

27 June 2022 | Digital

# MENAFUELS

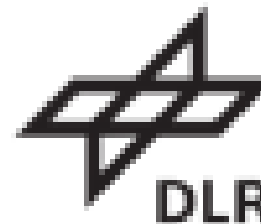
## Potentials and costs of synthetic fuels and hydrogen in 17 MENA countries

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Presentation of MENAfuels project results for advisory board

*Josua Braun, **Jürgen Kern**, Thomas Pregger*

*Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)  
German Aerospace Center*



Supported by:



Federal Ministry  
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and Climate Action

on the basis of a decision  
by the German Bundestag

- Do the MENA countries have **potentials** for the production of synthetic fuels for the defossilization of transport in Germany in 2050?

Yes, overall very large potential compared to the German demand (e.g. gasoline, kerosene, diesel in the scenario "classic drives 2050" only for traffic approx. 435 TWh/a)

	Total	less 2,0€/l
PV	145.000 TWh/a	132.000 TWh/a
CSP	47.000 TWh/a	34.000 TWh/a
Wind	15.000 TWh/a	760 TWh/a

Szenario 2050-ref

- At what **costs**?

Levelized costs of fuel (LCOF) from 124 €/MWh in 2050 (approx. ~1,22 €/l Diesel)

- With which **technologies**?

Solar (PV & CSP) potentials are considerably larger and (usually) cheaper than wind

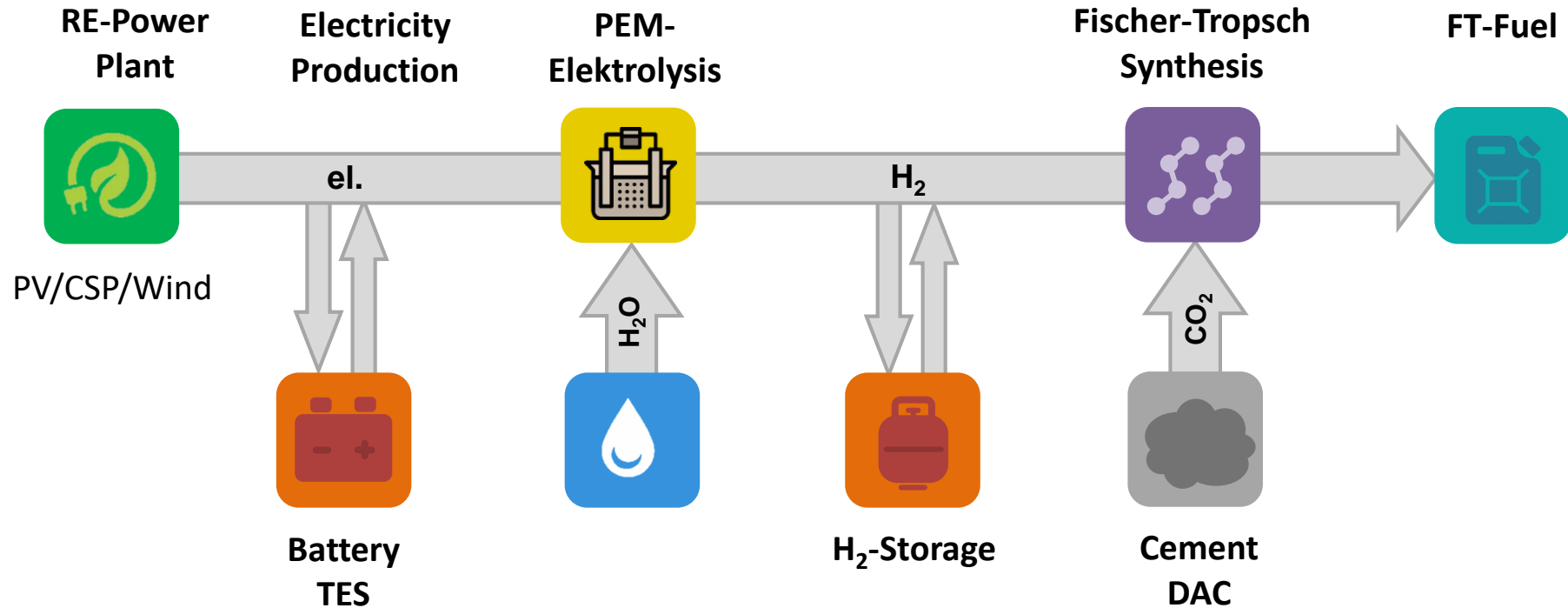
- ideally as a supplement in hybrid operation, influence of the operating strategy
- storage design (battery/TES and hydrogen storage) have a major impact

- In which **regions** and countries?

