

AURES II – Auctions for Renewable Energy Support II

Final conference

Virtual meeting, 28 April 2022

Impacts of auctions

Lena Kitzing – DTU



Agenda

Time in CET	Topic	Speaker
14:00-15:00	Impacts of auctions	Lena Kitzing (DTU)
14:05-14:15	Low risk auction design	Lena Kitzing (DTU)
14:15-14:20	Experience with financing of RES projects	Dominik Ruderer (European Investment Bank - EIB)
14:20-14:30	Impacts of auctions on the RE sector	Pablo del Río (CSIC)
14:30-14:35	Impact of auctions in Spain	Heikki Willstedt (Spanish Wind Energy Association (AEE))
14:35-15:00	Q&A and panel discussion	Moderator: Lena Kitzing (DTU), Panelists: Pablo del Río (CSIC), Moira Jimeno (Eclareon), Dominik Ruderer (EIB), Heikki Willstedt (Spanish Wind Energy Association (AEE)), Ana Amazo (Guidehouse)

Low risk auction design

Lena Kitzing – DTU



Low-risk auction design draws from analysis on auctions on cost of capital (WP5)



Work Package 5 (WP 5)

Survey on cost of capital in solar PV and wind projects

- 93 semi-structured interviews across EU member states (and UK)
- Bankers, project developers, investors, experts

	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20
Intercept	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Structural Conditions	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
Sector Experience	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Government Bonds	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Economic Growth	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Government Quality	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Public Support	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
American Presence	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Low Market Risk	0.000	0.000	0.000	0.000	0.000	0.000	0.000
High Market Risk	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Restrictive change	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Long Term Security	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. R ²	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Log Likelihood	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Var. cov.	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Var. diagonal (inverse)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Var. Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Econometric analysis on factors affecting cost of capital

- Macro-level variables (e.g., country risk)
- Meso-level variables (e.g., auctions - # rounds and MW, exposure market price)
- Project-level variables (e.g., resource risk)

Bids in [EUR/MWh]	Mean bid	Median bid	CoE mean	CoD mean	DSCR	Loan tenor	Debt shares	WACC
Min and max bid levels, and financing costs – fixed premiums (onshore wind)								
DK-Wind Onshore	2.31	0.79	7.00%	1.38%	1.15	18.33	74.71%	2.60%
RO-Wind Onshore	63.84	62.98	10.00%	5.63%	1.25	10.00	61.05%	6.78%
Min and max bid levels, and financing costs – sliding premiums (onshore wind)								
FR-Wind Onshore	54.28	54.63	6.92%	1.72%	1.17	17.95	76.93%	2.51%
NL-Wind Onshore	80.44	80.13	11.50%	1.94%	2.00	15.00	58.45%	5.62%
Min and max bid levels, and financing costs – contracts for difference (onshore wind)								
IE-Wind Onshore	47.11	47.14	10.00%	3.50%	1.50	16.00	65.34%	5.46%
LV-Wind Onshore	97.14	96.05	19.17%	4.92%	1.10	11.00	80.57%	6.87%

Cash-flow model to estimate

- Expected bid prices across EU 27 and UK
- Effect of financing conditions vs. other variables on bid prices
- Support costs

Low-risk auction design

Low-risk auction design takes the local financing conditions of developers into account and tries to minimise unnecessary risks for bidders

Good auction design does not need to shield bidders from *all* risks. Instead, it should help them correctly assessing and addressing the risks involved in participating in an auction

Low-risk auction design

1. Auctions can significantly impact financing conditions *
2. Policymakers can create low-risk investment environments by **choosing designs that ease financing** and decrease cost of capital
3. A focus on **de-risking of debt financing** delivers the largest reductions in cost of capital and thus support costs
>> loan maturities and debt size can be increased, interest margins decreased by revenue stabilisation mechanisms (such as CfDs, sliding premiums and price floors)
4. Sufficiently large volumes, **multi-year auction schedules** and **stability** can reduce cost of capital, by allowing for economies of scale and portfolio effects; and by reducing allocation and qualification risk
5. **Relaxing material pre-qualifications, bid bonds and penalties** does not create significant support cost reduction (e.g., through lower equity return requirement); instead, it **may create unwanted effects**, such as lower project realisation rates
6. “Walk-away” effect: Bidders may decide not to participate in an auction if its design is perceived unfavourable or with an inadequate risk-return profile

