

---

# Solving the Energy Crisis using the Energy Transition?

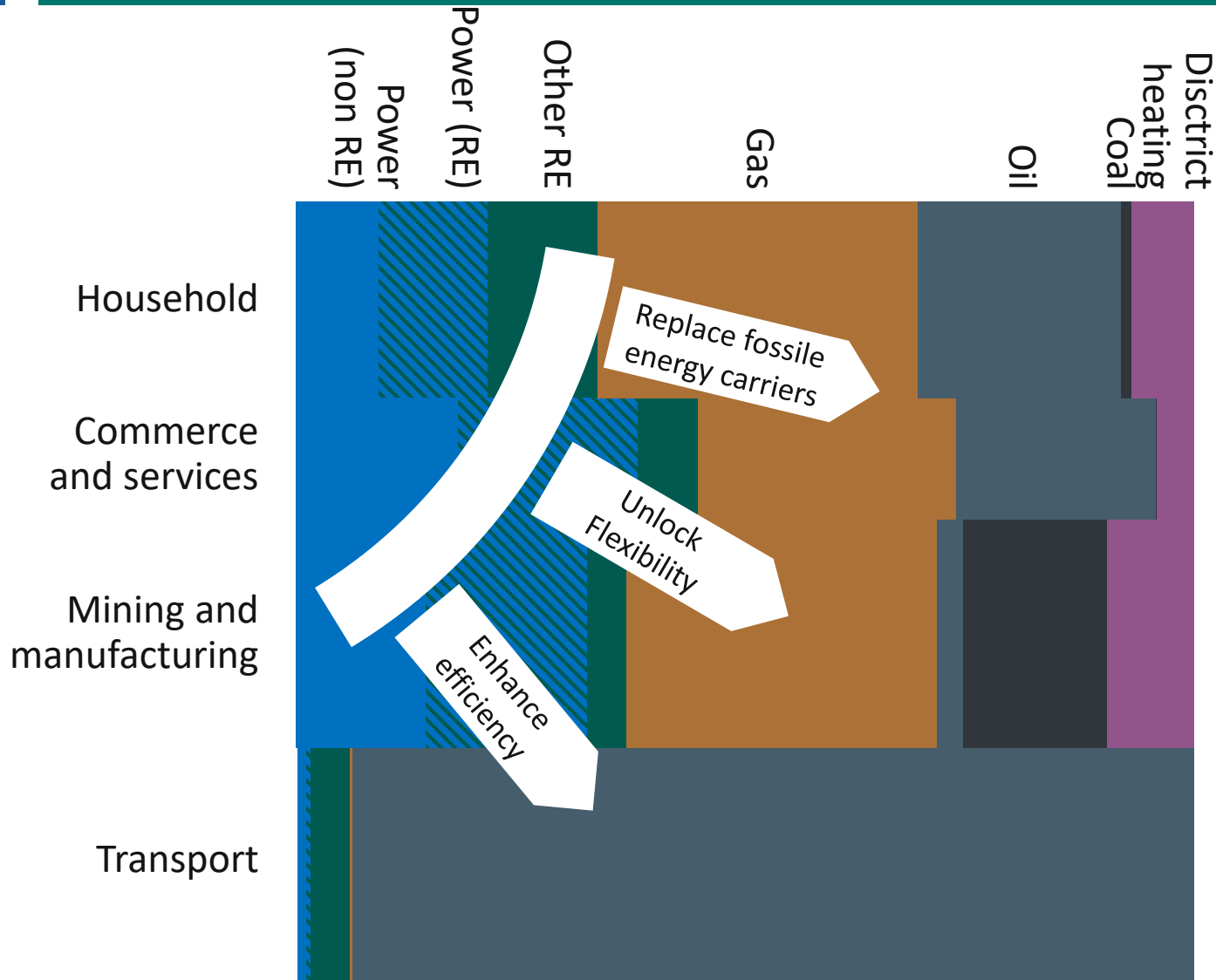
**Prof. Karsten Neuhoff, PhD**

Head of the Climate Policy Department, DIW Berlin

Professor for Energy and Climate Policy, TU-Berlin

- Longer-term Perspectives for Germany
  - Renewable energies
  - Energy efficiency
  - Resource efficiency
  - Development of Energy Imports
- Current energy/gas crisis
  - Price limit
  - Energy-saving targets and measures
  - International cooperation

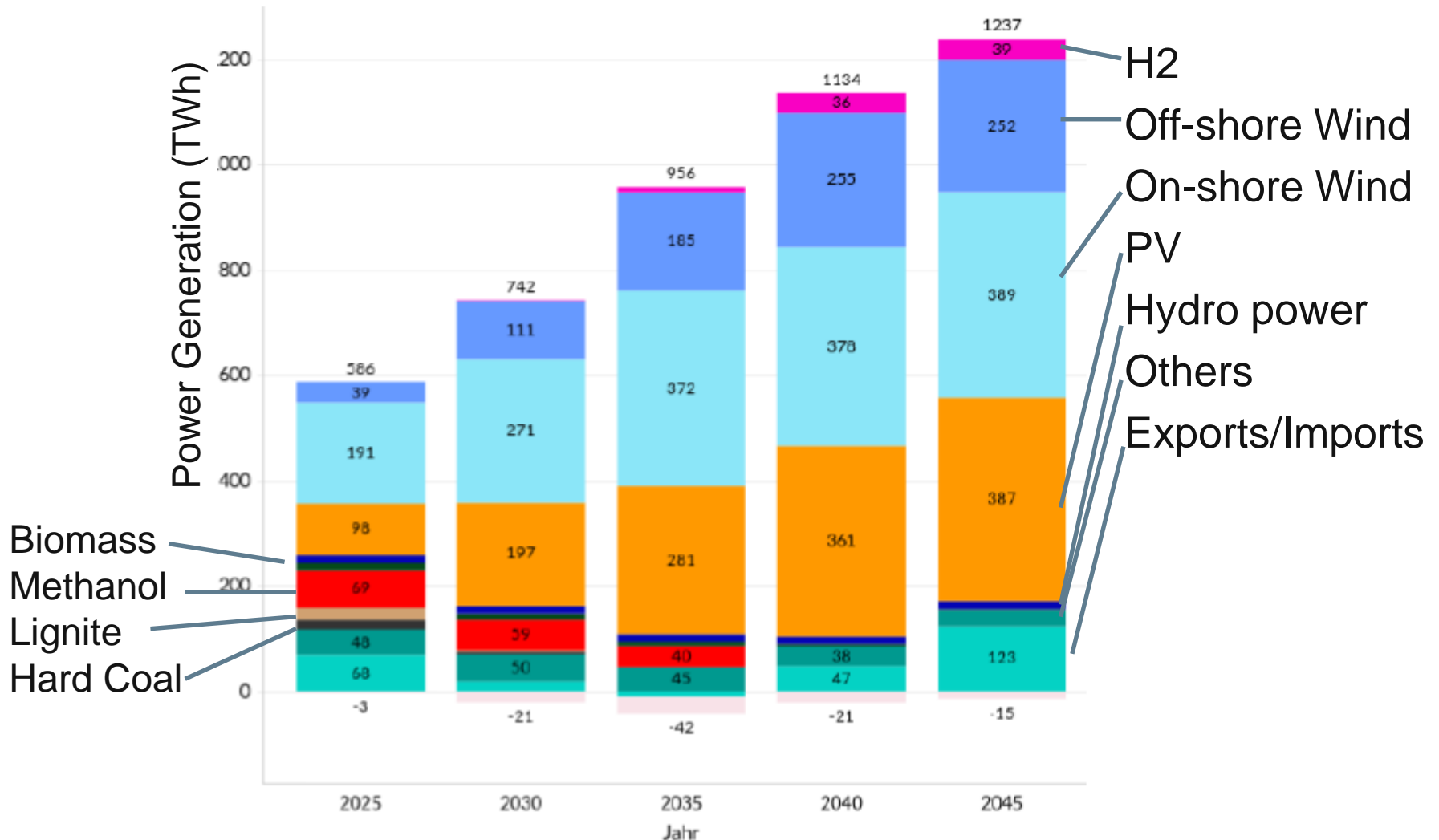
# What are implications of climate neutrality for German energy sector?