All regions have huge potentials

Country risks, financing, transport and trade will be crucial

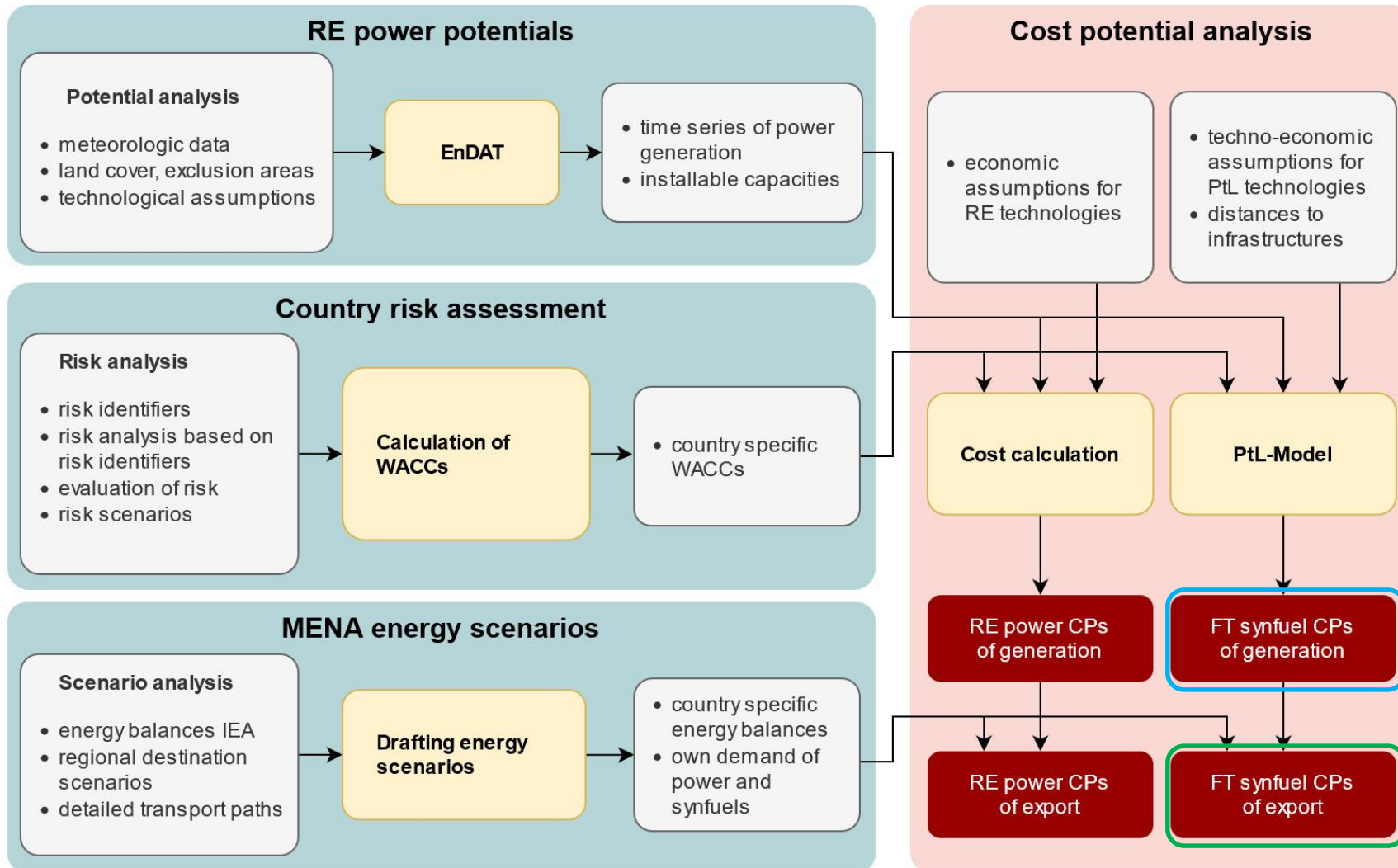
## PtL-Route



Calculation on the hourly fuels production  
⇒ Necessary Capacities ⇒ Total CAPEX and OPEX  
⇒ **Potential of fuels**

} LCOF (Levelized Cost of Fuel)

