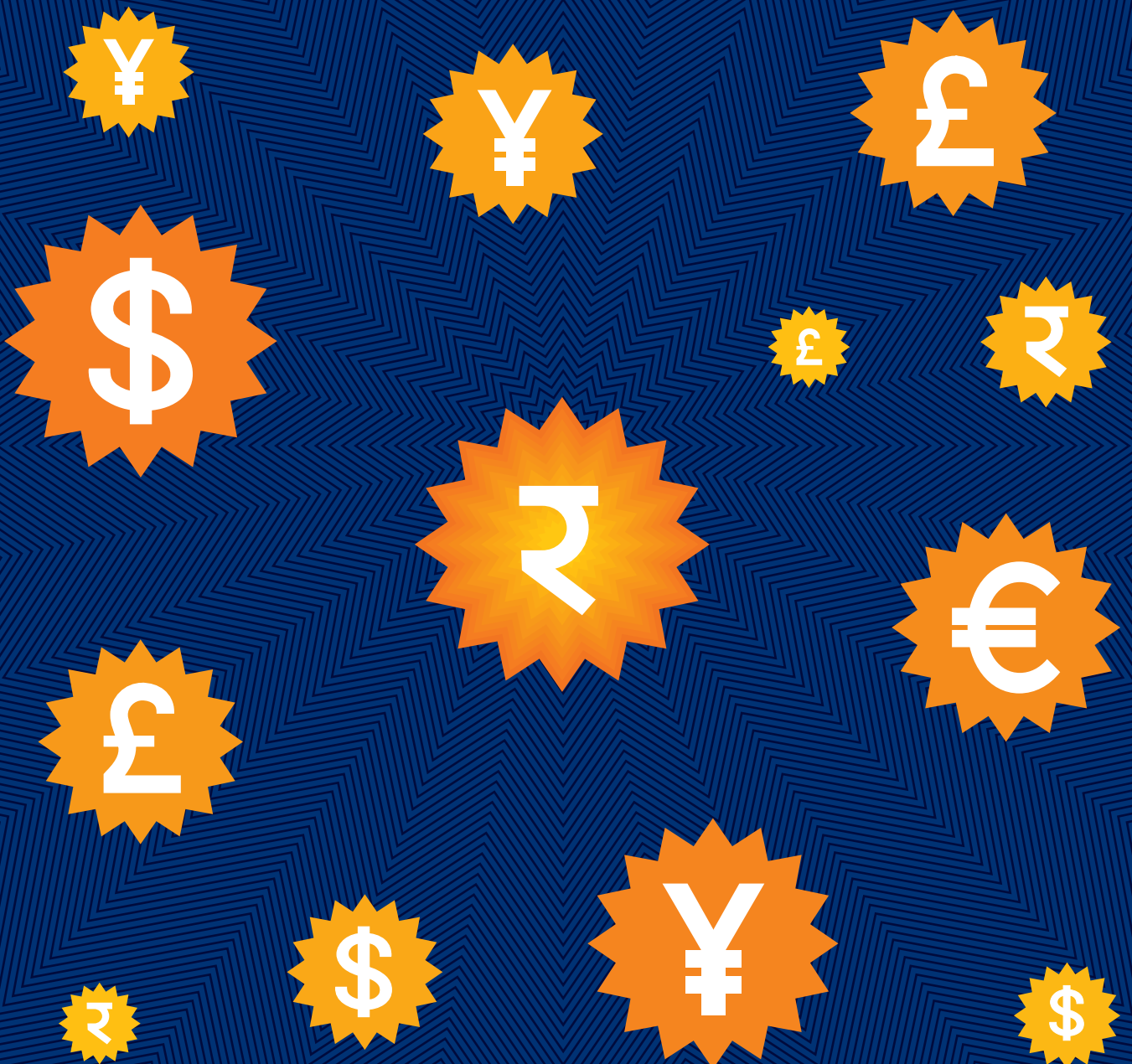




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Estimating cost of capital for Indian solar projects





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Executive summary

Intense bidding for solar projects has raised an important question - what is the cost of capital for this business? Investor expectations have shrunk from about 14% - weighted appropriately for capitalization structure - five years ago to anything between 8-10% over the last year. Recent auction results suggest that some developers may be working with even lower numbers than these.

There are well-established benchmarks for cost of capital for solar projects in most developed countries but unique local policy and operational challenges make it a much more complex subject in India

Solar projects are relatively simple assets and there are well established benchmarks for cost of capital in most developed countries. In India, however, the risk profile of solar projects is very different. The key is to understand these risks for estimating cost of capital with greater confidence. This report examines different methodologies and related issues for estimating cost of capital for Indian solar projects. We recognize that it is a complex issue with differences occurring from project to project as well as over time. It is subject to a lot of academic research as well as personal beliefs and quirks.

Our approach is to blend academic insights with a practitioner's perspective to derive meaningful insight. This subject is arguably more 'art' than 'science' - and highly dependent on specific details of given project(s) or project portfolio.

