Irreversibilities in climate action

Tyndall Centre 25th Birthday Celebration

Sep 2025

Charlie Wilson

iDODDLE
The Impacts of Digitalised Daily Life on Climate Change

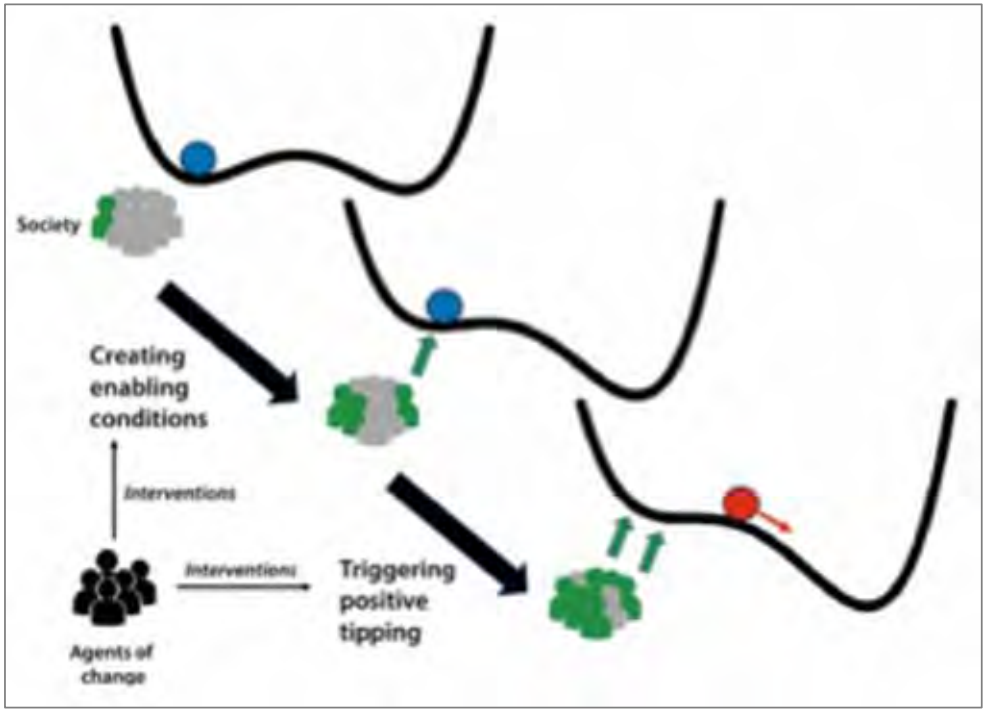
Environmental *Change* Institute
eci
UNIVERSITY OF OXFORD

erc European Research Council
Consolidator Grant #101003083

Irreversibility: three framing concepts.