Based on AG  
Energiebilanzen (2016)

# Electricity generation in Germany

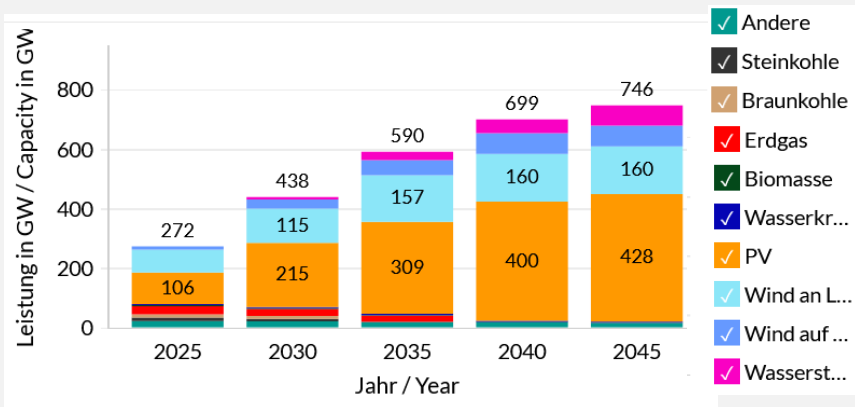
Long-term scenario of the German government (T45 electricity)



# 4

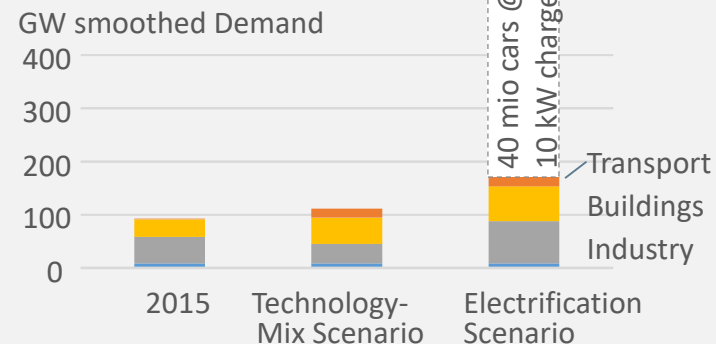
## Power systems with increasing shares of wind and solar need to use flexibility locally

### Generation



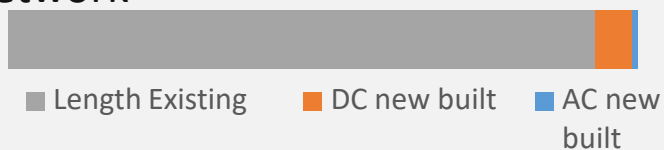
Wind and solar plants have already doubled the generation capacity connected to network, further multiplication until 2045.

### Load

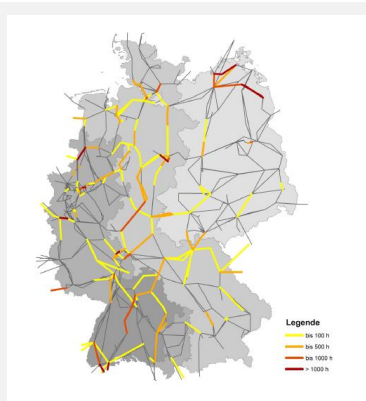


Electric cars and electrification multiple capacity of load, but also create flexibility.

### Network



Networks extension is necessary and increases with renewable deployment, but less than connected capacity.

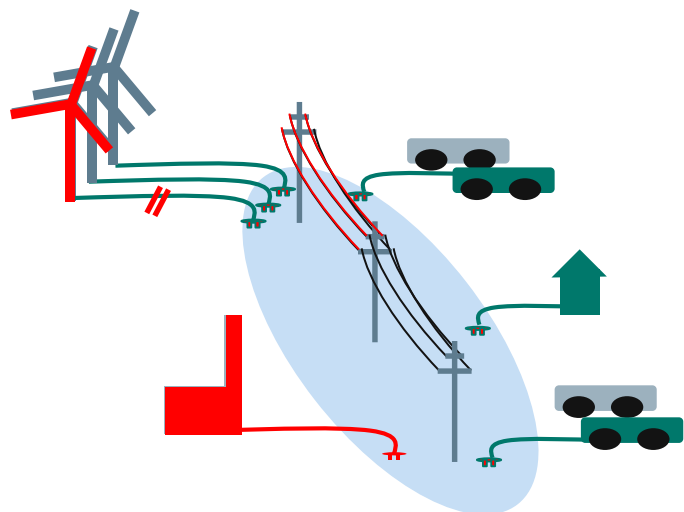


Effective load and storage management allow for wind/solar integration.

Flexibility needs to be used locally.

# Local prices are necessary to use demand flexibility and storage for congestion management

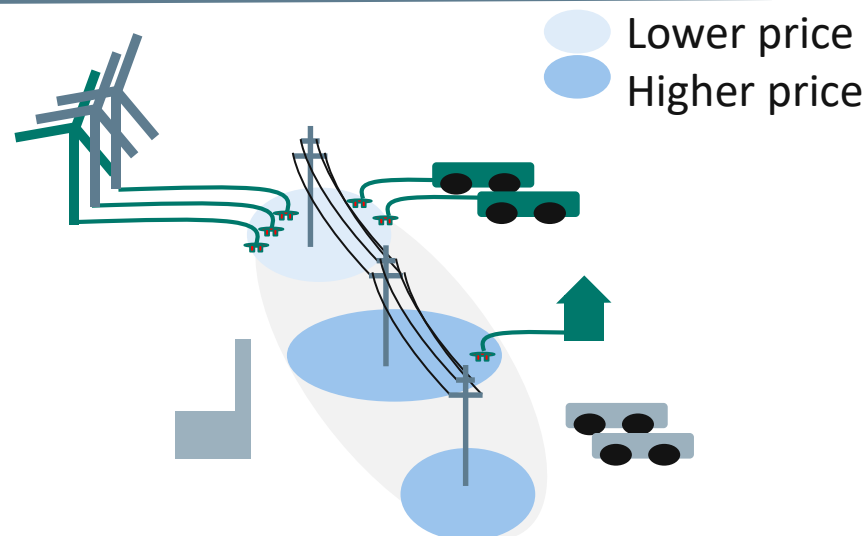
## Large pricing zone



- Zonal price balances demand, supply and imports/exports for zone.
- May result in transmission constraints.
- In such instances TSO mandates power stations to redispatch.
- Demand flexibility and storage cannot be used for congestion management.

