Deutsche Bank
Corporate Banking & Securities

Financing renewable energy projects
Takeaways from other markets

Bhaswar Chatterjee, Co-Head of Infrastructure & Energy Finance
August 2015

Passion to Perform

“IMPORTANT: This presentation (the “**Presentation**”) has been prepared by Deutsche Bank’s investment banking department exclusively for the benefit and internal use of the recipient (the “**Recipient**”) to whom it is addressed. The Recipient is not permitted to reproduce in whole or in part the information provided in this Presentation (the “**Information**”) or to communicate the Information to any third party without our prior written consent. No party may rely on this Presentation without our prior written consent. Deutsche Bank and its affiliates, officers, directors, employees and agents do not accept responsibility or liability for this Presentation or its contents (except to the extent that such liability cannot be excluded by law).

Statements and opinions regarding the Recipient's investment case, positioning and valuation are not, and should not be construed as, an indication that Deutsche Bank will provide favorable research coverage of the Recipient or publish research containing any particular rating or price target for the Recipient’s securities.

This Presentation is (i) for discussion purposes only; and (ii) speaks only as of the date it is given, reflecting prevailing market conditions and the views expressed are subject to change based upon a number of factors, including market conditions and the Recipient's business and prospects. The Information, whether taken from public sources, received from the Recipient or elsewhere, has not been verified and Deutsche Bank has relied upon and assumed without independent verification, the accuracy and completeness of all information which may have been provided directly or indirectly by the Recipient. No representation or warranty is made as to the Information’s accuracy or completeness and Deutsche Bank assumes no obligation to update the Information. The Presentation is incomplete without reference to, and should be viewed solely in conjunction with, the oral briefing provided by Deutsche Bank. The analyses contained in the Presentation are not, and do not purport to be, appraisals of the assets, stock, or business of the Recipient. The Information does not take into account the effects of a possible transaction or transactions involving an actual or potential change of control, which may have significant valuation and other effects.

The Presentation is not exhaustive and does not serve as legal, accounting or tax advice. Nothing herein shall be taken as constituting the giving of investment advice and this Presentation is not intended to provide, and must not be taken as, the basis of any decision and should not be considered as a recommendation by Deutsche Bank. Recipient must make its own independent assessment and such investigations as it deems necessary. In preparing this presentation Deutsche Bank has acted as an independent contractor and nothing in this presentation is intended to create or shall be construed as creating a fiduciary relationship between the Recipient and Deutsche Bank.”

