

Mapping the cost of capital for solar and wind energy in South Eastern European Countries

Findings from the Pricetag project

Fabian Wigand (Ecofys), Mak Đukan (Starfish Energy)

The Pricetag Project

The Diacore project

- Funded by the EU COM
- Analysis of RES investment risk profiles in Member States and recommendations on how to design risk-conscious RES policies
- [Report](#) available online

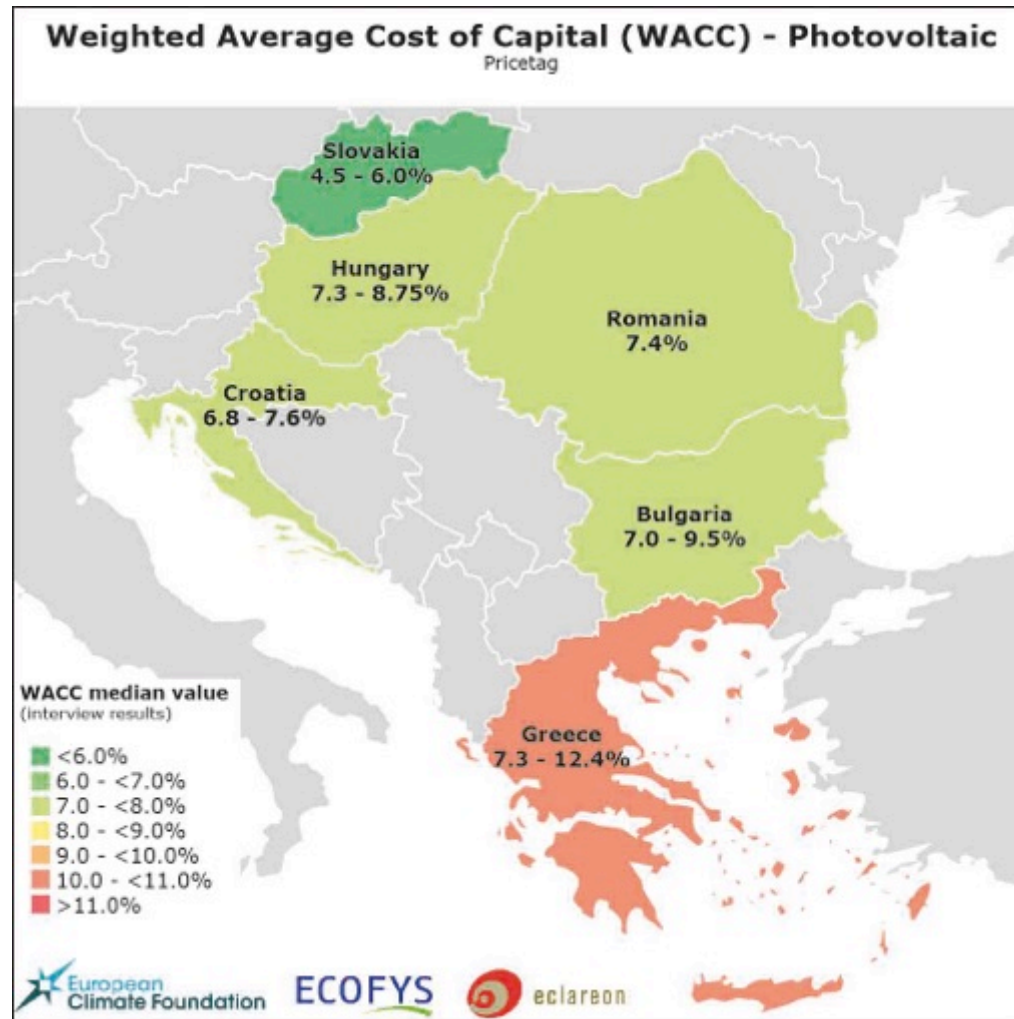
The pricetag project

- Funded by the European Climate Foundation
- Project team: Ecofys, eclareon, Starfish Energy
- Focus: South East Europe (Bulgaria, Croatia, Greece, Hungary, Romania Slovakia)
- Technologies: wind onshore and ground-mounted PV
- [Report](#) available online

