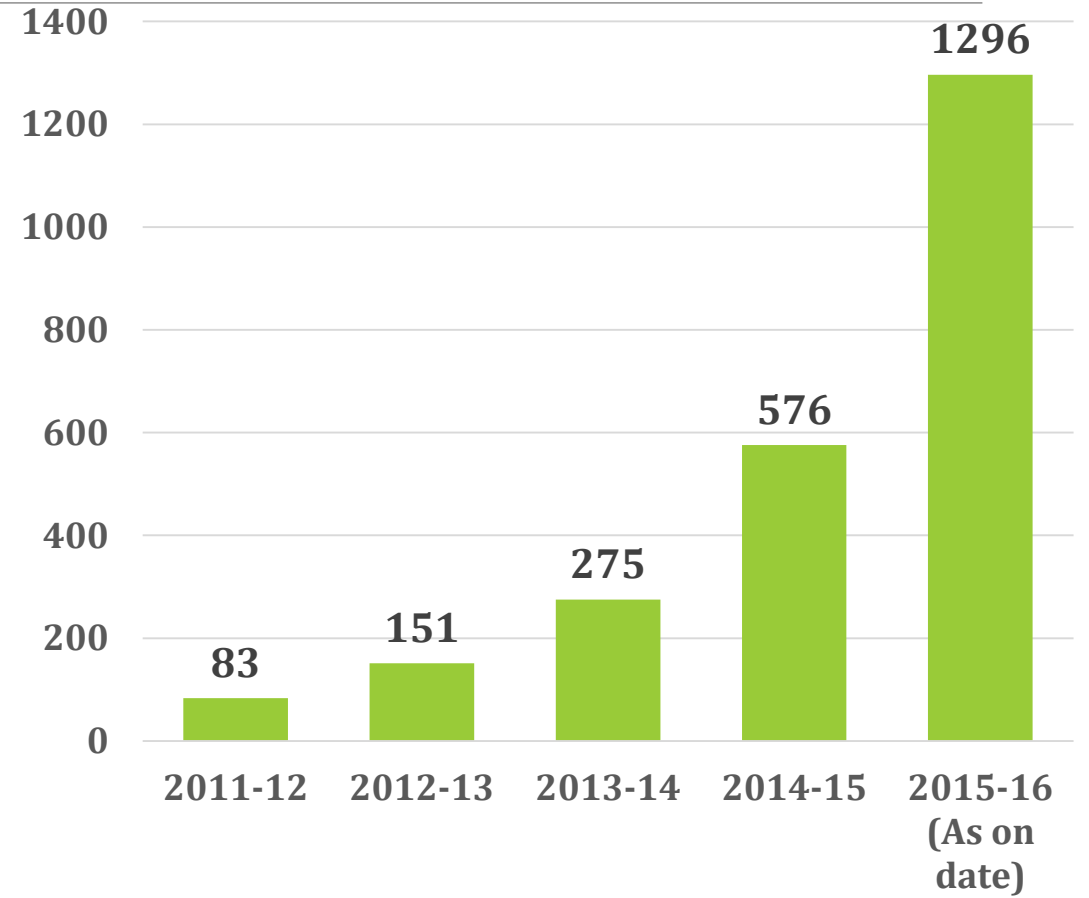
- ✓ SPV Market Development Programme – World Bank Line of Credit (1993) – 74 Projects with 2.145 MW installed capacity.
- ✓ SPV Pumping Programme – World Bank Line of Credit (1991 – 2001) – 6000 Nos of Pumps installed
- ✓ SPV Market Development Programme – KfW Line of Credit (1999) – 6 Projects with 176.4 KW installed capacity.
- ✓ Launch of Jawaharlal Nehru National Solar Mission (2010) envisaged to give boost to solar power with target of 20 GW by 2022.
- ✓ Scale up of Solar Target(2015) from 20 GW to 100 GW by 2022.

