Renewable Energy Auctions
Analysing 2016
IRENA – Energy Community Workshop on Renewable Energy Auctions
8 March 2017
Renewable Energy Auctions

Recent highlights

Note: ± Gigawatt hour.
Source: countries that have implemented auctions to date based on IRENA, 2018, 2011, 2013, 2014 and 2015, and recent bids from IRENA, 2017a.
Price trends: solar PV auctions
Price trends: solar PV auctions

**Downward trends in South Africa**

- Investor confidence and learning curve
- Design of the auction
- Existing domestic solar industry

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**Local content requirements and achievements in South Africa**

*Source: Submitter, Montmasson-Clair, and Das Nair (2015).*
Price trends: solar PV auctions

*Ups and downs in India*

- Auctions are decentralized (national and state level) with diverse conditions
- Domestic content requirements in some state auctions
- Relatively higher prices compared with Peru, the United States and South Africa

*The effect of inflation indexing on contract price*

*Note: the figure aims to show the remuneration of indexed/non-indexed contracts under nominal and real terms. A contract price of USD 100/MWh and 4% inflation were used in this example, for illustrative purposes.*
Price trends: solar PV auctions

Lower prices in the United States

- Investment tax credit, the federal solar tax credit, reduces the cost of installation by about 30%.

**US solar prices: actual vs. estimated effective prices, February 2013-May 2016**

Source: based on data from Shahan, 2016.
Price trends: solar PV auctions

*Higher prices in Germany*

- Capacity factor average 11%
- Costs of installing and operating solar plants (land, labour, etc.)

*Solar prices in France and Germany: actual results vs. adjusted result assuming a benchmark capacity factor of 25%, February 2010-August 2016*

*Source: based on data from BNEF, 2016.*
Price trends: solar PV auctions

Remuneration profile in Abu Dhabi in the United Arab Emirates

- Energy delivered from June to September counts for 1.6 times as much as energy delivered from October to May.
- Therefore, the bids do not reflect the actual remuneration of the project.

*Abu Dhabi’s solar auction: bid submitted vs. actual remuneration*

*Source: based on data from BNEF, 2016.*
Price trends: onshore wind auctions
Price trends: onshore wind auctions

A sharp decrease in Mexico

- Investor confidence and learning curve
- Economic signals for project location

Locational signals and offered capacity in each location: first vs. second Mexican auction

Source: based on Strategy &, 2016.
Price trends: onshore wind auctions

*Fluctuating prices in Brazil*

- Project lead times
- Intensified competition
- Availability of concessional financing
- Depreciation of the local currency
- Auction design

Brazil wind auction results

![Price trends graph](image-url)
Factors that impact the price

Price resulting from auction

- Country-specific conditions
- Auction design
- Policies supporting renewables
- Investor confidence and learning curve
Factors that impact the price

Country-specific conditions:

♦ Cost of finance (access to finance, ease of doing business, etc.)
♦ Cost of labor, cost of land, etc.
♦ Renewable energy resource availability
Investor confidence and learning curve:

- Credibility of off-taker
- Periodicity of auctions (as part of a long-term plan)
- Confidence from past auctions
- Lessons learnt from past auctions (auctioneer and bidders)
- Reuse of documents/studies from past rounds

Systematic auctions and the learning curve impact

<table>
<thead>
<tr>
<th>Country</th>
<th>Renewable energy technology</th>
<th>First iteration</th>
<th>Second iteration</th>
<th>Learning curve impact</th>
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</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>Various</td>
<td>2011: 53% bids qualified</td>
<td>2012: 64.5% bids qualified</td>
<td>+11% increase in bid qualification rate</td>
</tr>
<tr>
<td>India</td>
<td>Solar PV</td>
<td>2010: 12.16 INR/kWh</td>
<td>2011: 8.77 INR/kWh</td>
<td>28% decrease in contracted price</td>
</tr>
<tr>
<td>California (USA)</td>
<td>Various</td>
<td>2011: 92 bids received</td>
<td>2012: 142 bids received</td>
<td>+54% of bids received</td>
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</tbody>
</table>

Source: IRENA and CEM, 2015.
Factors that impact the price

Policies and measures supporting renewable energy development

- National plans and targets
- Fiscal incentives (tax credits, exemptions, accelerated depreciation, etc.)
- Grid access and priority dispatch
- Socio-economic benefits

<table>
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<th>NATIONAL POLICY</th>
<th>REGULATORY INSTRUMENTS</th>
<th>FISCAL INCENTIVES</th>
<th>GRID ACCESS</th>
<th>ACCESS TO FINANCE²</th>
<th>SOCIO-ECONOMIC BENEFITS³</th>
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<tr>
<td>Renewable energy target</td>
<td>Feed-in tariff</td>
<td>VAT/ fuel tax/ income tax exemption</td>
<td>Transmission discount/exemption</td>
<td>Currency hedging</td>
<td>Renewable energy in rural access/cool stove programmes</td>
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<tr>
<td>Renewable energy law/strategy</td>
<td>Feed-in premium</td>
<td>Import/export fiscal benefit</td>
<td>Priority/dedicated transmission</td>
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<td>Local content requirements</td>
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<td>Technology-specific law/programme</td>
<td>Auction</td>
<td>National exemption of local taxes</td>
<td>Grid access</td>
<td>Eligible fund</td>
<td>Special environmental regulations</td>
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<td>Quota</td>
<td>Carbon tax</td>
<td>Preferential dispatch</td>
<td>Guarantees</td>
<td>Food and water nexus policy</td>
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<td>Certificate system</td>
<td>Accelerated depreciation</td>
<td>Other grid benefits</td>
<td>Pre-investment support</td>
<td>Social requirements</td>
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<td>Net metering</td>
<td>Other fiscal benefits</td>
<td>Direct funding</td>
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Factors that impact the price

The design of the auction considering trade-offs:

♦ Ensuring project delivery and price
♦ Fulfilling development goals and price
♦ Encouraging small/new players and price

Choice of the auctioned volume and the way it is shared between different technologies and project sizes

Minimum requirements for participants in the auction

How the information is collected and the winner is selected

Specific rules to ensure high implementation rate of awarded projects in a timely manner

Auction demand
Winner selection
Qualification requirements
Sellers’ liabilities

IRENA and CEM, 2015
The way forward in planning and designing auctions

- Understanding the reasons behind the recent low prices is important to make informed policy choices
  - The low prices attained can be due to additional financial support, indexed contracts, or additional remuneration during periods of peak demand, etc.

- Concerns with auctions underestimating the true costs of renewable energy (e.g. balancing costs of renewables) or causing overly aggressive bidding

- Risks of underbuilding and delays can be reduced with solid contracts, enforceable penalties, and legal and regulatory stability. However, stringent compliance rules may deter the participation of small and/or new players

- The extent to which the results are affected depends on choices regarding the design elements and how well adapted they are to the country’s specific context (economic situation, structure of the energy sector, maturity of the power market and level of renewable energy deployment)

- The complex and dynamic environment of renewable energy auctions motivates constant innovation in the mechanisms’ design. The assessment of previous implementations and the most recent experiences is crucial
Thank you!