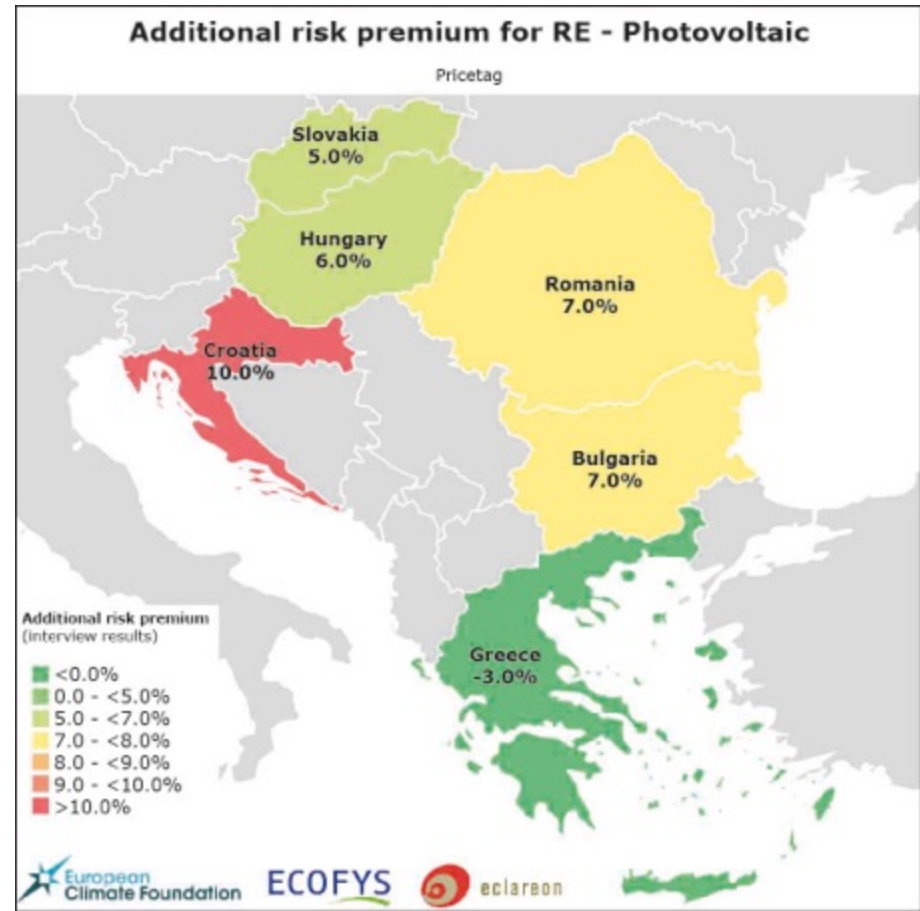
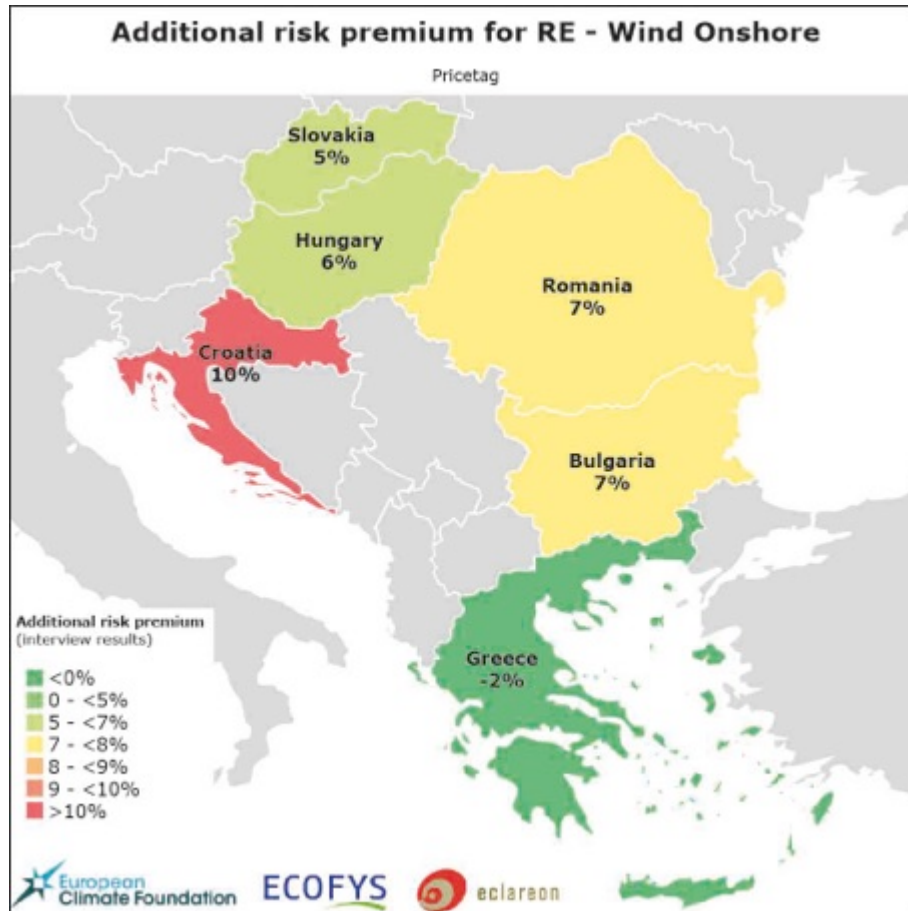
Findings: WACC for wind onshore



