AURES II – Auctions for Renewable Energy Support II

Regional Workshop 4
@Strommarkttreffen

Virtual Regional Workshop, 26 June 2020
AURES II – an overview

AURES II – Auctions for Renewable Energy Support II

- Supported through Horizon2020 framework
- November 2018 – October 2021
- Coordination: Fraunhofer ISI, Germany
- Consortium: 11 institutions from 6 EU Member States + UK
AURES II – 11 institutions from 7 European countries

AURES II has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 817619
AURES II – an overview

AURES II – Auctions for Renewable Energy Support II

• Supported through Horizon2020 framework
• November 2018 – October 2021
• Coordination: Fraunhofer ISI, Germany
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Objectives:

1. Generate and communicate new insights on the applicability, performance, and effects of specific auction designs
2. Provide tailor-made policy support for different types of auction applications
3. Facilitate knowledge exchange between stakeholders
AURES II – Inform the discussion on renewable energy auctions

- 12 country case studies
- AURES II Auction Database
- Policy Briefs
- Reports on current topics
- Research papers
- Stakeholder workshops
- Country case cooperation
Vasilios Anatolitis
Fraunhofer ISI
vasilios.anatolitis@isi.fraunhofer.de

**AURES II**

Website: [http://aures2project.eu/](http://aures2project.eu/)
LinkedIn: AURES II
Twitter: @auctions4res
Newsletter: [http://eepurl.com/gd42zz](http://eepurl.com/gd42zz)

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AURES II has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817619
Impact of Covid-19 on RES Auctions

Fabian Wigand, Guidehouse/Navigant

Virtual Strommarkttreffen / Region AURES II Workshop
26.06.2020
Impact of Covid-19 on RES procurement & project realization

- Strong decrease in short-term power demand, high mid-term uncertainty --> reduced power demand and tighter budgets could reduce new RES auction volumes
- 2020 RES targets: Countries previously at risk of falling short of their 2020 target might now not see the need for additional RES action
- Short-term supply chain disruptions (although may RES component sites in Europe continue to operate)
- Delays of permits by planning authorities
- Risk missing project realization deadlines, face penalties
Many industry associations call for deadline extension, although in Spain it asks for sticking to original deadlines.

Extension of realization deadlines:
- Germany (upon proof of causes)
- France
- Greece (by 6 months (until end of June) or 4 months (until end of year))

Postponement of auctions:
- France (av. 2 months)
- Ireland (1 month)
- Portugal (paused)
- Slovakia (cancellation)
- But: Greece and Netherlands stuck to schedule
Covid-19 increases financing and capital market risk

**Country risks**
- Long-term economic challenges and public debt downgrading country ratings

**Policy risks**
- Postponing auctions, retroactive policy changes

**Market risks**
- Lower and fluctuating wholesale prices emphasise need for state revenue stabilisation

**Capital market risks**
- Decreased availability and increased cost of capital for RES project finance, devaluation of assets inhibit balance sheet financing

**Financing opportunities**
- Pot. access to government-backed guarantees & loans through economic relief packages
How to adjust the RES auction design

- Extending realization deadlines of awarded projects and for upcoming auctions, tailored to local circumstances, automatic and uniform

- Allowing for longer award periods & increasing digitalization of auctions and permitting procedures

- Adjusting auction schedules but if possible avoiding auction volume revisions (unless competition significantly reduced)
Achieving the Renewable Energy Policy Objectives - Evidence from European Auctions

25th June 2020 – Online Workshop
Ann-Katrin Hanke & Vasilios Anatolitis

Forthcoming Research Paper
Identification of RES policy objectives based on national laws

- Are objectives positively or negatively correlated?
- Which design elements help to achieve objectives or are hindering their fulfillment?
- What are the countries’ objectives?

