

Capturing technological disruptions and behavioral change in long-term energy scenarios

Lightning presentation



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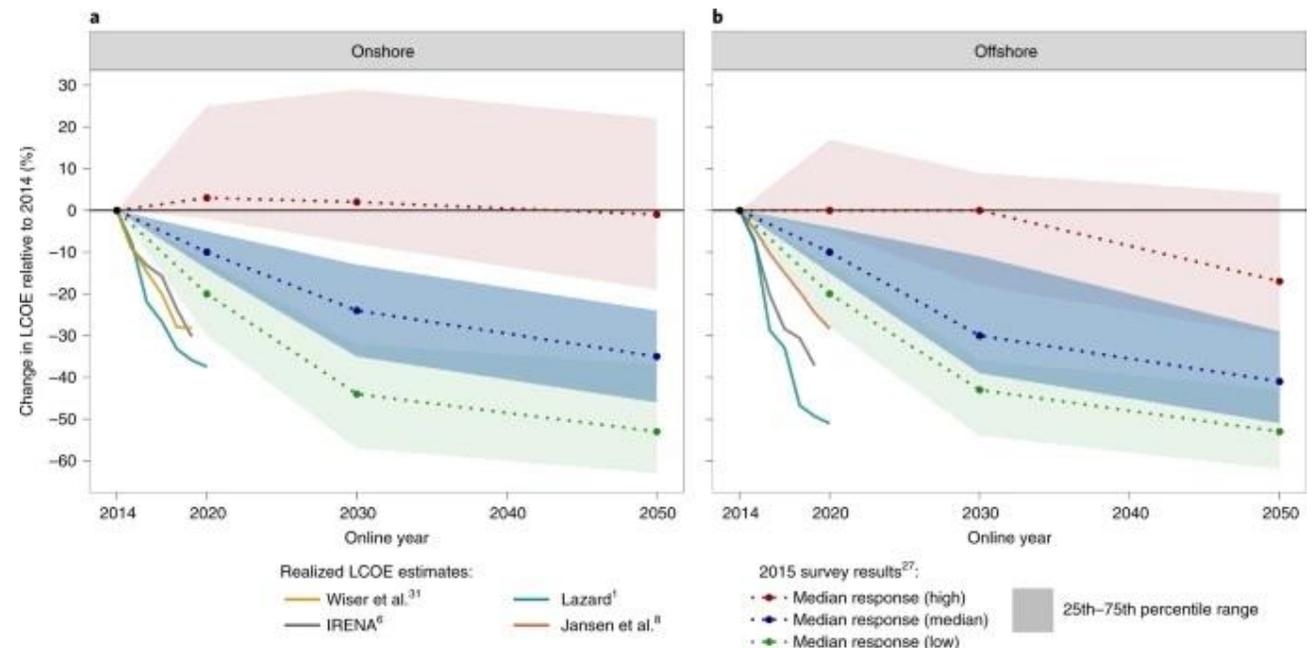
Innovation dynamics in LTES

- Innovation: key driver of our ability to reach one or the other decarbonization scenario - which rely on the deployment of cost-competitive climate mitigation technologies.
- Failing to capture innovation dynamics appropriately (including disruptive ones) means that scenarios are less useful to guide policy making or investment
- I will briefly comment on three aspects
 - Cost dynamics
 - Technology diffusion dynamics
 - Technological disruption

Modelling of technology costs

- Understanding the trajectory of future technology costs informs on which cost-competitive technological options are available
- Yet, modelling is constrained by difficulty in accounting for uncertainty around future technology costs
- Extrapolation of past costs cannot capture increase in the rate of cost reduction, same is true for expert methods