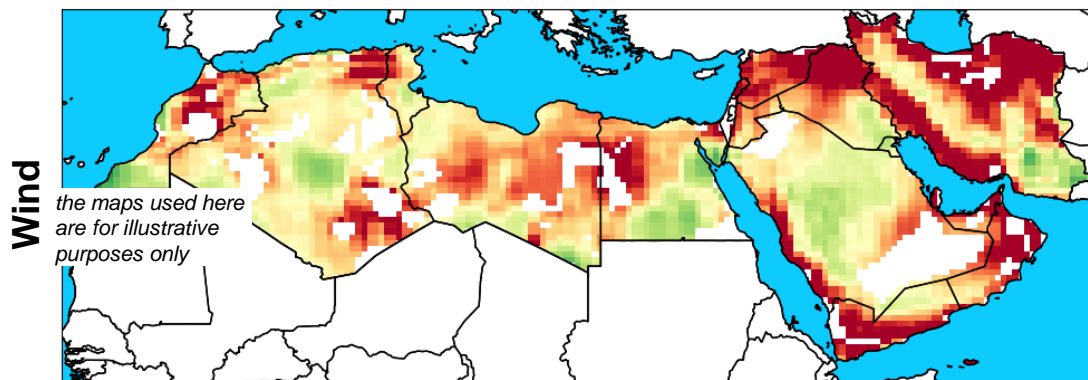
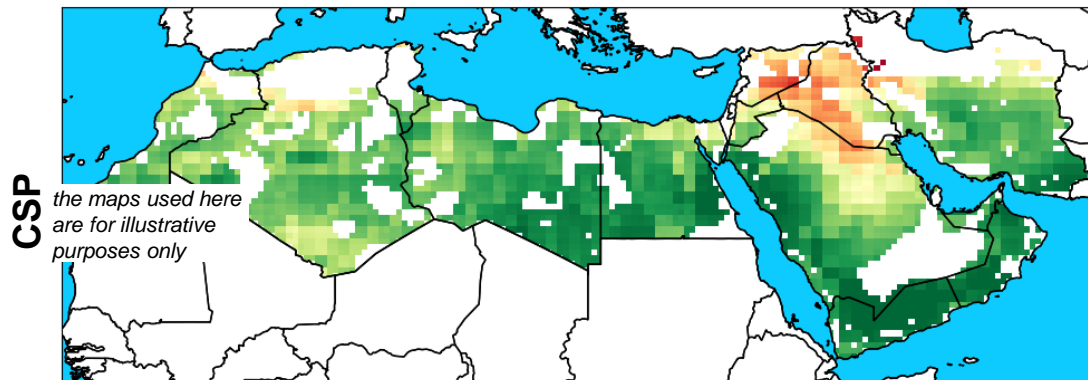
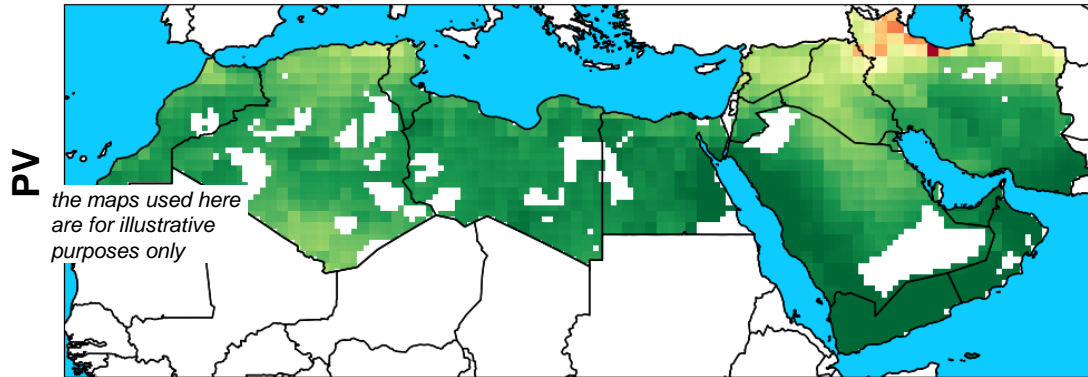
# Relation of methods and tools



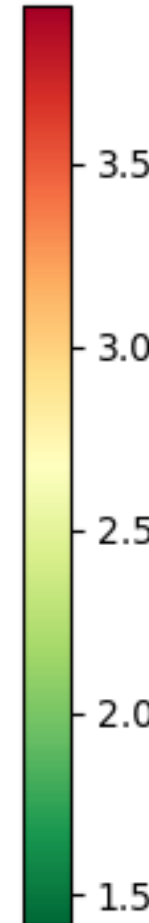
RE: Renewable Energy, EnDAT: Energy-Data-Analysis-Tool, FT: Fischer-Tropsch, IEA: International Energy Agency, CPs: Cost Potentials, MENA: Middle East and North Africa, PtL: Power-to-Liquid, WACC: Weighted Average Cost of Capital