* However: cost of capital do not only depend on support policies, but on many other external factors, such as country risk

AURES II resources on auctions, risk and financing



Reports

- [Effects of auctions on financing conditions for renewable energy](#), 2019
- [Renewable energy financing conditions in Europe: survey and impact analysis](#), 2021
- [Auction design and renewable energy financing](#), 2021

Policy Briefs

- [De-risking and scaling up renewables through market-based policies](#), 2022

Scientific articles

- [The impact of auctions on financing conditions and cost of capital for wind energy projects](#), Energy Policy, 2021

Data

- [Financing conditions of renewable energy projects –results from an EU wide survey](#), Open Research Europe, 2021

Experience with financing of RES projects

Dominik Ruderer – European Investment Bank (EIB)



Impacts of auctions on the renewable energy sector

Pablo del Río – CSIC



Impacts of auctions on the renewable energy sector



1. Effect of auctions on RES value chains.
2. Effects of auctions on RES communities.
3. Effects of auctions on technological innovation.

1. Impact of auctions on RES value chains



Objective:

To assess the perceived relative impacts of auction design elements (DEs) on two aspects of **Market Concentration (MC)**: the **number** of firms and their **diversity**, with respect to **other factors (context conditions)**, **focusing on two stages** of the value chain (developers and manufacturers).

1. Impact of auctions on RES value chains

Design elements

- Material prequalification requirements on projects.
- Material prequalification requirements on bidders.
- Financial prequalification requirements.
- Technology neutrality.
- Project size limitations (maximum/minimum).
- Schedule / high frequency
- Price-only auctions
- Uniform vs. PAB
- Remuneration type
- Realisation period.

1. Impact of auctions on RES value chains

Methodology

- Structured interviews with key experts (stakeholders / actors) from the RES sectors of four countries. An Expert Elicitation-based approach. Expert interviews were completed during March-July 2020.
- Focus on two stages (project developers and component manufacturers).
- Focus on four technologies (on-shore wind, off-shore wind, solar PV and CSP).
- Case studies:
 - Spain (onshore wind and PV).
 - UK (offshore wind).
 - Peru (onshore wind, PV).
 - South Africa (CSP, PV and on-shore wind).

