



# What market design for an efficient integration of renewables?



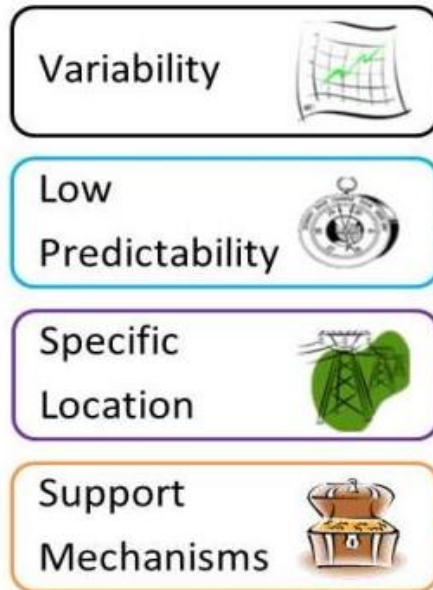
Final Conference of the  
towards2030-dialogue

Katharina Grave, Ecofys  
Brussels, 22 November 2016

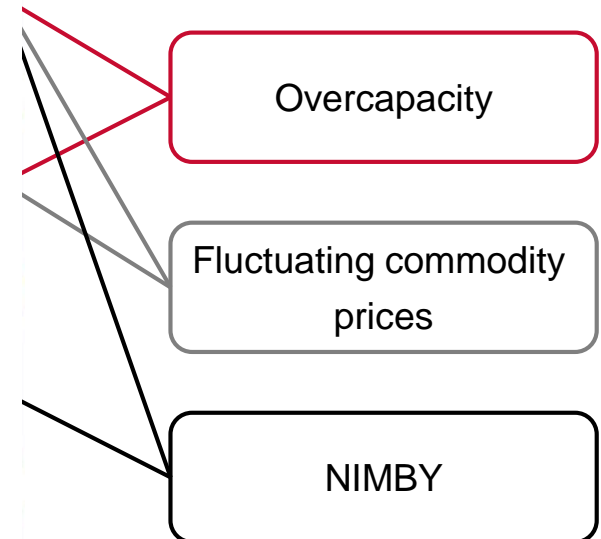


# Electricity markets and RES integration – Key challenges

## Characteristics of RES-E

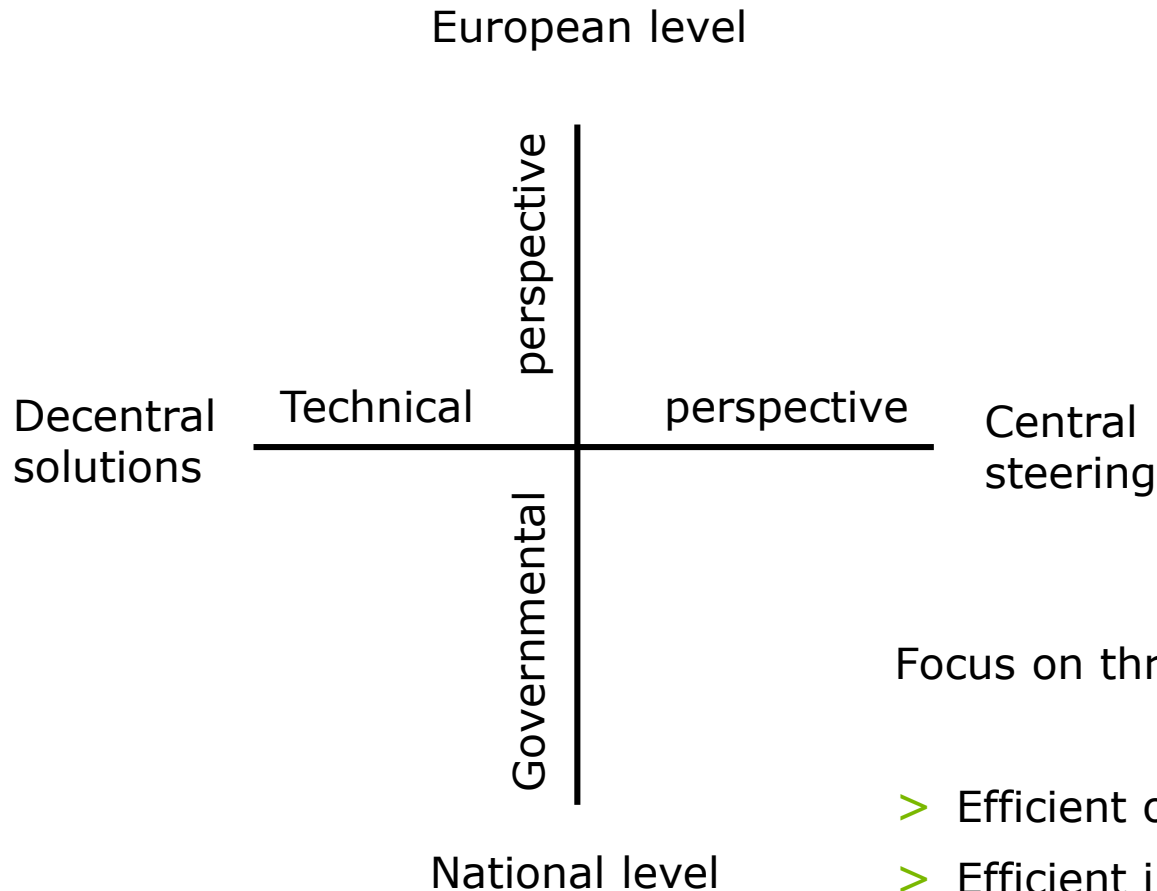


