# H2020 Project: Auctions for Renewable Energy Support

Webinar – Leonardo Energy, 26th January 2022

# AURES II: EU funded research collaboration on auctions for renewable energy support

*Funded by the European Union's **Horizon 2020** Framework Programme for research and innovation (2018 – 2021)*

# AURES II – 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

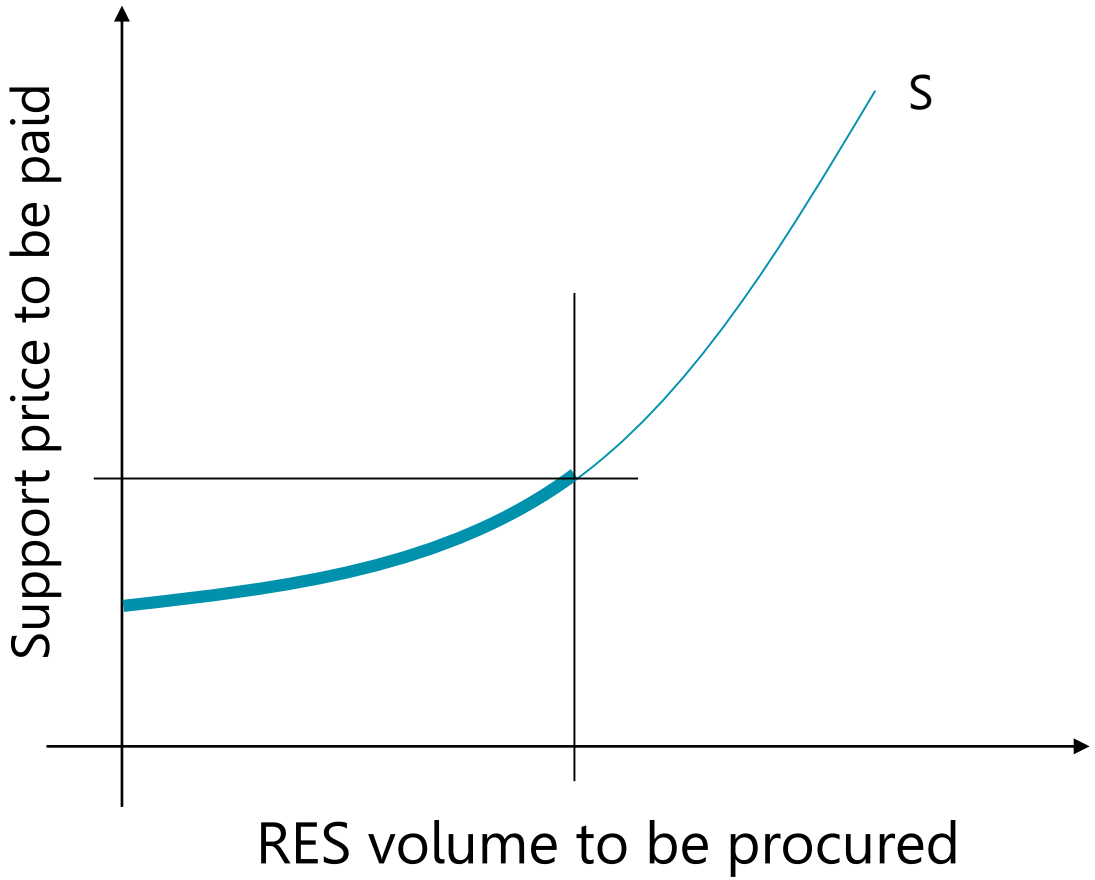
3. Facilitate **knowledge exchange** between stakeholders

# Terminology: Auctions or Tenders?

- **Auction:** the sale or procurement of products or services through a competitive bidding procedure
- **Tender:** a multi-criteria auction, where price and non-price factors are used to determine the winning bids.
- In practice, both terms are often used inter-changeably

# RES auctions: procurement of new RES

- **Procurement auction:** Government agency ‘procures’ renewable energy through tenders and makes contracts to install a certain capacity / to deliver certain energy volume
- Bidders compete for the **right to receive support** payments / to enter direct power purchase agreements
- **Winners are selected** based on the lowest required support level and/or highest scoring in other criteria



# How auction designs affect the financing of renewable energy projects?

Lena Kitzing, Mak Đukan (DTU)

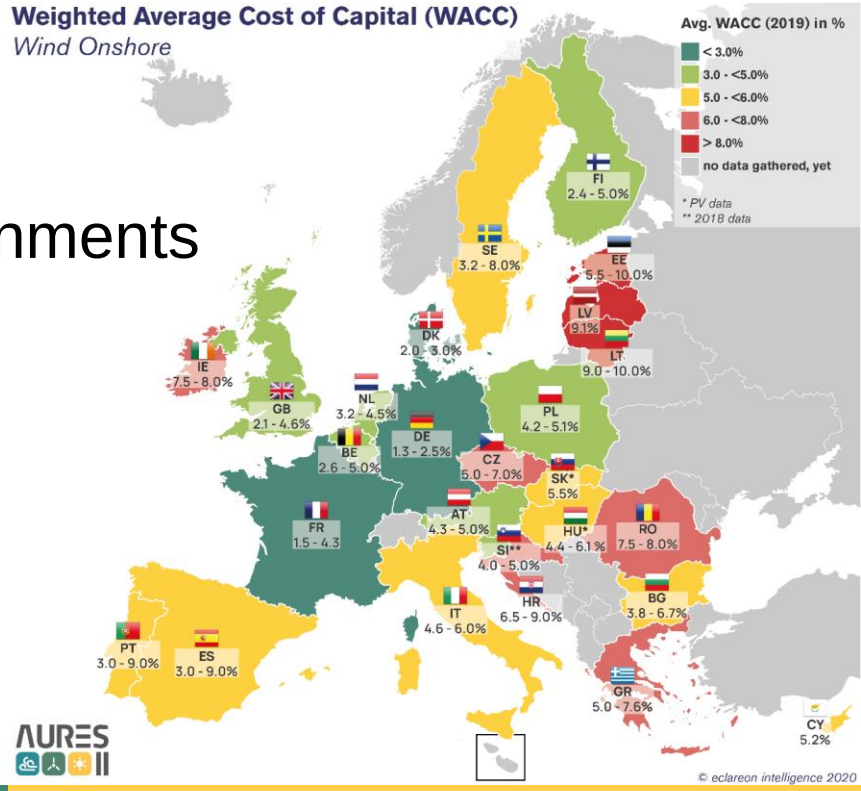
Moïra Jimeno (Eclareon)

Barbara Breitschopf (Fraunhofer ISI)

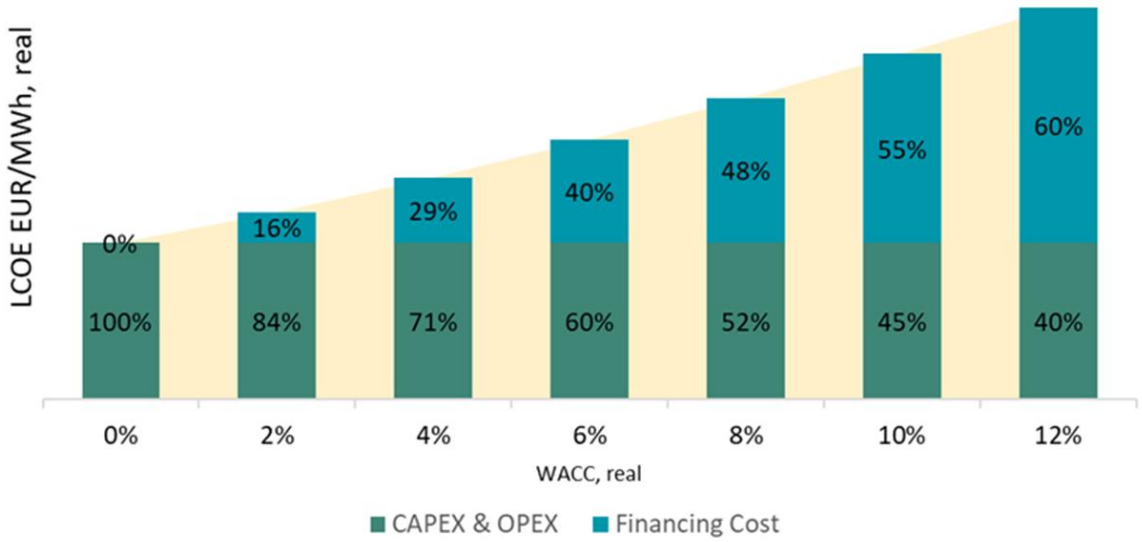
Ana Amazo (Guidehouse)

