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# Four challenges of decarbonisation

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- 1. Decarbonisation: state, market and society**
- 2. Four challenges of decarbonisation**
- 3. Success factors**

# Decarbonisation needs a proactive state



- Required: **aligning the structure of the economy** with the **needs of sustainable** development within established planetary boundaries.
- **Investment** & change of **consumption patterns**
- **Market in its current form is failing** to direct investment into clean technologies at the pace and scale needed.
- **'Proactive state'** (WBGU 2011) needs to intervene, mandated by **society**.
- Once overall direction and rules are clear, **market** can be **efficient instrument**.



- (a) pervasive market failures,
- (b) high levels of uncertainty and time pressure,
- (c) need to create new and disrupt old pathways,
- (d) political economy.

# Market failures: more than externalities



<i>Coordination failures</i>	<i>Public goods</i>	<i>Externalities</i>
Obtainable benefits are not being reaped due to lack of coordinated action	Goods that are non-excludable and non-rival in consumption	Deviation between private and social costs and benefits
<b>Crucial for creating new and disrupting old techno-economic pathways</b>	<b>Most severe in case of climate change mitigation suffering from ‘free-riding’</b>	<b>Pervasive in environmental pollution, waste management and natural resource use</b>



## ➤ **Uncertainty** about

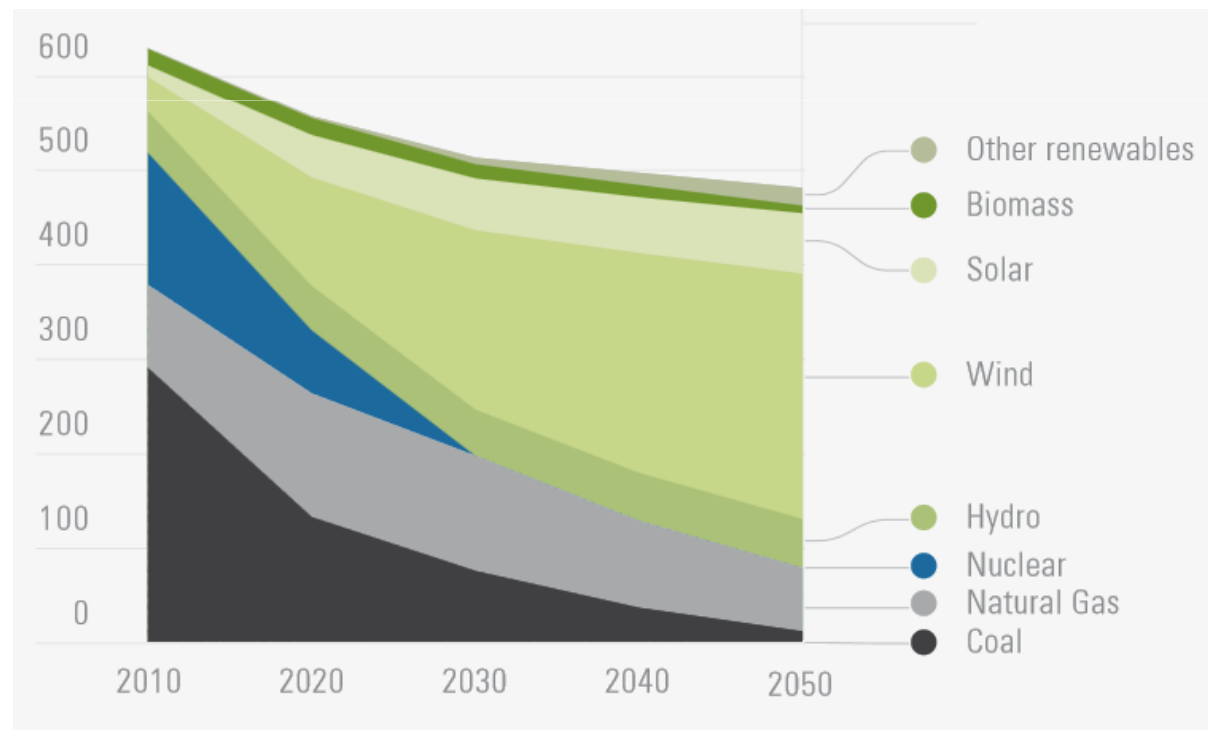
- Scale, timing, localisation and nature of environmental impacts
- Technological and market developments
- Development of international agreements
- Policy frameworks and impacts

## ➤ Pressure to **act now**

# Creating new and disrupting old pathways



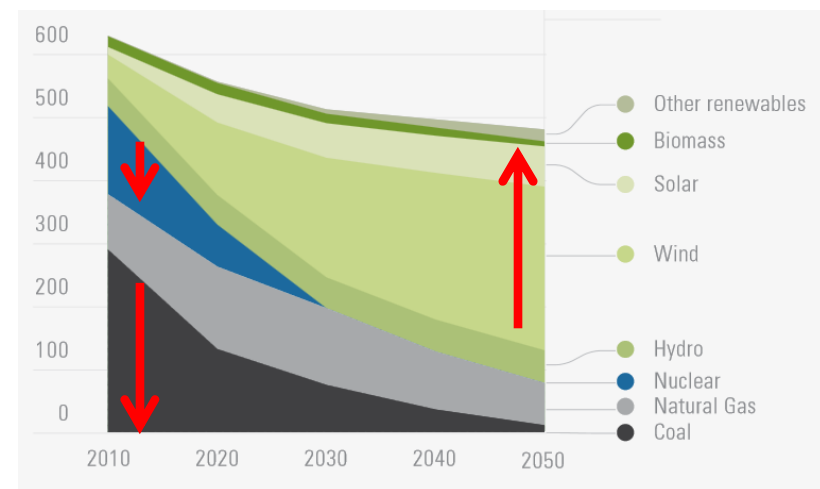
- ‚Aligning the structure of the economy‘: changing **technological pathways**
- Energy supply pathway for electricity generation by source, Germany (SDSN Pathways to deep decarbonization 2014 report)