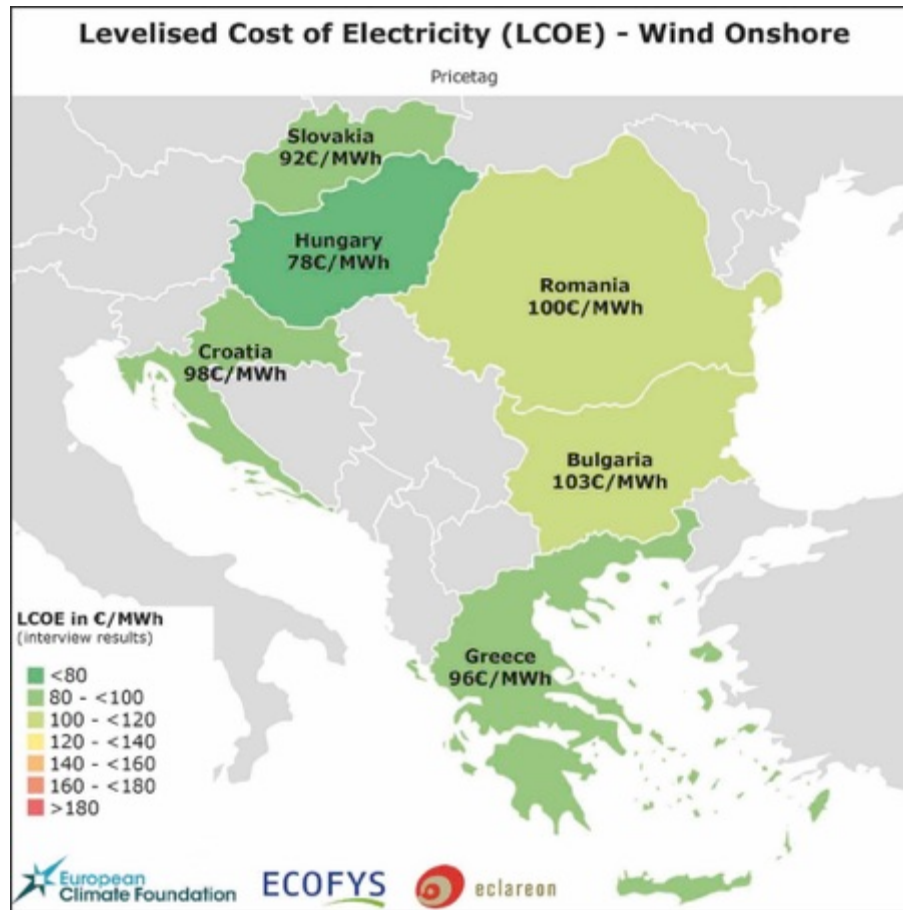
Findings: WACC for ground-based PV



Additional risk premium for RE projects as compared to infrastructure investments



LCOE of Wind onshore can be reduced by 7%-30% - and more



Country	Wind onshore		
	LCOE [€/MWh]	LCOE - optimised [€/MWh]	Remuneratio n. Level (2014) [€/MWh]
Bulgaria	103	83	63-64
Croatia	98	76	85-86
Greece	96	68	82-105
Hungary	78	66	104-130
Romania	100	84	122-144
Slovakia	92	85	74-75

LCOE Optimised: key parameters taken as for 'best in class' in Europe

- cost of equity 8%
- cost of debt 2%
- debt/equity ratio 80/20%

Main conclusions from analyses so far

- Policy schemes have to be designed at national and European level to allow for adequate **RE business cases** and trigger private investments.
- Countries can benefit from a low WACC only **if adequate policies are in place**.
- In addition, '**WACC-aware**' policies and policy instrument designs can have a significant influence on the cost of capital and hence on the costs of the support schemes.