Deutsche Bank global renewables expertise

IJGlobal

Winner

#2 Renewables
Top Mandated
Lead Arrangers

H1-15

Deutsche Bank

PFI
PROJECT FINANCE INTERNATIONAL

PFI – H1-15

Global Top 4 for
Project Bonds

Deutsche Bank

US$8+ billion USD of solar and wind underwritings

~7.3 GW of solar and wind operating or in construction

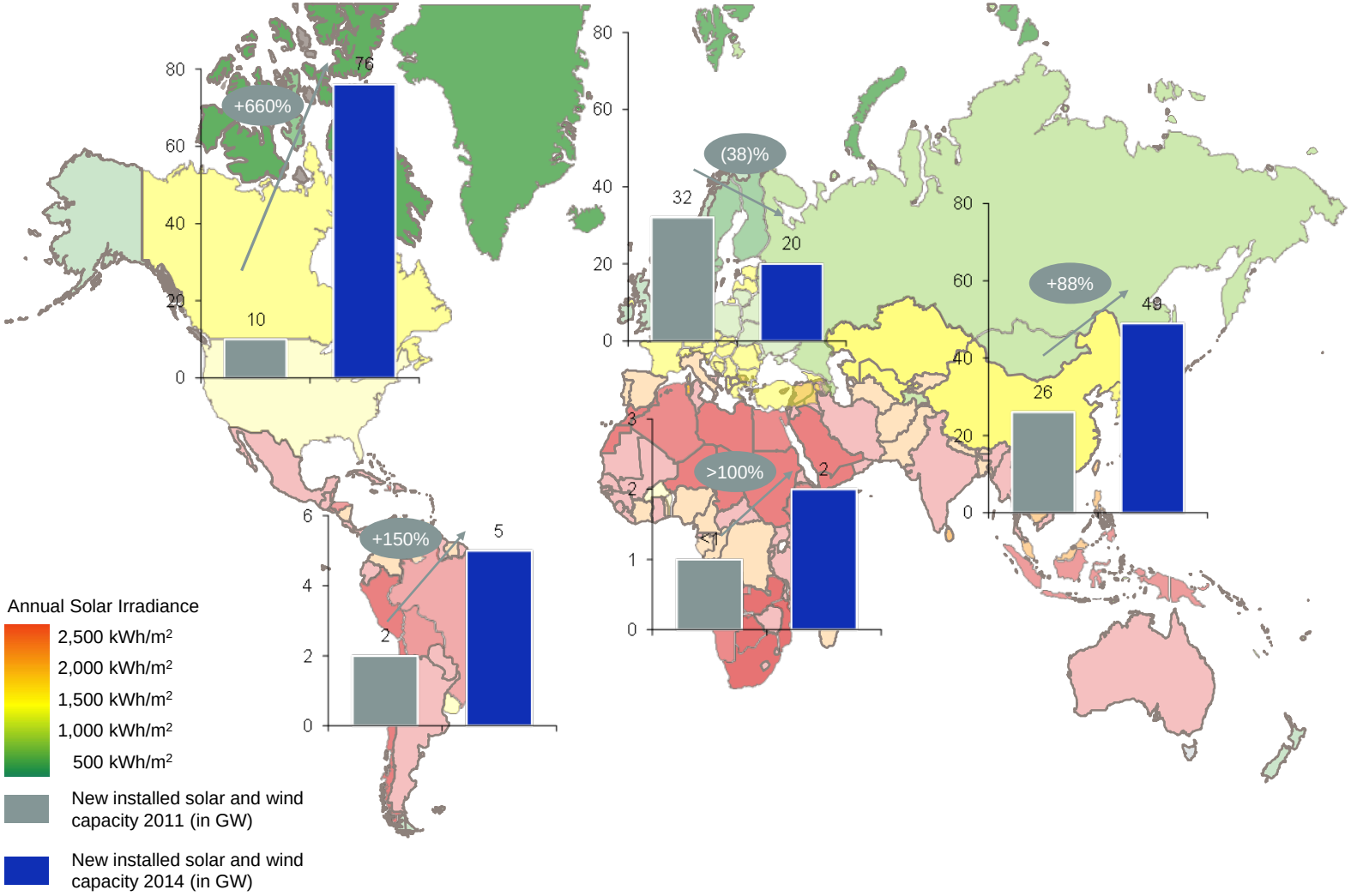
Where renewables markets are expanding

Geography

Renewable energy targets

Australia	2020: 20% (2014: 9.14%)
China	2020: 15% renewables and nuclear (2014: ~11% renewables and nuclear)
EU	2030: 27% (2014: 15.3%)
India	2022: 60GW of wind, 100GW of solar (2014: 22GW/3GW)

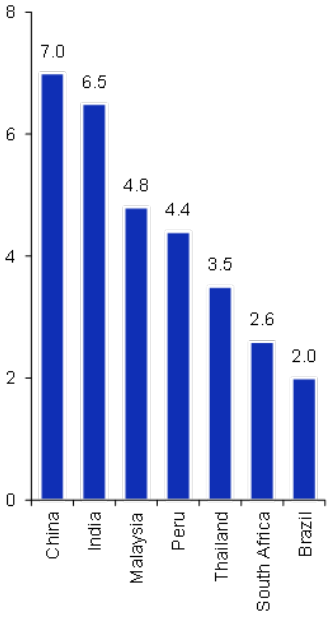
Source: Bloomberg, Reuters



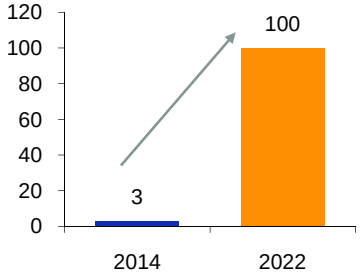
Source: International Energy Agency, Global Wind Energy Council

Emerging markets are attractive growth regions with strong renewable support programs