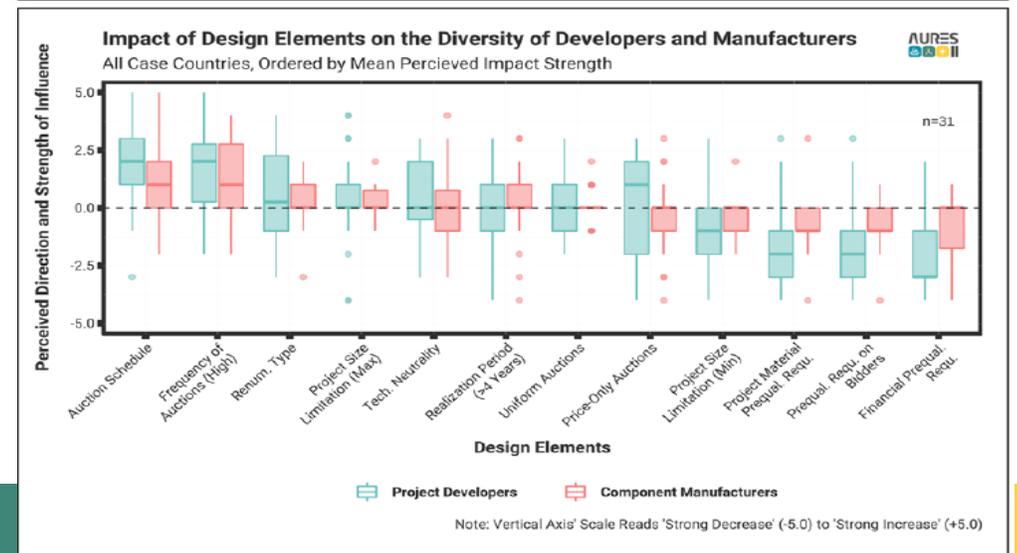
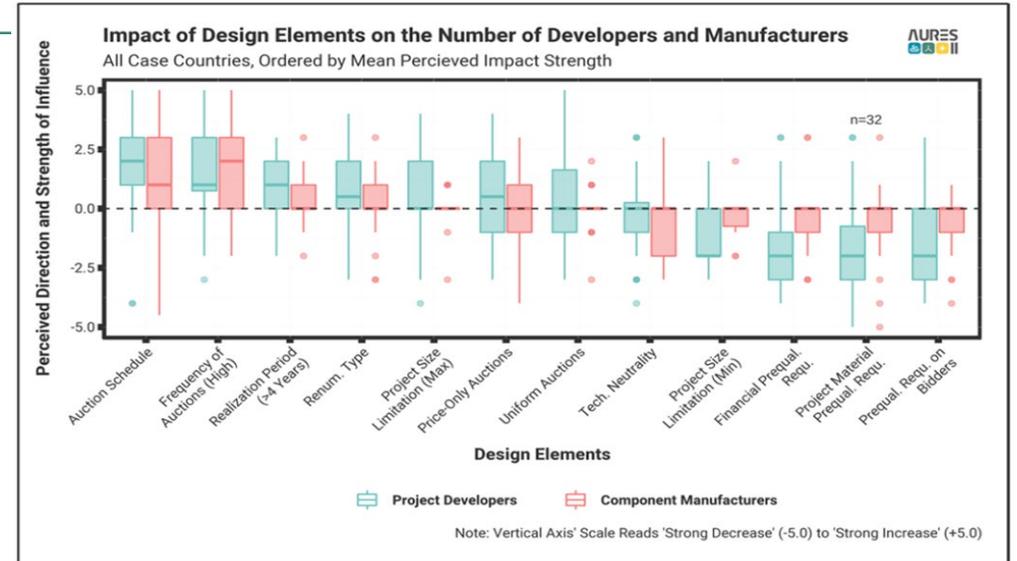