Wiser et al (2021) Nat En



Modelling of technology diffusion

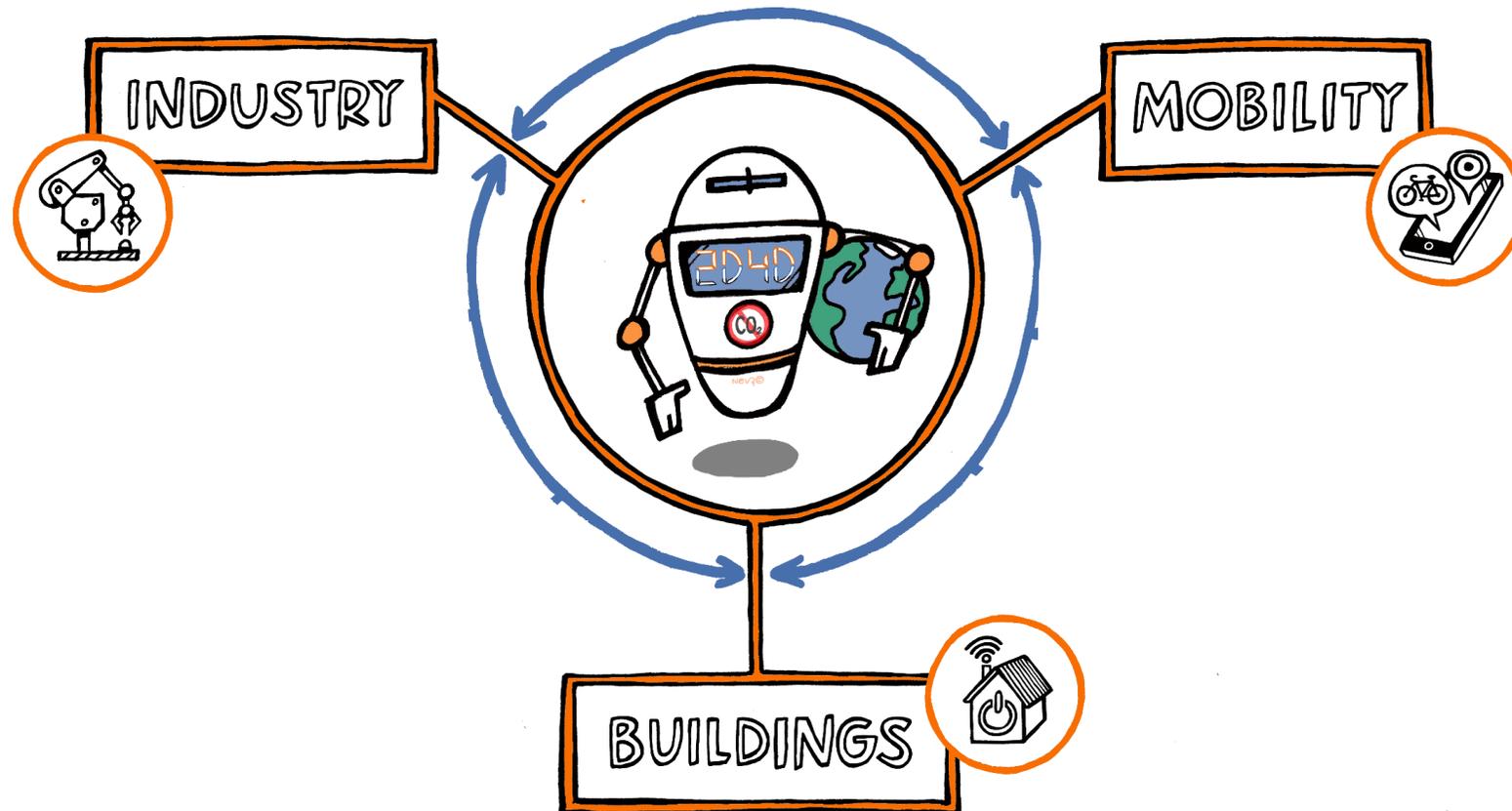
- Diffusion dynamics not solely driven by costs
- Other non-technological barriers or enablers change the relative attractiveness of different low-carbon technologies
 - Behavioral and societal: personal preferences, perceptions and expectations; network or infrastructure externalities; risk-aversion
 - Institutional: policy stringency and design, including uncertainty and effectiveness; lack of adequate institutional framework; political acceptability; vested interest
- These barriers currently not explicitly detailed in most of the climate-energy-economy models
- They are accounted for through scenario narratives (e.g. SSPs); acceptability strengthened through scenario co-design and co-creation