(1) path dependence

(2) positive tipping

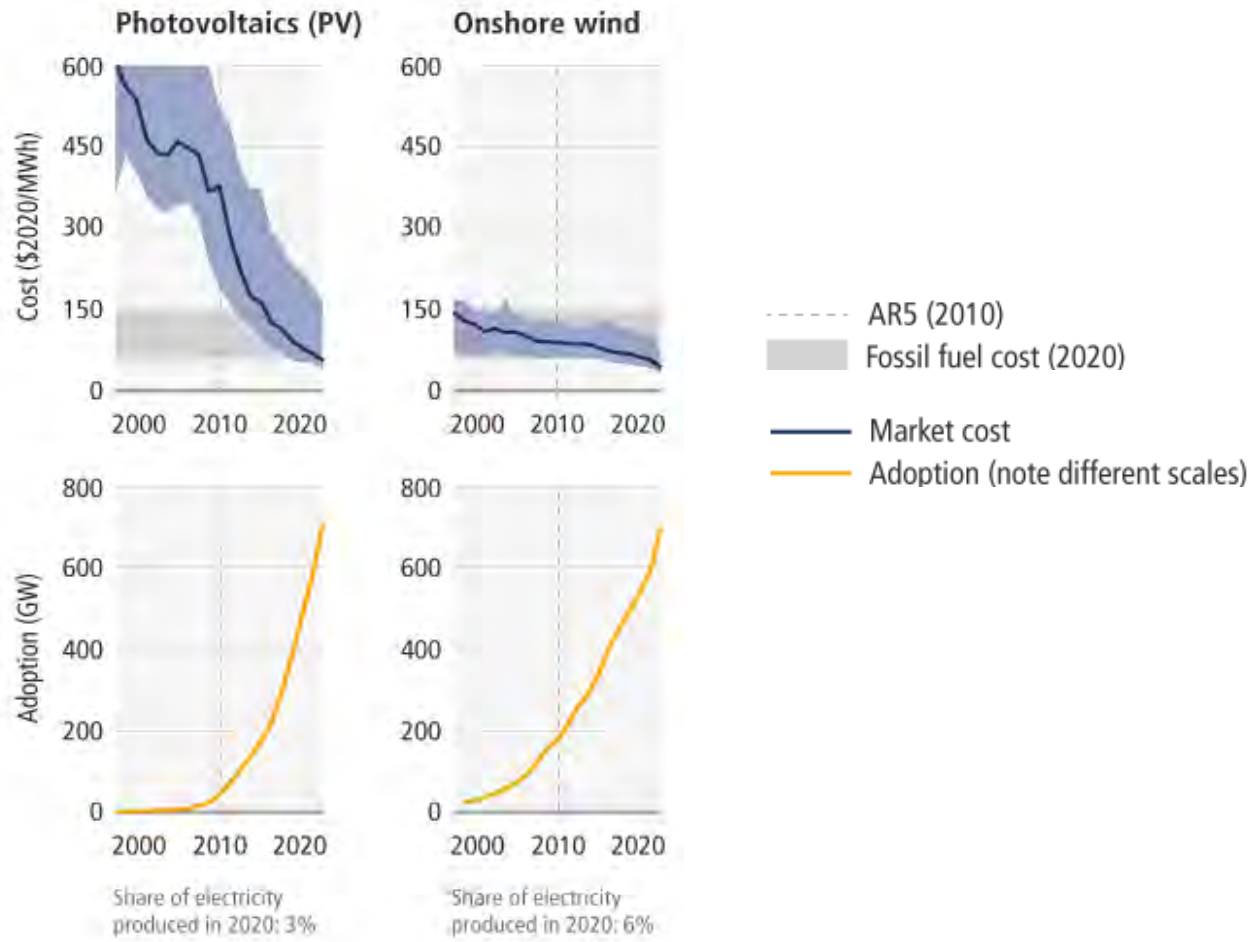


(3) positive returns to scale

Fouquet 2016 *Nature Energy*. doi.org/10.1038/nenergy.2016.98
Map from open cycle map data