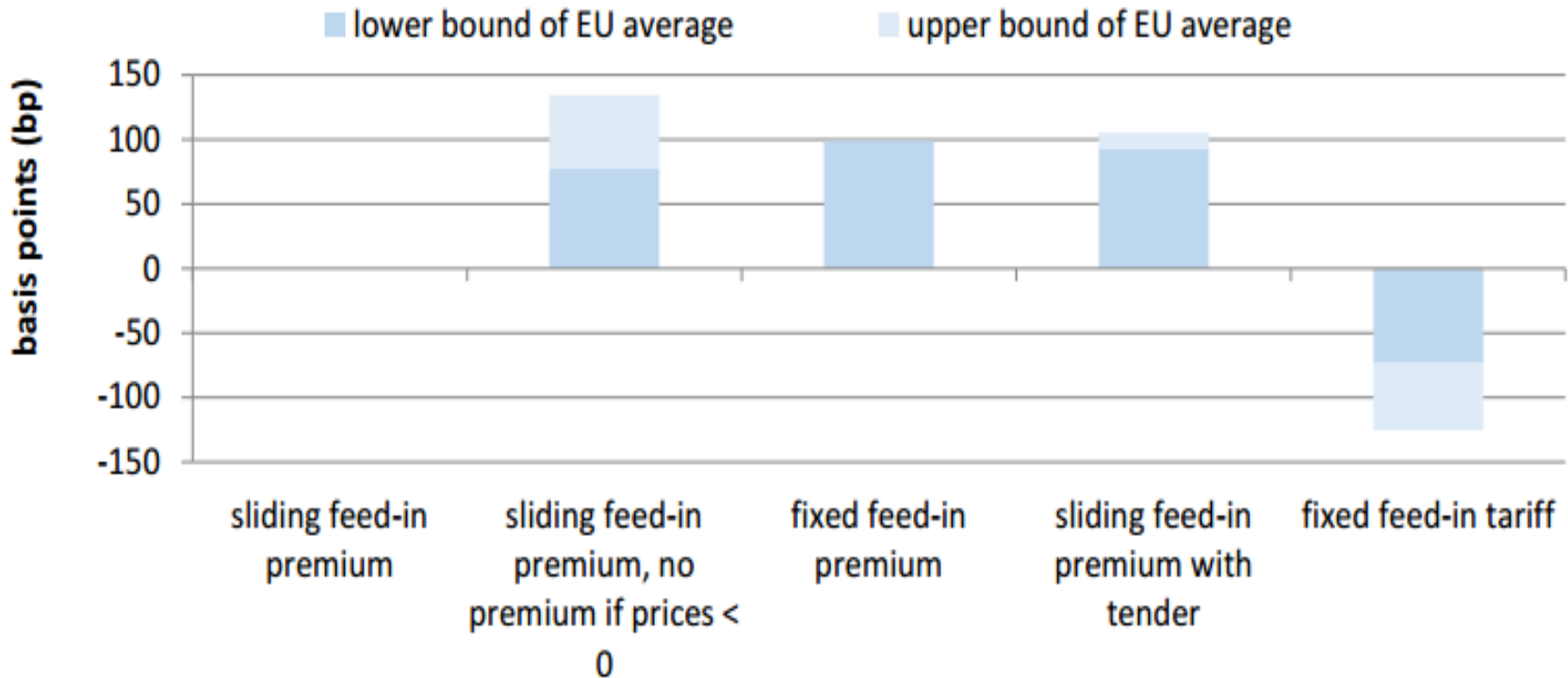
Impact of changes to FIP and tendering on bidder risk

- Changing to a FIP:
 - FIT provides the highest level of revenue stability: a fixed amount is paid per kWh produced.
 - The revenue risk is increased in a FIP: premium is paid on top of the electricity market
- Changing to tendering procedure:
 - Risk of not bid not being selected (in spite of project pre-development costs)
 - “Price” risk due to uncertainty about the level of competition
 - “Penalty” risk, if not able to realize projects or only with delays