## Aggravating factors



- > Low investment incentives due to overcapacities
- > High risks for long term investments due to fluctuations in commodity prices
- > Increasing importance of short term trade
- > Local stakeholders prevent changes in their direct environment (“Not In My BackYard”)

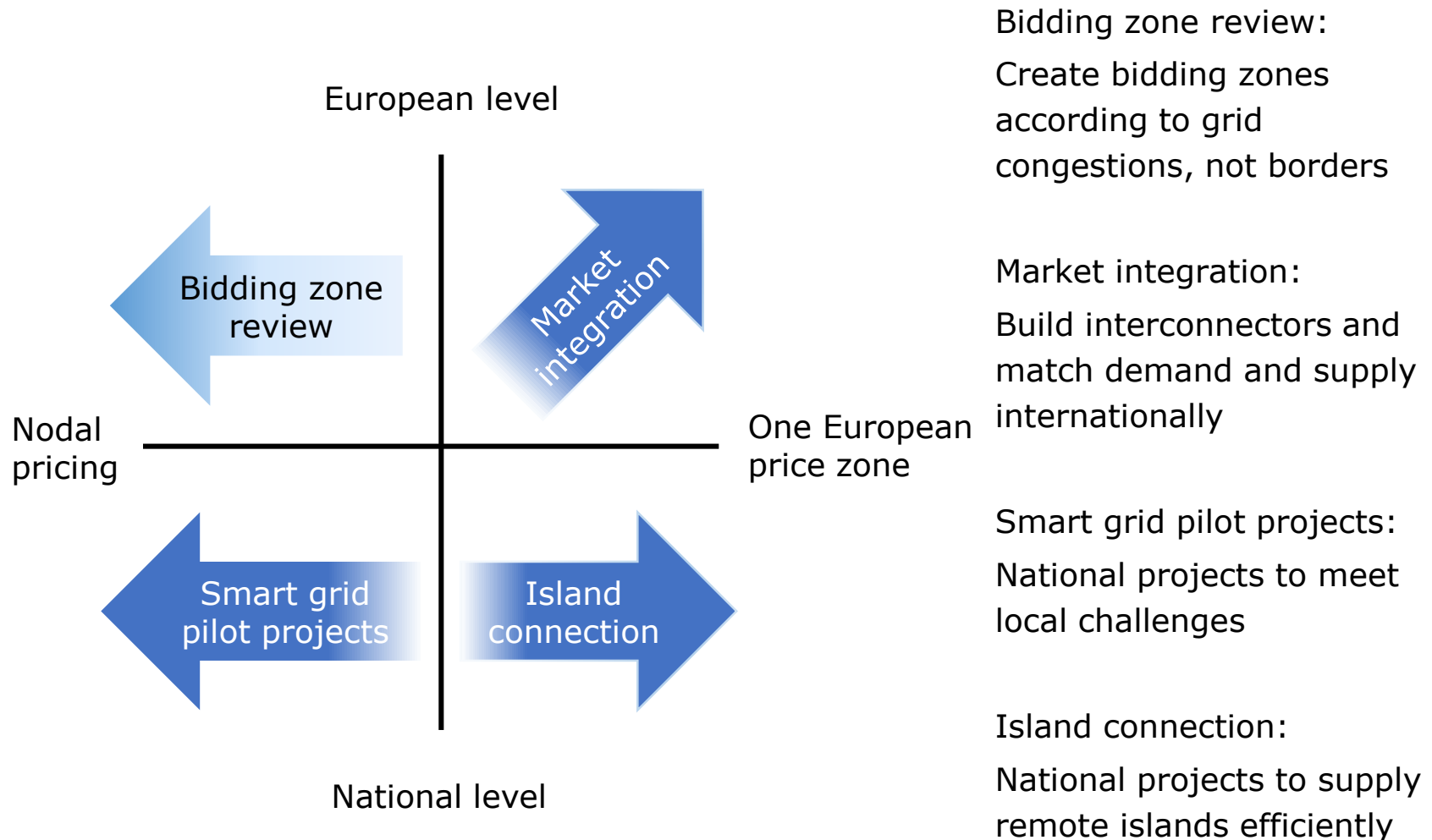
# Trends can be categorised in two dimensions