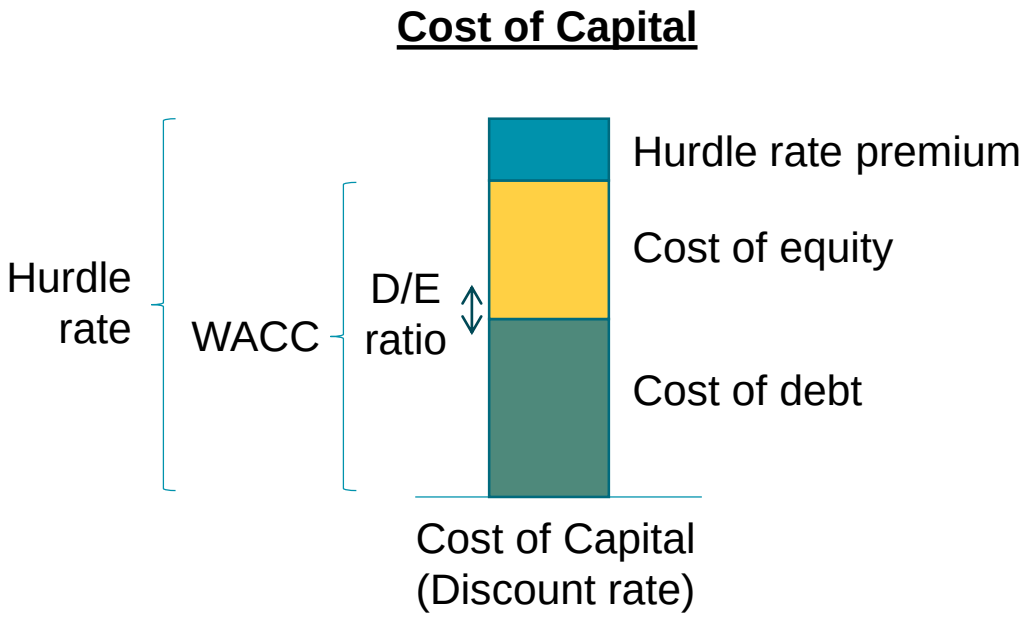
# Impacts of auctions on financing

- Exploratory analysis on factors impacting financing conditions
- Financing survey
- Econometric analysis
- Cashflow simulations
- Auction design to provide enabling financing environments

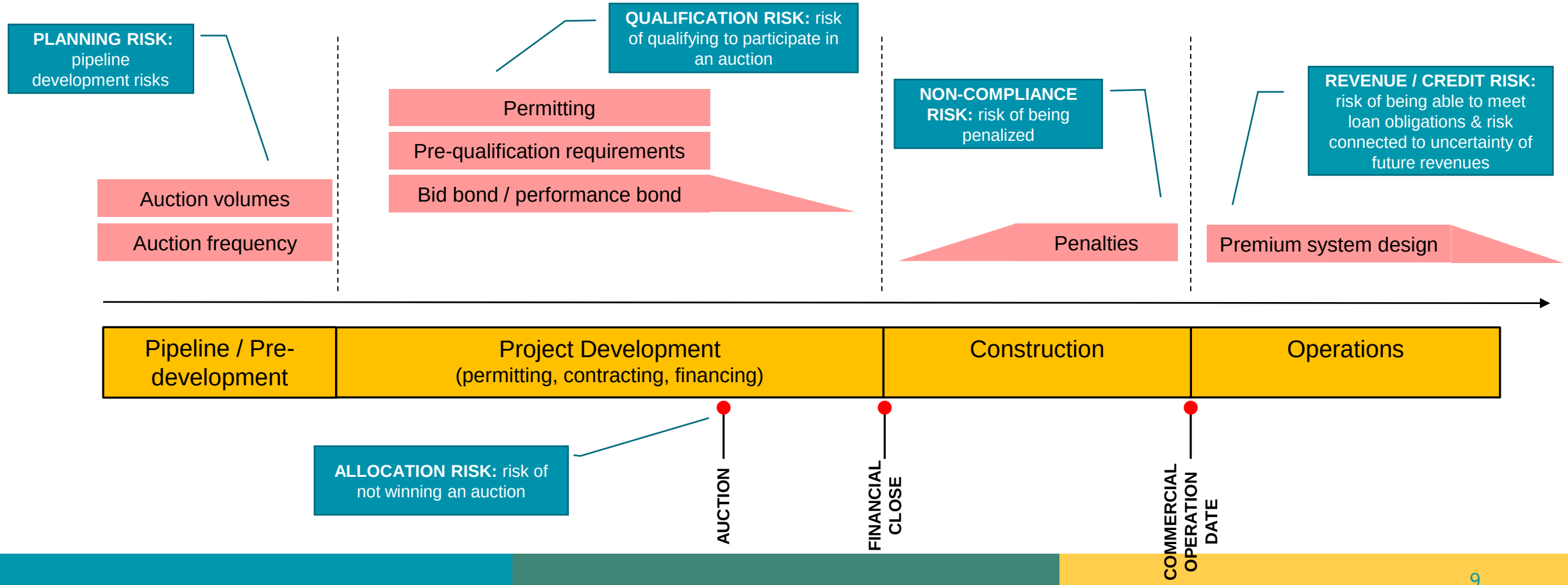


# Costs of capital have a large effect on RE electricity production costs



# Auctions could lead to some new risks, which did not exist in the era of centrally determined support schemes (such as FIT)



# Results from an EU-wide survey on financing conditions

January 26, 2022

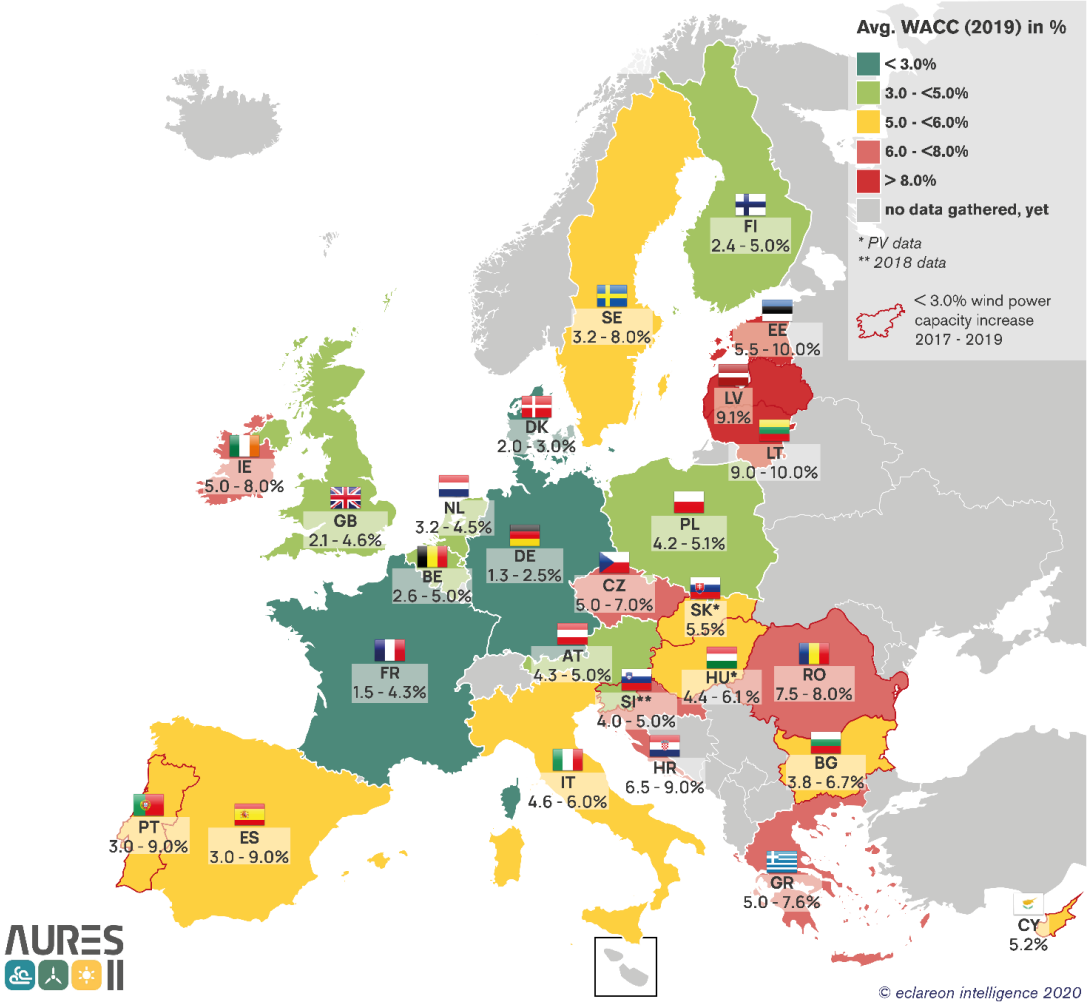
Moïra Jimeno – Project Manager in Policy Consulting at Eclareon