# Levelized costs of fuels (LCOF) without country risks

Szenario 2050-ref



LCOF [€/l]



## Regions with low LCOF

### PV, CSP and Wind (all)

- Region Morocco
- Southeast of Iran

### PV and CSP (solar)

- around the Red Sea (Egypt, Jordan, Saudi-Arabia)
- South of Libya
- Yemen
- Oman

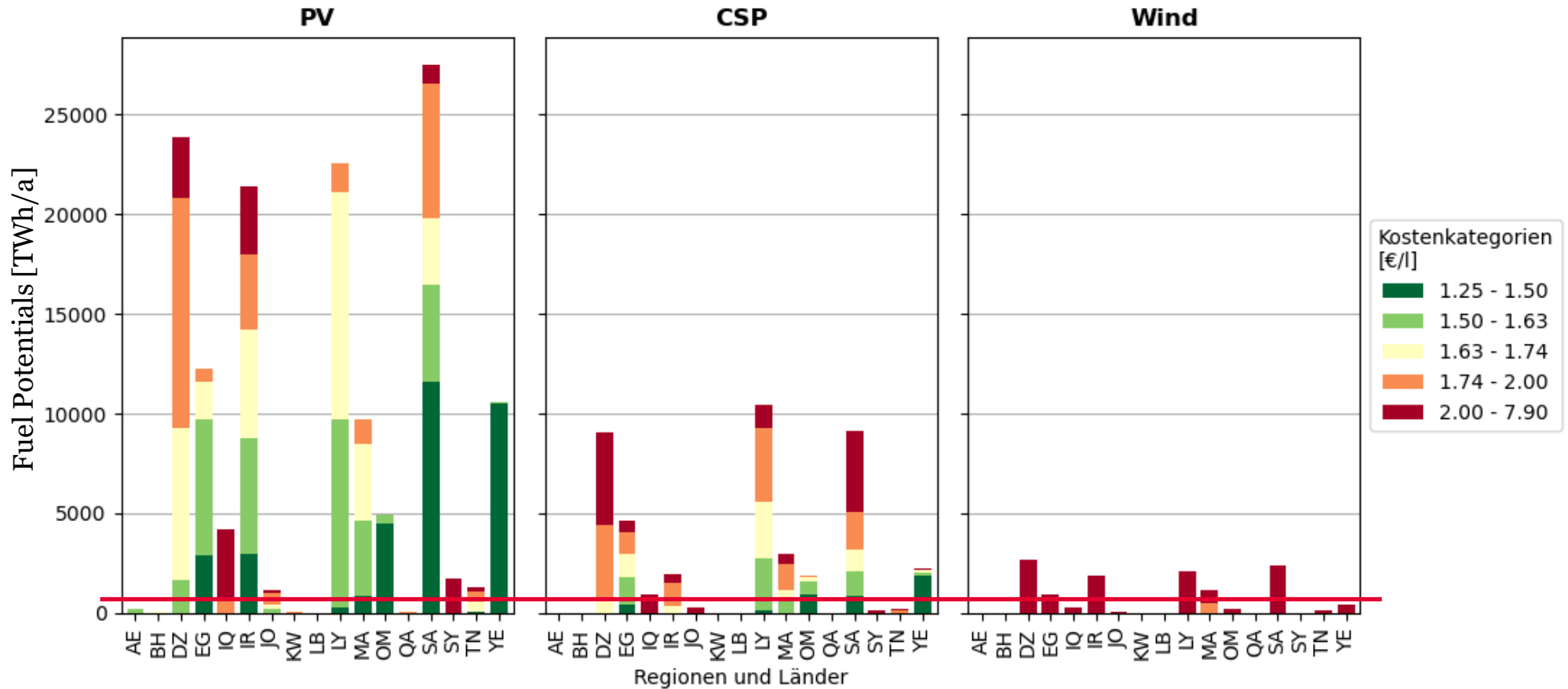
### Wind

- Center of Algeria
- South of Libya
- Southeast of Egypt
- Center of Saudi-Arabia