## Local prices

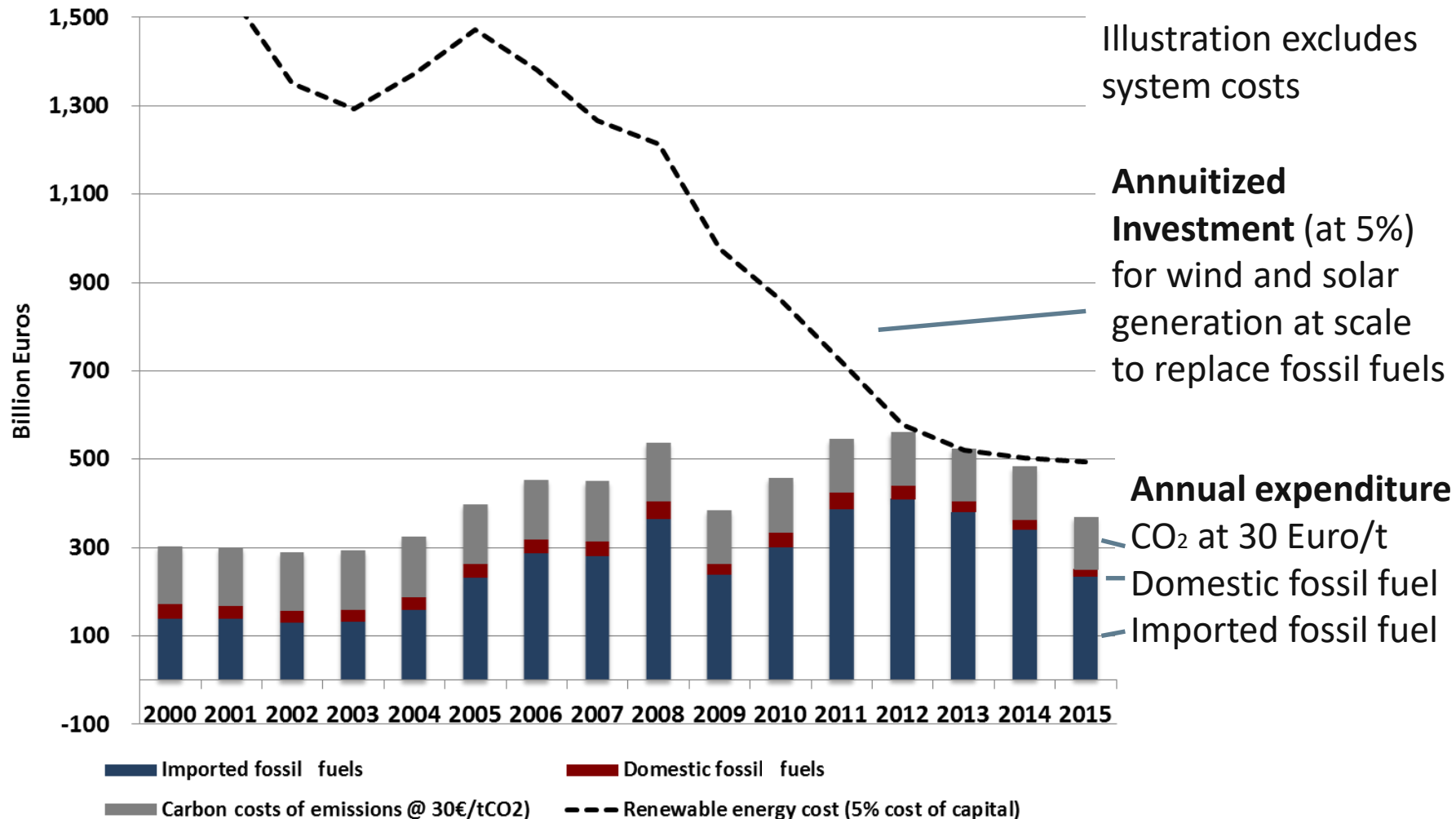
*Illustration*



- Local prices balance demand, supply and imports/exports.

- Including demand flexibility and storage in congestion management reduces wind-spill and conventional power generation.

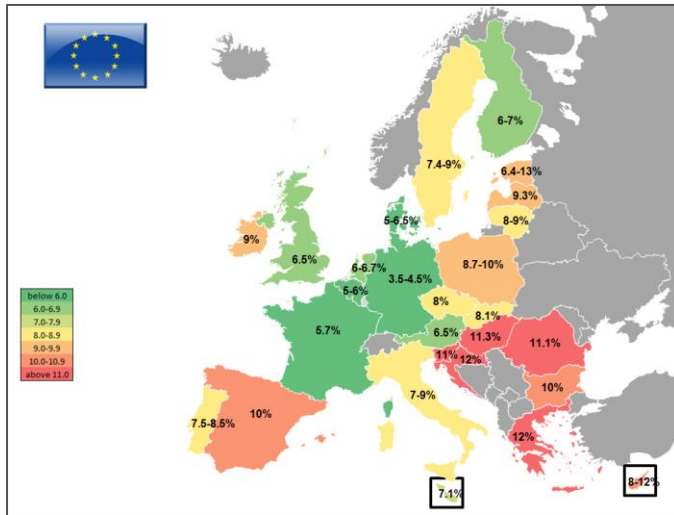
# Make use of renewables to stabilize energy costs



*Similar cost level for serving demand with new wind and solar as with fossil fuel:*

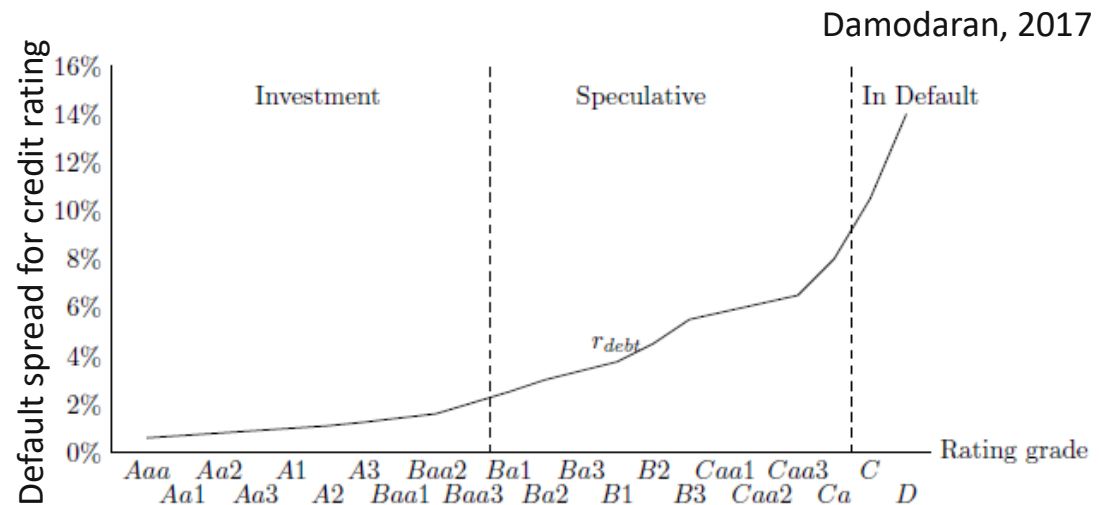
- *Cost of learning investment in wind and solar dominates debate but is sunk.*

