Firm wind for deep decarbonization

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Wind main source by 2050



Variability



Source: Agora Energiewende



Integration cost

Flexibility needs (Schill, 2020)

Cannibalization (López Prol et al. 2020)

Curtailment (Bird et al., 2016)

Start-up costs (Schill et al. 2017)

Source: Ueckerdt et al. 2013

Firm wind

Optimize capacity factor-volatility trade-off



Capacity factor (CF)

Firm wind PDF



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Efficient frontier and optimal portfolio



Efficient frontier and optimal portfolio





Optimal portfolio







Limitations

- Technical optimal -> €
- Political feasibility
- Interconnection cost vs. alternatives
- Spatial resolution

Thank you!

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Texas RE

SERC