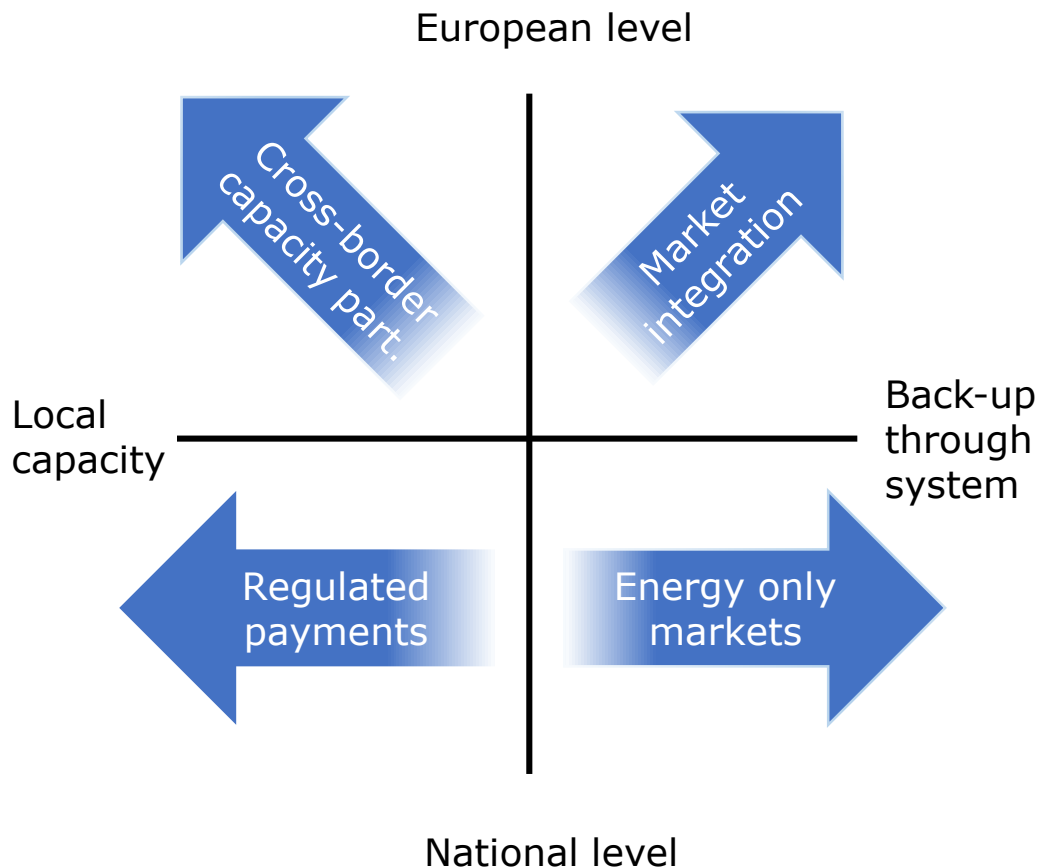
Focus on three challenges:

- > Efficient operation of capacity
- > Efficient investment in capacity
- > Variability in demand and supply

# Challenge: Efficient operation of generation capacity



# Challenge: Efficient investment in generation capacity



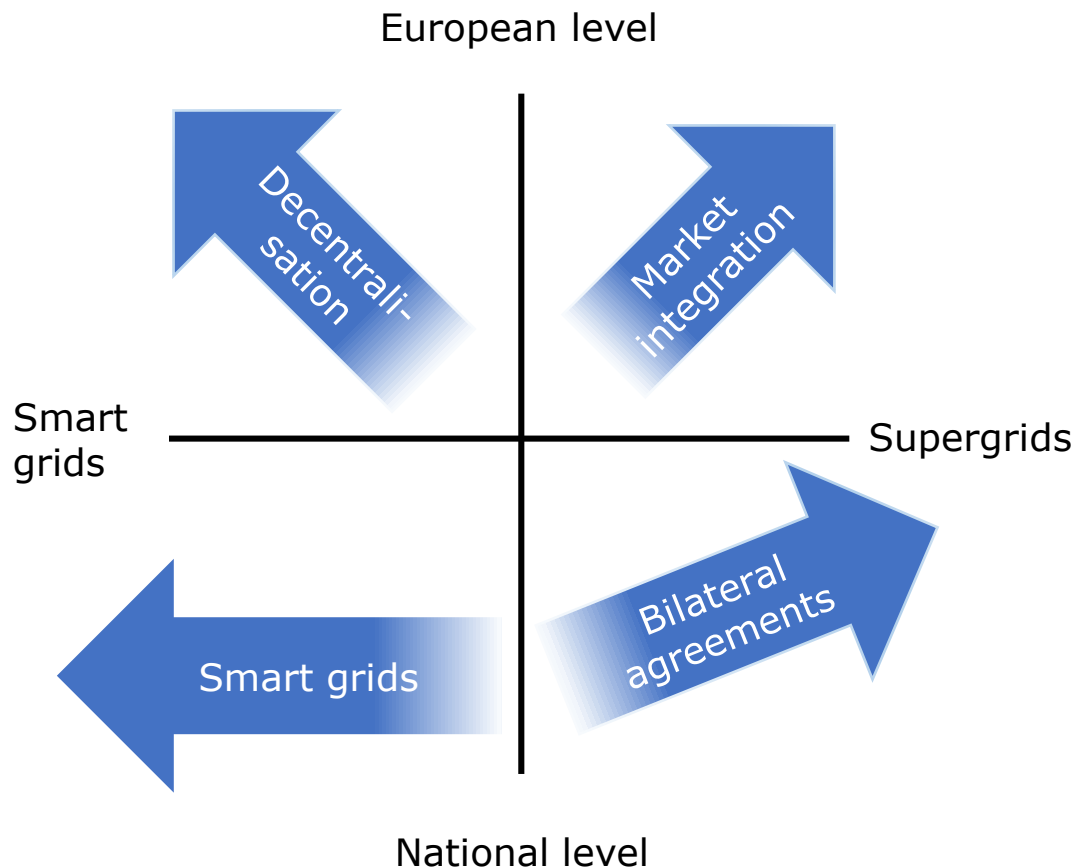
Regulated payments:  
National compensation for capacity availability

Energy only markets:  
National decision to only rely on energy markets

Cross-border participation:  
Participation from other markets

Market integration:  
Increase markets to balance regional differences in demand and supply

# Challenge: Variability in demand and supply



Decentralisation

European grid codes for distributed resources

Market integration:

Balance regional variability in demand and supply in larger systems

Smart grid pilot projects:

Balance variable demand and supply locally

Bilateral agreements:

Increasing cross-border capacity and integration of balancing markets

# Modelling: Comparing TREND and OPTIMAL scenarios

## Market design trends

Efficient operation

Efficient investment

Smart grids

Acronym	RES policy			Grid development		Electricity market design		Demand-Side response	
	LOW	REF	HIGH	REF	DELAY	EOM	CM	REF	HIGH
T-Trend		●			●		●	●	
T-Optim		●		●		●			●

## Primary impacts on RES

Wholesale market value

Retail "value"