# Creating new and disrupting old pathways

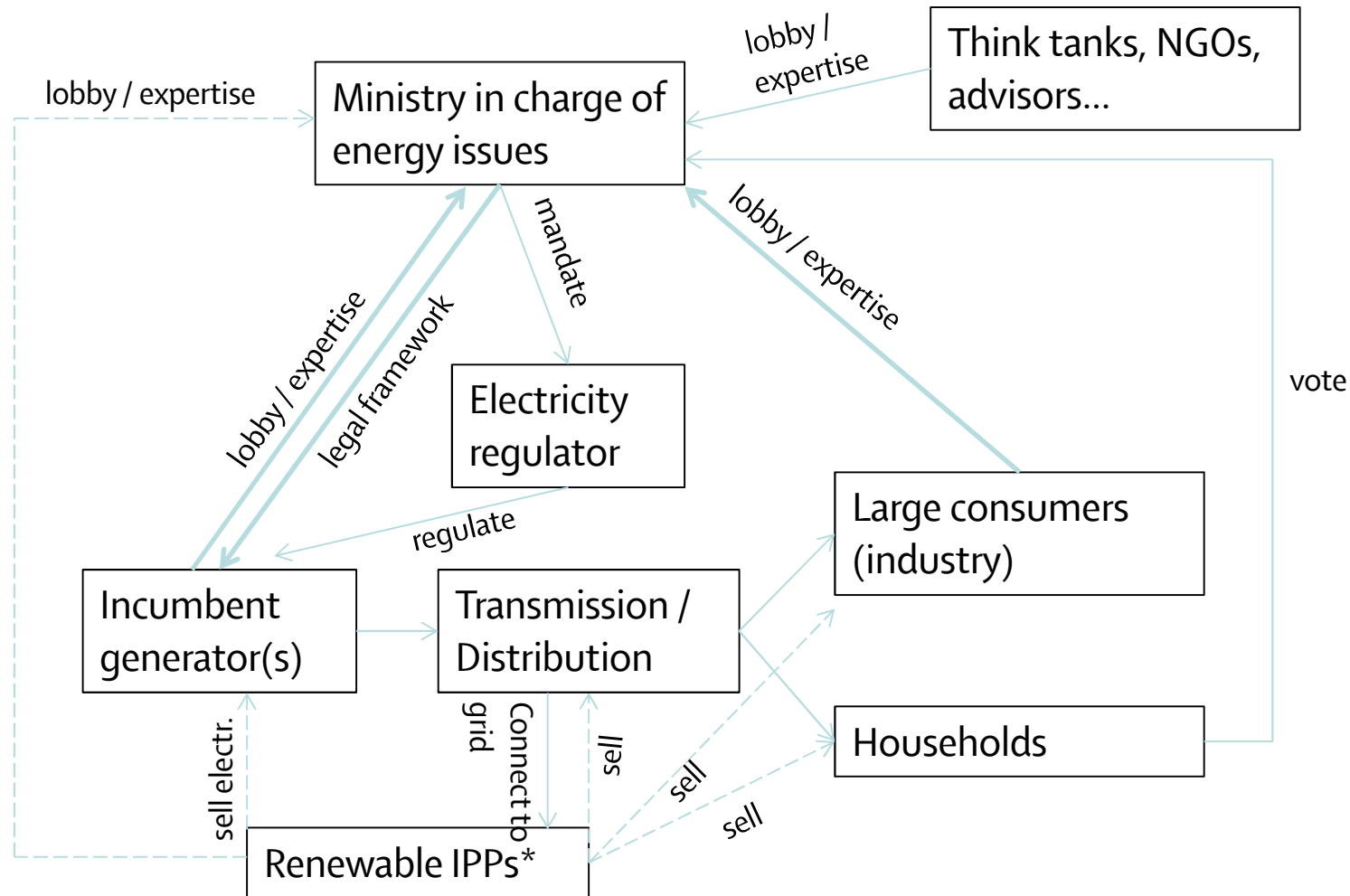


- In the past: path disruption usually **gradual** process, **better solutions** replacing old ones (steam engine, IT...). Now: politically driven process, fast disruption and creation of paths (time pressure!).
- Challenging because of
  - organisational, institutional, infrastructural, political, behavioural **lock-in**
  - need to target **supply and demand** (i.e. preferences and behaviour)
  - strong **vested interests...**





# Actors electricity sector





- Most powerful actors must be ,on board'
- Who wins, who loses?
- How can powerful actors win (co-benefits? Change profit opportunities? Avoid windfall profits!)
- If they lose, can / should they be compensated (stranded assets)?
- How can the power of actors with aligned interests be strengthened?



- **Market failures:** internalise costs (and remove harmful subsidies) & agree internationally & coordinate investments
- **Uncertainty:**
  - What are the policies of the future? Accelerate policy learning (Johnson, Altenburg, Schmitz in Pegels 2014): Learning from other countries, systematic learning cycles, policy experimentation
  - What are the technologies of the future? Facilitate technological search processes instead of picking winners (Rodrik)



## ➤ Changing pathways:

- strategic niche management (Kemp, Schot, Geels...), technology missions (?) → technology push,
- create policy-induced lead markets (Beise, Rennings, Jänicke, Jacob...) → market pull
- 'de-legitimise' polluting technologies

## ➤ **Political economy:** build coalitions e.g. by using co-benefit arguments (Schmitz / Altenburg), compensate losers where necessary, use market as efficient instrument, support civil society as guardian of accountability...

# Thank you!