Lenton 2022. *Global Sustainability*. doi.org/10.1017/sus.2021.30

Irreversibility (obvs): renewables cost parity



IPCC 2022 Sixth Assessment Report. WG3. Fig. SPM-3

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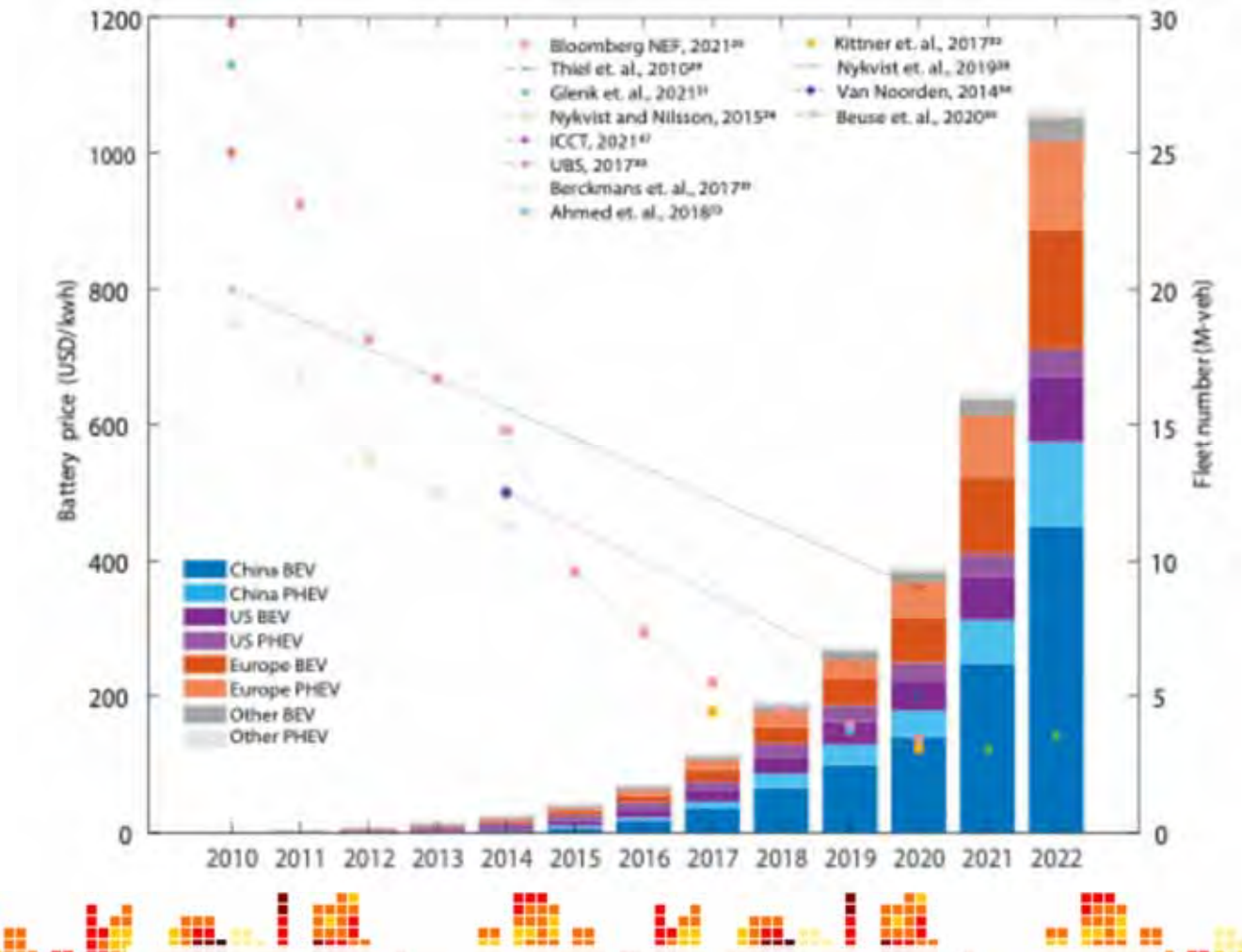
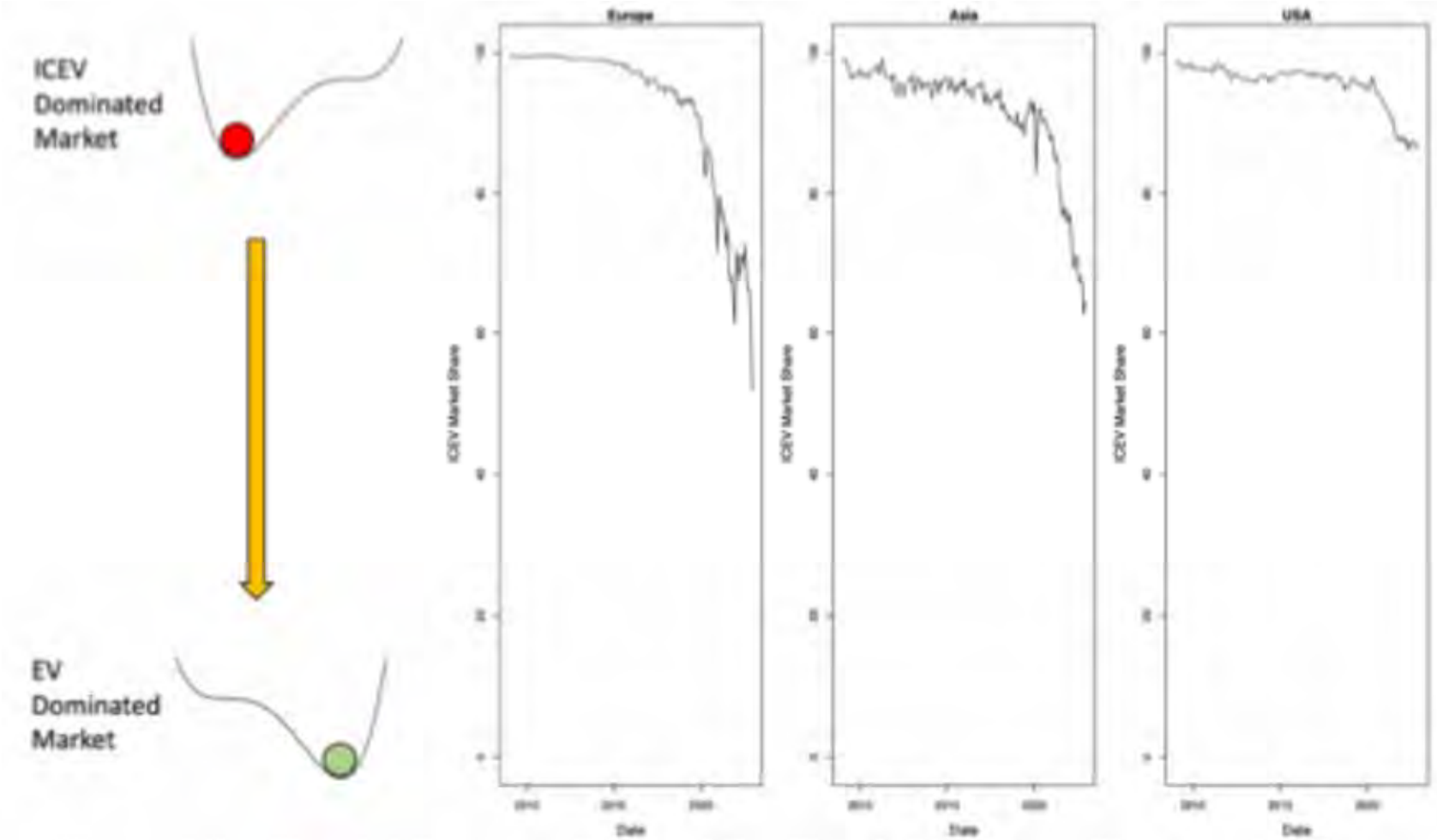
Irreversibility (obvs): EVs (purchase cost parity, Norway)



Lam & Mercure 2022. Evidence for a global electric vehicle tipping point.
EEIST Working paper series number 2022/01.