1. Impact of auctions on RES value chains

Results and overall findings

Impact of DEs on the n° and diversity of firms

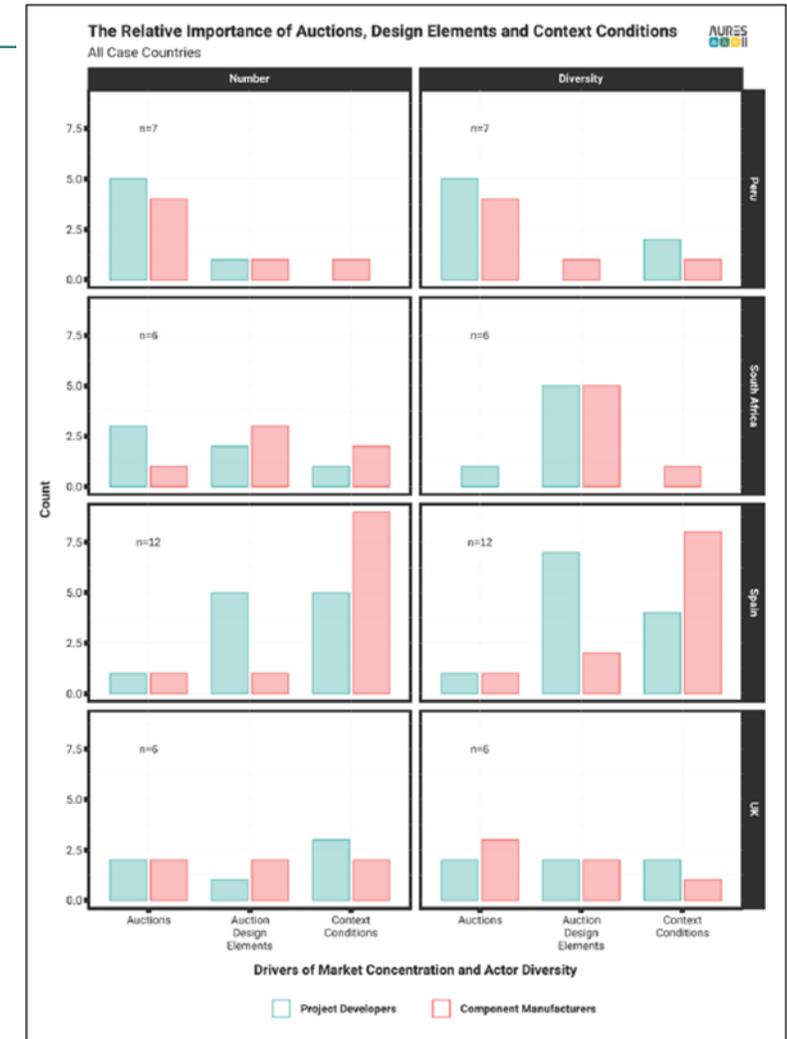
- DEs have a marked effect on the number and diversity of project developers (PDs) and component manufacturers (CMs).
- Broadly speaking, DEs tend to affect the value chains of the four considered countries in quite similar ways.
- Impactful DEs: the frequency of auction rounds, existence (or not) of a transparent schedule, and prequalification requirements.



1. Impact of auctions on RES value chains

Results and overall findings (IV)

- The relative importance of auctions, design elements and context conditions
- Auctions themselves are not the major determinant of the n° and diversity of firms in the two considered stages of the value chain.
- Country-specific context (and other) factors can be expected to play an important role in this regard.



2. Impact of auctions on renewable energy communities (RECs) & measures

Scope

- Relevance of community energy
- Definitions of “RECs”
- Impact of auctions on RECs
 - Measures to address the impact of auctions on RECs
 - Inside auction: DE + FR
 - Outside auction: DNK
- Lessons learnt

Results: challenges

- Risks are higher than for non-community actors due challenges:
 - Expertise of REC (new to the market / one-time actor vs. experienced actor)
 - Activity of REC in project lifecycle (development, operation, ownership)
 - Level of cooperation with professional project developers and/or financiers

Results: measures

Measures within auction

	Other conditions for participation	Bonus or quota	Different pricing rule
Example	Lower pre-qualification requirements in Germany	Citizen participation bonus in France	Uniform pricing rule in Germany
Financial risk			
Risk of not being awarded	✓	✓	
Price risk			✓
New-bidder risk			
Penalty risk	✓		