Disruptive technologies

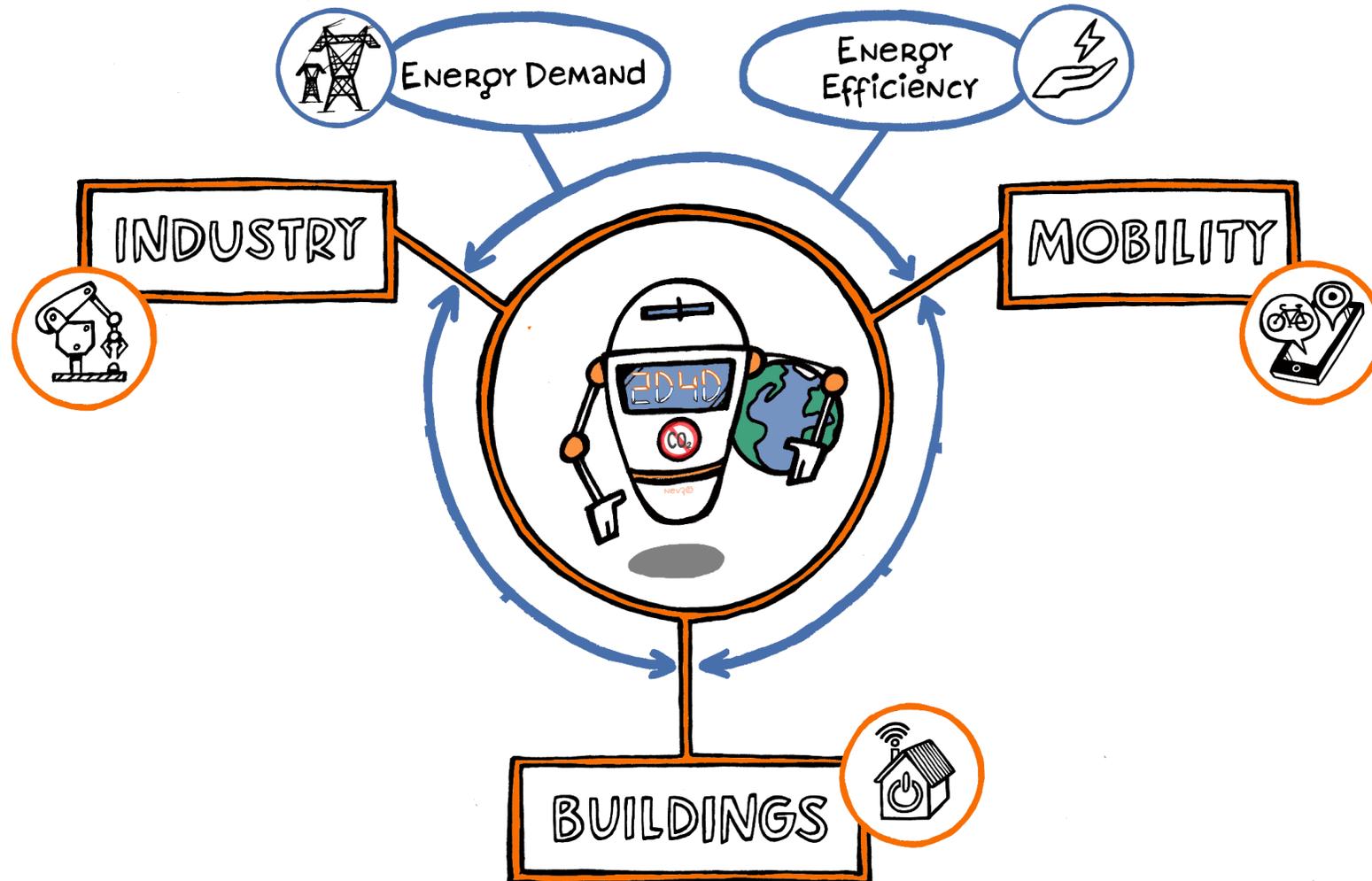
- Hard to account for unforeseen future developments (much like what happened with the shale gas revolution). A decade ago, modelers used to talk about “breakthrough technologies”
- Yet, other major disrupting technologies will impact decarbonization, but they are currently not fully accounted for in models
- This is the case for digital technologies and the wide array of their applications



