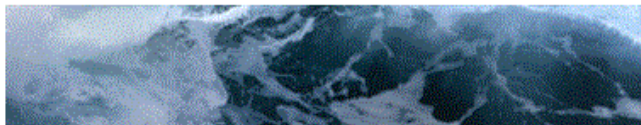


Energy Transition: Decarbonisation Challenges

Fiac Gaffney & Paul Deane

MaREI, University College Cork, Ireland



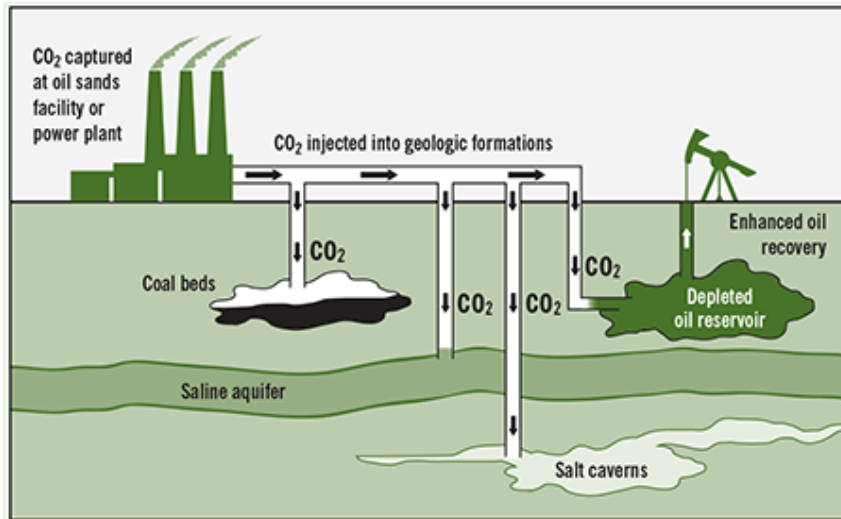
Decarbonising the European power system in alignment with the Paris Agreement: A comparison of scenarios

Examining a snapshot of single year scenarios for the EU power system in 2050 under varying levels of decarbonisation*

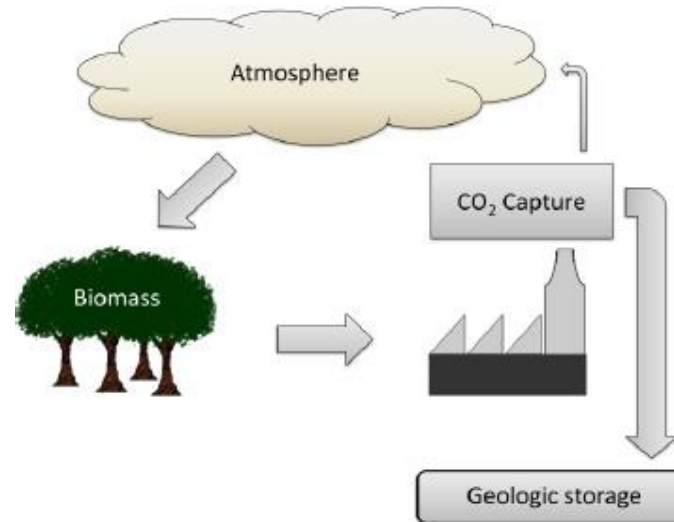
*Preliminary results presented

The Paris Climate Agreement.....

- Alignment will require CO₂ removal not just CO₂ reduction!
- Negative Emission Technologies (NETs) have a large part to play



Carbon Capture & Storage (CCS)



Bioenergy CCS (BECCS)