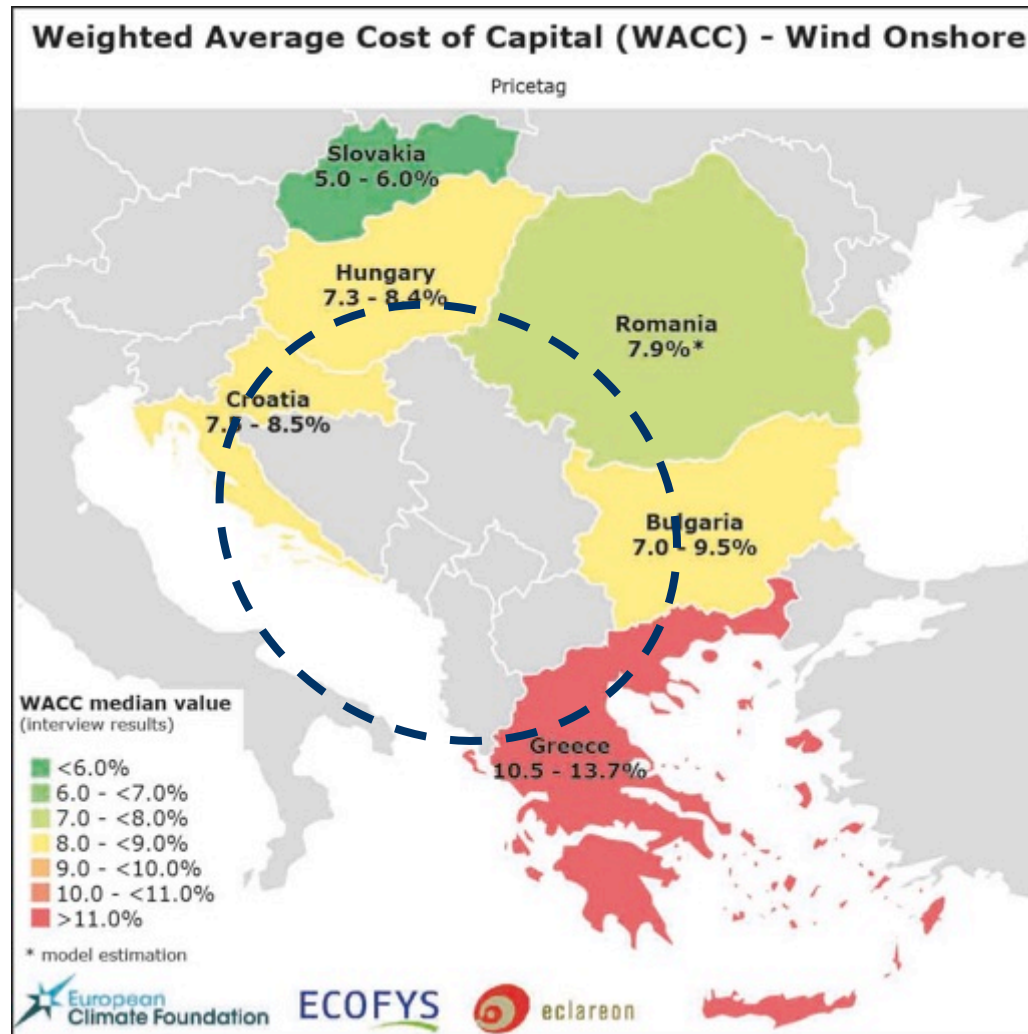
Impact of changes to FIP and tendering on bidder risk

- Results from DiaCore study (2016)
 - Reference case: typical onshore wind project with a sliding FIP

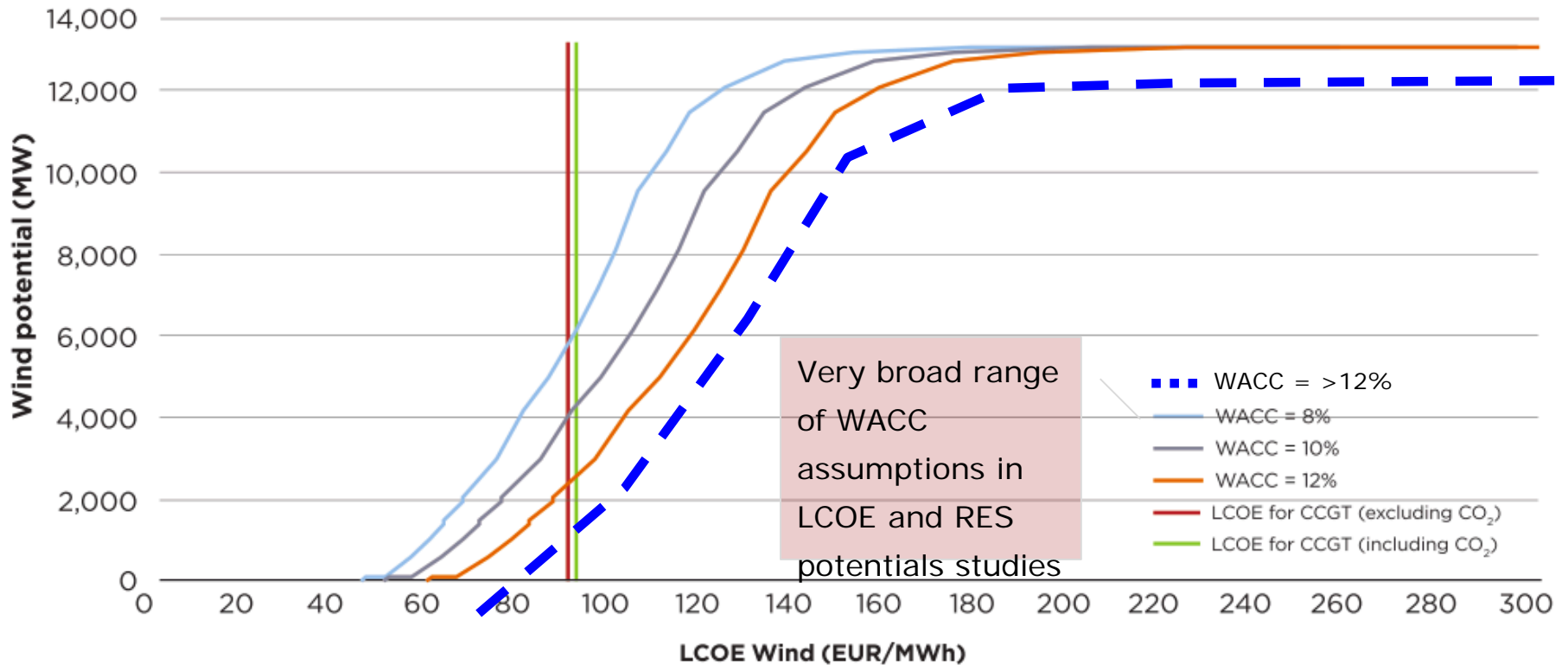
Changes of WACC under changing policy designs compared to FIP_s