<table>
<thead>
<tr>
<th>Design element</th>
<th>Effectiveness Cost efficiency</th>
<th>Support cost efficiency</th>
<th>Green growth</th>
<th>Security of supply</th>
<th>Actor diversity</th>
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<tbody>
<tr>
<td>Volume of auctioned product</td>
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<td>+</td>
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<td>Multi-technology</td>
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<td>Financial prequalifications</td>
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<td>Material prequalifications</td>
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<td>Floor price</td>
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<td>Quotas</td>
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<td>Favourable treatment for specific actors</td>
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<td>Penalties</td>
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<td>Actor diversity</td>
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</table>

Table 2: Analysis of relation between the aforementioned objectives. Legend: + = complementary, + = rather complementary, o = neutral, - = rather contrary, -- = contrary.

Table 3: Analysis of the impact of selected auction design elements on the objectives. Legend: + = positive impact, o = no impact, - = negative impact.

Table 4: Overview of identified objectives of different EU countries.
Most countries follow coherent strategies in defining objectives and design

Did countries follow consistent strategies when defining their objectives?

<table>
<thead>
<tr>
<th>Aligned</th>
<th>Ambiguous</th>
<th>Non-aligned</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>France</td>
<td>Estonia</td>
<td>Finland</td>
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<tr>
<td>Italy</td>
<td>Germany</td>
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<tr>
<td>Lithuania</td>
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<td>Hungary</td>
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<td>Luxembourg</td>
<td>Greece</td>
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<td>Netherlands</td>
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<td>Spain</td>
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<tr>
<td>United Kingdom</td>
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</tbody>
</table>

Table 6: General tendency of the relation between identified objectives of different EU countries

Did countries design their auctions according to their objectives?

<table>
<thead>
<tr>
<th>Suitable</th>
<th>Improvable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>Estonia</td>
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<td>Finland</td>
<td>Germany</td>
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<tr>
<td>France</td>
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<td>Luxembourg</td>
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<td>Netherlands</td>
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<td>Spain</td>
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<td>UK</td>
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</tbody>
</table>

Table 7: General performance of policy designs of different EU countries based on designated objectives
AURES II has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 817619

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LinkedIn: AURES II
Twitter: @auctions4res
Newsletter: http://eepurl.com/gd42zz
Auctions and energy communities

Risks, design options, and international experiences

Ana Amazo – Senior Consultant at Navigant/Guidehouse
4th AURES II Regional Workshop & Strommarkttreffen Webinar
#1 Energy communities can take many forms and strive for different objectives

- Core elements identified, but do not apply to all energy community actors:
  - Local proximity
  - Local (financial) ownership vs. participation in project development
  - Focus on community benefits

Definitions are important in targeting measures to energy communities

- Definitions can reduce the potential for non-intended use but implementation is challenging: compliance evaluation can be cumbersome
- Broader definitions can be alternative to defining specific actors/business models for community actors
  - If targeting specific business models is the right fit, an option is to support outside the auction

<table>
<thead>
<tr>
<th>Actor-based (“business model”)</th>
<th>Community involvement criteria (independent of actor/business model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany’s citizen energy companies in wind auctions (in 2017)</td>
<td>France’s bonus for participatory funding</td>
</tr>
</tbody>
</table>
#2 Measures within the auction can facilitate participation but come at the compromise of market distortion

<table>
<thead>
<tr>
<th>Measures inside the auction</th>
<th>Other conditions for participation</th>
<th>Bonus or quota</th>
<th>Different pricing rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country example</td>
<td>Preferential auction rules in Germany</td>
<td>Citizen participation bonus in France</td>
<td>Uniform pricing rule in Germany</td>
</tr>
<tr>
<td>Financial risk</td>
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</tr>
<tr>
<td>Allocation risk</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Price risk</td>
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<tr>
<td>New-bidder risk</td>
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<td>Non-compliance risk</td>
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<tr>
<td>Non-realization risk</td>
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</tbody>
</table>

