Overview
India has set ambitious renewable energy targets. The National Action Policy on Climate Change (NAPCC) has set a target of 15% of electricity via renewable energy sources by 2020. Further, under the Jawaharlal Nehru National Solar Mission (JNNSM), the government aims to develop 20,000 MW of solar energy by 2022. To reach these ambitious targets, in March 2011 the Government of India has launched the Renewable Energy Certificates (REC) – a market based mechanism – to drive renewable energy development and spur further investments.

However, a look into the actual performance of REC market trading till date shows that the current number of accredited certificates issued is less than 2.5% of the technical REC demand potential, indicating that the full potential of the REC markets is far from being realized. Further, according to financial institutions, the RECs are not bankable, resulting in virtually no new projects being brought online due to the REC mechanism.

Methods
In this report, we analyze the REC policy framework in India in the context of theory and international best practices and understand the reasons as to why RECs have not yet had the projected effects. The method is of comparative analysis, which is as quantitative as possible, and is done in the Indian institutional context.

Results
We first provide the institutional setup for the REC markets in India. Several institutions at the center – the Central Electricity Regulatory Commission (CERC), Forum of Regulators (FOR), and National Load Dispatch Center (NLDC) – and state level – State Electricity Regulatory Commission (SERC) and State Load Dispatch Center (SLDC) – are involved in the regulation and implementation of the scheme. Renewable energy generators undergo accreditation process by the state agencies and registration process with the central agencies. The central agencies also issues certificates and oversee the monthly trading activity in two power exchanges – Power Exchange of India Limited (PXIL) and Indian Energy Exchange (IEX).

We then examine international best practices. While no “best practices” were discovered for many design features, we identify that several trade-offs exist in choosing the elements of an effective REC design. Forward markets, banking and price bounds (i.e., floor and forbearance prices) are recommended for stable markets, best-of-class methods for determining the optimal length of banking, the level of floor and forbearance prices, and the values of credit/vintage multipliers are not fully established. In particular, empirical studies relating these REC market design elements to the actual effectiveness of REC markets are scarce. Despite this, we ascertain that reasonable guidelines can be established to assess the REC markets in India. Our future work will focus on addressing the gaps identified in this work.
The basic elements of the Indian REC market design are similar to international REC markets. RPO targets – that would create the demand in the market – have been set, RECs – the commodity to be traded – are issued to eligible entities, and a nation-wide market – which would allow the obligated entities to meet their target at least cost – has been established.

However, the main issue here appears to be the demand uncertainty in the absence of clarity on compliance. Though states have issued regulations, enforcement of these regulations is yet to see the light of the day in most jurisdictions. Without strict enforcement, which is seen as the precursor to develop long-term stable markets and secondary markets, full-fledged REC markets may not develop in India. Thus, for the REC markets to develop, the pressing need of the day is that the states, in addition to passing regulations, must ensure compliance through strict enforcement. The absence of instruments that can help provide long-term certainty to investors – banking provisions and secondary markets – raise questions about how RECs can be made bankable. Thus, a simple solution to the bankability issue would be to allow unlimited banking and allow for a robust secondary market (i.e., use of forward contracts) to develop.

Further, though CERC has attempted to use price bands to provide price certainty, we find that, though the usage of forbearance price makes sense; the same cannot be said for floor prices, given not only the difficulties in determining the correct levels over time – an exercise that is very similar to determining long-term feed-in tariffs in presence of considerable uncertainty on technology evolution – but also due to the fact that floor prices may be obsolete if other market-based features are used appropriately. In addition, CERC’s approach to determining the price band is questionable on many accounts: ranging from the method of determination – which depends on the average purchase price (APPC) and preferential tariffs in the states – of these prices to the fact that the current levels of floor prices provide unusually high profits to projects in some states.

As far as other design features are concerned, given that set-asides have been more successful than credit-multiplicy in promoting resource diversity, the choice of set-asides appears to be the right option to promote solar energy; though many gaps still remain, especially in relation to the design of vintage multipliers.

**Conclusions**

We expect that the policymakers in India will benefit from our preliminary analysis, and work collaboratively with us on modifying the current design of the REC markets – so as to not only create a vibrant REC market but also to ensure that the RECs become a viable financial instrument, leading to the eventual fulfillment of the RPO targets.