# Use Contracts for differences to minimize energy costs ... otherwise



1. Counter Party risk increase LCoE by approx. 10%

2. Higher financing costs for demand side imply increased LCoE of 20%



**3. Total effect of higher financing costs and risks on balance sheet**

29% (DIW 2018/May 2021))

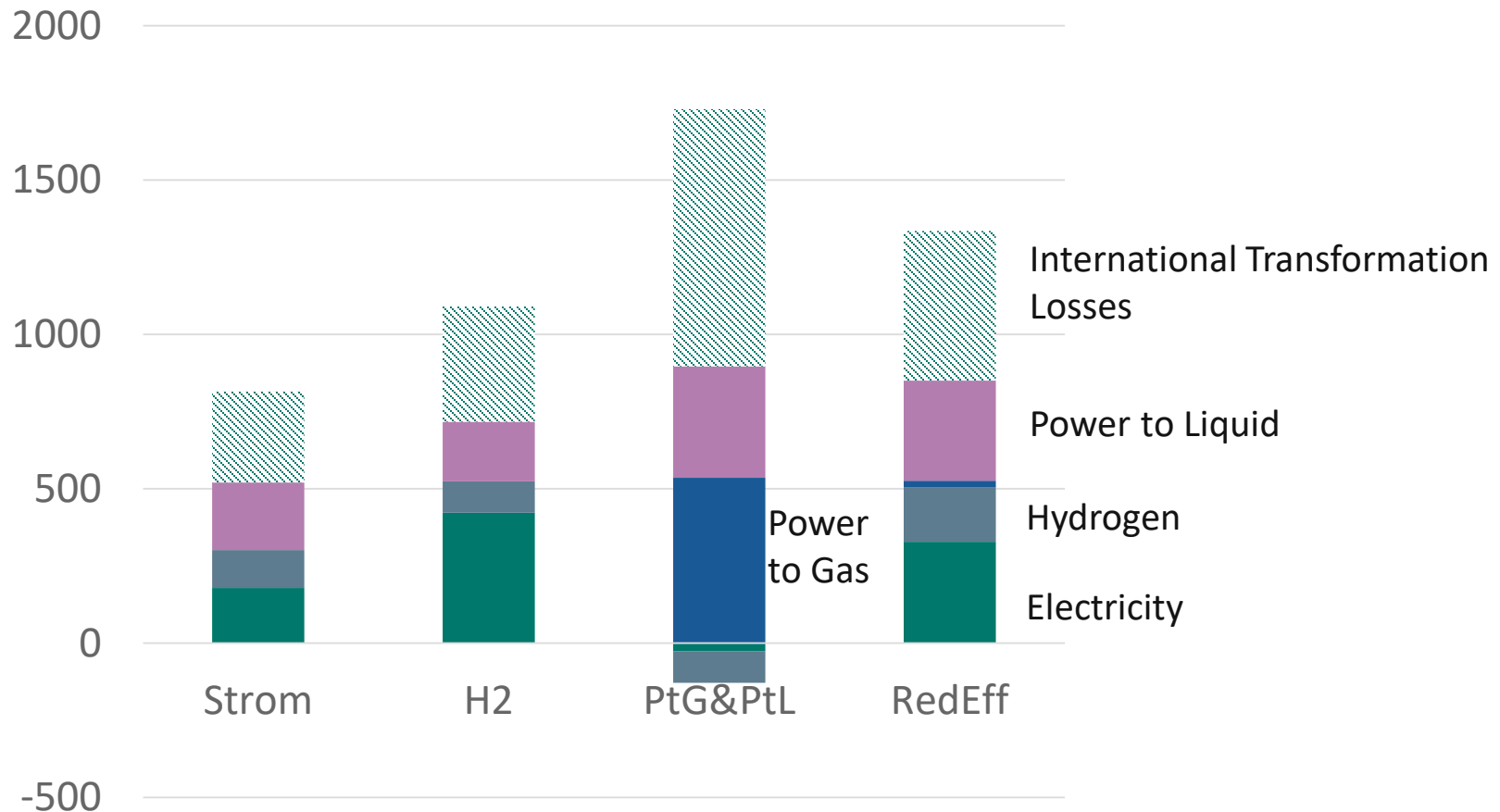
28% (Aurora Energy Research, 2018)

25% (Enertrag, 2019)



# Energy Imports to Germany in 2045

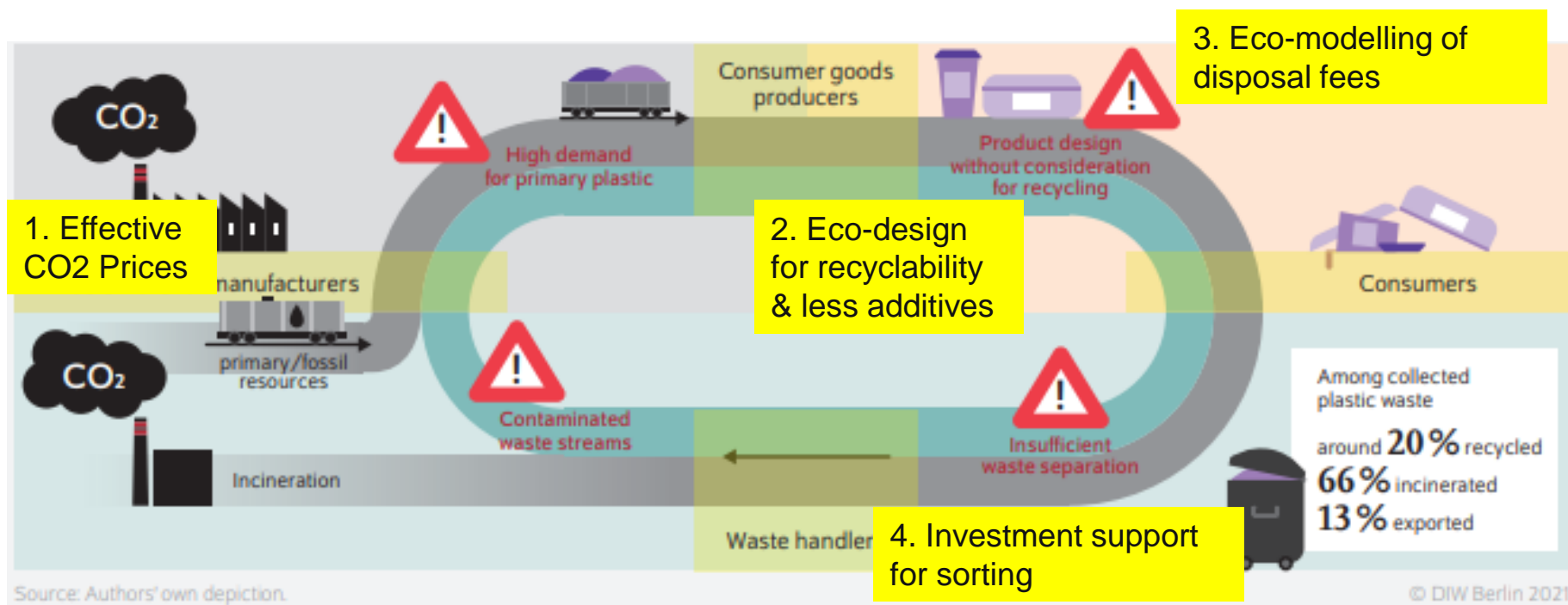
## Long-term Scenario of the federal government (T<sub>45</sub>-Strom)



