

Changing Dynamics in the Global Electricity Markets – Indian Solar

“Climate Change poses risks to which financial market regulators and company boards have, to-date, given little attention.”

Dr Martin Parkinson, August 2015

Tim Buckley, Director of Energy Finance Studies, Australasia

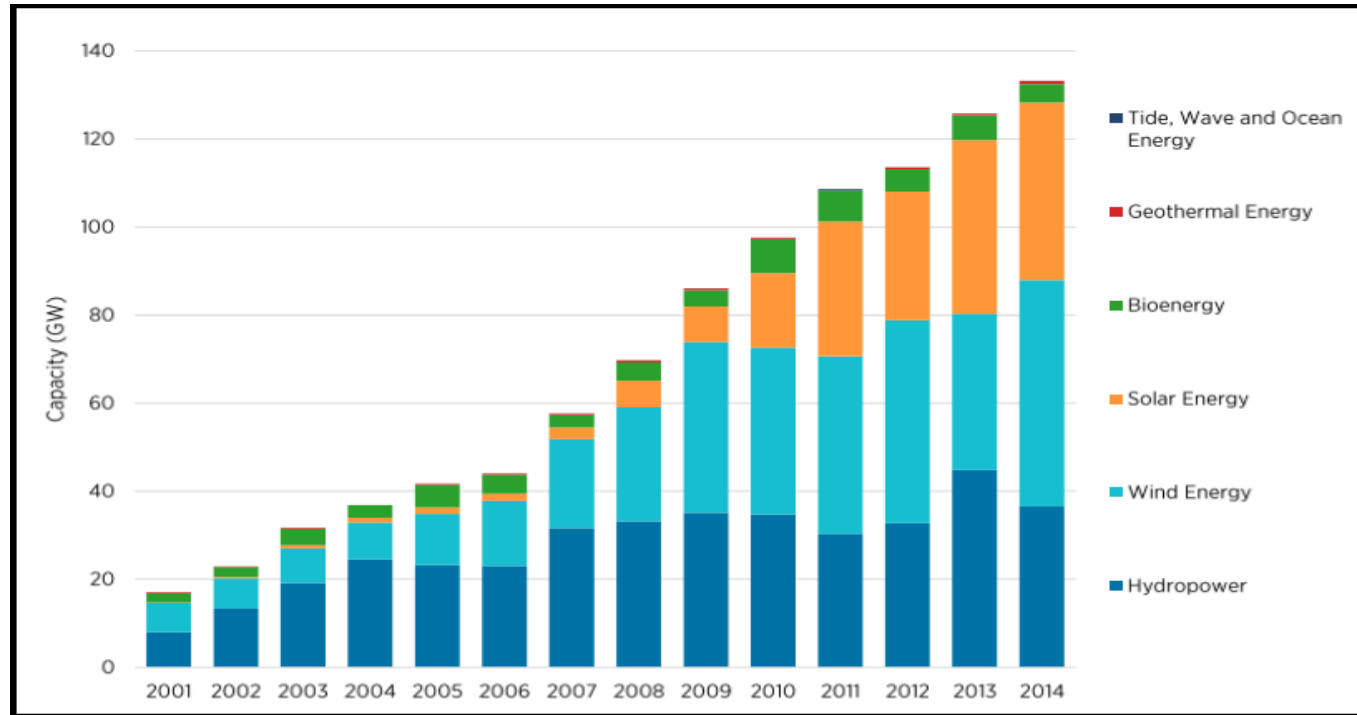
2016 Australian Summer Study on Energy Productivity