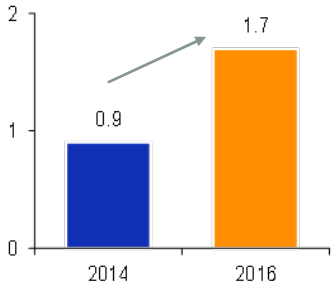
Projected GDP growth
2015 – 2016



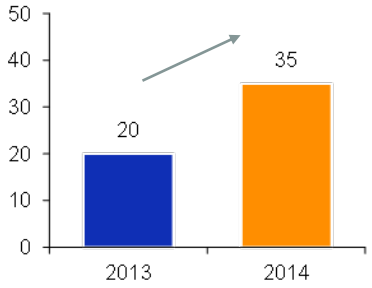
India GW solar



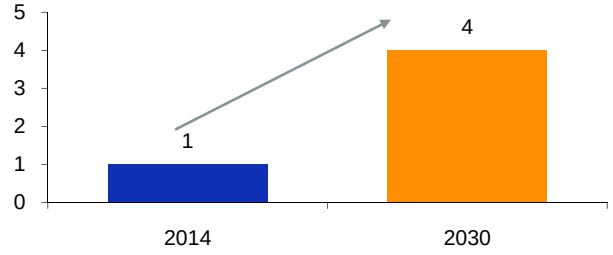
South Africa GW solar



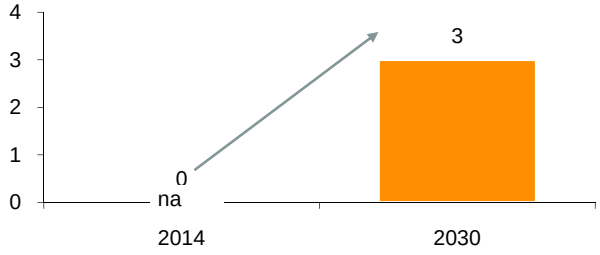
China GW solar



Malaysia GW renewable



Thailand GW solar



Select countries with ambitious renewable growth targets

	India	Malaysia	South Africa	Thailand	China
National government backed program	✓	✓	✓	✓	✓
Program	– National Solar Mission – State solar program	– Feed-In-Tariff Program	– REIPP program[a]	– Feed-In-Tariff	– Golden Sun – Feed-In-Tariff Program

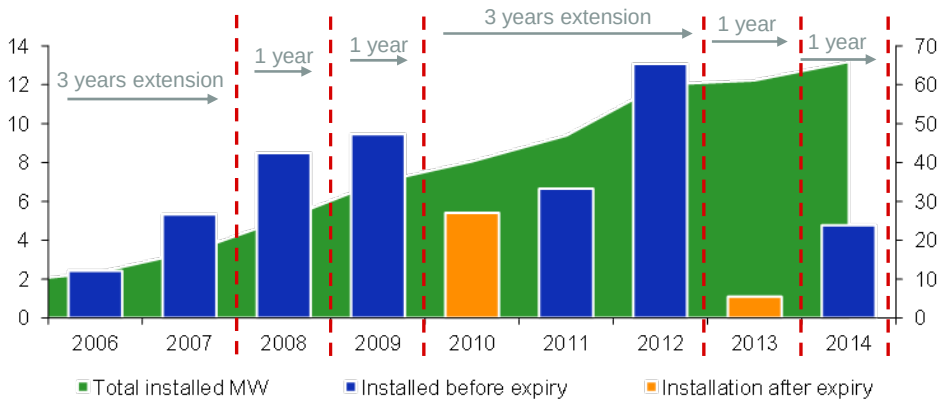
(a) Renewable energy independent procurement program