H<sub>2</sub> used for chemicals (120 TWh), steel (44 TWh), process heat (60 TWh) and power generation (74 TWh)

# Removing barriers to a circular economy

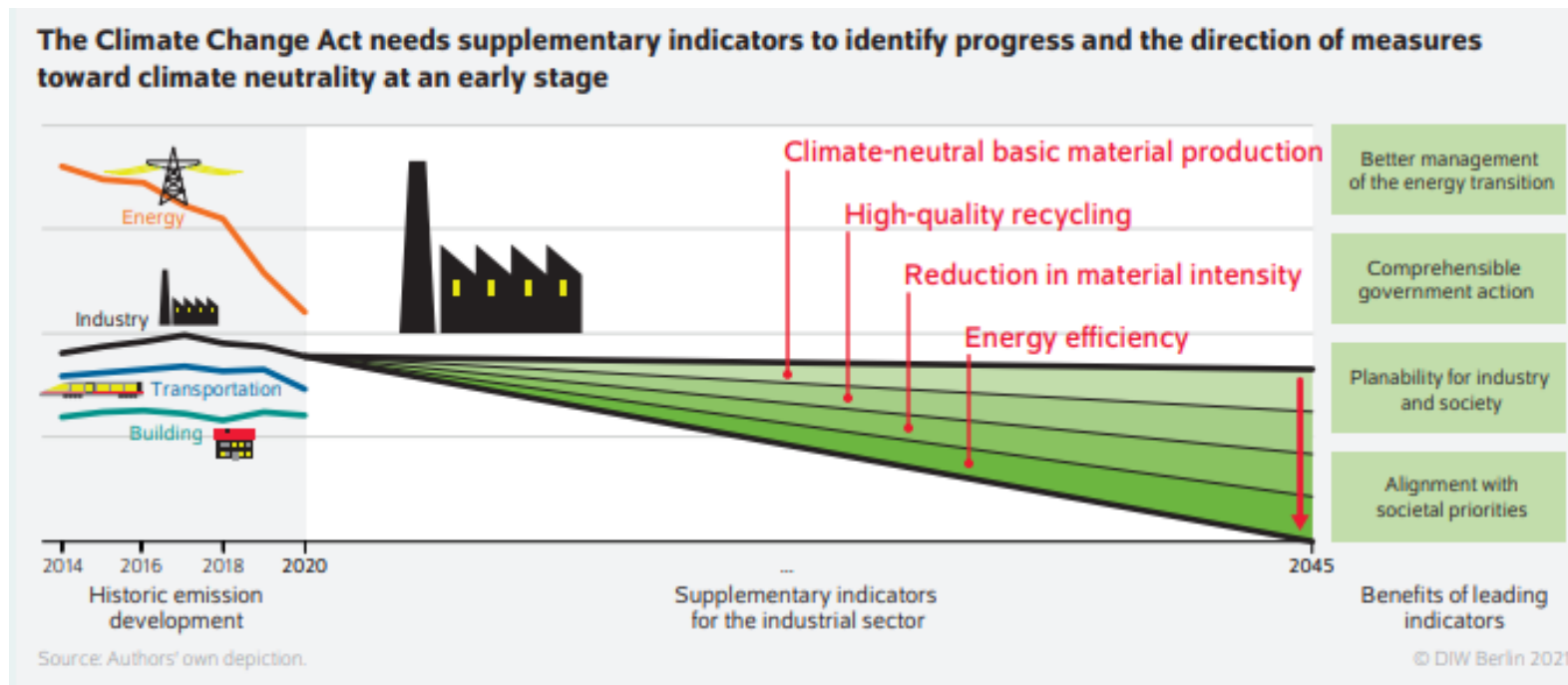
- High-quality recycling can save a large part of emissions
- However, framework conditions along the value chain are inadequate