# Agenda

1. Weigthed Average Cost of Capital: Main results 2019 & over time development
2. Cost of Debt: Main results 2019 & over time development
3. Cost of Equity: Main results 2019 & over time development
4. Conclusions

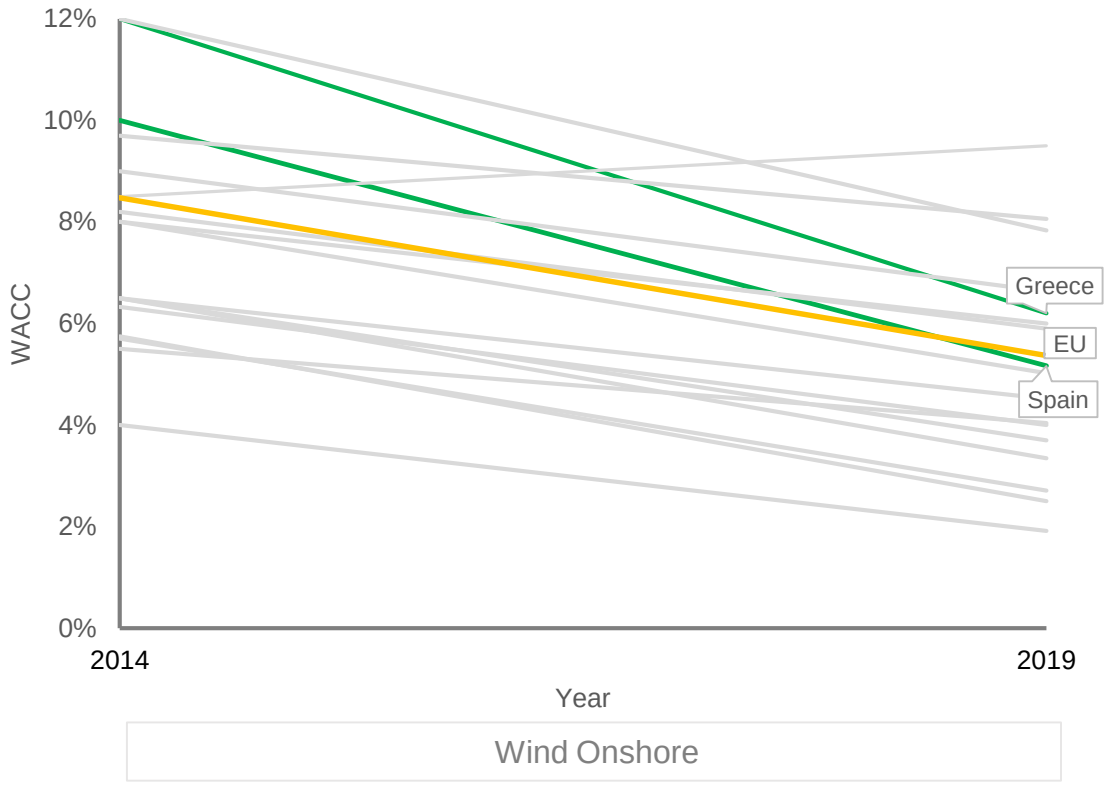
# WACC 2019 – Wind Onshore

**Results show there is still a gap between Member States**



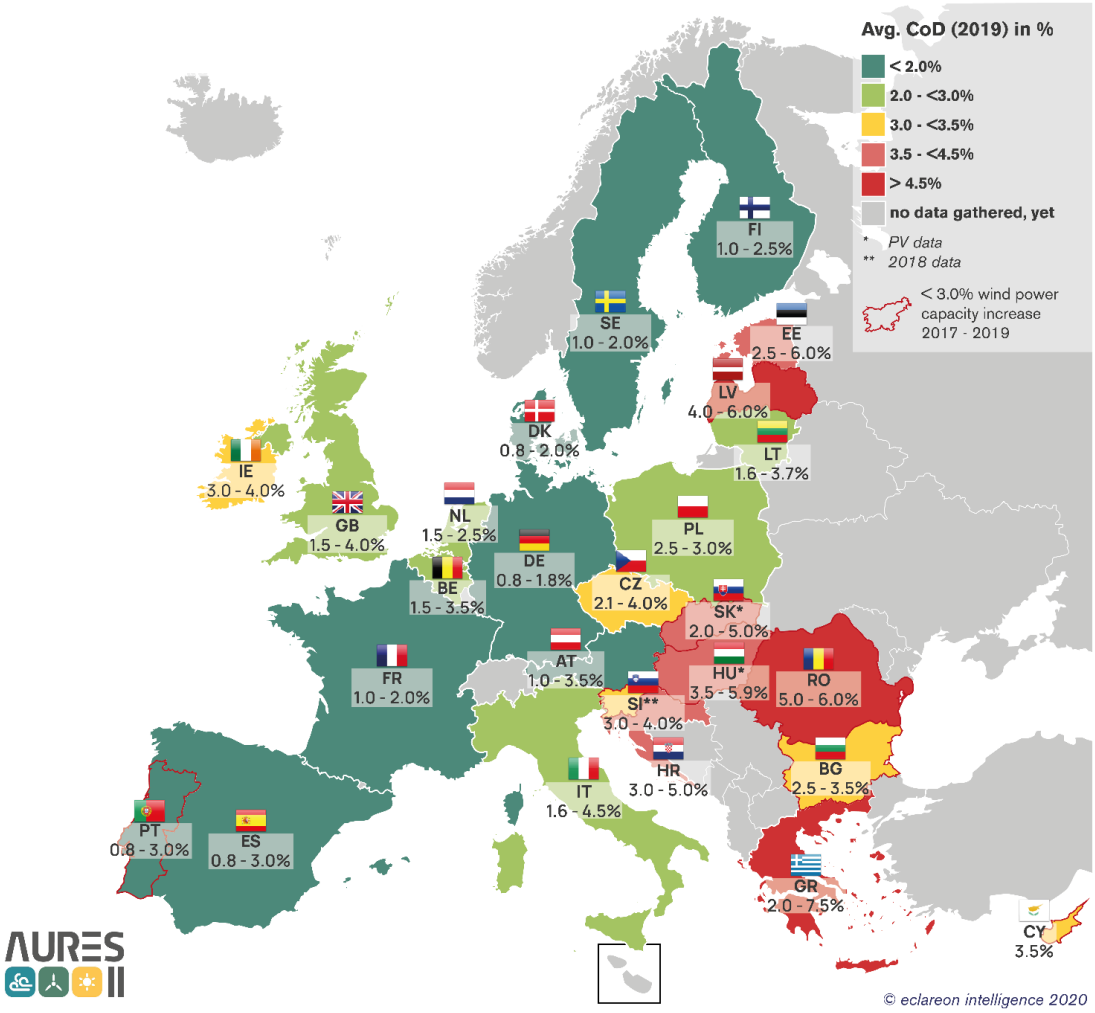
# WACC Development 2014-2019

**Dramatic WACC decrease in most countries and the gap is narrowing**



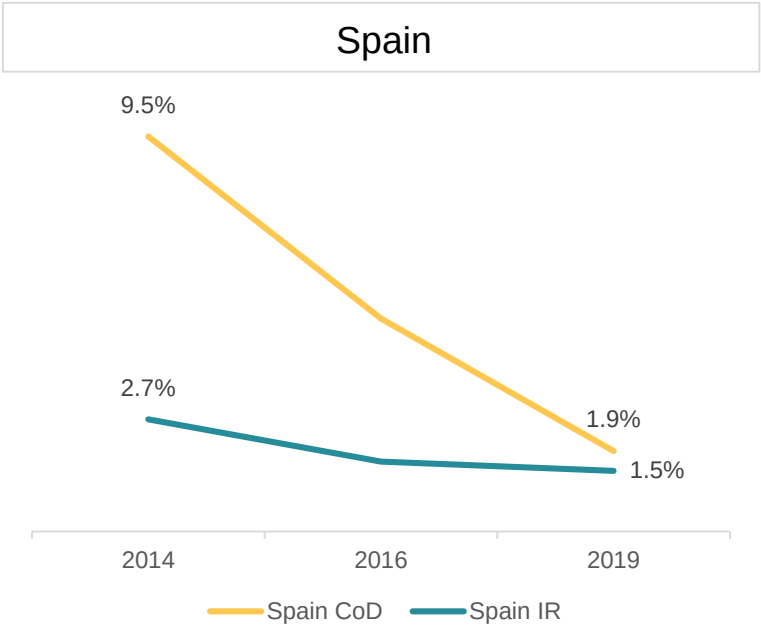
# Cost of Debt 2019

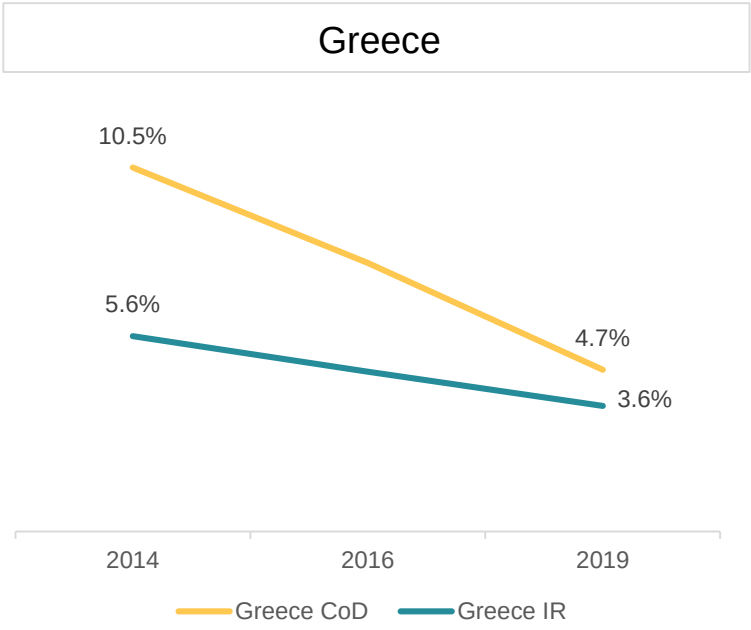
**Many countries with an average CoD lower than 2%**