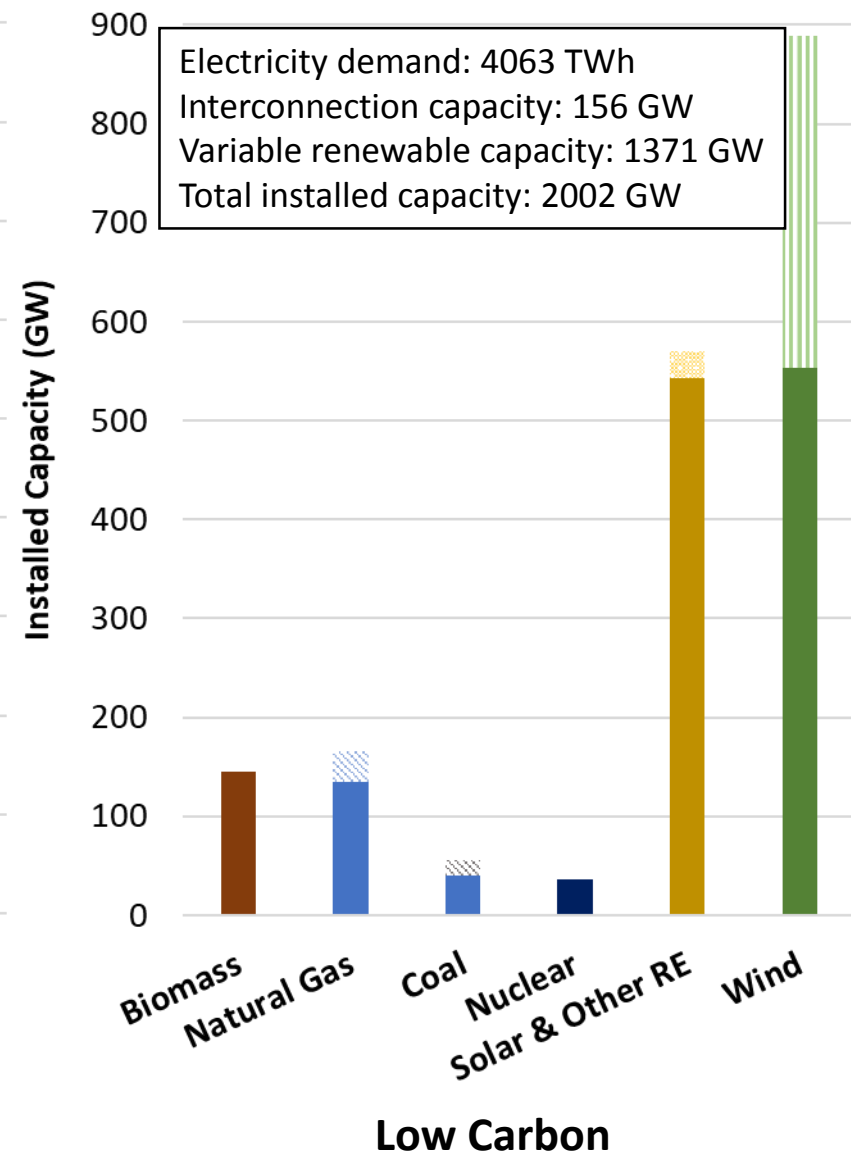
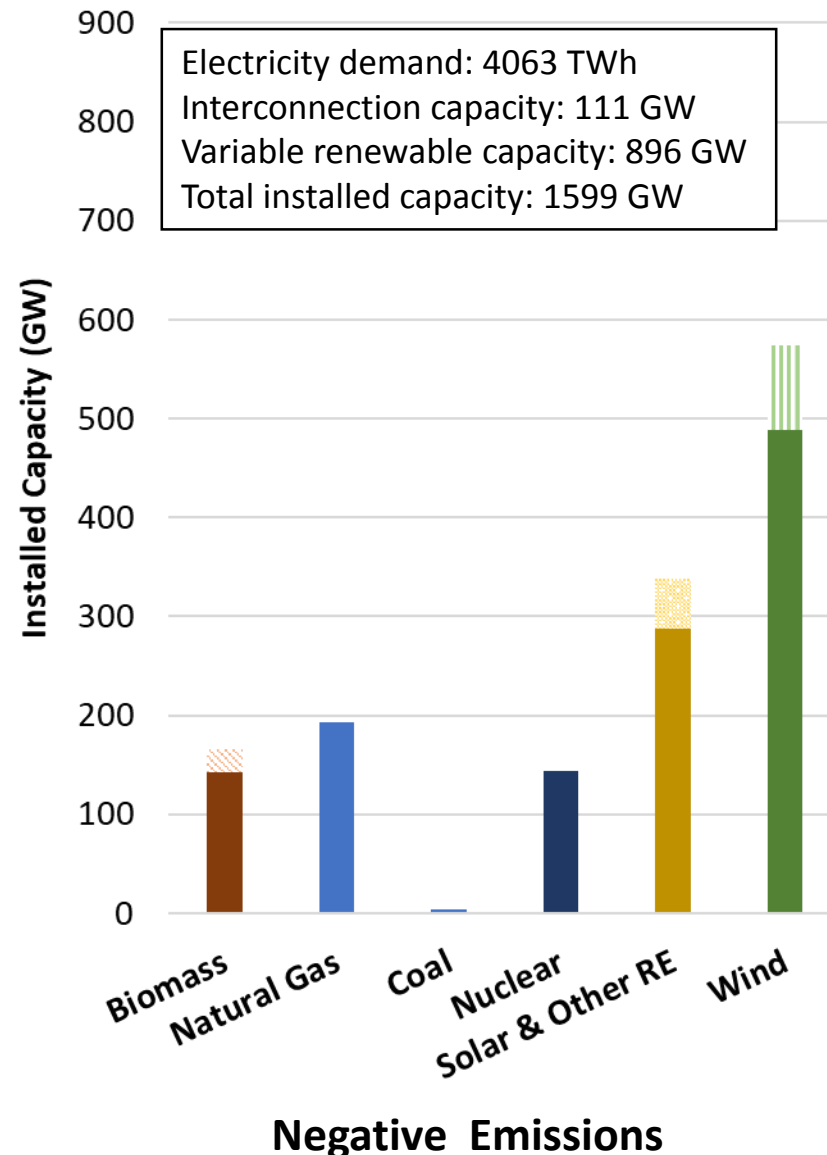