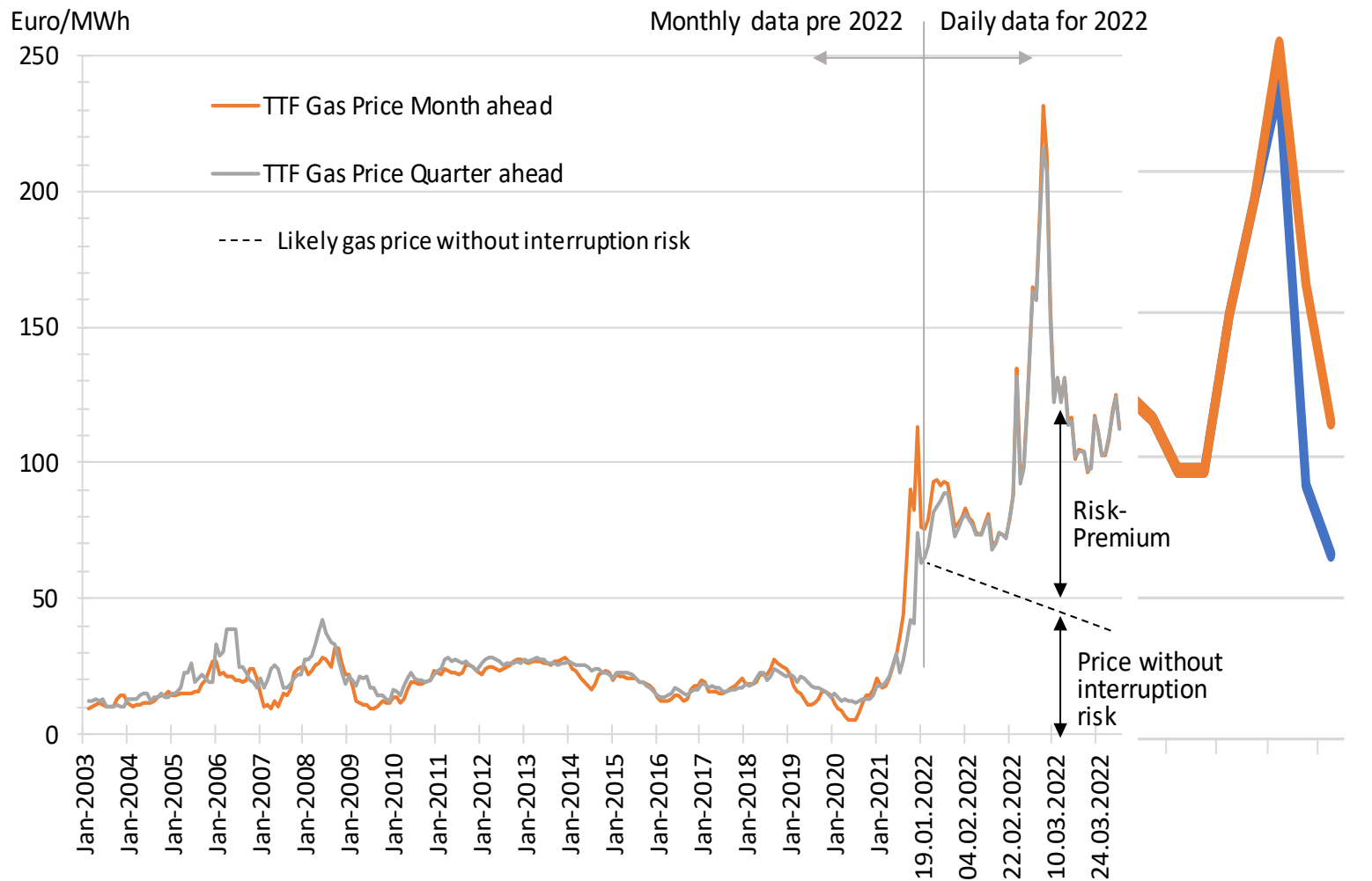


- Measures must be implemented as a policy package

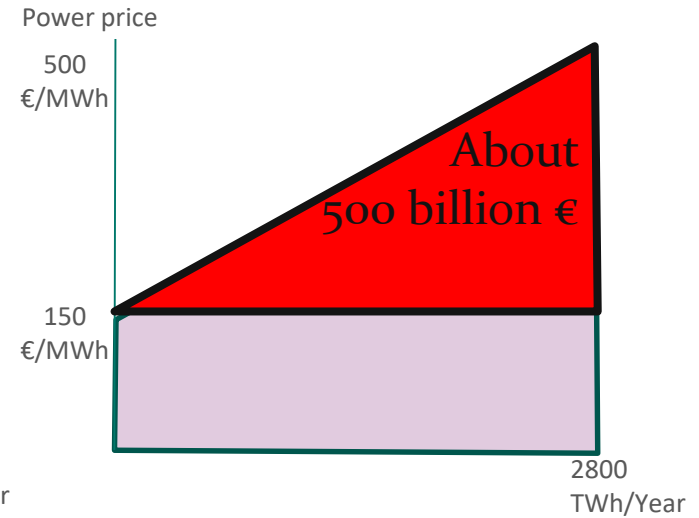
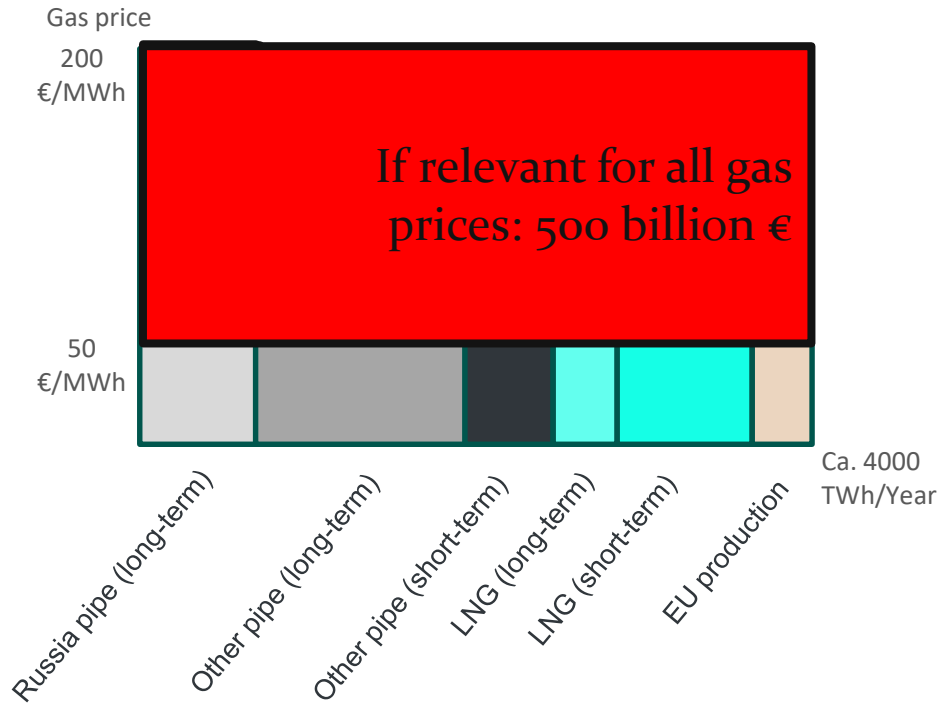
# Using the Climate Protection Act for Coordination of the Transformation

- Climate Protection Act only provides for monitoring of emissions thus far
- Leading indicators improve management and reduce uncertainty