# CoD Development 2014-2019

**Correlation between CoD and Interest Rates in the Eurozone €**

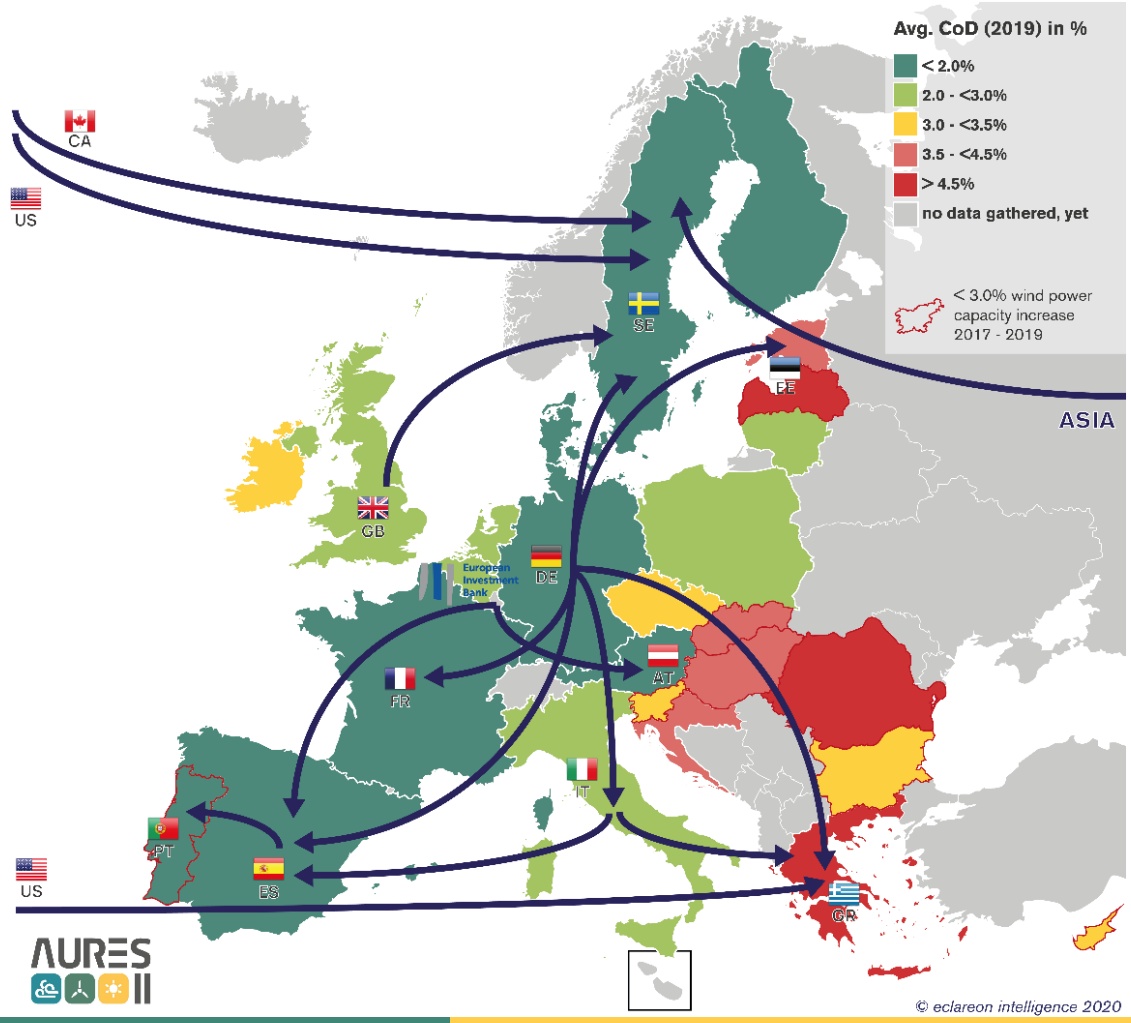



Wind Onshore

# CoD Development 2014-2019

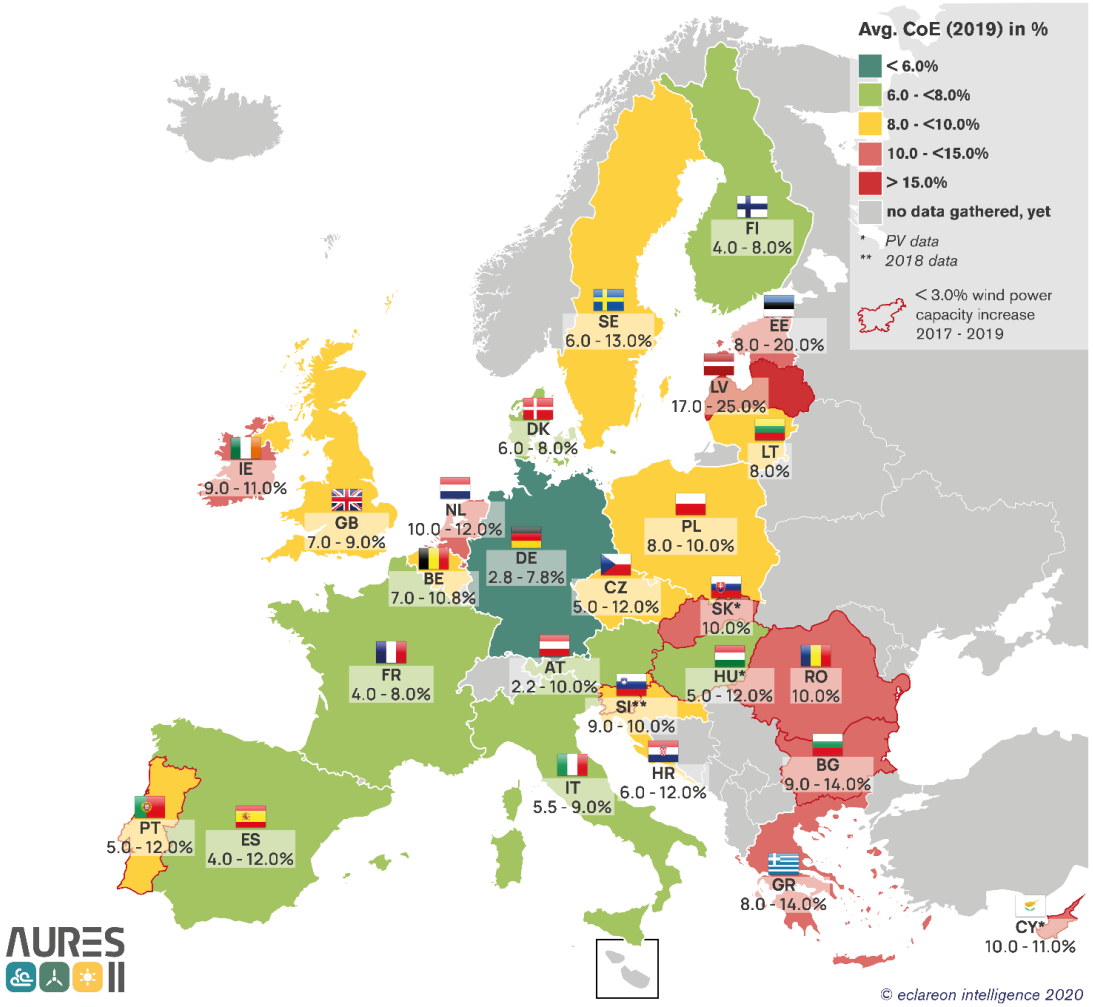
**International flow of capital**



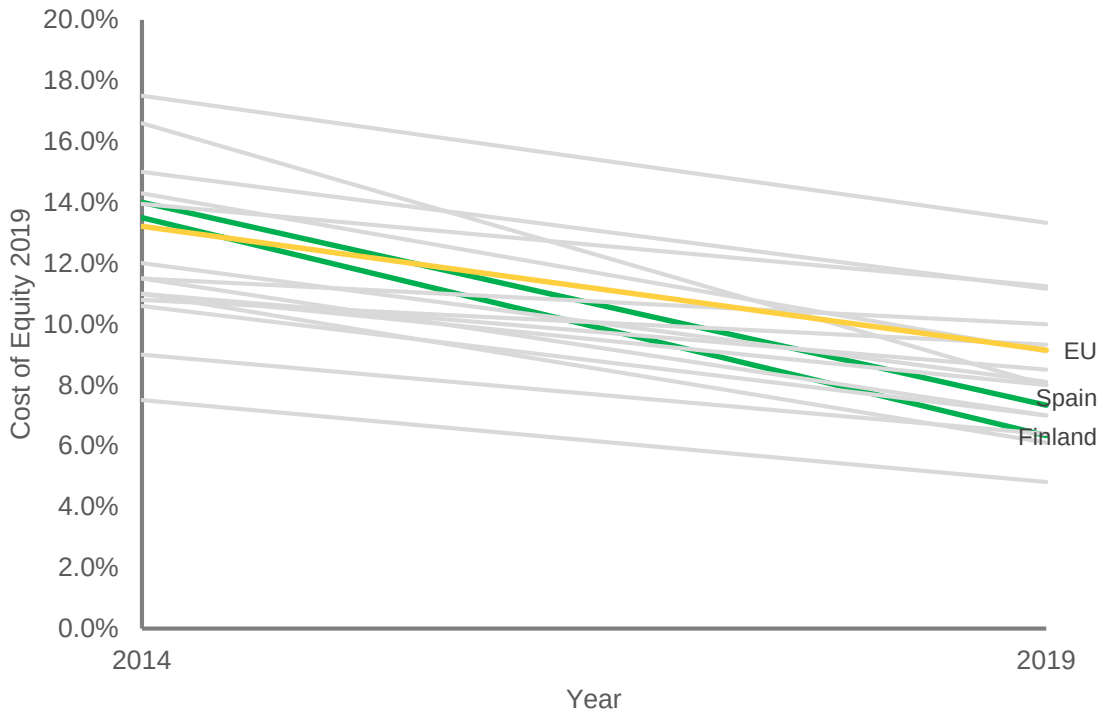
# Cost of Equity 2019

**65% of countries with a CoE lower than 10%**

**Riskier countries = higher CoE**



# CoE Development 2014-2019




**Emergence of new market players interested in greening their portfolios due to pressure:**

- Use of ESG factors (Environmental, Social, Governance) by Credit Rating Agencies
- Climate policy (Paris Agreement)
- EU Sustainability Taxonomy (reg. 2020/852 on the framework to facilitate sustainable investment)
- Task Force on Climate Related Financial Disclosures (Financial Stability Board)

Wind Onshore

# Conclusions

**Dramatic decrease of the WACC, CoD, and CoE**

**CoD: huge role of interest rates and international capital spill-overs**

**CoE: emergence of new investors with different interests and business models**

**Lower Costs of Capital are a positive sign for a further RE development and to reach energy and climate goals**

# Econometric assessment of the effects of auctions on financing

January 26, 2022

Barbara Breitschopf – Researcher at Fraunhofer ISI

# What is our research question?

What do we observe regarding investments in renewables?

- diverse risks increase cost of capital
- cost of capital varies between countries
- in some countries, albeit favourable natural conditions for RE, the generation cost of renewable electricity is not significantly lower than in countries with less favourable natural conditions
- high cost of capital obviously outweighs favourable generation conditions for RE

What don‘t we know yet, when looking at auctions?

- whether auctions entail additional risks for investors