Interest to expand the project to the Energy Community countries



Wide variation in WACC assumptions affects LCOE and brings uncertainty to private investors



Source: IRENA, Joanneum Research and University of Ljubljana (2017), Cost-Competitive Renewable Power Generation: Potential across South East Europe, International



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

WACC increasing policy: PPA design & granting procedure in BiH



- investor receives final PPA (and support) only after the project has been constructed (in FBiH and RS)
- requirement to pay 1% of investment costs as bank guarantee and submit this within 30 days or receiving preliminary PPA from Operator for Renewable Energy Sources and Efficient Cogeneration – but in P-PPA stage investor still does not know if he will receive the final PPA and what its exact conditions will be (in FBiH)
- PPA not viewed by banks as bankable document – lack of experience with large projects and generally weak PPA from investor security perspective



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

WACC decreasing policy: new PPA package Serbia



- “Single PPA” - Ability to conclude PPA immediately after receiving the Temporary Privileged Producer (TPPP) status [1]
- Change-in-regulations clause – “Changes in legislation which ultimately lead to an increase in producer’s expenses, shall result in the corresponding increase in FIT” [1]
- Political force majeure – if any competent authority fails to issue, upkeep, amend or prolong any public authorization without the fault of the generator or the off-taker, the agreement shall remain in force, but its legal effects shall be suspended for the period of duration of the force majeure event [2]

[1] Lakovic and Petrovic, Schonherr [2] Mitrovic, Karanovic & Nikolic



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

Risks of new policy design: effect of changing from FIT to FIP in Croatia



- Market with experience in FIT \approx 48 MW solar PV, 26 MW biomass, 28 MW biogas and 412 MW onshore wind etc.
- Renewable energy law ([NN 100/2015](#)) mandates change from FIT to FIP and auctioning > implementation delayed to early 2018 ([NN 123/2016](#))
- What are the effects on risk perception? What are lessons learned for others in Western Balkans?



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

Risks of new policy design: effect of changing from FIT to FIP in Croatia



Research base

- 8 interviews in total conducted for Pricetag in Croatia
- 3 with heads of project and structural financing departments of major Croatian commercial banks: Unicredit Group (ZABA), Erste Bank, Raiffeisen Bank

Main conclusion

- Irregular revenue flows from FIP schemes (due to fluctuation in electricity prices) and delays in implementation negatively effects risk perception
- Compared to FIT the envisaged FIP scheme valued as more risky, but with no hard conclusions available due to lack of experience



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

Why should we know more about risk and WACC for RES in Western Balkans?



- Systematics investigation on barriers exists but without direct connection to costs of financing (example: IRENA et al 2017)
- Creation of WACC aware policies could decrease the cost of financing renewables in Western Balkans
- Better WACC understanding enables more precise design of current (FIT) and future (FIP) policy schemes and LCOE estimates



@starfishenergy



@lowcarbonSEE



STARFISH ENERGY
LOW CARBON DEVELOPMENT IN SOUTH EAST EUROPE

Thank you for your attention!