## Secondary impacts on RES

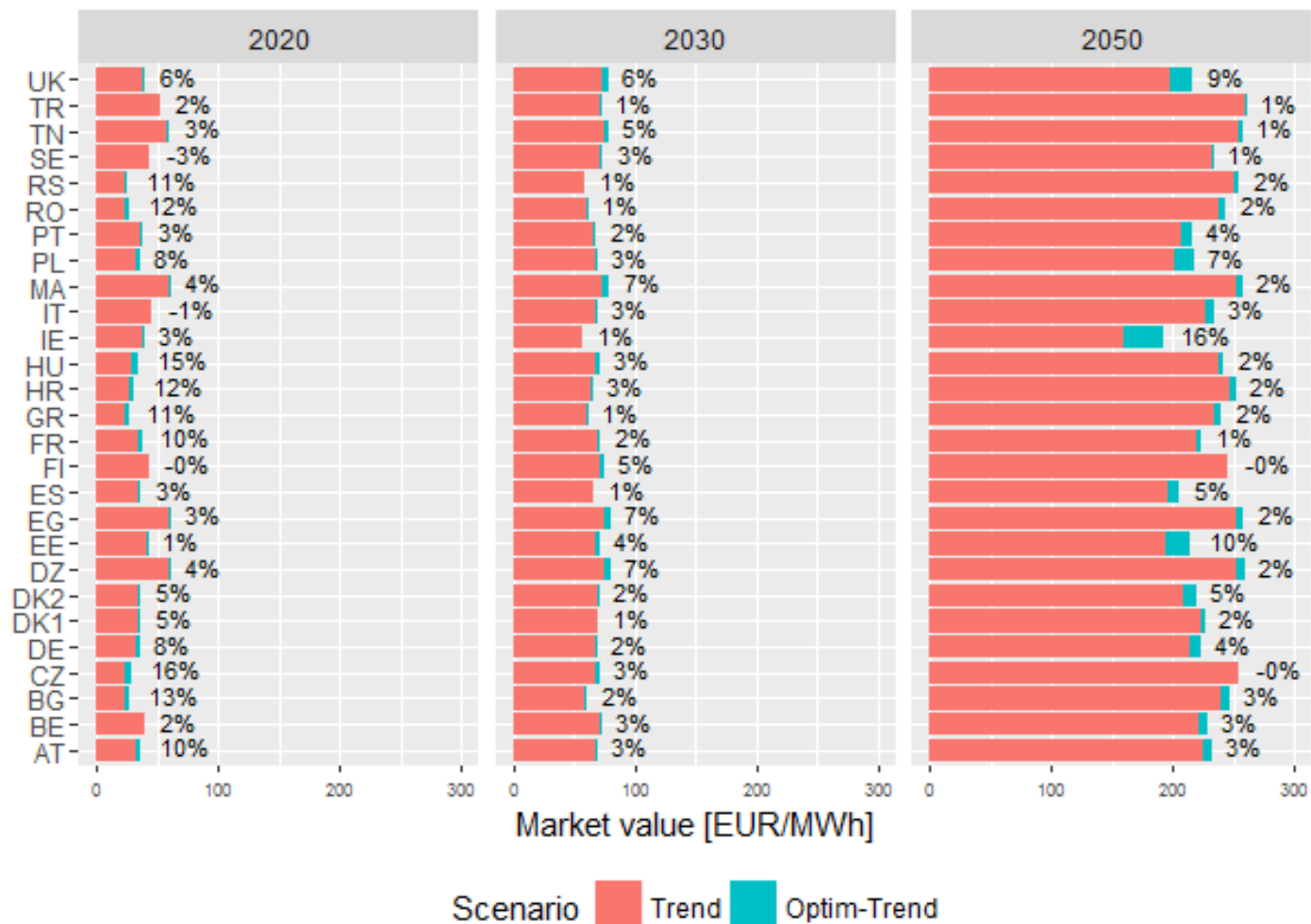
Support costs

Technology mix

Spatial location

Central / Decentral

# Change in day-ahead market value of Wind Onshore



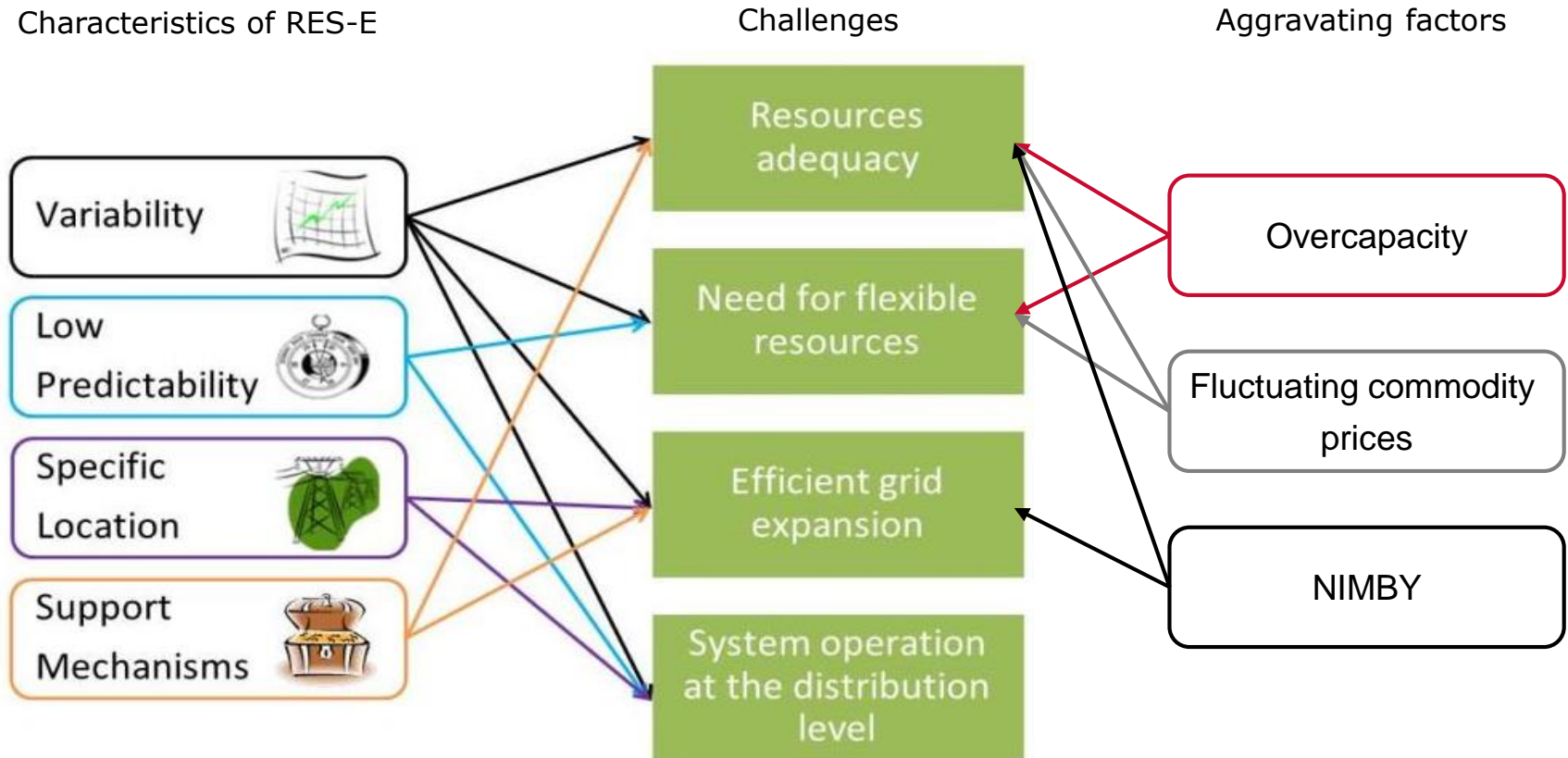


# Electricity market design impacts RES pathways

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- > Different market designs change market revenues of RES and thus indirectly impact required support premiums to achieve a certain target
- > Wholesale market revenues of RES could be increased by 1 to 7% in 2030 when a “RES-friendly” market design would be implemented
- > Revenues are unevenly impacted by technology and country  
-> implications on generation mix
- > Retail market design and regulations significantly impact investment incentives in decentralized power generation (e.g. PV) and storages
- > Debate on RES policy framework needs to consider ongoing electricity market reforms and trends

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