- which are the dominating risks affecting cost of capital
- to what degree auctions and other factors affect cost of capital

What is our key question?

- do auctions and remuneration schemes affect the risks, and, hence, the cost of capital?

# How do we approach our question?

- Differentiated risks by levels
  - country or macro-level: e.g. government bond rates, societal acceptance, political stability, economic development
  - sector or meso-level: remuneration schemes, auctions, RE deployment (experience), long-term policy, capital market conditions,
  - project or micro-level: technology, investor type, type of finance, natural resources

- Data
  - AURES II auction data base
  - AURES II WACC data base
  - additional sources e.g. Eurostat, World Bank, EC reports, ECB, etc.

- Econometric model
  - dependent variable: WACC, independent variables: factors at the three levels

# What do we find?

- Risk factors at the **macro level** are the dominating factors of the cost of capital, i.e. government bonds and  economic growth
- Factors at the **sector level** have some impacts on the cost of capital:
  - auctions and support policies: policies reducing market risk exposure have a slightly cost reducing impact, while the introduction and implementation of auctions has not increased the cost of capital
  - learning effects: it seems that with increasing auction experience, the cost of capital even decreases, and experiences in the sector (RE deployment) support this finding
- At the **project level** (micro), we see that the choice of technologies - solar and wind onshore - has no impact, while we have not been able to identify further influencing factors such as project structure, type of investors, counterpart risks that could partly compensate for high macro-level risks

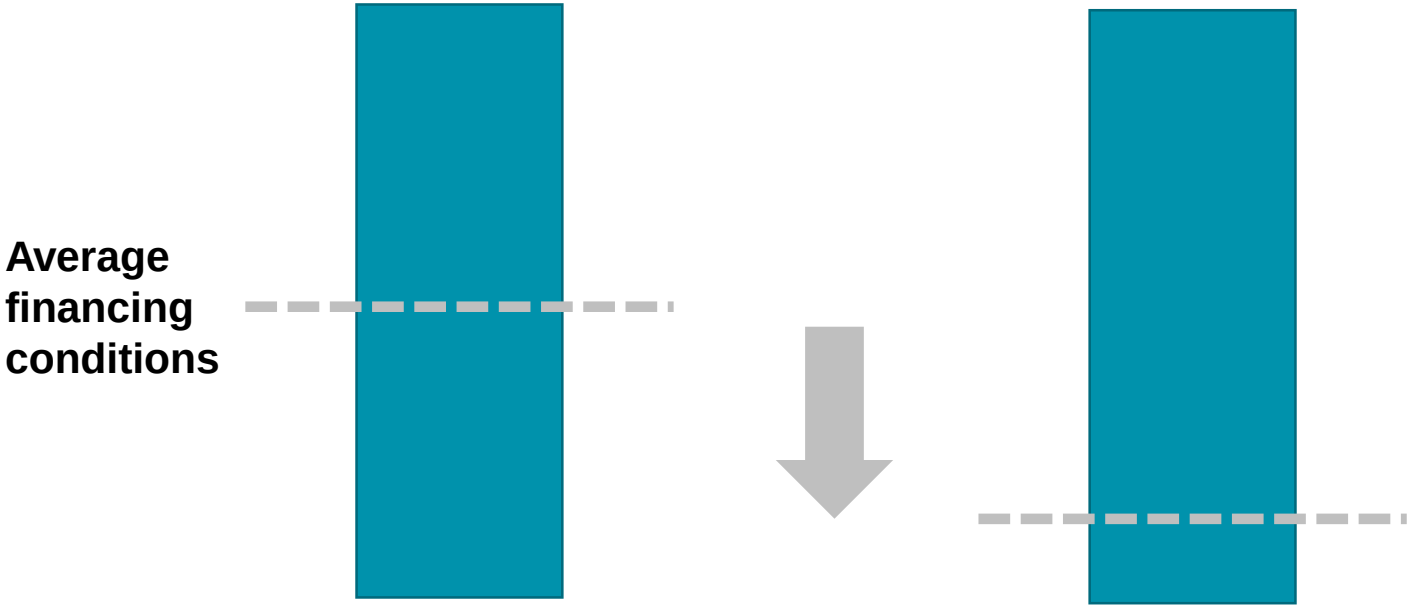
# How much can EU countries save by reducing risks for renewables?