For more information:

Ecofys – Fabian Wigand, Corinna Klessmann

f.wigand@ecofys.com, c.Klessmann@ecofys.com

www.ecofys.com

Starfish Energy – Mak Đukan

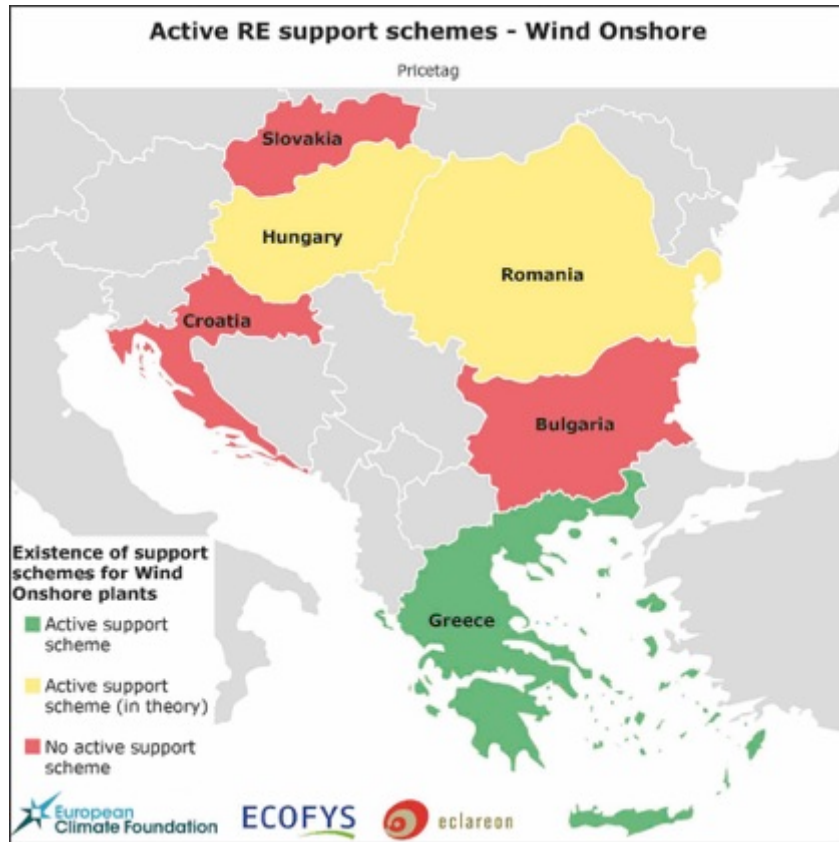
mak@starfishenergy.org

www.starfishenergy.org

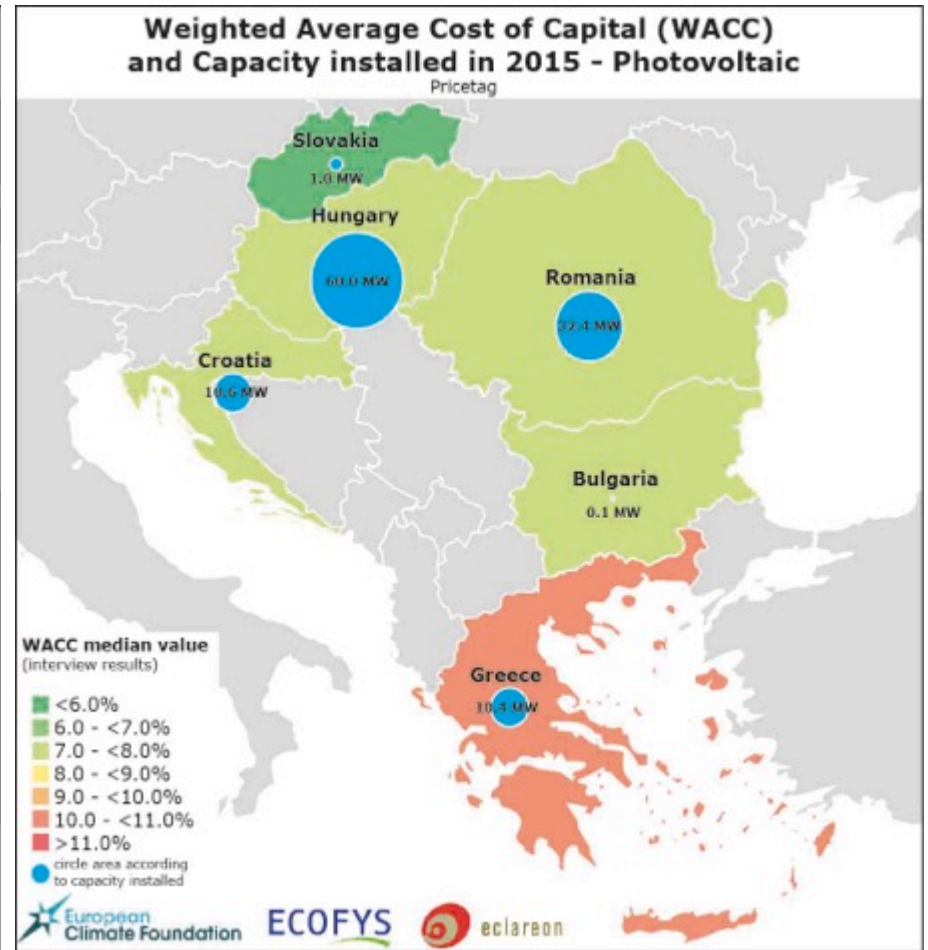
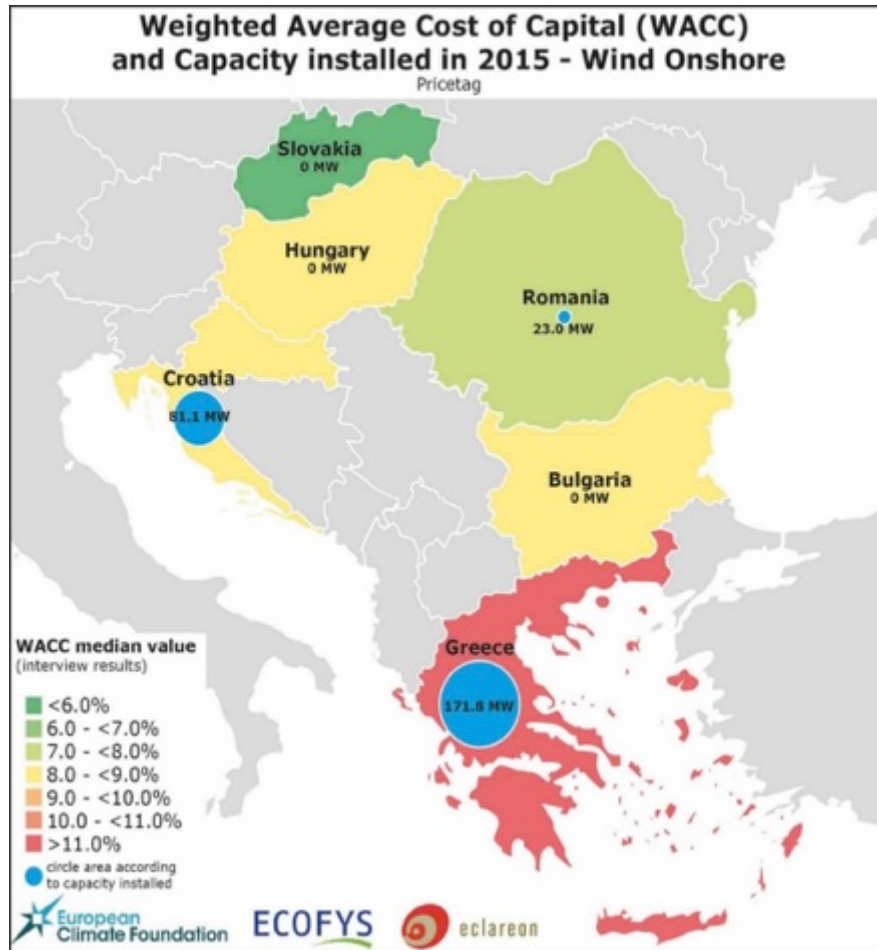
Backup: Methodology: approximating the policy risk premium

- Risk premium in WACC
 - Premium in cost of equity:
 - CoE from interviews
 - Country risk premium (CRP) in CoE from economic literature
 - = Risk premium related to renewable energy technology and policies
 - (Premium in cost of debt (not quantified))
 - (Difference in debt/equity ratio (not quantified))

Backup: Active RE support schemes?



Backup: 2015 wind onshore/PV installed capacity and WACC



Backup: General risk examples in Western Balkans

- Administrative procedures – often very long and unclear
- Grid risk – ability of the grid to take variable RES
- Sudden policy change – frequent changes in government structures and lack of stability
- Policy design risk – changes from Feed in Tariffs to Feed in Premiums
- Legal risk – design of the PPA

Impact of changes to FIP on bidder risk

