Department of Industrial and Management Engineering
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Electricity Amendment Bill 2014: RE Perspective

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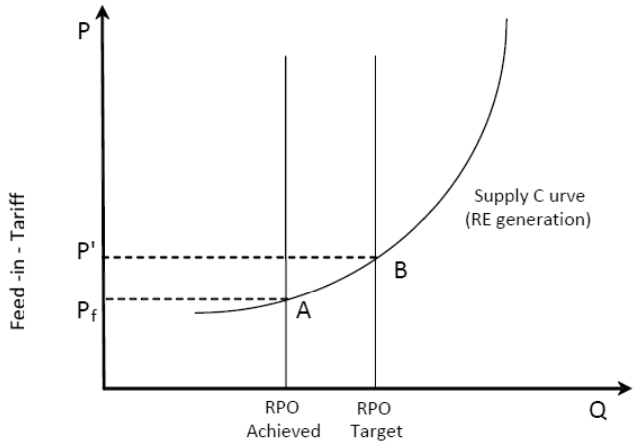
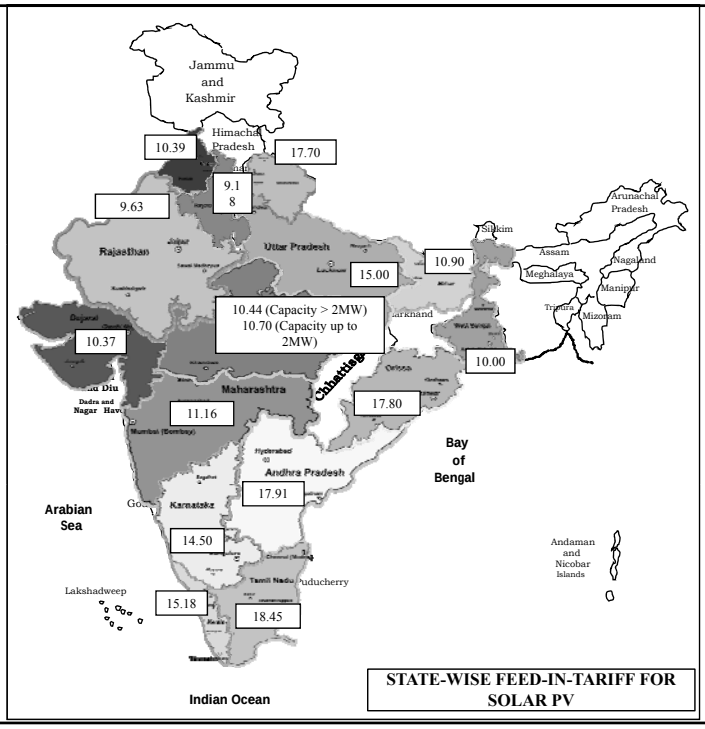
Challenges in present RE Framework

- Economic Efficiency of existing policies
- Missing Compliance of RPO
- States have different resource endowments and some have very limited ones (e.g. Delhi, Chandigarh)
- How to incentivise renewable resources in remote areas not connected with grid?

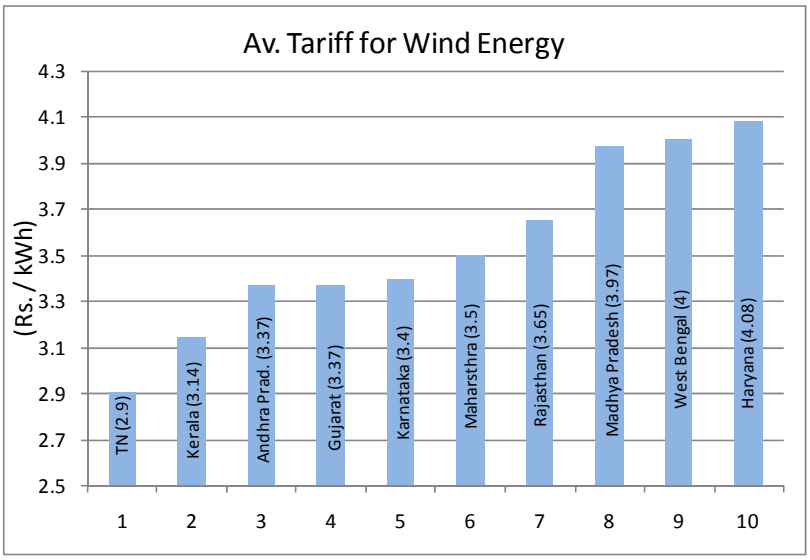
Discontinuity in prices in the demand function



Feed-in-Tariff and Shortfall in RPO Compliance



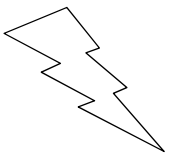
Wind Energy Tariff Across States (2008-09)



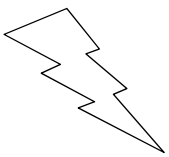
100 kW Solar PV plan in Tangtse, Ladakh

A solution?