Irreversibility (obvs): EVs (purchase cost parity, Norway)



Lenton et al. 2023 *Global Tipping Points Report 2023*. Fig 4.3.4

Irreversibility (1): More + more stringent climate policies

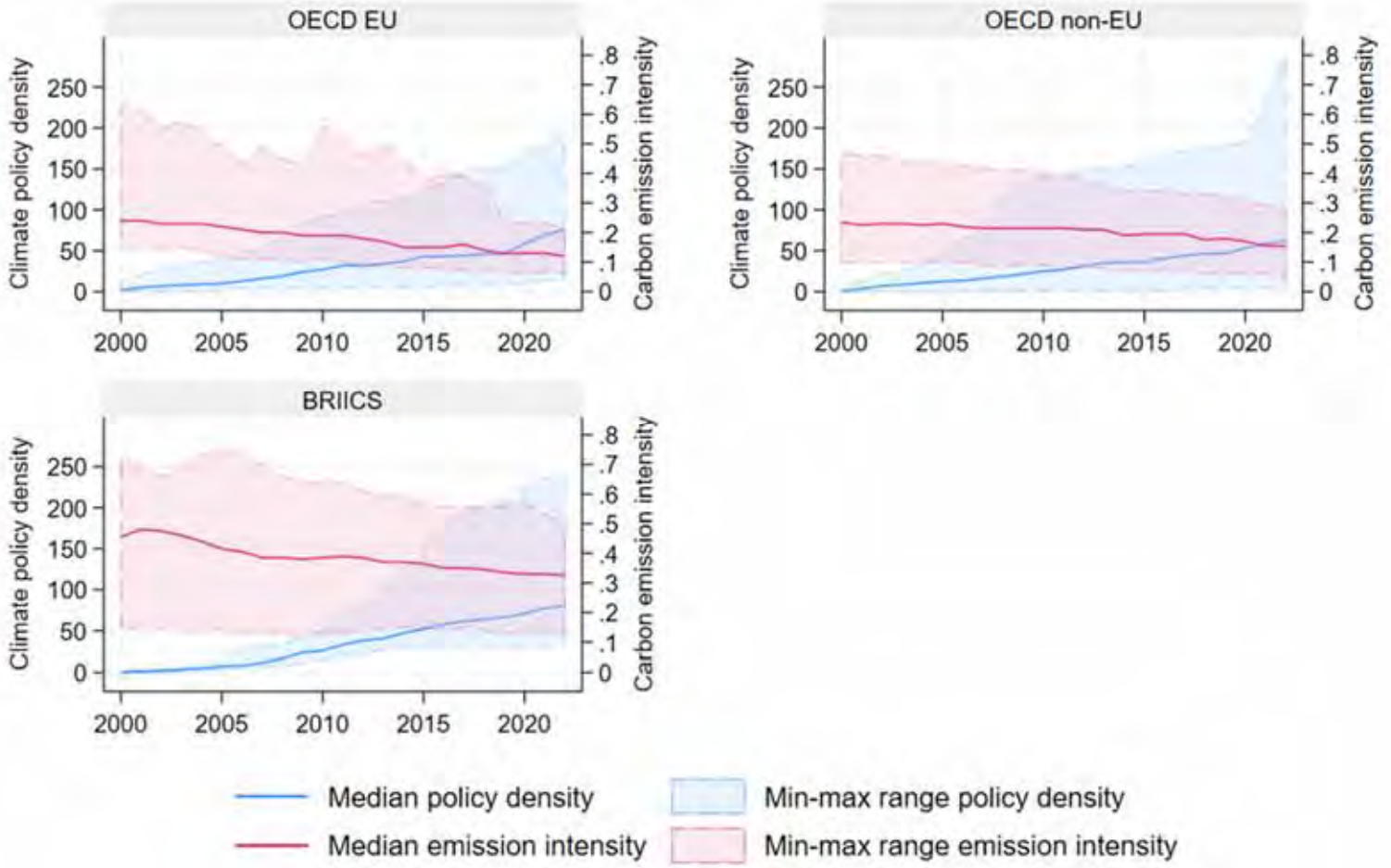
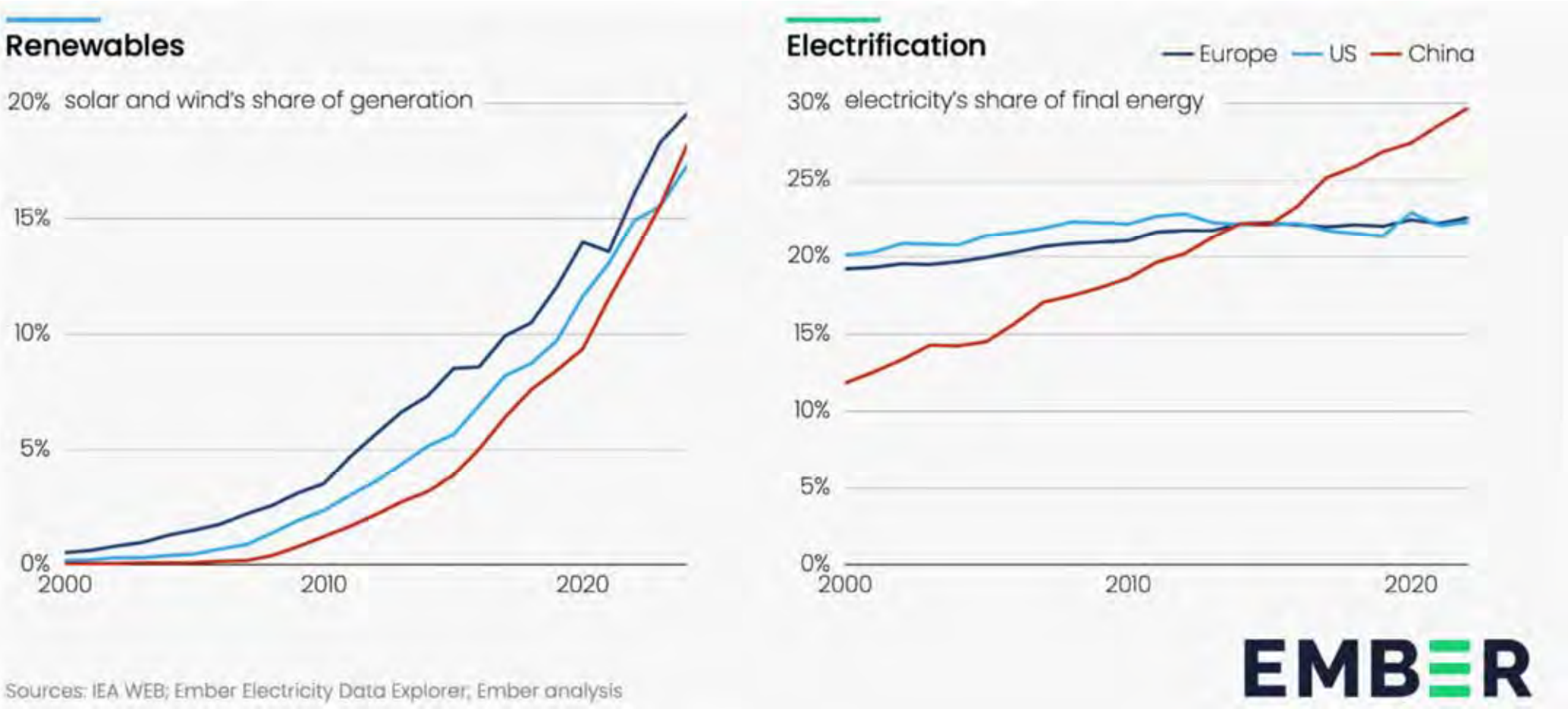