**Challenges**

Measures can have adverse effects on auction outcomes

- Preferential auction rules in Germany → auctioning of projects in different development stages increases non-realization risk
- Bonus or quota → auction price level higher
#3 Measures outside the auction interfere less with the auction but show limited impact against actor consolidation trend

<table>
<thead>
<tr>
<th>Country example</th>
<th>Guarantee Fund in Denmark</th>
<th>Several countries introducing auctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial risk</td>
<td>✔</td>
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<tr>
<td>Allocation risk</td>
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<td>Price risk</td>
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<td>New-bidder risk</td>
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<tr>
<td>Non-compliance risk</td>
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<tr>
<td>Non-realization risk</td>
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</tbody>
</table>

**Challenge**

Limited effectiveness in reversing a trend towards overall actor consolidation

**Guarantee Fund in Denmark**

Community energy projects have not yet participated in past auction rounds (Caveat: limited experience due to few rounds)

Similar measures promoting community energy actors → “option-to-purchase” and “value-loss” scheme
Exemptions from auction is at odds with overall transition to auction-based support schemes
→ “Accession mechanism” (granting access to the auction outcome) lowers risks of participating and winning an auction and increases compatibility with auction outcome

Country examples

Spain: accession mechanism with quota, first-come, first-served allocation (in discussion)

Greece: Since 2019, admin. tariff for solar projects: average of past 3 rounds * 1.05 (multiplied by 1.1 for energy community projects).

Considerations

Finding an appropriate legal definition for RECs to qualify for the exemption is a challenge

Project-based definitions (size) provide incentive to develop small projects, instead of larger, more cost-effective projects
Five things to remember

Energy communities can take many forms and strive for different objectives.

Measures within the auction can facilitate participation but come at the compromise of market distortion.

Measures outside the auction interfere less with the auction but show limited impact against actor consolidation trend.

Exempting energy communities and coupling support to auction result can be a compromise, but should be done carefully.

*Opening of community turbine – Fintry, Scotland (Source: Peter Skabara – Community Energy)*
Thank you

The report was prepared under the AURES II project funded by the EU Research Program Horizon 2020.

Download the report here:


Ana Amazo – Senior Consultant at Navigant/Guidehouse
4th AURES II Regional Workshop & Strommarkttreffen Webinar
Empirical Analysis of the Impact of Auctions on Local Supply Chains

Task 4.2

AURES II - Regional Workshop 4 / Strommarkttreffen, 26 June 2019

Craig Menzies
Head of the Energy Department, Factor
Objective and Methodology

**Objective:** To estimate the *perceived impacts of auctions, design elements & context conditions* on the *market concentration* (number and diversity) of project developers and component manufacturers.

**Methodology:** An *Expert Elicitation-based approach* with key experts from the RES sectors of ES, UK, PE & SA. Focus on project developers and component manufacturers of *4 technologies* (on-shore wind, off-shore wind, solar PV and CSP).

**Interview Structure:**
- **Expert Self-Assessment** — for validation and calibration
- **Context Factors** — to evaluate the impact of contextual factors
- **RE Auction Design Elements** — for validation and calibration

---

**MAXIMUM PROJECT SIZE (vs. NO MAXIMUM SIZE LIMITS)**

When there is a maximum project size, only projects of a size below a maximum limit may participate in the auction.

ADMS: Compared to the absence of a maximum project size limit, how would you rate the effect of the existence of a maximum project size...

- a) on the number of project developers?
  - Strong Decrease
  - Neutral
  - Strong Increase

- b) on the number of component manufacturers?
  - Strong Decrease
  - Neutral
  - Strong Increase
The Effect of Design Elements on the NUMBER of Developers and Manufacturers:

► A transparent auction schedule, as well as frequently implemented auctions, were perceived to be determinants for a high number of developers and manufacturers.