January 26, 2022

Mak Đukan – PhD Student at Technical University of Denmark

# Support cost savings through improving financing conditions

## De-risking potential [EUR/MWh] (sensitivity analysis)

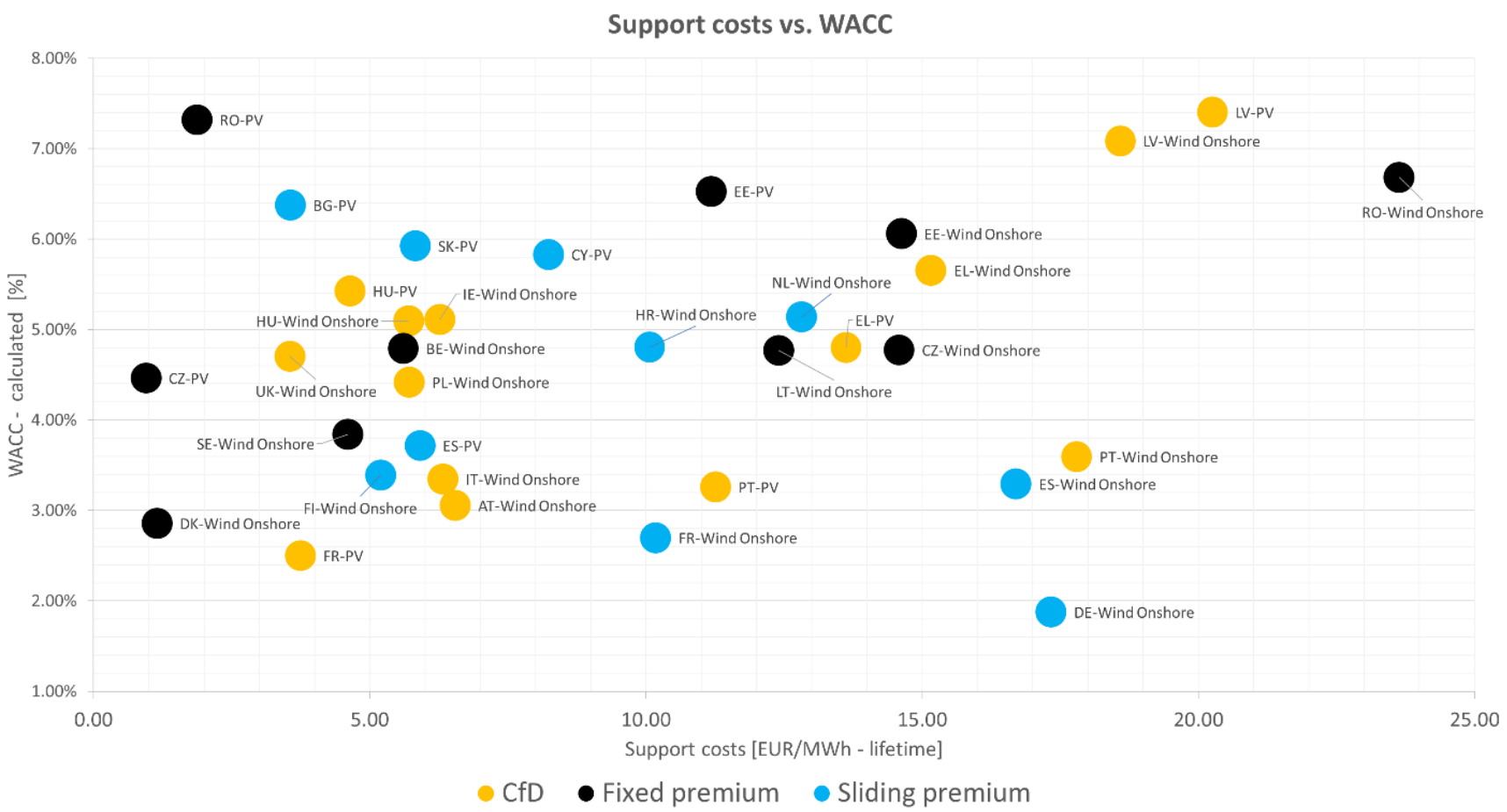



**Scenarios (from average to minimum surveyed)**

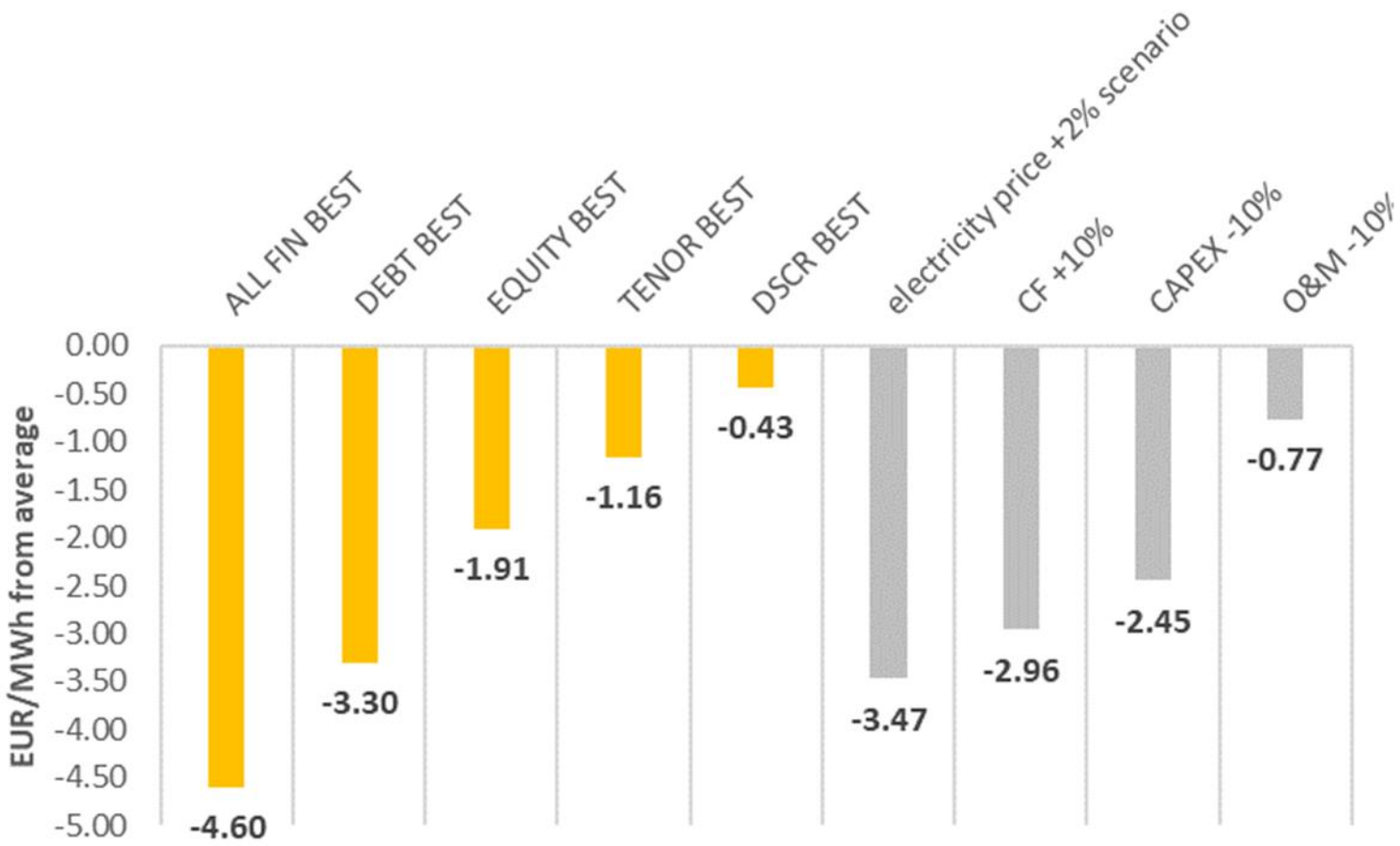
1) **All financing conditions**
2) **All debt financing**
3) **Cost of debt**
4) **Cost of equity**
5) **DSCR**
6) **Loan tenor**