Figure by Simon Schaub.
Source: *hopefully forthcoming soon* Arvanitopoulos et al. Preprint: doi.org/10.21203/rs.3.rs-4742975/v1

Irreversibility (2): Electrification of energy end use



Source: Walter, Bond, Butler-Sloss (2025). Ember.
https://ember-energy.org/latest-insights/the-electrification-imperative/

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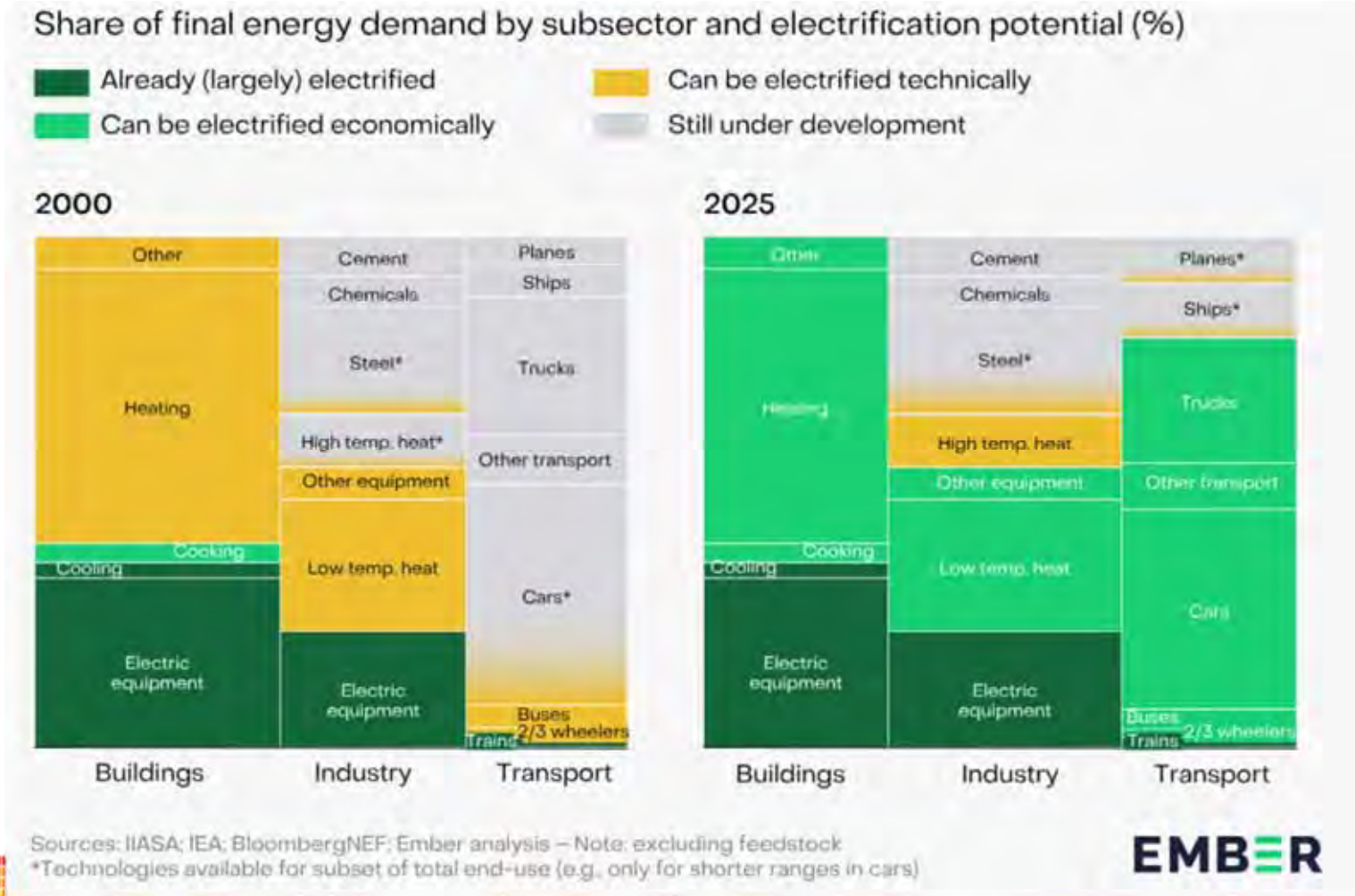