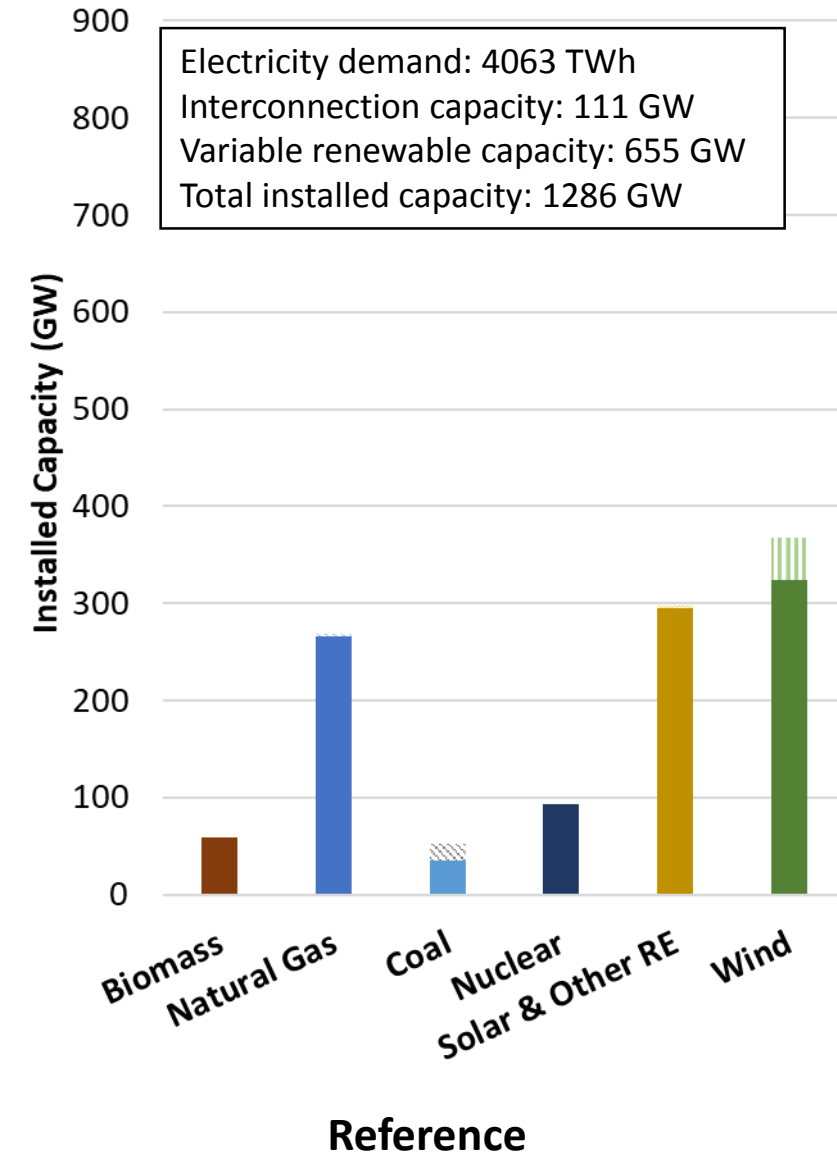
Direct Air Capture (DAC)