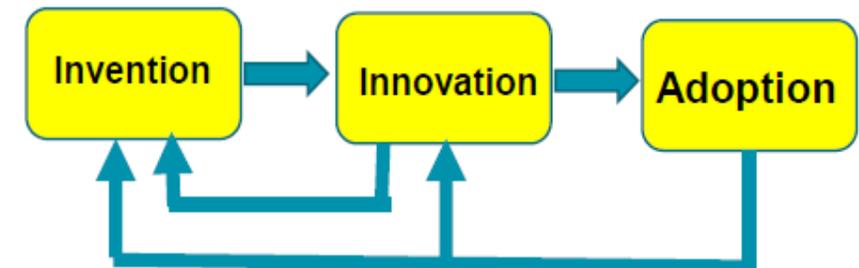
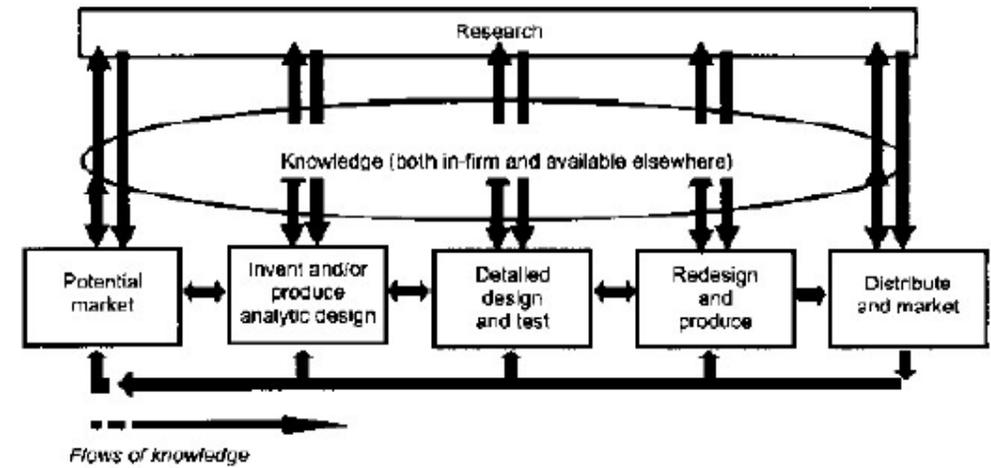
Measures outside auction

- Measures outside the auction **interfere less with auction outcomes** compared to measures within the auction.
 - **Challenge:** how effective in reversing a trend towards overall actor consolidation?