IREDA : Solar Sector Performance

Loan Sanctions (Rs. Crores)



Loan Disbursements (Rs. Crores)



Cumulative Sanctions
5,971 Crores

Cumulative Disbursements
2,860 Crores

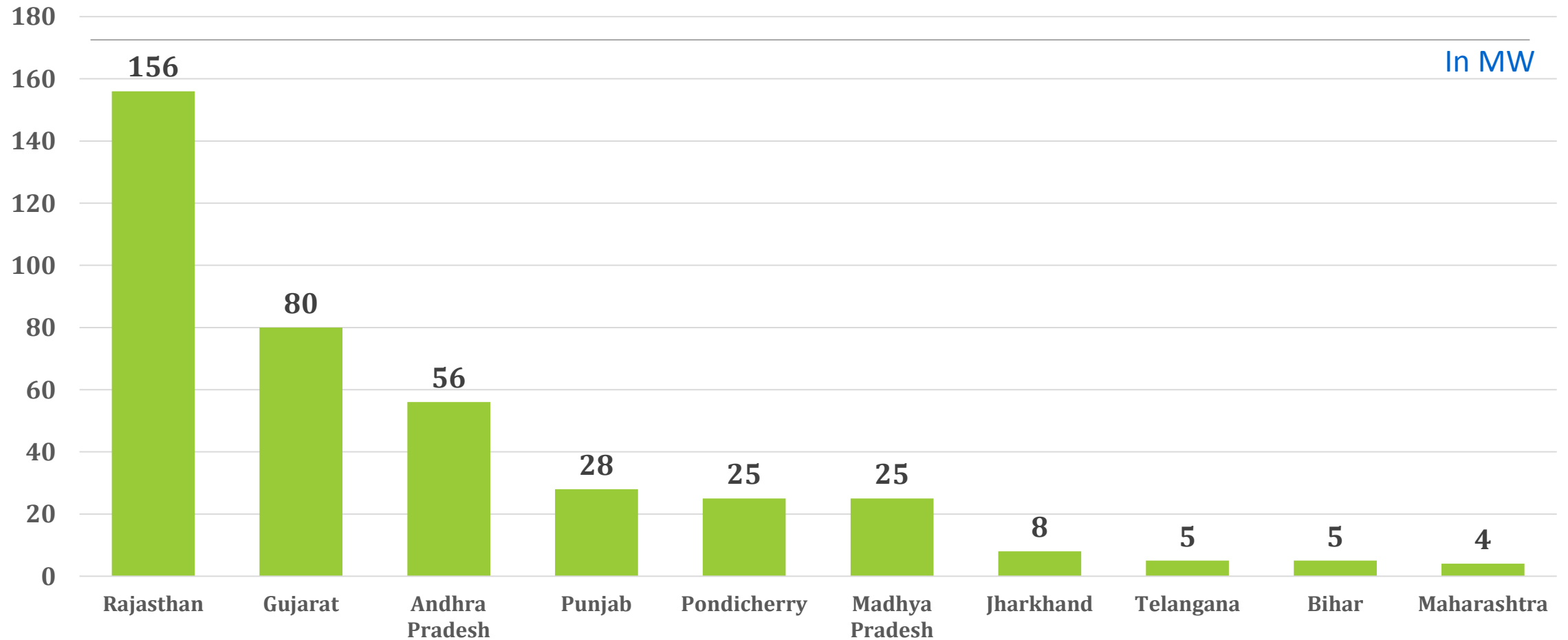
Total Commissioned
393 MW

More than 100
Projects

Project Size
1 MW to 350 MW

IREDA : Solar Sector Performance

State-wise Commissioned Projects – 393 MW



IREDA's loan scheme for Rooftop Solar PV Power Projects

Applications can be submitted through Rooftop Solar Aggregators under following categories:-

1. Aggregator Category:

- a) Can submit application as borrower for either single project or multiple sub-projects as per eligibility guidelines.
- b) Minimum total project capacity ≥ 1000 kWp.
- c) Minimum sub-project capacity under this mode ≥ 20 kWp.

2. Direct Category

- a) Applicants can submit applications for a project ≥ 1000 kWp on a single roof /contiguous roofs
- ❖ Rate of interest: 10.20% to 11.40% p.a. with loan repayment period upto 9 years with moratorium of 6 to 12 months from the date of COD
- ❖ Quantum of Loan: 70% of the total project cost with min. promoter's contribution of 30% of the project cost.