**Institute for Energy Economics
and Financial Analysis**
IEEFA.org

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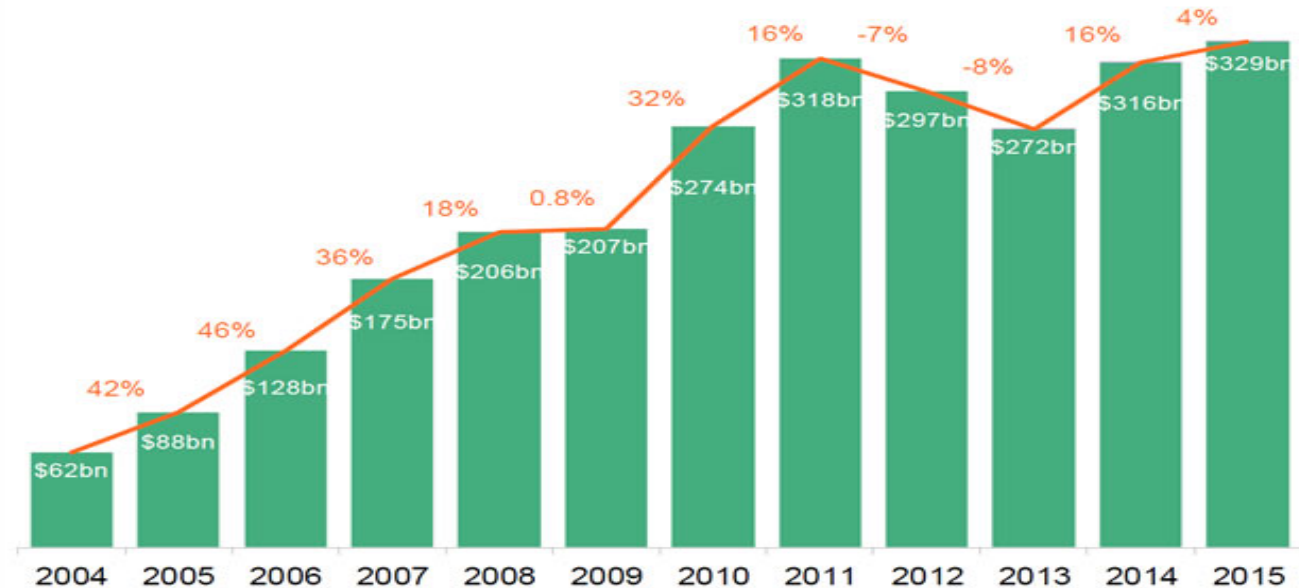
1.1 Renewables are spreading



Source: IRENA 2015

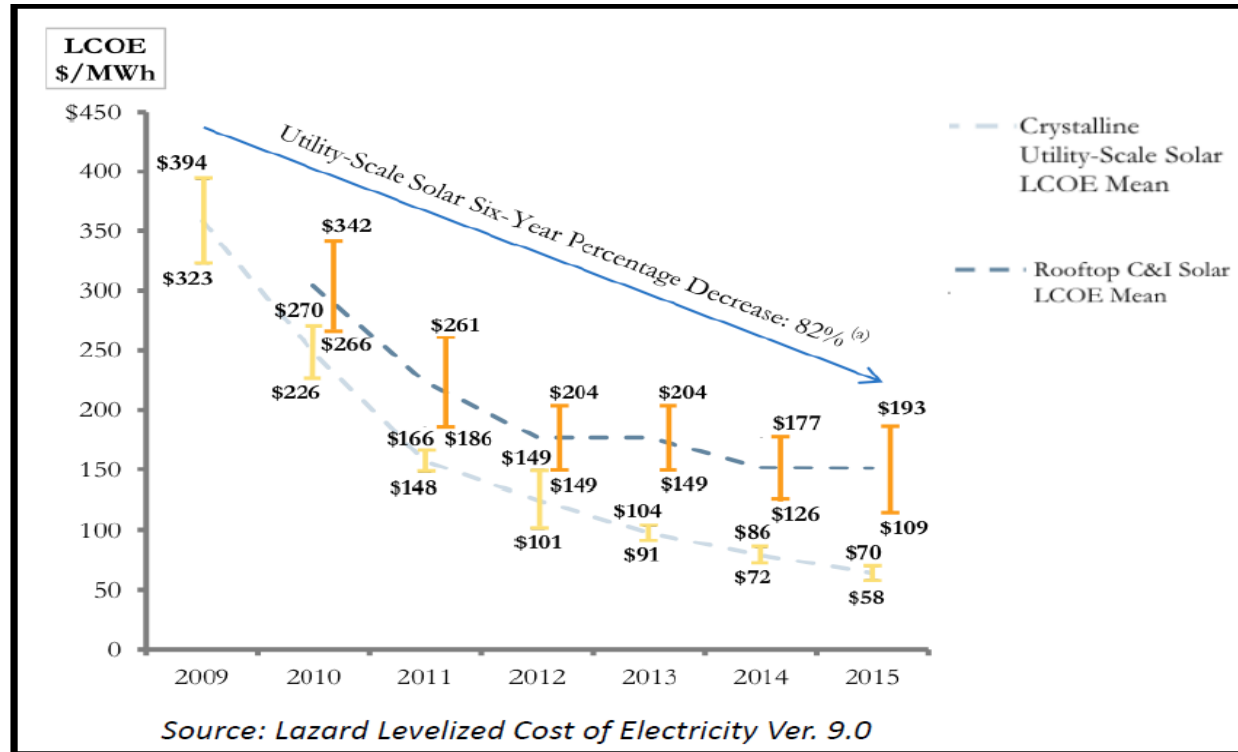
1.2 2015 was another Renewable Energy record