► Prequalification requirements (of all kinds) are perceived to reduce the number of developers and manufacturers.
The Effect of Design Elements on the **DIVERSITY** of Developers and Manufacturers:

► At the extremes, the **diversity** and **numbers** (of developers and manufacturers) are affected by the **same design elements** and in **similar ways**.

► **Impacts on diversity** are perceived to be quite strong for project developers, especially via **prequalification requirements**.
Preliminary Discussion

The **full impact** of auctions (versus administratively-set support) on **market concentration** is perceived to be **generally balanced** (on average).

Some **common patterns** can be observed **across case countries**. However, certain differences also exist

=> e.g., in Peru, the impact of auction design elements is perceived to be more negative overall

The **relative importance** of auctions, design elements and context conditions appears to be **heterogeneous** for the four case countries, according to the elicited expert judgments.
AURES has received funds for the years 2018-2021 from the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 817629

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Newsletter:  http://eepurl.com/gd42zz
Renewable energy revolution in Poland

U-turn in the Polish RES auctions system since 2018
2005 to 2016 - 70-fold expansion of wind capacity

10 GW
Installed renewable capacity in Poland by mid-2020

65%
Onshore wind share in installed RES capacity at the end of 2019

Sources: PWEA, ICIS
Planned RES auction volumes in Poland

Auction baskets for new installations

- Biogas
- Multi-technology
- Other RES
- Wind onshore/solar

U-turn in the Polish RES auctions system since 2018
Further changes in 2020

- Relaxing of 10H rule for onshore wind planned from 2021
  - Amending Act on Investments in Wind Power Plants
- Extension of the auction system from mid-2021 to 2026
  - RES act amendment planned in September 2020
- Anti-Crisis Shield 1.0
  - Up to 12 months extension to start generating RES power to receive subsidy
- Offshore wind draft published in January 2020
  - Law adoption planned by the end of 2020
Strike prices below market prices

Power Horizon capture prices forecast compared to 2019 auctions strike prices

Annual average capture price/AVG strike price [€/MWh]

- Solar
- Wind Onshore
- Large solar strike price
- Small solar strike price
- Wind strike price

U-turn in the Polish RES auctions system since 2018
Instead of conclusion

• **Open questions:**
  • Why the renewable U-turn in Polish policies?
  • Why large onshore wind and solar goes into auctions when being on the market seems more profitable?
Thank you
AURES II & Strommarkttreffen

India’s first 24/7 RE-tender linking renewables with energy storage solutions

Tobias Winter, GIZ India, New Delhi
26 June 2020
365 days of solar generation in India

MWp generation, 365 days

Source: [https://carbontracker.in](https://carbontracker.in), based on data from MERIT India, last accessed 20th Oct. 2019
Daily generation from solar in Germany 2019 (in %)

Share of total electricity “consumption”, 365 days

Source: [https://www.energy-charts.de/ren_share.htm?source=solar-share&period=daily&year=2019]
365 days of solar generation in India

MWp generation, 365 days

Source: https://carbontracker.in, based on data from MERIT India, last accessed 20th Oct. 2019
Electricity generation from renewables in India

Peak demand of the year 2019 happened on 4th June 2019

Peak demand: 182 GW at 22:45 hr

Demand curve

RE Generation (mainly PV + Wind)
Electricity generation from renewables in India

9th October 2019 – lowest generation of electricity from all RE in 2019

Peak demand: 154 GW 18:55 hr

Demand curve

RE Generation (mainly PV)

Source: https://carbontracker.in, based on data from MERIT India, last accessed 16th June, 2020

India’s first 24/7 RE-Tender linking renewables with energy storage solutions
Price for utility scale power discovered through reverse auction

Large scale RE is able to compete with coal. But can RE deliver during peak demand at night?