IREDA's loan scheme for Rooftop Solar PV Power Projects

Eligibility Business Models

Project Ownership Model

Rooftops owned by single party

Rooftops owned by multiple parties

Revenue Model

Captive power generation by roof owner

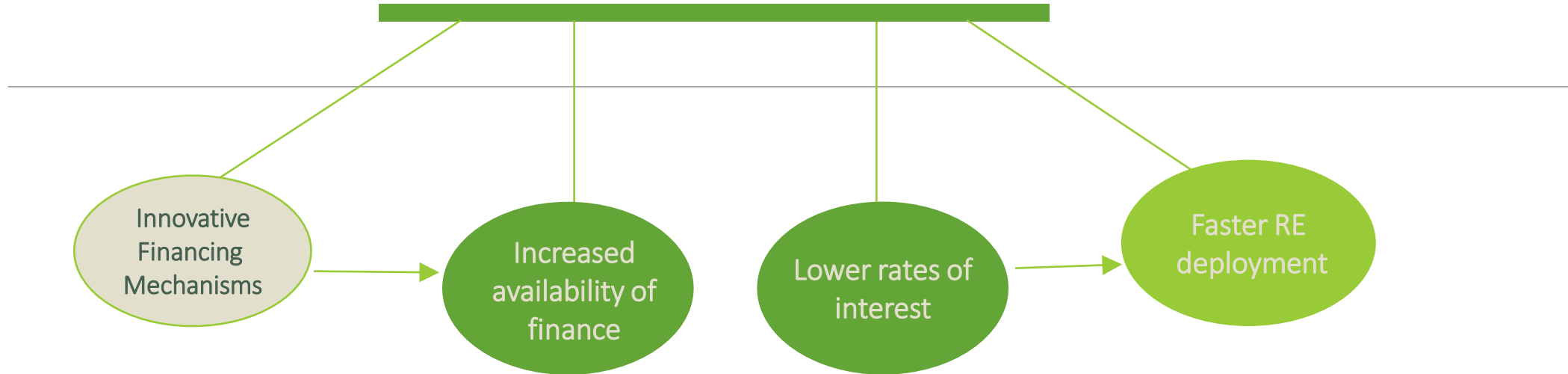
Sale to grid under Net Metering/PPA

Sale to Grid under Gross Metering PPA

Distribution licensee/ Govt. / Semi Government bodies/institutions

Any other viable model

GOI Initiatives to promote Solar Energy



- **Renewables accorded Priority Sector lending status:** Loans up to ₹ 15 crore for renewable power projects included. Banks mandated to disburse 40% of adjusted net bank credit to priority segments.
- **Rooftop Solar through Home Loans:** DFS has issued guidelines and circulars issued by various banks to include rooftop under housing loan
- **Tax-Free Bonds:** Government approves INR 50 billion tax-free bonds to enable low interest rate funding for RE
- **Green Bonds:** Enabling low cost funding for clean energy , REC, PFC, IREDA, IDBI and private sector like ICICI, Yes Bank asked to issue green bonds to raise funding for RE projects
- **Indian Renewable Energy Fund (1 Billion US\$) : To raise funds to invest in Renewable Energy Projects and associated value chain including equity (Proposed)**

Sources of Low Cost Capital

Instruments	Indicative Rates	Sources
Green Bonds	7-9%	Public Deposits
International Funds	6-8%	Multilateral Agencies
Insurance / Pension Funds	7-9%	Corporate
Raising Equity	10-12%	Stock Exchange, Mutual Funds
Climate/ Carbon Funds	0-3%	Tax on Fossil Fuels

Issues / Concerns – Solar Projects

- Timely infusion of Equity
- Land acquisition and conversion
- Establishment / availability of evacuation facilities
- Quality of EPC / O&M
- Availability of skilled manpower
- Ensuring quality of equipment in regime of low tariffs
- Inadequate experience of consultants for monitoring
- High dependency of supply of equipment from single country source

Conclusion – Solar Scale-up Plan

- ❑ Scope for funding grid-connected projects in solar parks & under states / central schemes.
- ❑ Solar Rooftop PV Systems have great potential, however, there is a need for awareness creation about technology packages, financing etc.
- ❑ Policy support is essential in terms of regulations for net metering, grid interconnection and energy accounting
- ❑ Need for promoting large scale, local manufacturing to reduce cost.
- ❑ Need for technical innovations in storage technologies.
- ❑ Financing shall remain a challenging issue to propel the growth of solar energy sector in India - IREDA is committed to ensure optimum credit flow to the Indian Solar sector.

15 MW SPV Projects Financed by IREDA under JNNSM at
District Bikaner, Rajasthan



1 MW SPV Projects Financed by IREDA at District Mansa, Punjab





Thank You

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