What differentiates electricity from renewable energy sources?

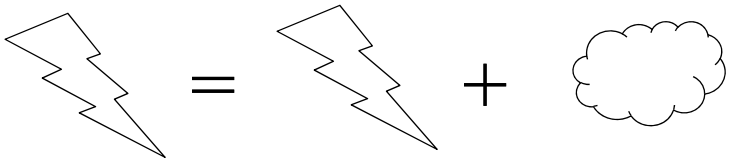


- Electricity from Conventional energy Sources



- Electricity from Renewable energy Sources

What is Renewable Energy Certificates?



‘Green electricity’ ‘electricity ‘green certificates’

- Sell ‘electricity’ and ‘green certificates’ in different markets

Advantages of Renewable Energy Certificates/Credits (RECs)

- Assist in RPO Compliance (Compliance market)
- Assist promotion of RE (Voluntary market)
- Marketing ‘Green/Greener’ Electricity to Consumers
- Promote efficiency in investment and assist choice of appropriate technology
- Provide incentives for cost reduction and benchmarks for innovation in RE applications
- Avoiding transmission of electricity generated through RE sources
- Assist efficient implementation of promotional policies by the government. (esp. off-grid RE based rural electrification)

Suggestions for Development of REC Market

- Fungibility of RECs & RECx multiplier
- RPO Compliance needed for market confidence
- Need to link FiT and REC mechanisms (Participation of disocms under FiT regime).
- 'Buy out policies' (penalty for RPO shortfall) ... and mutualisation.
- Linking PAT and REC mechanism
- Programmatic Application of Renewable Energy (PARE)
- Voluntary Market
- Banking (and Roll over?)
- Stand-alone systems

REC certificates for Programmatic Application of Renewable Energy (PARE)

- (PARE) can be referred to the program based activities involving a number of users and involving deployment of RE to replace electricity requirement. For e.g. the solar lantern programme, rooftop solar water heaters etc.
- While the scope of existing regulations is limited to 'electricity generated' from RE sources, in the near future, the REC regulations may provide for eligibility for such applications with adequate criteria for usage and measurement of electricity replaced with renewable energy.

RE – EA Amendment Bill 2014

- Sec 46A – 'obligated entities' definition clarified to include Captive and OA consumers.
- Sec 57A – Renewable Energy defined.
- " renewable energy sources" for the purposes of this Act, means the **small hydro, wind, solar, bio-mass, bio-fuel, bio-gas**, co-generation from these sources, **waste including municipal and solid waste, geothermal, tidal, forms of oceanic energy and such other sources** as may be notified by the Central Government from time to time. (Cogen from the rest excluded!)

RE – EA Amendment Bill 2014 (Contd.)

- Section 4 - "notify a national policy for **harnessing solar power and other forms of renewable energy to ensure electricity to un-electrified rural households and permitting stand alone systems**"
- Introduction of concept of Renewable Generation Obligation (RGO) – Sec 7 (2)
- "**any generating company establishing a coal and lignite based thermal generating station after a date and in a manner to be notified shall be required to establish a Renewable Energy Generation capacity as prescribed by the Central Government from time to time which shall not be less than ten per cent. of the thermal power installed capacity.**

RE – EA Amendment Bill 2014 (Contd.)

- Sec 7(3) In case any existing coal and lignite based thermal power generating station, with the concurrence of power procurers under the existing Power Purchase Agreements, chooses for setting up additional renewable energy generating capacity, the energy produced from there shall be allowed to be **bundled and pass through** shall be allowed in such cases by the Appropriate Commission and the Obligated Entities who finally buy **such power shall account the same towards their renewable purchase obligations**."

RE – EA Amendment Bill 2014 (Contd.)

- Provided also that where a person intends to generate and supply electricity from renewable energy sources, such person shall not require any license for such **generation and supply** of electricity, but he shall comply with the measures which may be specified by the Authority under sections 53 and 73. ('Distribution' missing! May be required in some cases.)

RE – EA Amendment Bill 2014 (Contd.)

- Section 46A - Recognition of **market instruments (REC)** to meet RPO. Should be applicable for RGO as well.
- '(46A) "obligated entity" means the distribution licensee or the consumer owning the captive power plant or the open access consumer, as the case may be, which is mandated under section 86 of the Act in order to procure electricity from or any market instrument representing the renewable energy sources;'
- Notion of Technology based 'REC multiplier' missing. As number of RECs ≡ RPO

RE – EA Amendment Bill 2014 (Contd.)