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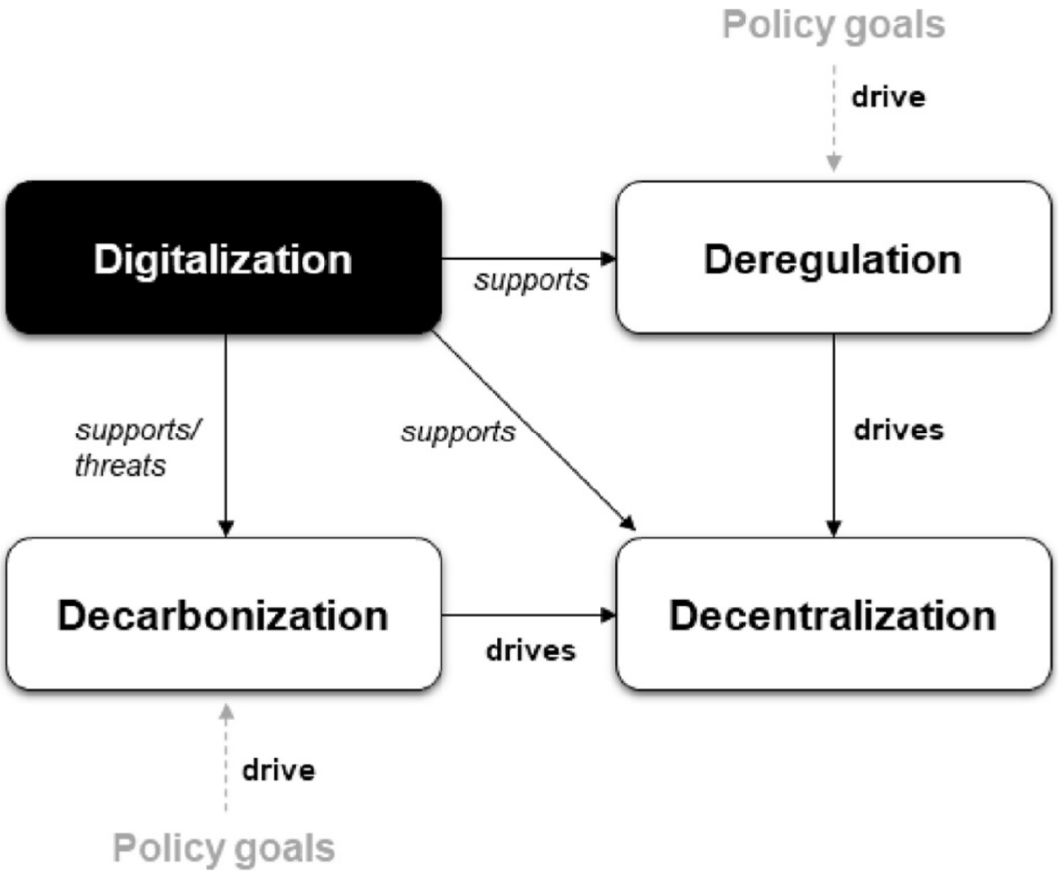

Heymann et al. 2023. Energy. doi.org/10.1016/j.energy.2022.125521

Irreversibility (3): Digitalisation & AI.