Avg. Coal
~5 EURct./kWh

Lowest bid PV
~3 EURct./kWh

Lowest bid Wind
~3 EURct./kWh

Sources: [https://posoco.in/reports/as3-details/](https://posoco.in/reports/as3-details/), [www.pixabay.com](http://www.pixabay.com)
Levelised cost of electricity in India (nominal $/MWh)

Last updated in 05/2020

Source: BNEF 2020
Projected net coal power capacity additions in India (in GW)
to cater the electricity demand growth of approx. 4% annually (peak demand growth approx. 7% annually) until 2030

India's first 24/7 RE-Tender linking renewables with energy storage solutions

Source: www.cea.nic.in    Compiled by:
1.2 GW PPAs with specific peak power tariffs (in EURct./kWh)

Govt. of India giving higher tariffs for peak power with preference for renewables + storage

India’s first 24/7 RE-Tender linking renewables with energy storage solutions
PPAs with specific peak power tariffs (in EURct./kWh)

Govt. of India giving higher tariffs for peak power

~3,4 EUR ct./kWh
~8 EURct.
off-peak tariff ~3,4 EURct./kWh
peak tariff ~8 EURct.

00:00 06:00 9:00 18:00 24:00

min. 2 hours of delivery during peak time
min. 4 hours of delivery during peak time

India’s first 24/7 RE-Tender linking renewables with energy storage solutions
PV + Storage cheaper than coal?

31.01.2020 - India wrote history! Here prices for bid of 300 MW RE + storage capacity (min. 150 Mwh with 50-150 MWp)

India’s first 24/7 RE-Tender linking renewables with energy storage solutions
# Time-of the day tariff for generation

*Worldwide first 1,2 GW Renewables plus Storage tender by SECI*

<table>
<thead>
<tr>
<th>Bidder / Developer</th>
<th>Capacity</th>
<th>Peak Tariff</th>
<th>Off-Peak Tariff</th>
<th>Weighted Avg. Tariff*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenko</td>
<td>900</td>
<td>6.12</td>
<td>2.88</td>
<td>4.04</td>
</tr>
<tr>
<td>ReNew Power</td>
<td>300</td>
<td>6.85</td>
<td>2.88</td>
<td>4.30</td>
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<table>
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<th>₹/kWh</th>
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<th>₹/kWh</th>
<th>EURct./kWh**</th>
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</thead>
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<td>Off-Peak Tariff</td>
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<td>3,4</td>
<td>4,30</td>
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</tr>
</tbody>
</table>

**Lessons learnt:**
- Time-of the day tariff for generation! instead of power trading at electricity exchange
- Single technology PPAs will continue but may be less preferred in future
- Dispatchable power from batteries, hydro and even wind the preffered choice for catering the peak demand

*2 hours in the morning and 4 hours in the evening out of the defined hours of peak supply*

** as per exchange rate of 25th June 2020

*Source: [Mercom 2020](#)*
Price for utility scale power discovered through reverse auction

Large scale RE is able to compete with coal. But can RE deliver during peak demand at night?

Avg. Coal
~5 EURct./kWh

Lowest bid PV
~3 EURct./kWh

Lowest bid Wind
~3 EURct./kWh

Sources: https://posoco.in/reports/as3-details/, www.pixabay.com

26.06.2020

India's first 24/7 RE-Tender linking renewables with energy storage solutions 49
21/7 not 24/7

*performance criteria and tariffs for up to 1,2 GW*

**Tariff**
- Fixed tariff for off-peak hours for 25 years
- Tariff for the peak hours through reverse action
- Excess generation can be sold in open market
- No tariff escalations
- Penalty of 1,7 EURct./kWh for all units below 3 MWh/MW of project capacity during 6 defined peak hours

**Performance criteria**
- 35% capacity utilization factor annual (+10/-15% annual variation in generation is permitted for first 10 years)
- 3 MWh/MW of project capacity to be supplied daily for six of the nine peak hours defined
- 6 out of 9 peak hours chosen by utility on a daily basis
- MWh energy storage backup with a minimum of 50% of the generation capacity. MWp sizing as per decision by bidder.
- Commissioning max. 30 months from PPA signing