Source: Bloomberg New Energy Finance

Importance of policy continuity

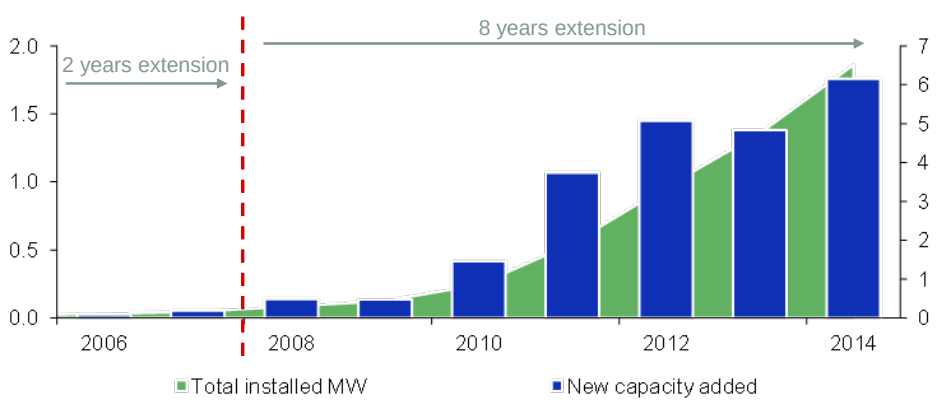
Case study: Tax credit programs in the US

Annual wind installed in the US (GW)



Source: US Department of Energy, American Wind Energy Association

Annual solar installed in the US (GW)



Source: Solar Energy Industries Association

Production tax credit

Asset	Wind
Value tax credit as % costs	30%
Year established	1992
Number of renewals (since 2006)	6
Largest drop in installations (Y-o-Y)	(92)%
Annual growth rate (since 2006)	24%

Source: US Department of Energy, US Energy Information Administration, American Wind Energy Association

Investment tax credit

Asset	Solar
Value tax credit as % costs	30%
Year established	2006
Number of renewals (since 2006)	1
Largest drop in installations (Y-o-Y)	(5)%
Annual growth rate (since 2006)	68%

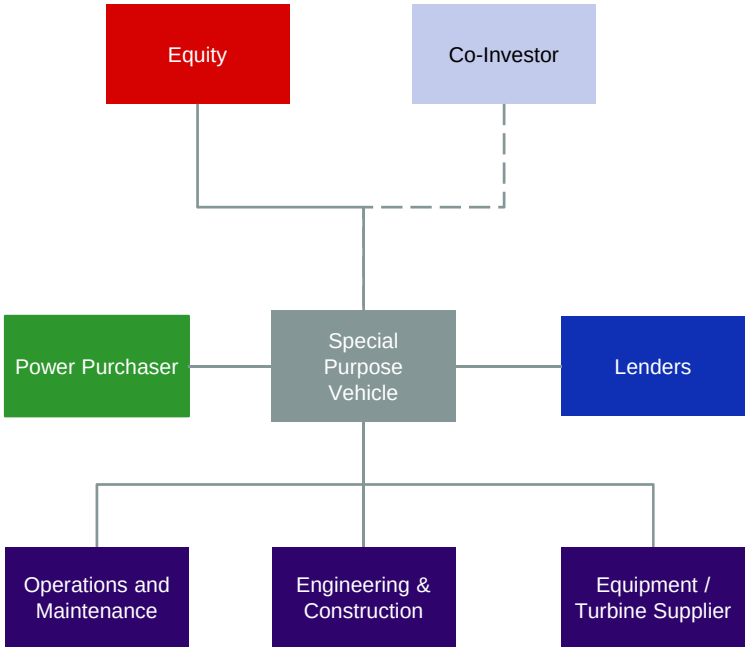
Source: Solar Energy Industries Association

Developments in financing structures

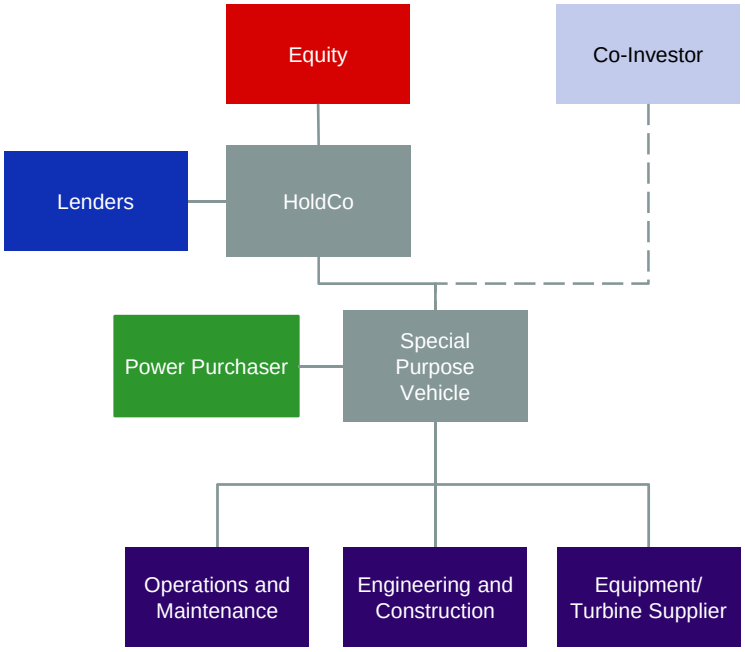
Project finance structures have evolved to incorporate:

- Portfolio assets
- Junior debt
- Tax enhanced products

Standard project finance structure



HoldCo structure



Debt financing products through the asset lifecycle

Capital raising for in-development and operational projects have become more creative and abundant as banks and private investors have become more sophisticated in evaluating risks and returns

Debt solutions at all stages

Construction to commercial operations

- Short tenor bridges
- Term loan convertibles
- Revolving credit facilities

Commercial operations to stabilization

- Warehouse and aggregation facilities
- Single-asset term loans
- Mini perms

Fully stabilized

- Asset-backed securitizations
- Project bonds
- Portfolio term loans

Construction/acquisition

- Requires lenders and equity partners that are sophisticated comfortable with project completion risk
- Large commercial or utility scale projects (typically > 10 MWp) can be financed on a one-off basis for projects
- Residential systems and small commercial projects typically utilize revolving credit facilities that can fund many projects simultaneously

Ramp-up to stabilization

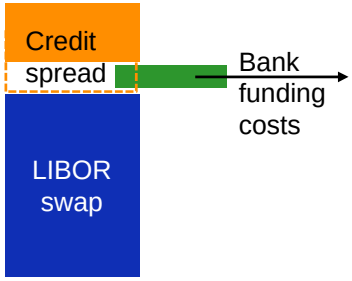
- Warehouse facilities are utilized by developers to ‘store’ large in-construction or completed assets that are available for purchase to a long-term investor (like a Yieldco)
- Aggregation facilities allow for ramp-up of residential and small commercial systems, to bring about a critical mass for efficient refinancing or sales into the long-term capital markets

Stabilization

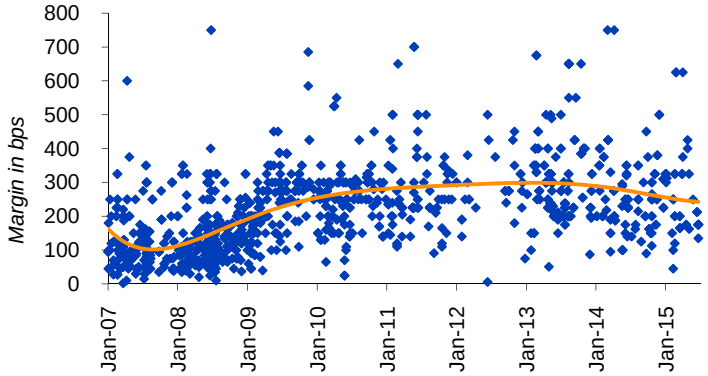
- Asset backed securities feature pools of small residential and solar systems that are sold to long and medium-term institutional investors
- Project bonds and Green Bonds can be issued into traditional capital markets for projects, companies or portfolios

Evolution of bank financing costs

Composition of debt financing costs:

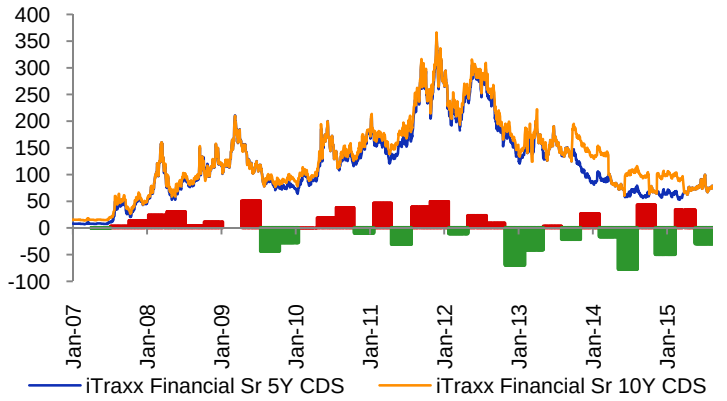


Loan margins have proven stable over past five years



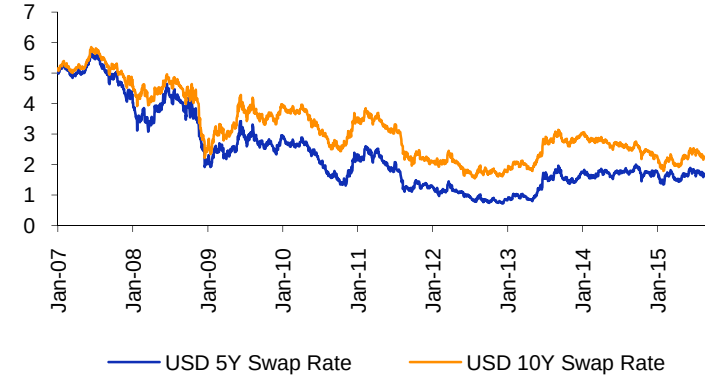
Source: Dealogic

Even as bank funding costs have been volatile



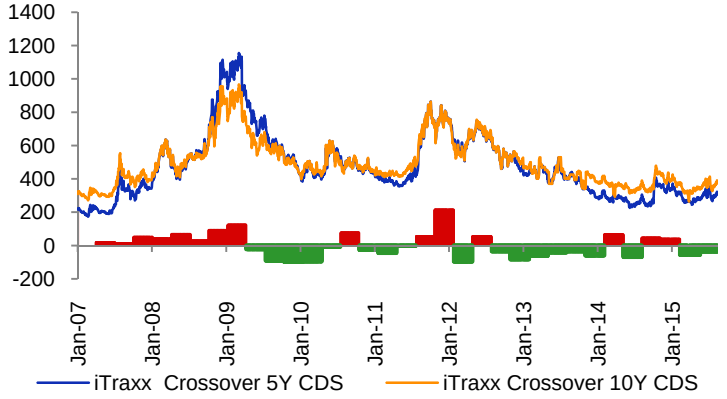
Source: Deutsche Bank

Benchmark Libor rates have reduced substantially



Source: Deutsche Bank

Appetite for sub-investment grade risk has grown



Source: Deutsche Bank

Bridge facilities and warehouses

1 Construction Bridge Loans

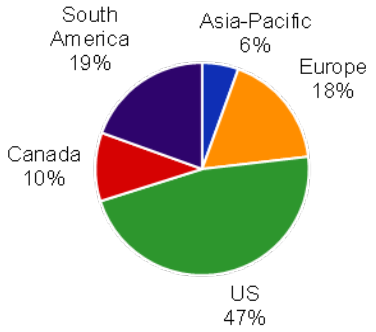
- Short tenor (6 months to 2 years) that can represent 70 – 80% of total construction costs, or more if a contracted purchase is in place.
- Primarily used for utility-scale projects

Size: construction loans drive large utility-scale projects

Period	Bridge Loans Issued (USDmm)	No. of Loans	Amount Issued per Loan (USDmm)
2008 – 2010	4,101	35	117
2011 – 2013	6,393	45	142
2014 – H1 2015	4,688	24	195

Source: Dealogic

Geography: bridge facility is used extensively in North America

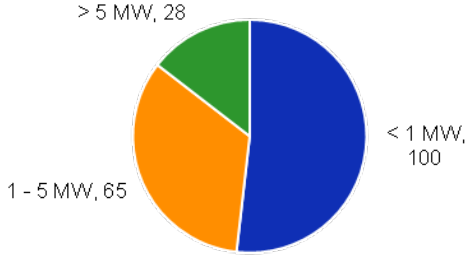


(a) Based on 2008 – 2015 H1 reported renewable project financings
Source: Dealogic