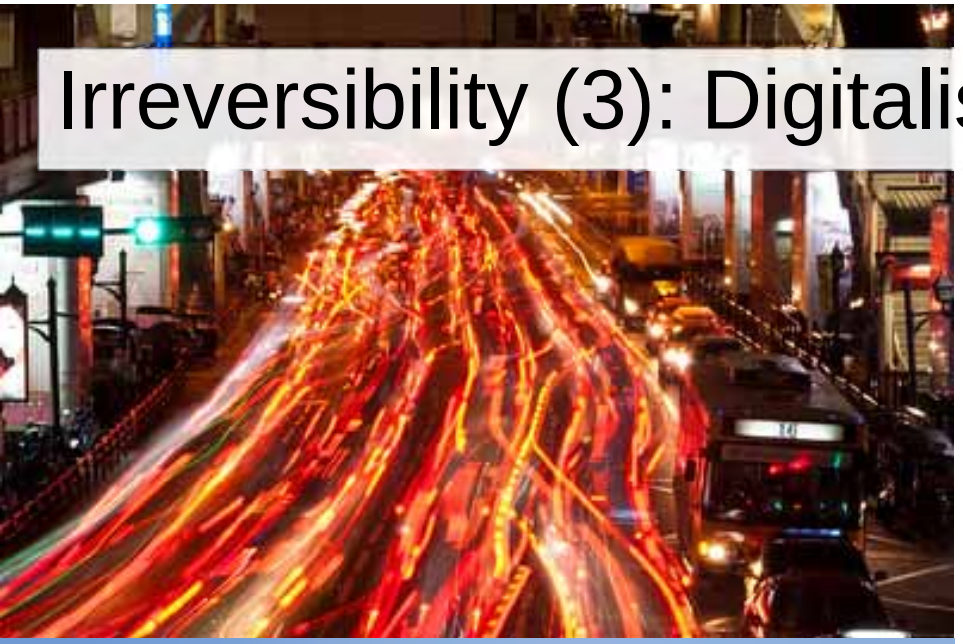

Photo: Fischer @Flickr. CC BY-SA 2.0

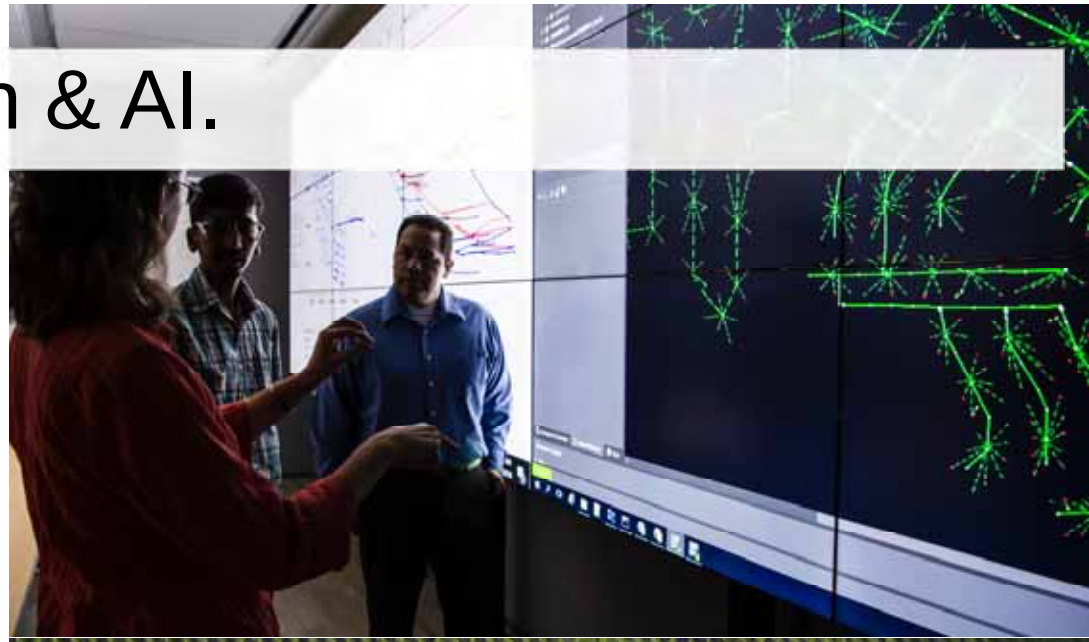

Photo: Unsplash.