# Cost-Potentials – without country's own demand



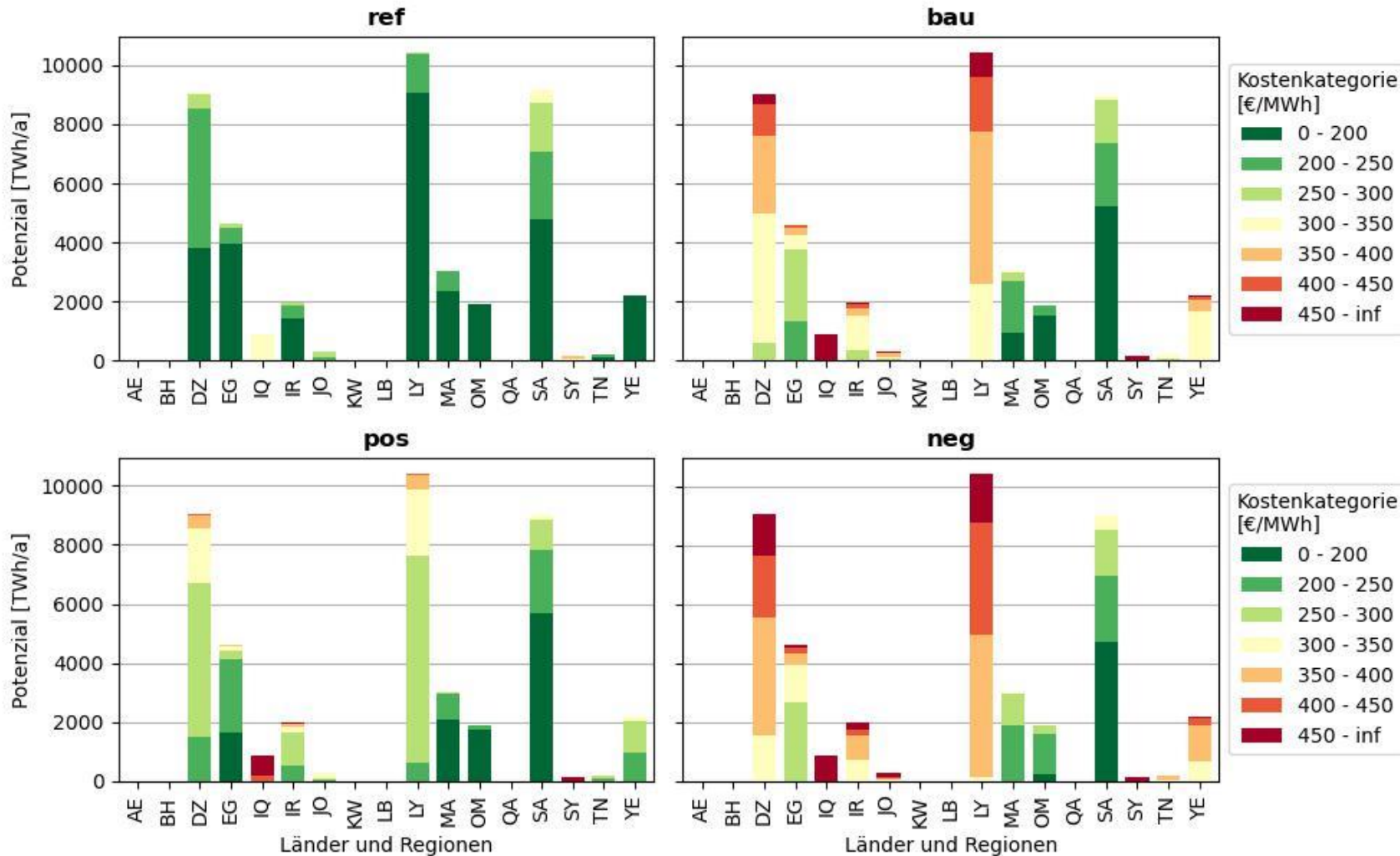
Scenario 2050-ref, Energy scenario 2050-ALT2



- Overall very high export potential
- See, for example, Germany's fuel requirements for the transport sector in the "Classic Drives" scenario for 2050: approx. 435 TWh/a

# Cost-Potentials – CSP for different WACC scenarios

## CSP-2050



➤ Risk scenario has a huge impact on costs

*Jürgen Kern* | [juergen.kern@dlr.de](mailto:juergen.kern@dlr.de)

# Thank you for your attention

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more informations on [www.wupperinst.org/MENA-Fuels](http://www.wupperinst.org/MENA-Fuels)

[www.wupperinst.org](http://www.wupperinst.org) *Peter Viebahn* | [peter.viebahn@wupperinst.org](mailto:peter.viebahn@wupperinst.org)

[www.dlr.de](http://www.dlr.de) *Jürgen Kern* | [juergen.kern@dlr.de](mailto:juergen.kern@dlr.de)

[ww.izes.de](http://ww.izes.de) *Juri Horst* | [horst@izes.de](mailto:horst@izes.de)