**Technology**
- Only solar, only wind or co-located wind-solar projects along with energy storage systems
- Any combination of battery energy storage, pumped hydro, mechanical and chemical storage systems

**Driver**
- Utilities prefer RE generation which matches their demand profiles with guaranteed minimum power dispatch
- Utilities prefer responsibility of balancing intermittent renewables laying with the independent power producers (IPPs)
Strategies to manage the capacity factor requirements at given tariff

Financial and technical measures

Financial

• Lower IRR expectations from this first project to stay ahead of competitors
• Assume a drop in costs of PV modules and batteries at time of procurement (mid 2021)
• Expect financing costs to fall as result of fiscal and monetary measures for Covid-19 recovery
• Pay penalty for a month’s shortfall in generation and recover from third party sale in other months

Technical

• Locate project in multiple locations to maximize energy production
• Use cheaper batteries with faster replacement to benefit from further cost reductions or new technologies
• Deploy a mix of seasonal storage, like pumped hydro and short term storage, like batteries
• Use advanced tools for forecasting of wind and solar output to manage charging and discharging of storage

Source: BNEF 2020
Vielen Dank!

Thank you!

धन्यवाद
Backup / Captive / Self-consumption behind the meter

Market opportunity for alternatives (approx. +5 GW annual growth)

~120 GW
PV rooftop + storage gaining momentum in India

At present in the commercial and industrial sector because of higher electricity tariffs
Vielen Dank!

Thank you!

धन्यवाद
## Power tariffs in India for final customers

*Depends on the state and the type of the consumer! RE + battery competitive?*

<table>
<thead>
<tr>
<th>State - tariff class</th>
<th>EURct. / kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Delhi - tariff for industries</td>
<td>~11</td>
</tr>
<tr>
<td>State of Madhya Pradesh - tariff for residential homes</td>
<td>~9</td>
</tr>
<tr>
<td>State of Maharashtra - tariff for commercial customers (Shopping center, call center, etc.)</td>
<td>~14</td>
</tr>
</tbody>
</table>

Source: BNEF 2020
Electricity Generation from Renewables in India

Peak demand of 2020 happened on 3rd March 2020 so far

170 GW peak at 08:55 hr

Source: https://carbontracker.in based on data from MERIT India, last accessed 16th June 2020
DYNAMIC AUCTIONS UNDER THE NEW WINDSEEG: TEST BALLOON FOR MORE OR A FALSE START?

Dominik Huebler
Associate Director

Leonie Janisch
Research Officer

Virtual Strommarkttreffen
Berlin, 26.Juni 2020
About us

- Associate Director in the Energy and Infrastructure Practice in Berlin

- 12 years of experience advising companies, investors, law firms and public institutions regarding renewable energy, e.g.:
  - Advice on instruments promoting renewable energy sources in Europe and bidding support for renewables investors
  - Regulatory and market due diligence for off-shore wind projects, cogeneration and regulated networks in Germany and Europe
  - Economic consulting in court and arbitration proceedings on renewable energy, including the Offshore Wind Energy Act, the Combined Heat and Power Act and state aid including in Germany, Bulgaria and Croatia
  - Several publications in energy economics, e.g. on Art. 51 EEG (reduction of the support in the case of negative prices), changes to renewable energy support schemes, financing costs,…
  - Regular lectures covering e.g. long-term risks of green PPAs and international experiences with auctions for renewable energies.