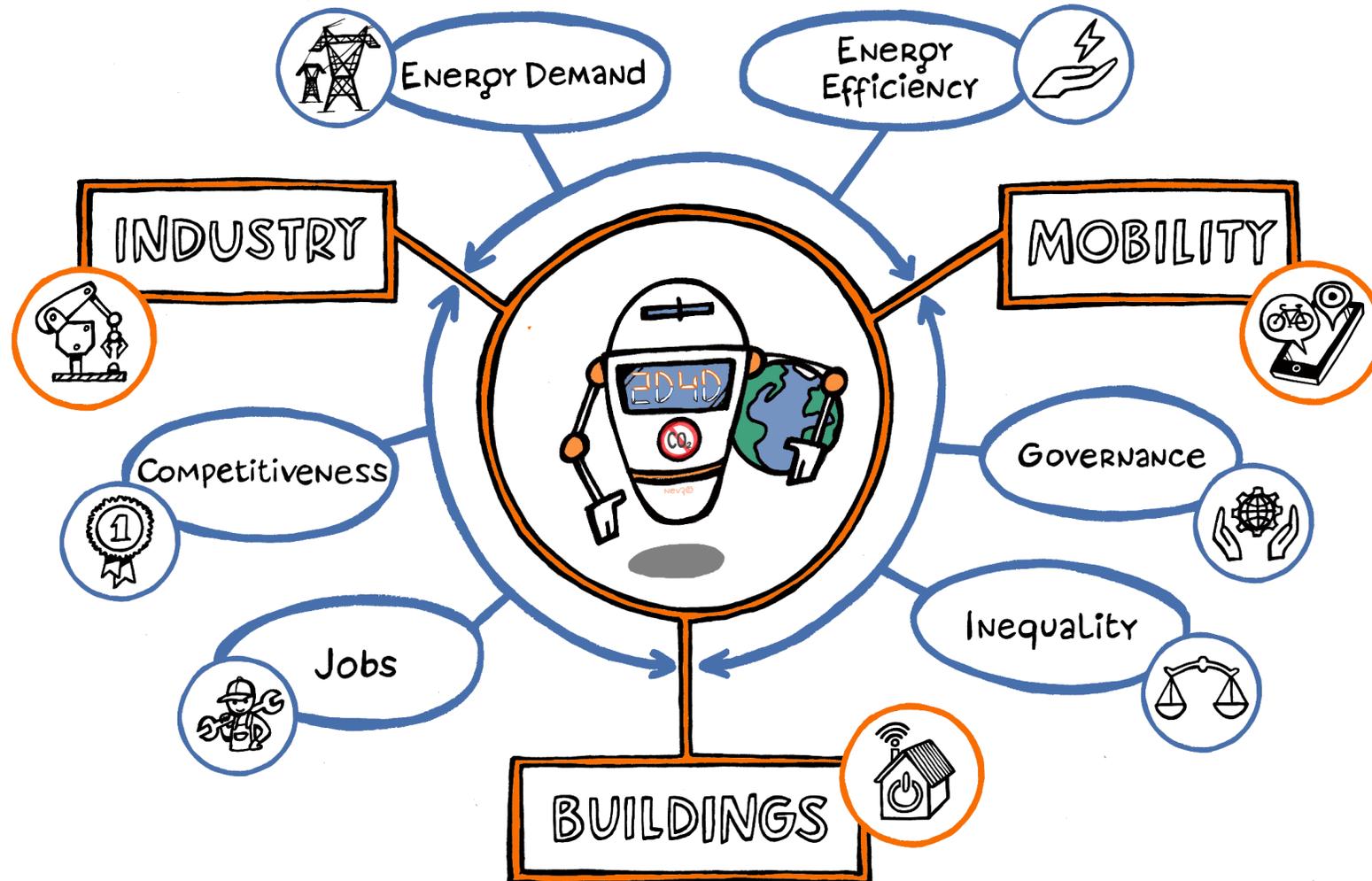
Digitalization and Decarbonization



Digitalization and Decarbonization



Digitalization and Decarbonization





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Thank you



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