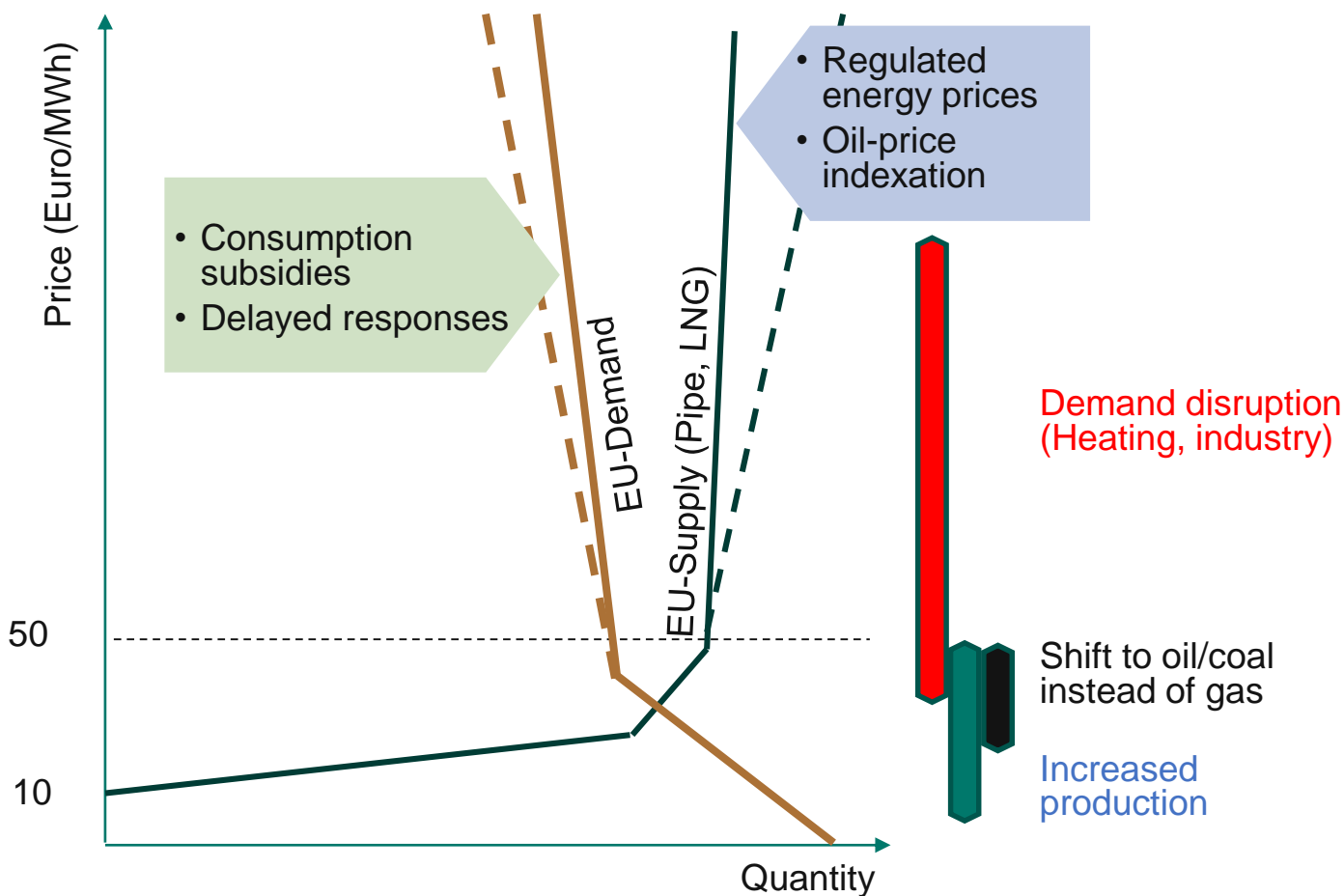




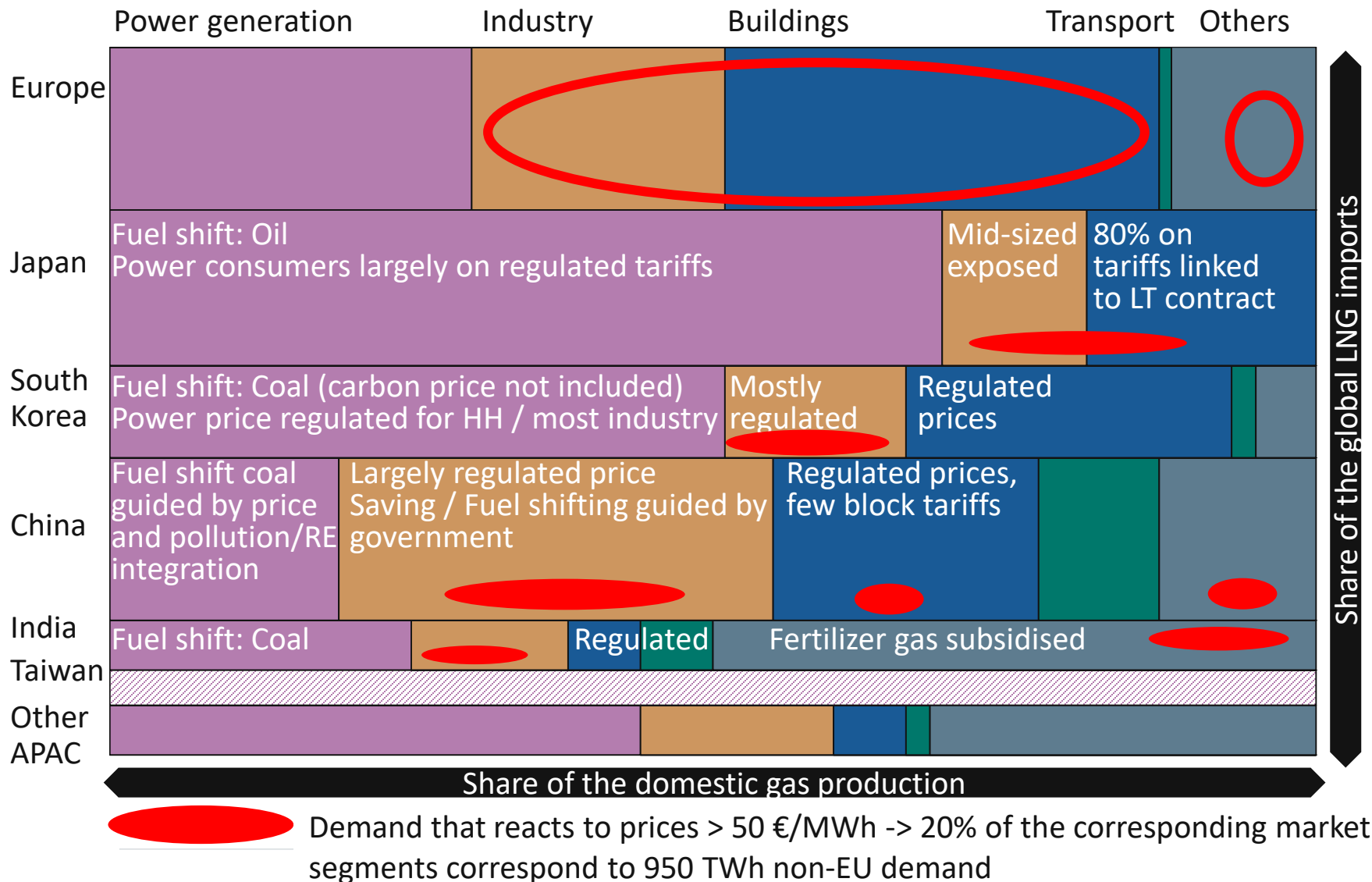
# Cost imposed by Russian gas interruptions