2 Revolving Construction Facility

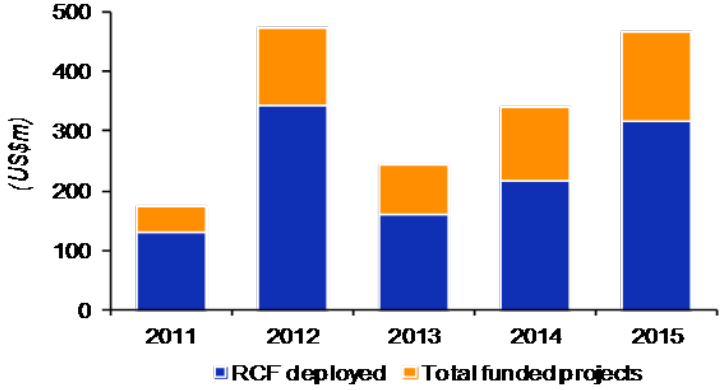
- Primarily used for small to medium residential and commercial systems
- A sample US$300m revolver can deploy over US$1bn in debt capital to finance over 500 MW in generation capacity

Size: over 50% of projects funded are less than 1 MW



(a) 2015 is first half only
Source: Deutsche Bank

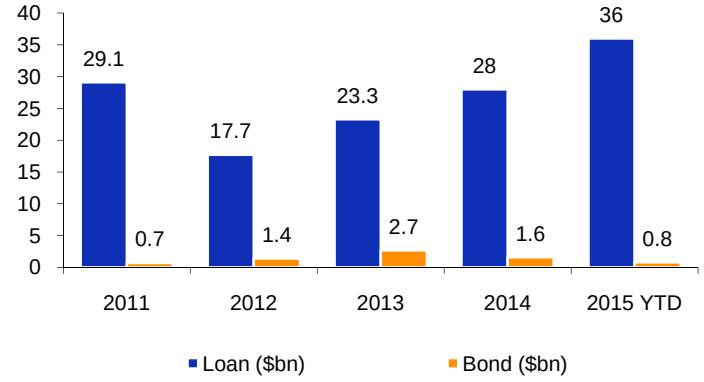
Velocity: funds can be 'reused' and turned over many times



(a) 2015 is first half only
Source: Deutsche Bank

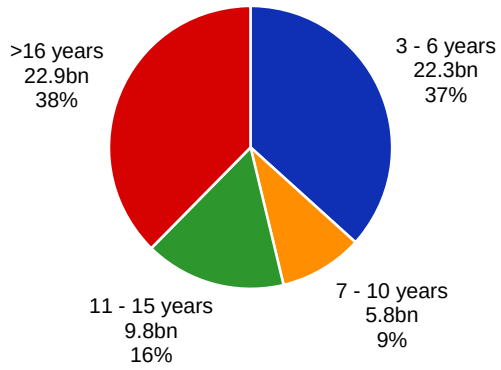
Long-term debt via term loans and capital markets

Renewable project finance loans and bonds



Source: Dealogic

Market split b/n mini-perm (<10y) and long-term (>10y) loans



(a) Since 2010
Source: Dealogic, IJ Global

Capital markets financing offers attractive alternatives to traditional term loan products

	Capital markets total	Project bonds	Green bonds	Asset backed securities
Number of issuances	479	66	408	5
Amount issued (US$m)	88,551	18,478	69,512	561
Average size (US$m)	185	280	170	112
Average tenor	Nine years	Fourteen years	Seven years	Seven years
Type of systems		– Solar and wind – Utility projects and HoldCos	– Solar and wind – Corporates/portfolios	– Solar – Residential/commercial

(a) Since 2010
Source: Bloomberg; Dealogic, IJ Global

Constraints in Indian market for international capital

External commercial borrowing norms are restrictive on pricing/maturity

- Does not accommodate certain financing structures, e.g. short term revolvers

The security rights applicable to foreign lenders are not covered by the same legislation as that of Indian banks

- Lack of security discourages foreign direct investment by banks and makes borrowing more difficult/ more expensive

Institutional market (life insurance / pension funds) are not yet significant funders to renewable power in the Indian marketplace

- Long term takeout financing options are limited

Cross-currency swaps market, which allows hedging of INR / USD risk is not liquid beyond 3.5 year

- Alternative solutions are required to accommodate longer tenor USD debt