7) **Investment variables**
   - CAPEX
   - Capacity Factor
   - OPEX
   - Electricity price

# Relationship between the average country WACC and support costs



# Average savings from improvements in financing conditions vs. other investment variables



# Conclusions and discussion

- Largest benefit from debt de-risking implies policymakers should focus on revenue stabilisation mechanisms (like two sided CfD's)
- Our cross country study does not find evidence that countries with CfD's have lower costs of capital. Instead country risk is the main risk driver (Greece with two sided CfD has a 2.7% higher WACC on average than Denmark with a fixed premium)
- De-risking CoE has lesser impact so policymakers should conduct measures that relax auction designs in the pre-biding stage only as means of achieving goals other than cost-efficiency
- Other market conditions have a very large impact on support costs – such as site conditions, technology costs and electricity price expectations (increasing electricity price expectations from 1% increase per year to 2% leads to slightly greater support cost savings than de-risking debt financing)

# De-risking RE development through auction design

January 26, 2022

Ana Amazo – Managing Consultant at Guidehouse

# Agenda

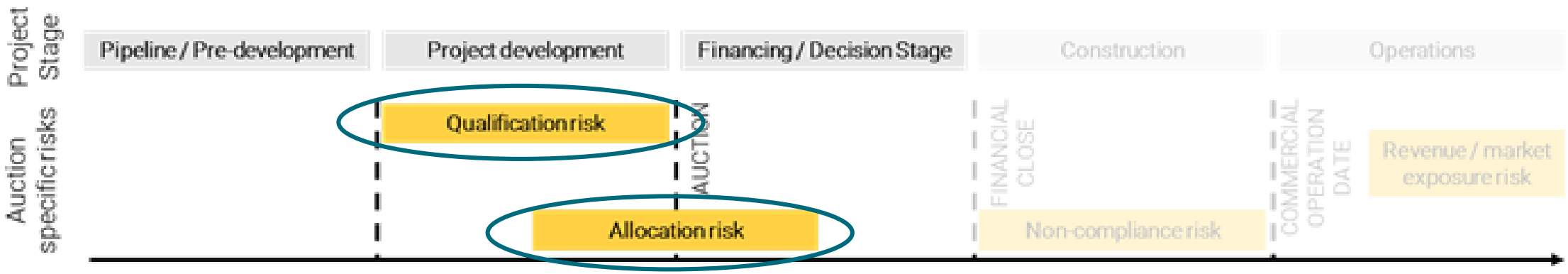
1. Key risks along the RE project development cycle
2. Design elements to address auction-related risks
3. Design elements to address project revenue risks
4. Lessons learned

# 1. Key risks along the RE project development cycle


*Source: Based on Đukan & Kitzing (2021)*

| Risk |
|---|
| **Qualification risk:** bidder prepares bid but does not fully meet an auction's participation requirements. |
| **Allocation risk:** bidder prepares bid, participates in the auction but does not win. Bid preparation costs become sunk costs. |
| **Non-compliance risk**: bidder pays penalty or loses awarded contract for e.g., delayed or failed project commissioning. |
| **Revenue and market exposure risk:** project revenue exposed to e.g., price volatility in electricity markets, dispatch and payment default risk, currency depreciation & high inflation, lead to unsecured revenues. |

# 2. Design elements to address auction-related risks (I/III)




*Source: Based on Đukan & Kitzing (2021)*

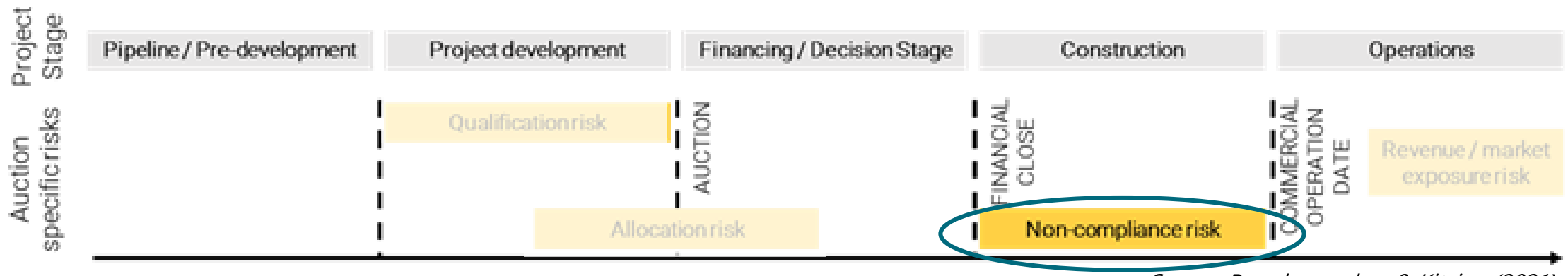
| Design element | Evidence | Recommendations |
|---|---|---|
| **Auction volume & auction frequency** | As auctions become more established (i.e., more auction rounds implemented and large volumes auctioned), cost of capital can decrease. | • Auction volume **should be sufficiently high** to ensure large participation rates but also maintaining a right competition level.<br>• **Multi-year auction schedule + regular frequency**<br>  • Mitigates the impact of allocation risk (project pipeline development)<br>  • Flexibility: policymakers should be able to adjust volumes to avoid strong price fluctuations |

# 2. Design elements to address auction-related risks (II/III)


*Source: Based on Đukan & Kitzing (2021)*

| Design element | Evidence | Recommendations |
|---|---|---|
| **Endogenous rationing** | Increases planning risk and can affect<br>the corporate financing of project pipelines | • In general, **it should be avoided**. Instead, the auction volume could be reviewed for next rounds.<br>• If nevertheless applied, the conditions and size of the volume adjusted should be clearly stated before the auction (e.g., based on past auction results). |

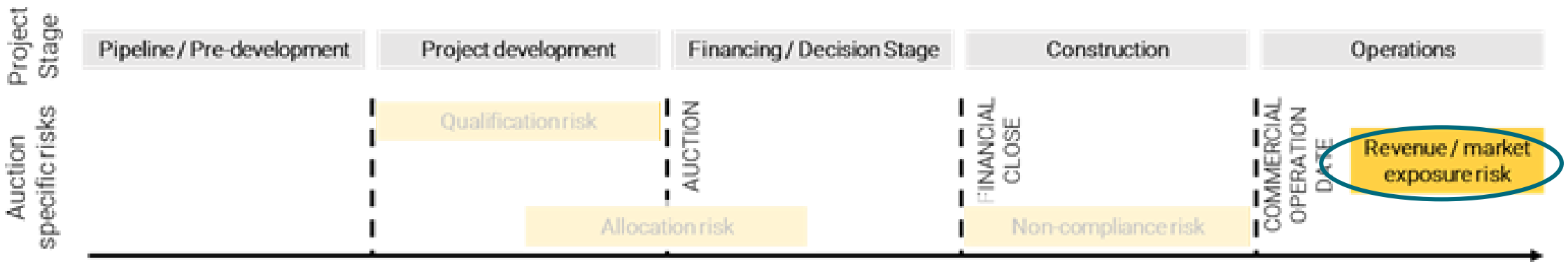
# 2. Design elements to address auction-related risks (III/III)




*Source: Based on Đukan & Kitzing (2021)*

| Design element | Evidence | Recommendations |
|---|---|---|
| **Materia Pre-qualification /**<br><br>**Bid bonds /**<br><br>**Penalties** | • Relaxing these design elements does not meaningfully reduce bid levels and support costs (e.g., through lower equity return requirement); instead, it may create unwanted effects, such as lowering project realisation rates.<br><br>• Too high / strict requirements can **increase** “w**alk-away” effect** | • They should generally be set carefully at a level that is:<br>  • necessary to **ensure** a high probability of **project realisation** and<br>  • to help serious bidders **gain relevant insights** on project site conditions, costs, and local regulations |