# What determines gas-price formation?

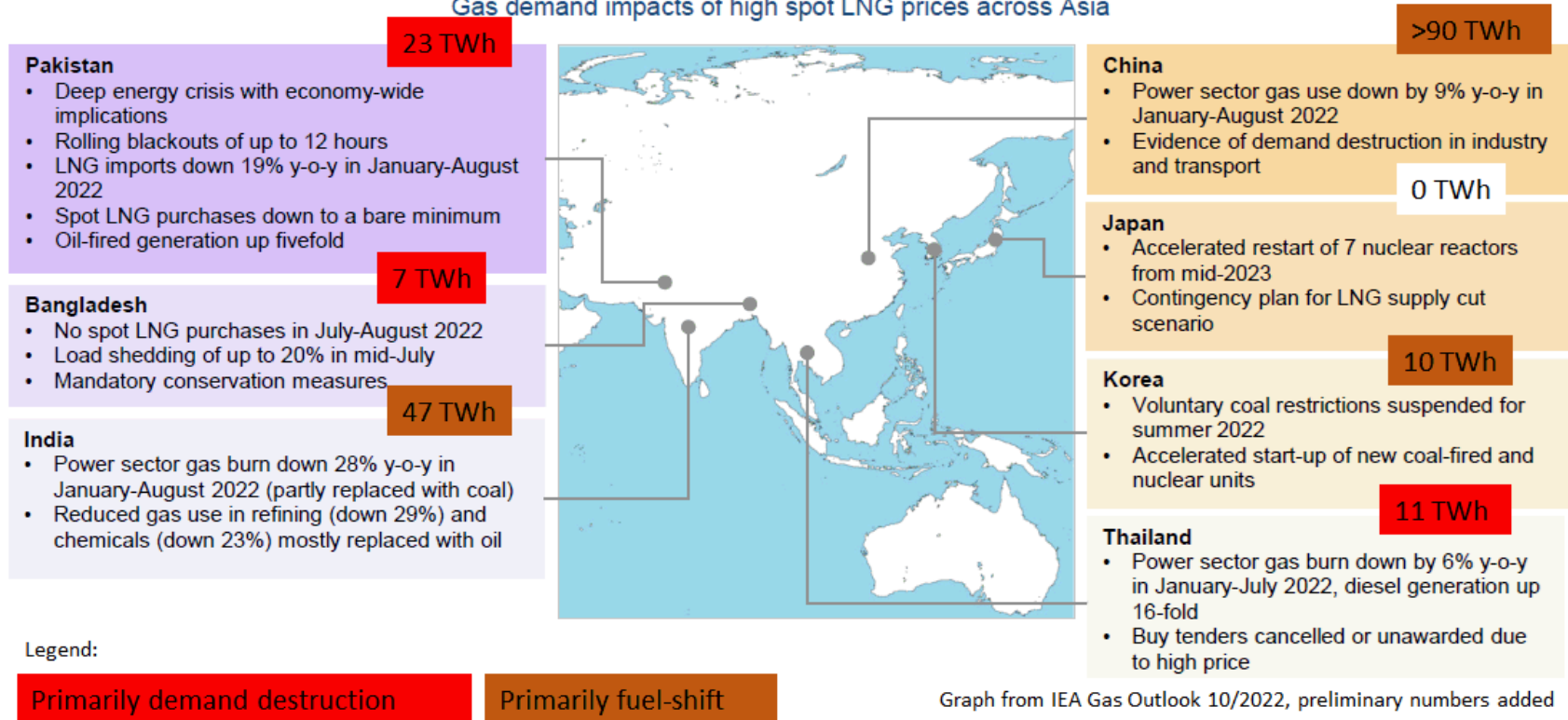


# Overall picture – where does demand react to prices > 50 Euro/MWh



## Demand response to high LNG prices varied widely among the main importers in Asia

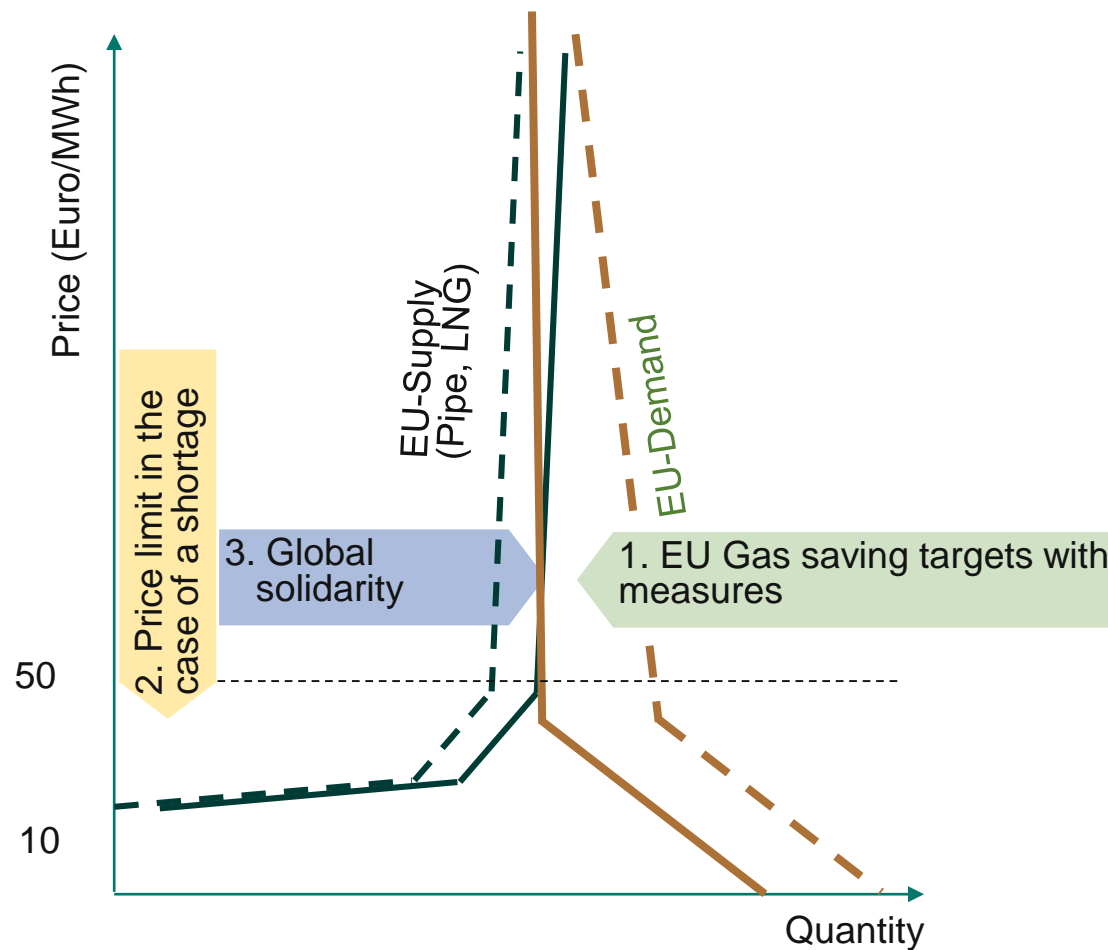
Gas demand impacts of high spot LNG prices across Asia





## Way forward - An EU deal on gas saving targets with saving incentives and a price limit - ...

- Pivotal supplier Gazprom can create shortage with uncertain and extremely high gas prices – escalating its revenue and cost for EU
- Price limit at EU-scale has potential to effectively respond to abuse of dominant position
- Price limit needs to be combined with firm gas saving targets at EU-scale
- EU agreement on gas saving targets can also involve commitment to retain marginal incentives
- An effective solidarity mechanism requires both gas-saving targets and a price limit
- Combination of firm gas saving targets and price limit makes an EU agreement attractive for all EU countries
- Price limit at EU scale will mitigate risks for developing countries



- Longer-term perspective for Germany
  - Renewable energies
  - Energy efficiency
  - Resource efficiency
  - Development of energy imports
- Current energy/gas crisis
  - Price limit
  - Energy saving targets and measures
  - International cooperation