- Section 66 - The Appropriate Commission shall endeavour to promote the development of a market (including trading and forward and futures contract) in power and **a market for encouraging energy efficiency in power** in such manner as may be specified and shall be guided by the National Electricity Policy, referred to in section 3, and other directions issued by the Central Government in the public interest from time to time."
- A new market instrument competing PAT?. Why shouldn't REC & PAT be merged

RE – EA Amendment Bill 2014 (Contd.)

- Section 3 (4) - Promotion of RE generation
- "The Central Government may, after such consultation with the State Governments as may be considered necessary, notify policies and adopt measures for promotion of Renewable Energy Generation including through **tax rebates, generation linked incentive, creation of national renewable energy fund, development of renewable industry** and for effective implementation and enforcement of such measures." (Intervention Through market instruments missing!.)

RE – EA Amendment Bill 2014 (Contd.)

- **Promotion** of 'Hydro power' added alongside RE (Sec 61 (1) (h). What is the intention? And what would this translate to?
- Promotion of 'generation' of electricity from RE (along with existing cogeneration) Sec 86 (1) (e)
- Promotion of 'co-generation' of electricity from non-RE also Sec 86 (1) (e)
- Sec 57 B - "Renewable Energy Service Company" means an energy service company which **provides renewable energy to the consumers in the form of electricity** for the purposes of this Act;'; (part RE?. Ca only sell to consumer not 'ss licensees', traders? RESCO can also provide 'other services' not only electricity for e.g. as Green power through RECs)

RE – EA Amendment Bill 2014 (Contd.)

- Section 7 – "to provide for setting up of renewable energy generating station with a spinning reserve". RE can't be scheduled itself, unless better RRF is in place.

- Maintenance of minimum ecological flow of river (Sec 8 (2) (c). Who would decide?

RE – EA Amendment Bill 2014 (Contd.)

- Sec 1A - Decentralised Distribution Generation (DDG) defined.
- '(*15A) "decentralised distributed generation" means electricity generation* from wind, small hydro, solar, biomass, biogas, bio-fuel, generation from any
- kind of waste including municipal and solid waste, geothermal, **hybrid power system** or such other sources as may be notified by the Central Government for end-use at or near the place of generation;'; (RE+non-RE hybrid ok?)
- Sec 86 1 (c) , State Commission to
- "facilitate intra-State transmission and wheeling of electricity and **promote Smart Grid, net metering, ancillary services and decentralised distributed generation;**
- **'Delay of electrification of Remote areas', should they continue to pay high tariff and not get any CS?**

RE – EA Amendment Bill 2014 – Some questions/suggestions

- RGO – instead of mandate for setting up RE plants, flexibility with compliance with REC should be introduced.
- Future of DDG – how long they would be depend on 4-5 hour electricity supply. Contract between RE developer and discom to subsume that power plant or buy RE from 'DDG' at pre defined tariff.
- Will non-RE cogen 'crowd out' RE cogen?

RGO Vs RPO

- Easy to Implement and enforce
- Pooled Price of bundled conventional and RE power
- More effective mechanism for compliance of RE obligation than RPO
- RPO then should be gradually phased out. This would require that REC market be more vibrant and efficient.

More Role of Market for Renewable Energy Certificates (REC) & Green Power

- Implementation of RGO would place greater demand for RECs as conventional generators would need to secure RE energy.
- REC market offers an ease of compliance through REC purchases
- Market for ‘Green Power’. Choice should allow for notion of green electricity. Should that get some incentive?
- REC based ‘RE PPA’ for bankability

Thank You

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Further Readings

- "Economics, Regulation and Implementation Strategy for Renewable Energy Certificates in India", India Infrastructure Report 2010, OUP.
- "A Market for Renewable Energy Credits in the Indian Power Sector", *Renewable and Sustainable Energy Review* journal, Elsevier, 13 (2009) 643–652.
- "Nationally Tradable Renewable Energy Credits for Renewable Portfolio Obligation in the Indian Power Sector", SEE Conference Proceedings, Bangkok., 21-23 Nov.2006.

Selected Readings

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- "Climate Co-benefit Policies for the Indian Energy Sector: Domestic Drivers and North-South Cooperation", *Climate Policy* 9 (5) 529-543 2009
- "Informal Markets for Electricity: Economics of lighting for Hawkers in India", *International Journal of Energy Sector Management: Special Issue on India, 3(3), 308-323,* 2009.
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- "Rural Electrification in India: Economic and Institutional aspects of Renewables", with James Cust and Karsten Neuhoff, EPRG WP 0730, University of Cambridge, UK., 2007