Renewable Energy Auctions
An overview of design
IRENA – Energy Community Workshop on Renewable Energy
Auctions
8 March 2017
173 countries have at least one type of renewable energy target – up from 43 in 2005

Targets in the global renewable energy landscape

**INCREASING SPECIFICITY, MEASURABILITY AND BINDING CHARACTER**

1. **POLITICAL ANNOUNCEMENTS AND VISION STATEMENTS**
   (e.g., white papers, regional level, energy communiqués, declarations and plans)

2. **ENERGY STRATEGIES AND SCENARIOS**
   (e.g., electricity expansion plans, integrated resource plans)

3. **DETAILED ROADMAPS AND ACTION PLANS**
   (e.g., NREAPs, five-year plans, renewable energy programmes, technology-specific roadmaps)

4. **LEGALLY BINDING RENEWABLE ENERGY TARGETS**
   (e.g., Laws, Renewable Obligations, Renewable Fuel Standards, Renewable Portfolio Standards etc.)

## Types of renewable energy policies and measures

<table>
<thead>
<tr>
<th>NATIONAL POLICY</th>
<th>REGULATORY INSTRUMENTS</th>
<th>FISCAL INCENTIVES</th>
<th>GRID ACCESS</th>
<th>ACCESS TO FINANCE&lt;sup&gt;a&lt;/sup&gt;</th>
<th>SOCIO-ECONOMIC BENEFITS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<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/cook stove programmes</td>
</tr>
<tr>
<td>Renewable energy law/ strategy</td>
<td>Feed-in premium</td>
<td>Import/export fiscal benefit</td>
<td>Priority/ dedicated transmission</td>
<td>Dedicated fund</td>
<td>Local content requirements</td>
</tr>
<tr>
<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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<tr>
<td></td>
<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></td>
<td>Certificate system</td>
<td>Accelerated depreciation</td>
<td>Other grid benefits</td>
<td>Pre-investment support</td>
<td>Social requirements</td>
</tr>
<tr>
<td></td>
<td>Net metering</td>
<td>Other fiscal benefits</td>
<td>Direct funding</td>
<td>Direct funding</td>
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</table>
Trends in renewable energy support policies

- Used auctions to set feed-in tariffs
- Used feed-in tariffs to set price cap for auctions
- Implemented auctions and a feed-in tariff simultaneously

Number of countries with renewable energy policies, by type

- FIT (FIP)
- RPO
- Auctions


Countries: Germany, France, South Africa, China
FITs Strengths and weaknesses - Keeping pace with rapidly decreasing costs

**FITs**

**Strengths**
- Limits the risks for investors also in emerging technologies
- Facilitates the entry of new players in the market
- Often funded by consumers and not exposed to public budget cuts
- Long term security drives technological development

**Weaknesses**
- Costly with high deployment rates and generation is not exposed to electricity market prices
- Tariff setting and tariff adjustment process is challenging and complex

**PV FIT degression mechanism in Germany, the U.K. and France**

Source: IRENA (2014), Adapting renewable energy policies to dynamic market conditions
Auctions Strengths and weaknesses - Keeping pace with rapidly decreasing costs

Auctions

**Strengths**
- Flexibility in the design according to conditions and objectives
- Permit real price discovery
- Provide greater certainty regarding prices and quantities
- Enable commitments and transparency

**Weaknesses**
- Are associated with relatively high transaction costs for both developer and auctioneer
- Risk of underbuilding and delays

*Based on REN21 Global Status Report (2005 to 2016)*
Auction design elements

- Choice of the auctioned volume and the way it is shared between different technologies and project sizes
- Minimum requirements for participants in the auction
- Specific rules to ensure high implementation rate of awarded projects in a timely manner
- How the information is collected and the winner is selected