- **Exemptions from auction** is at odds with overall transition to auction-based support schemes.
 - **Challenge:** Finding an appropriate legal definition

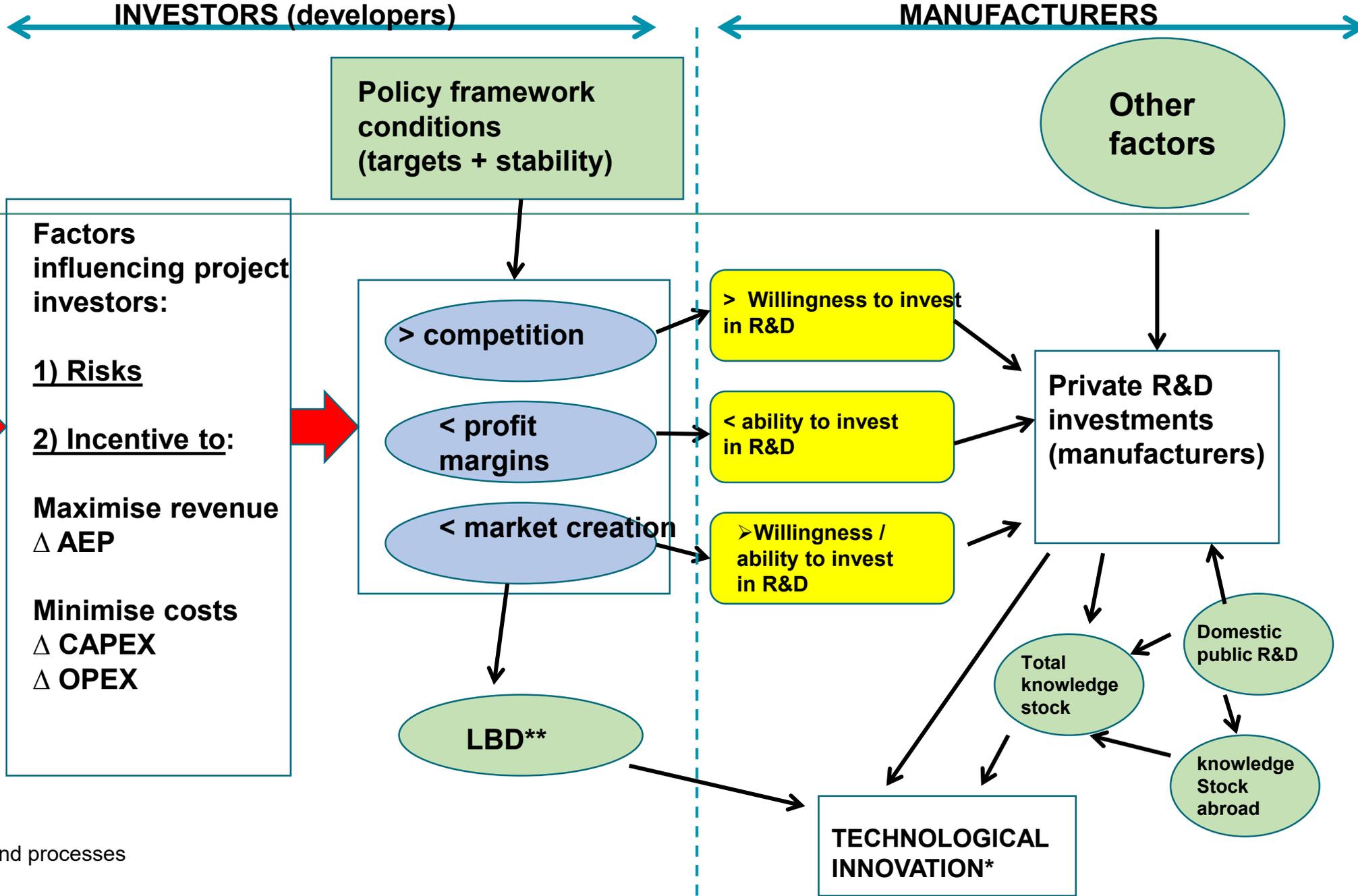
3. Impact of auctions on technological innovation