Dominik Hübler
Associate Director
NERA Economic Consulting
Büro Berlin
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The bidding mechanism in Germany’s new Offshore Wind Act: some old, some new

Proposed model retains a one-sided market premium but adds potential concession fees

- Unlike most other main European offshore markets (UK, DK, FR, PL) Germany retains a one-sided market risk premium
- In case of negative bids the developer pays an annual concession fee over a 15-year period

Proposed auction model is a hybrid dynamic / static auction

- Initial sealed bid round (as before)
- Dynamic second bidding stage in case of multiple zero-subsidy bids in round 1
- Winner of the dynamic bidding round gets the opportunity to raise bid (in de facto sealed bid) before the owner of the step-in right gets the chance to take over
Not entirely unchartered territory: Dynamic auctions have been already been used elsewhere

• SDE+ in NL
  – Multi-item auction with an increasing ceiling price. Bids are awarded up to the auctioned budget.

• Dynamic, zone specific auction for PV in PT
  – „Ascending clock“ auction (increasing net present value) which continues until the offered volume is less or equal to the auctioned volume.

• Spectrum auctions
  – Dynamic auction designs are the standard in telecommunication tender processes.
Benefits of static vs. dynamic auctions

- Plenty of precedent and experience from spectrum auctions for mobile telephony and capacity auctions in the energy sector
- Reduced risk of winners curse, as the behaviour of other bidders can be observed
- More suitable if multiple areas are auctioned simultaneously (but will they?)

- Standard for renewables in most European countries
- Simplest operational model (but can be strategically complex under first price award rules)
- May be better at ensuring competitiveness of auction where step-in rights exist (lower “cost” of information revelation)
Some questions on the proposed German mechanism

HYBRID AUCTION DESIGN
• Why the back and forth between static and dynamic bidding within a single auction

THE TWO SIDES OF INFORMATION REVELATION
• Usefulness of Additional „costs“ which may deter potential bidders from participating in the auction

ARE WE AUCTIONING THE RIGHT PRODUCT
• Costs and benefits of the current one-sided market premium vs. a symmetric market premium (CfD)
### Will we see the new mechanism in action?

| + | • Highly competitive market as proven by recent bidding in DE, NL, UK  
   • Technological progress expected to bring down costs |
|---|---|
| - | • Lower power prices due to Covid  
   • Small lot sizes in 2021 in particular  
   • Existence of step-in rights may deter bidders  
   • Lower option value (higher penalties / shorter time frames) under new design may limit aggressiveness of bidding |
### Where we can help

<table>
<thead>
<tr>
<th>• Auction analysis and bid support (e.g. Vattenfall, Equinor, SSE, ...)</th>
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</thead>
<tbody>
<tr>
<td>• Auction simulation and bid optimisation</td>
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<tr>
<td>• Analysis PPA-market and co-investors</td>
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<td>• Competitor analysis</td>
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<td>• “War Gaming”</td>
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<th>• Evolution of regulatory frameworks for RE subsidies</th>
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<td>• Impact assessment of CfD introduction for UK DECC</td>
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<td>• Analyses of different tender mechanisms for offshore wind in NL</td>
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<td>• Design, preparation and subsidy analysis regarding the introduction of CfD in RO</td>
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<th>• Market entry/ economic analyses of offshore wind in Germany (e.g. for China Three Gorges, ...)</th>
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<td>• Analysis of the regulatory framework (electricity market and renewables subsidies)</td>
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<td>• Electricity price prognosis in various scenarios</td>
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<td>• Analyses of auction scenarios</td>
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<th>• Economic consulting in court and arbitration proceedings on RE</th>
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<td>• Long-term delivery contract Solar-Wafers (ICC)</td>
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<td>• Adjustment of regulatory framework conditions win (ICSID)</td>
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<tr>
<td>• Adjustment subsidy conditions hydro power, biomass (both ICSID)</td>
</tr>
<tr>
<td>• Diverse, e.g. grid connection, financial feasibility (FERC, ad hoc)</td>
</tr>
</tbody>
</table>
Recent NERA publications on renewable energy auctions

- https://www.nera.com/content/dam/nera/publications/2016/Quotidiano%20Energia%20NERA%2013%20December%202016.pdf

https://www.nomos-shop.de/titel/offshore-windenergierecht-id-80902/
Thank you for your attention!

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