IRENA and CEM, 2015
### 1- Auction Demand

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

**Auction demand**

<table>
<thead>
<tr>
<th><strong>Specific demand bands</strong></th>
<th><strong>Volume auctioned</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Related to the partitioning of renewable energy demand based on different criteria (technology, size, location, etc.):</td>
<td>Key input in the auction process, consistent with the renewable energy policies and electricity system’s technical capabilities:</td>
</tr>
<tr>
<td>» Exclusive demand bands</td>
<td>» Fixed auctioned volume</td>
</tr>
<tr>
<td>» Competitive demand bands</td>
<td>» Price-sensitive demand</td>
</tr>
<tr>
<td>» Partially competitive demand bands</td>
<td>» Multi-criteria volume setting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Periodicity and commitments</strong></th>
<th><strong>Demand-side responsibilities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>» Standalone auctions – used to achieve economies of scale, mainly in smaller countries with less mature technologies</td>
<td>» Allocation of costs</td>
</tr>
<tr>
<td>» Systematic auctions – may attract a larger number of bidders, leading to gradual renewable energy penetration</td>
<td>» Contract off-taker</td>
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<td>» Contracting schemes</td>
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</tbody>
</table>

**Diagram:**

Consumers → Contract off-taker → Generator
2- Qualification requirements

Minimum requirements for participants in the auction

Qualification requirements

<table>
<thead>
<tr>
<th>Reputation requirements</th>
<th>Technological requirements</th>
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</thead>
<tbody>
<tr>
<td>Usually based on the following information regarding the bidding company itself:</td>
<td>Supply-side constraints:</td>
</tr>
<tr>
<td>» Legal requirements</td>
<td>» Renewable energy generation source</td>
</tr>
<tr>
<td>» Proof of financial health</td>
<td>» Equipment specifications</td>
</tr>
<tr>
<td>» Agreements and partnerships</td>
<td>» Project size constraints</td>
</tr>
<tr>
<td>» Past experience requirements</td>
<td></td>
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<tr>
<td><strong>Socio-economic development instrument</strong></td>
<td></td>
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<tr>
<td>Maximising the socio-economic benefit through:</td>
<td></td>
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<tr>
<td>» Empowerment and employment requirements mainly focused on the local community</td>
<td></td>
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<tr>
<td>» Local content requirements - aimed to promote the local industry</td>
<td></td>
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<tr>
<td><strong>Production site selection</strong></td>
<td></td>
</tr>
<tr>
<td>The following aspects must be defined</td>
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<tr>
<td>» Site selection responsibility</td>
<td></td>
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<tr>
<td>» Location constraints</td>
<td></td>
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<tr>
<td>» Site documentation requirements</td>
<td></td>
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<tr>
<td><strong>Securing grid access</strong></td>
<td></td>
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<tr>
<td>Defines how the physical access to the electric grid will be ensured</td>
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</tbody>
</table>
## 3- Winner Selection

### Bidding procedure
- Collecting supply side information:
  - Sealed bid process - all bid info is directly provided to the auctioneer
  - Iterative process including descending clock auction - bid info is disclosed gradually during the auction
  - Hybrid process

### Winner selection criteria
- Minimum-price auctions
- Adjusted minimum-price auctions - using a “correction factor”
- Multi-criteria auctions

### Clearing mechanisms and marginal bids
- Clearing the auction's supply and demand through flexible demand schemes, price-quantity bidding or ex-post adjustments

### Requirements of minimal competition
- Maximum awarded capacity constraint prevents a single player from becoming dominant in the auction
- Ceiling price mechanisms - “anti-monopoly” mechanism, preventing dominant players from bidding high
- Other mechanisms

### Payment to the winner
- Pay-as-bid pricing - most common implementation, despite the dependence of one's bid on its remuneration
- Marginal pricing schemes - encourage disclosure of real project development costs
- Nonstandard pricing schemes
## 4- Sellers’ liabilities