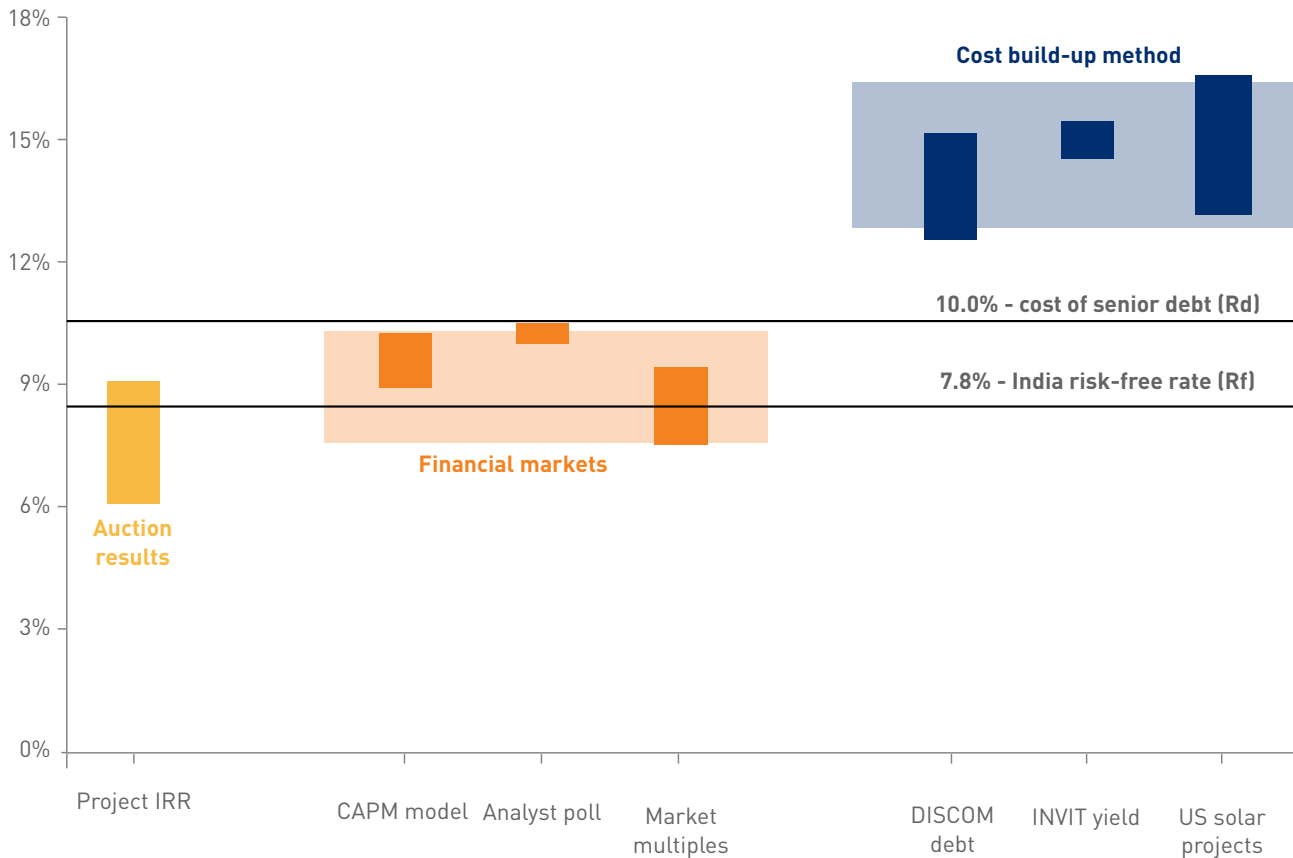
There can be multiple approaches to estimating cost of capital. The most popular ones, Capital Asset Pricing Model (CAPM) and market multiples method, have critical limitations and are not appropriate for the sector in our view.

We prefer the cost build up method, which uses a suitable proxy market return indicator as a benchmark and makes incremental adjustments for various risk parameters

We prefer the cost build up method, which uses a suitable proxy market return indicator as a benchmark and makes incremental adjustments for various risk parameters. This method is based on market-tested benchmarks and allows for sector specific risk adjustments based on real-life experience. We have used three different benchmark indicators - DISCOM debt, INVIT trading yield and US solar project yield expectations - to arrive at a range of estimates for cost of capital.

The CAPM and market multiples approaches give us estimates between 7.40-10.50%. But these are substantially lower in comparison to the cost build up method results (12.50-16.50%).

Figure : Cost of capital estimates using different approaches



Source: BRIDGE TO INDIA research

Note: All estimates are shown on post-tax basis at project level (pre-tax for investors).

Interestingly, the highest estimate is arrived at using US cost benchmarks. That possibly explains why the US investors have largely stayed out of the Indian solar sector.

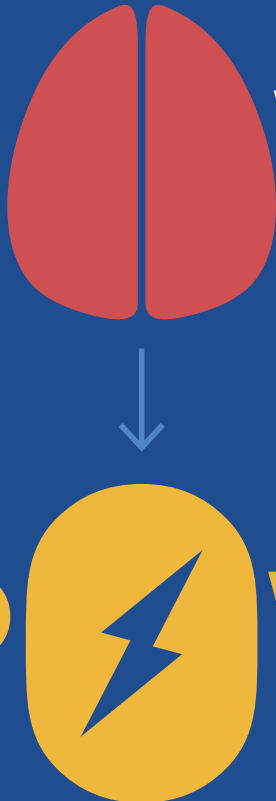
High difference between different results shows disconnect in the market and suggests risk is not being priced appropriately in both primary and secondary markets

The high difference between different results shows disconnect in the market. As we stated in our recent report, [Analysis of utility scale solar tenders in India](#), risk is not being priced appropriately in primary and secondary markets. This can be attributed to many factors – slowing pipeline of tenders over last year, urge to enter the market (for new players) or to grow the business (for developers who have raised capital and made commitments to their investors) or even developers hopeful of getting higher exit valuations.

The regulatory and business environment is very dynamic. The ever-changing landscape makes it essential for investors to constantly re-evaluate cost of capital as against relying on static benchmarks.

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