Global clean energy investment 2004-15, \$bn



Source: Bloomberg New Energy Finance

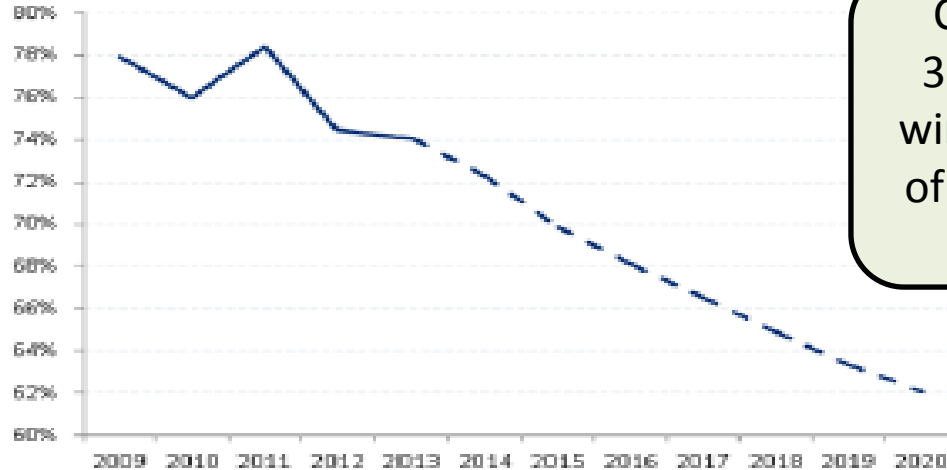
1.3 US Utility Solar Costs down 82% 2009-2015



2 China's Electricity Sector Transformation

Coal's share of China's electricity generation mix is set for a steep decline

Year to Dec 2015:
China GDP +6.9%
Electricity +0.5%
Domestic coal -4.1%
Coal imports -30%



China added 30GW of new wind and 15GW of solar in 2015 alone

3.1 India

India's Energy Minister Piyush Goyal stated November 2014:

1. *Plans to transformation of the entire Indian electricity system with 175GW of renewable energy installs by 2021. This involves a trebling of wind installs to 6-8GW and lifting solar installs tenfold to 10GW pa.*
2. *A plan for a US\$50bn national grid upgrade to drive grid efficiency.*
3. *Plans to more than double India's domestic coal production to 1.5Bn tpa by 2019, requiring a massive investment in rail infrastructure, coal handling and preparation plants plus major new mine development.*
4. *Goyal: "I'm very confident of achieving these targets and am very confident that India's current account deficit will not be burdened with the amount of money we lose for imports of coal. Possibly in the next two or three years we should be able to stop imports of thermal coal."*

3.2 India

- Indian Energy Minister Goyal's Ministry of New and Renewable Energy (MNRE) provided a update of progress on solar installs achieved to the end January 2016, and detailed the new March 2016 and March 2017 financial year targets.^[1]
- As of 31 January 2016, India's total solar capacity reached 5.25GW cumulative installs, with 1.5GW being installed in the first 10 months of the 2015/16 financial year (10MFY16). MNRE expects total installs in the 2015/16 year to reach 3.79GW, >300% year-on-year (yoy) growth on the 1GW of installs achieved in 2014/15. Total cumulative installs are forecast to reach 7.53GW by end March 2016.
- The MNRE forecasts installs in 2016/17 will show another 300% yoy growth to 12.16GW – tripling India's cumulative installs to-date in just one year.
- IEEFA had forecast 260% yoy growth to 2.6GW of new installs in 2015/16, with our assumption that the rate of growth would decelerate to 'only' a doubling in 2016/17 to 6.0GW of additions (half the MNRE's latest target). As such, there is significant upside surprise potential for us (and the financial markets in general) should the rate of growth continue at current rates. All signs to-date suggest positive surprise is increasingly likely under Energy Minister Piyush Goyal's excellent leadership.^[2]