<table>
<thead>
<tr>
<th>Commitment contract signing</th>
<th>Settlement rules and underperformance penalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>The choice of requiring bid bonds or not</td>
<td>Critical obligations with an effect on the plant’s remuneration, addressed as:</td>
</tr>
<tr>
<td></td>
<td>» Temporal aggregation clauses</td>
</tr>
<tr>
<td></td>
<td>» Over-and underperformance penalties</td>
</tr>
<tr>
<td></td>
<td>» Revisions of contracted quantity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contract schedule</th>
<th>Remuneration and financial risks</th>
<th>Delay and underbuilding penalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Lead time - lag for plant construction</td>
<td>Aims to avoid financial risks (usually inflation) that might affect the remuneration:</td>
<td>Critical rules for a high implementation rate of the awarded projects:</td>
</tr>
<tr>
<td>» Contract duration - commitment length</td>
<td>» Straightforward escalation</td>
<td>» Completion bond</td>
</tr>
<tr>
<td>» Post - contract provisions - plant’s ownership at the contract’s end</td>
<td>» Hybrid contract indexation</td>
<td>» Delay specific penalties</td>
</tr>
<tr>
<td></td>
<td>» Variable remuneration profile</td>
<td>» Contract resolution clauses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of quantity liabilities</th>
<th>Liabilities for transmission delays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the nature of commitment assumed by the project developer, which is directly related to the allocation if risk: capacity-, energy- or financial oriented agreements</td>
<td>The liabilities can be assigned to the project developer or to another agent (TSO, the central planning agency, etc.)</td>
</tr>
</tbody>
</table>
Key considerations in designing and implementing auctions

Increasing competition for cost-efficiency
- Increased participation of bidders
- Prevention of collusion and price manipulation

Limiting participation to bidders who can meet goals
- Project delivery
- Deployment goals

Ensuring global socio-economic development goals
- Qualification requirements
- Multi-criteria selection
Increasing competition for cost-efficiency

Diversity of technology

• Implementing a technology-neutral auction can enable the development of least-cost technologies

• Implementing a technology-specific auction can fulfil deployment goals

Volume auctioned

• Auctioning a large volume at once allows for rapid capacity addition but might result in lack of competition
Increasing competition for cost-efficiency (cont’d)

**Level of participation of bidders**

- Reducing entry barriers:
  - Requirements and compliance rules commensurate with market conditions
  - Resource assessments, feasibility studies and permits provided to bidders
  - Streamlined administrative procedure and one-stop-shop
  - Fair and transparent rules

**Reducing the perception of risk**

- Demand-side responsibilities
- Increased certainty and regularity of auction rounds
- Mitigated financial risk

**Prevention of collusion and price manipulation**

- Selecting an appropriate bidding procedure may prevent collusion
- Introducing a ceiling price can limit the price
Limiting participation to bidders who can deliver the project

Reputation requirements

- Proof that bidders have the financial, technical and legal capability to develop the project to prevent speculative bidding
- Proof that bidders have the past experience and proven track record to help ensure successful delivery

Compliance rules

- Bid bonds and project completion bonds to help ensure successful and timely delivery
- Penalties for delay and underbuilding to help ensure successful and timely delivery
- Penalties for under (or over) performance to help prevent under (or over) producing
Limiting participation to bidders who can meet deployment goals

Technological requirements
- Technologies that can compete to align with national energy policy
- Equipment specifications to ensure quality

Project size requirements
- Minimum size to enable economies of scale and reduce transaction costs
- Maximum size to encourage small and/or new players

Location constraints
- Achieve geographic diversification and avoid competition with other sectors
- Ensure proximity to the grid

Grid access requirements
- Ensure feasibility of integrating renewable electricity into the grid
- Avoid delays due to grid expansion
Ensuring global and local goals

Socio-economic impacts

- Qualification requirements
- Multi criteria selection

- In 2015, the global renewable energy sector employed 9.4 million people
- Doubling the share of renewables in the energy mix by 2030 would:
  - increase global GDP by up to 1.1 per cent
  - improve welfare by up to 3.7 per cent and
  - support over 24 million jobs in the renewable energy sector
Key messages

Policy makers may want to consider the following:

♦ Different policy options are not mutually exclusive and each type can be used to address different technologies, capacities, markets and objectives.

♦ Auctions play an important role in the new generation of policies and they have become increasingly sophisticated in their design
  • Account for the trade-offs between different design elements
  • Tailor the design of auctions to the specific context and objectives

♦ Mobilising the scale of investment necessary requires an environment that is built on an enabling policy and regulatory framework that can catalyse private investments into the energy sector
Thank you!