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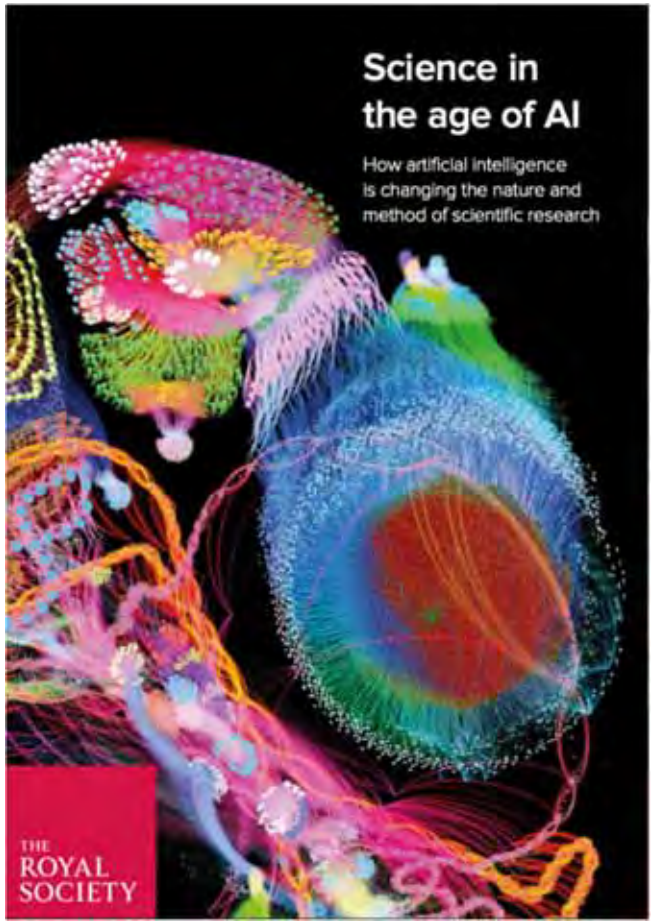
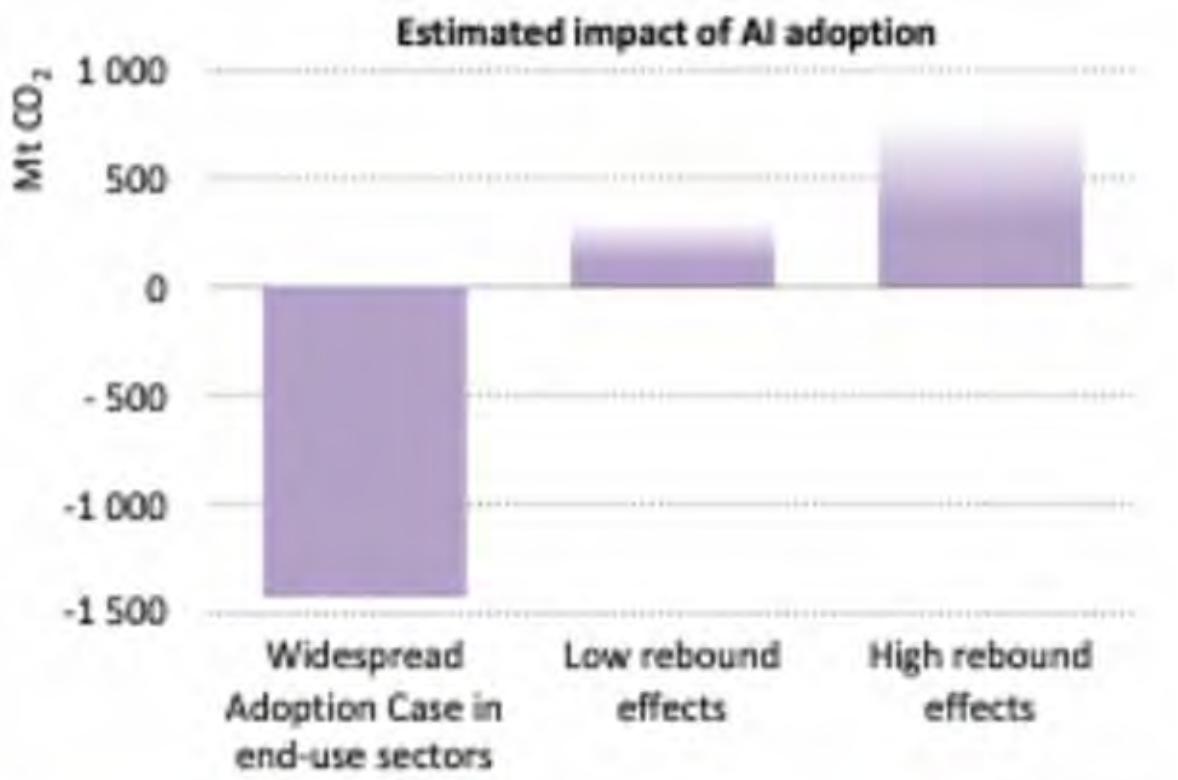


AI *indirect* impact on energy end-use in 2035?



IEA 2025 Energy and AI. Fig 5.31.

Irreversibility: Straw poll (exc. RE, EV)

air pollution

Photo by Kristen Morith on Unsplash

urban leadership

Photo by Victor on Unsplash

CC as perceived or experienced threat

Gallup 2020 World Risk Poll.

+ net-zero institutional momentum | + veg on menus
+ EU ETS & C pricing | + firm net-zero strategies
+ divestment | + social movements …