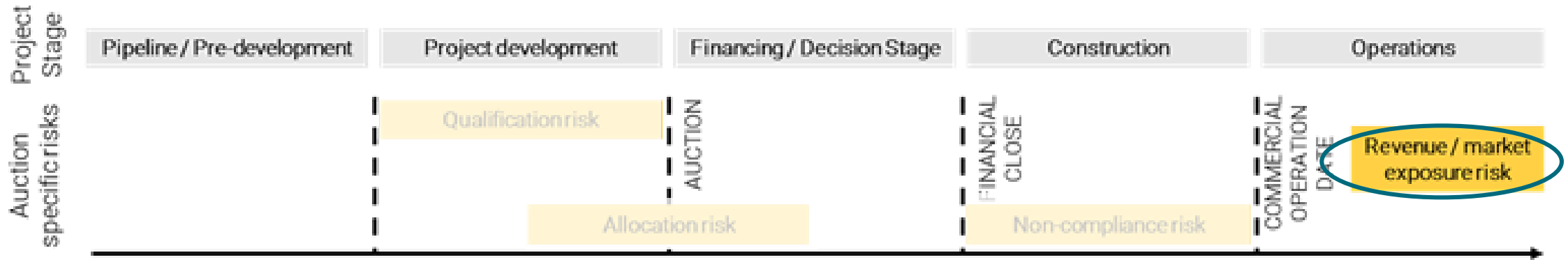
# 3. Design elements to address project revenue risks (I/IV)




*Source: Based on Đukan & Kitzing (2021)*

| Design element | Evidence | Recommendations |
|---|---|---|
| **Support scheme design (fixed or variable FIP)** | • Support schemes reducing market risk exposure enhances positive effect of "presence of auctions" on costs of capital.<br>• However: Cost of capital depends mainly on macro-level risks such as country risk. | • Support designs with **higher certainty of future cash flows** (e.g., shielding from volatile market prices) improve financing conditions.<br>• Both one-sided or two-sided FIP can work well. Policymakers should consider that risk depends on differences in country risks, market electricity prices, and capacity factors. |

# 3. Design elements to address project revenue risks (II/IV)

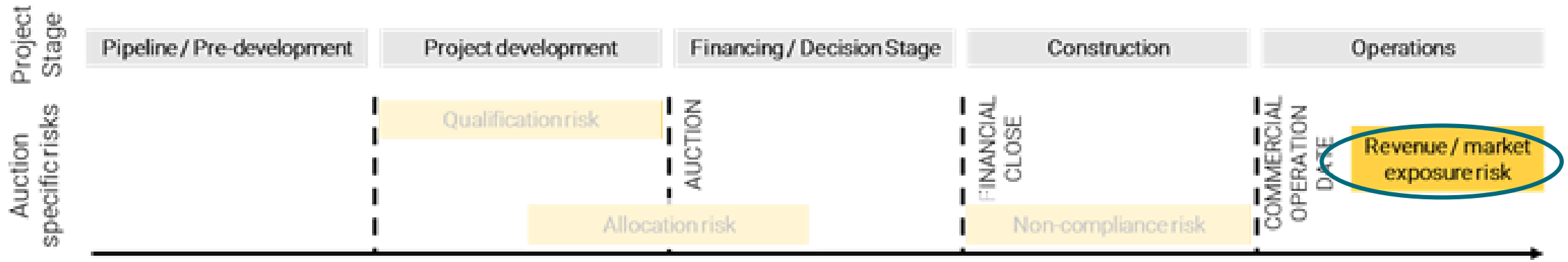



*Source: Based on Đukan & Kitzing (2021)*

**Relevant question to Contracting Parties of the Energy Community**

| Design element | Impact on risk | Recommendations |
|---|---|---|
| **Conversion from FIT to FIP** | • The auction awards a FIT which is later converted into a FIP once an electricity market has been established.<br>• The **conversion event introduces uncertainties** that can be heavily discounted by bidders (higher bid prices). | • Conversion of remuneration schemes **should generally be avoided.**<br>• Yet, if necessary, the negative impacts can be attenuated if the:<br>  • Conversion event is defined clearly (i.e., pre-defined criteria and prior readiness assessment)<br>  • Previous FIT level acts as strike price of two-sided CfD<br>  • Partial responsibility for imbalances if no liquid intra-day market. |

# 3. Design elements to address project revenue risks (III/IV)

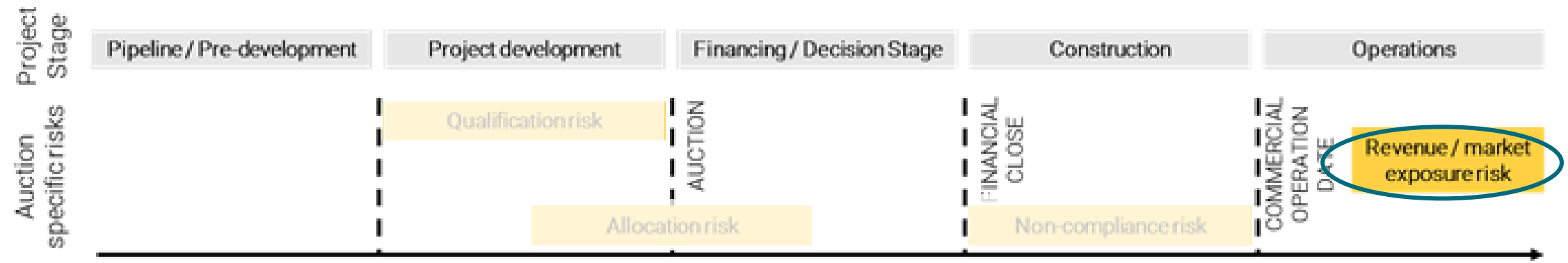



*Source: Based on Đukan & Kitzing (2021)*

**Relevant question in Contracting Parties of the Energy Community**

| Design element | Impact on risk | Recommendations |
|---|---|---|
| **PPA: Curtailment compensation** | • Dispatch risk: risk that the power plant is not dispatched by the off-taker or TSO | • Define “deemed energy” (e.g., through non-compensable events and/or a «bank» of allowed curtailment) and compensation level (e.g., PPA price, day-ahead price + premium). Compensation practices vary widely in Europe. |
| **Off-taker liquidity support** | • Payment default risk: Off-taker may face liquidity constraints that lead to payment delay/default. | • Consider off-taker liquidity support, e.g., through letter of credit, bank guarantee or escrow equivalent to e.g., 3-12 months of PPA revenues (depending on the market). |

# 3. Design elements to address project revenue risks (III/III)




*Source: Based on Đukan & Kitzing (2021)*

**Relevant question in Contracting Parties of the Energy Community**

| Design element | Impact on risk | Recommendations |
|---|---|---|
| **Tariff indexation** | • Foreign exchange risk: currency mismatch between the off-taker's revenues (in local currency) and the producer's project financing (in 'hard' currency, especially debt if local finance market is not very liquid).<br>• Currency depreciation results in costs. | Right indexation mix depends on:<br>• Which project costs can be paid in local currency?<br>• How developed are local lending markets? |

# 4. Lessons learned

1. Sufficiently large volumes and multi-year auction schedules foster competition and visibility for investors.
   - As auctions become more established (i.e., more auction rounds implemented and large volumes auctioned), cost of capital can decrease.

2. Support scheme design that stabilizes revenues from the electricity market (variable FIPs) increases certainty on future revenue stream for investors.
   - Support scheme design enhances positive effect of “presence of auctions” on costs of capital. However: Cost of capital not depend only on support policies, but on many other external factors, for instance, the country risk.

3. 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 lowering project realisation rates.

4. Good auction design does not need to shield developers from all risks, instead, it should help them correctly assess the risks involved in participating in an auction.

# AURES II publications on auctions 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
  - 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

# Q & A – type question in Zoom chat

Lena Kitzing, Mak Đukan (DTU)
Moïra Jimeno (Eclareon)
Barbara Breitschopf (Fraunhofer ISI)
Ana Amazo (Guidehouse)

**AURES II**

| | |
|---|---|
| Website: | http://aures2project.eu/ |
| LinkedIn: | AURES II |
| Twitter: | @auctions4res |
| Newsletter: | http://eepurl.com/gd42zz |

AURES II has received funds for the years 2018-2021
from the European Union's Horizon 2020 research and innovation programme
under grant agreement no. 817629