^[1] <http://mnre.gov.in/file-manager/UserFiles/GW-Solar-Plan.pdf>

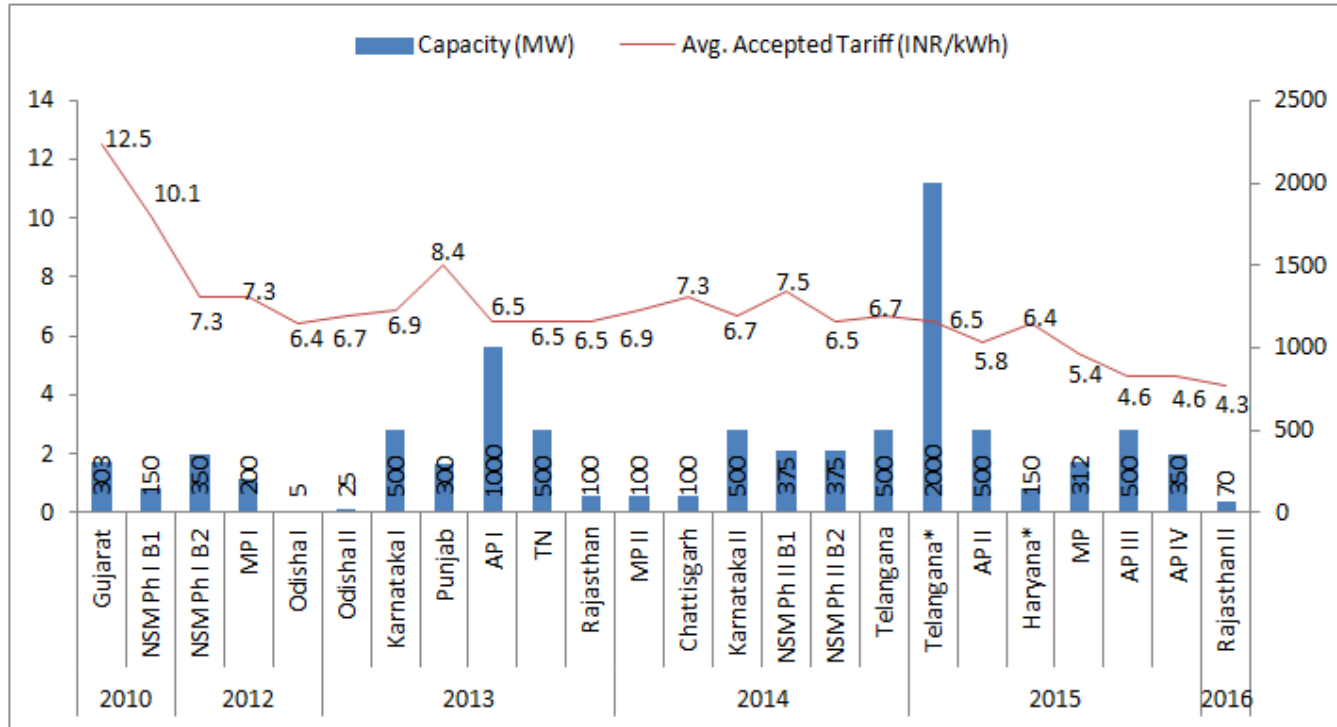
^[2] <http://ieefa.org/wp-content/uploads/2015/11/IEEFA-India-Electricity-Sector-Transformation-Global-Capacity-Building-11112015.pdf>

3.3 India

- India has seen global firms commit over US\$100 billion to the Indian solar sector in 2015.
- SoftBank (Japan) and Foxconn (Taiwan) tied up with Bharti Enterprises (India) and committed US\$20bn to Indian solar over five years.
- The Adani Group has committed US\$16bn to numerous solar projects across India in 2015, and is due to commission the world's largest solar project in Tamil Nadu next month – a US\$650m investment to build a 648MW project (only commenced in January 2015).
- Reliance Power has cancelled 14GW of thermal power project proposals to focus on 6GW of solar and 5GW of hydro instead.

http://ieefa.org/wp-content/uploads/2015/11/IEEFA-India-Electricity-Sector-Transformation_Global-Capacity-Building_11112015.pdf

3.4 India – Solar Tariffs Are Falling Rapidly



Jan 2016: A new low utility solar of Rs4.34/kWh (US\$64/MWh) was set: zero indexation for 25 years.

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