- **Starting point:** Auctions can have an indirect impact on innovation in RETs through their effects on the diffusion of these technologies.
- An **analytical framework** on the mechanisms linking technological innovation and auctions and their design elements is built.
- **Some research propositions** are derived.
- An **exploratory study**.

Chain-Link Model of Innovation, Kline, 1986



Analytical framework



* New and improved products and processes
 ** learning by doing

3. Impact of auctions on technological innovation

Research propositions:

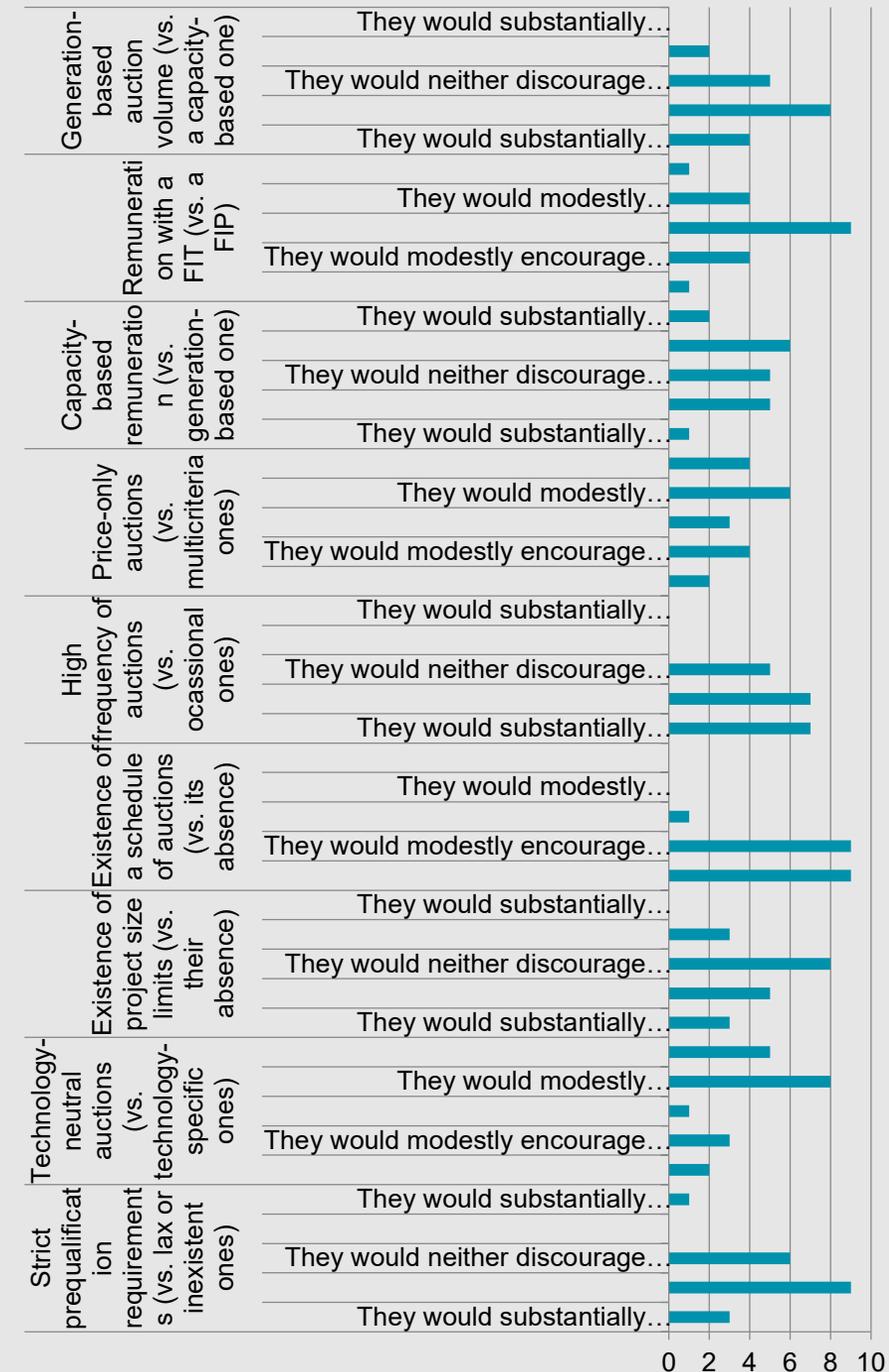
- Auctions and auction design elements influence innovation through their indirect impact on manufacturers and technology developers.
- Four main channels:
 - (i) impact on private R&D through a greater/lower profit margin.
 - (ii) the expectation that there will be a market for the technology (i.e., where manufacturers and technology developers can sell their technology),
 - (iii) impact on technology diffusion and
 - (iv) impact on the competitive pressures faced by manufacturers and technology developers to reduce costs or increase revenues.
- Opposing effects (market creation/profit margins vs. competition effects).
- Auctions will be one of the factors influencing innovation in RETs, but probably not the main one. Many other non-policy and policy factors influence innovation (technology-push policies, international competition in a globalised sector).
- Different design elements in auctions have different impacts on innovation....

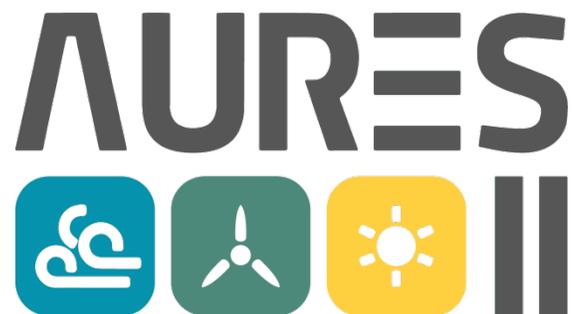


3. Impact of auctions on technological innovation

Overall, the most influential design elements on technological innovation:

- the stringency of prequalification requirements,
- technological neutrality,
- a schedule of auctions,
- highly frequent auctions.





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Impact of auctions in Spain

Heikki Willstedt – Spanish Wind Energy Association (AEE)



Q&A and panel discussion Impacts of auctions

Moderator: Lena Kitzing (DTU)

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