CCS: <https://energywatch-inc.com/wp-content/uploads/2017/04/4-19-17-CCS.gif>

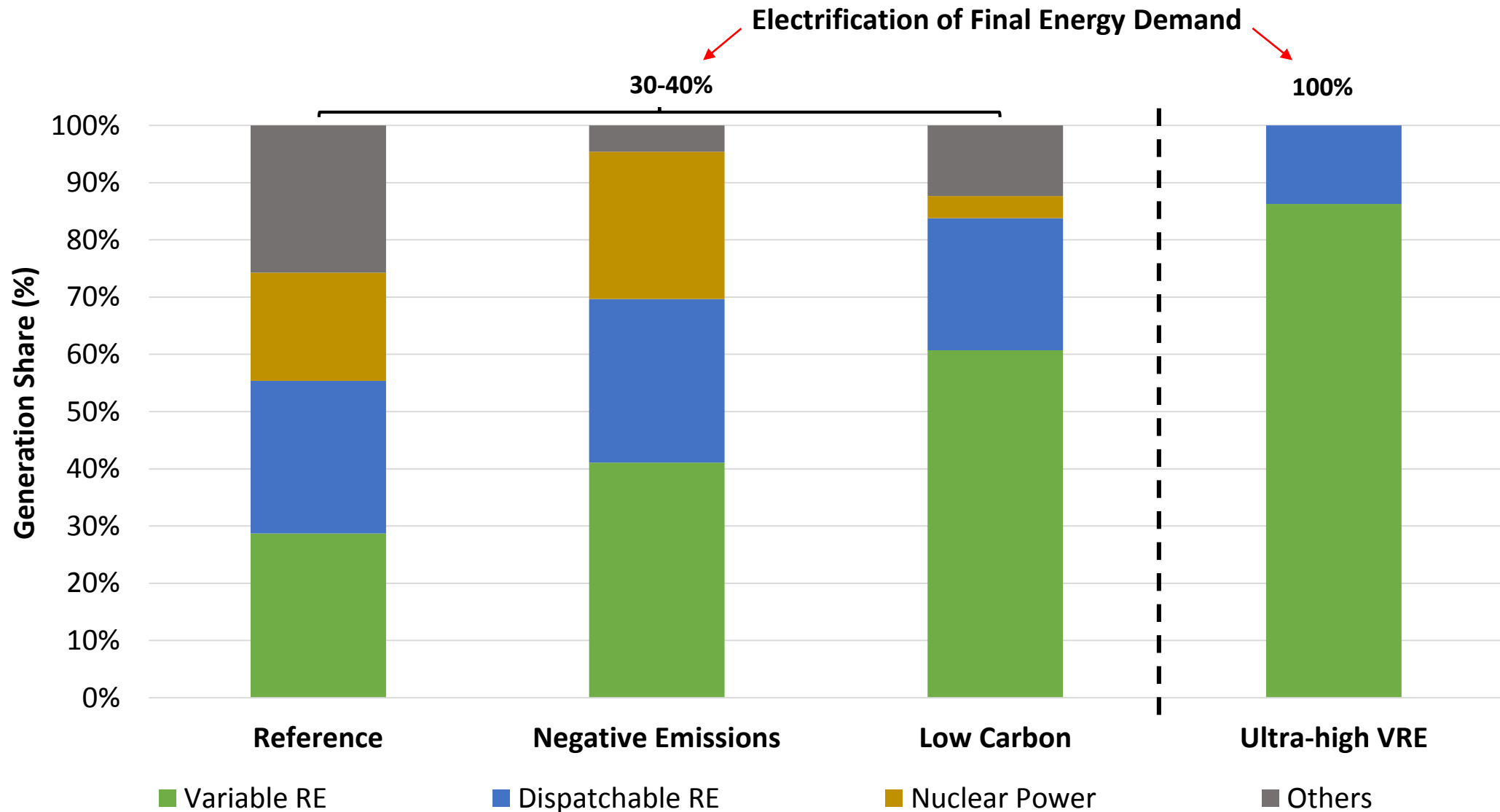
BECCS: <https://hub.globalccsinstitute.com/sites/default/files/imagecache/620xH/publications/13516/advanced/07.jpg>

DAC: http://www.sciencemag.org/sites/default/files/styles/inline_450w_no_aspect/public/RETTER.jpg?itok=izjg_jeD

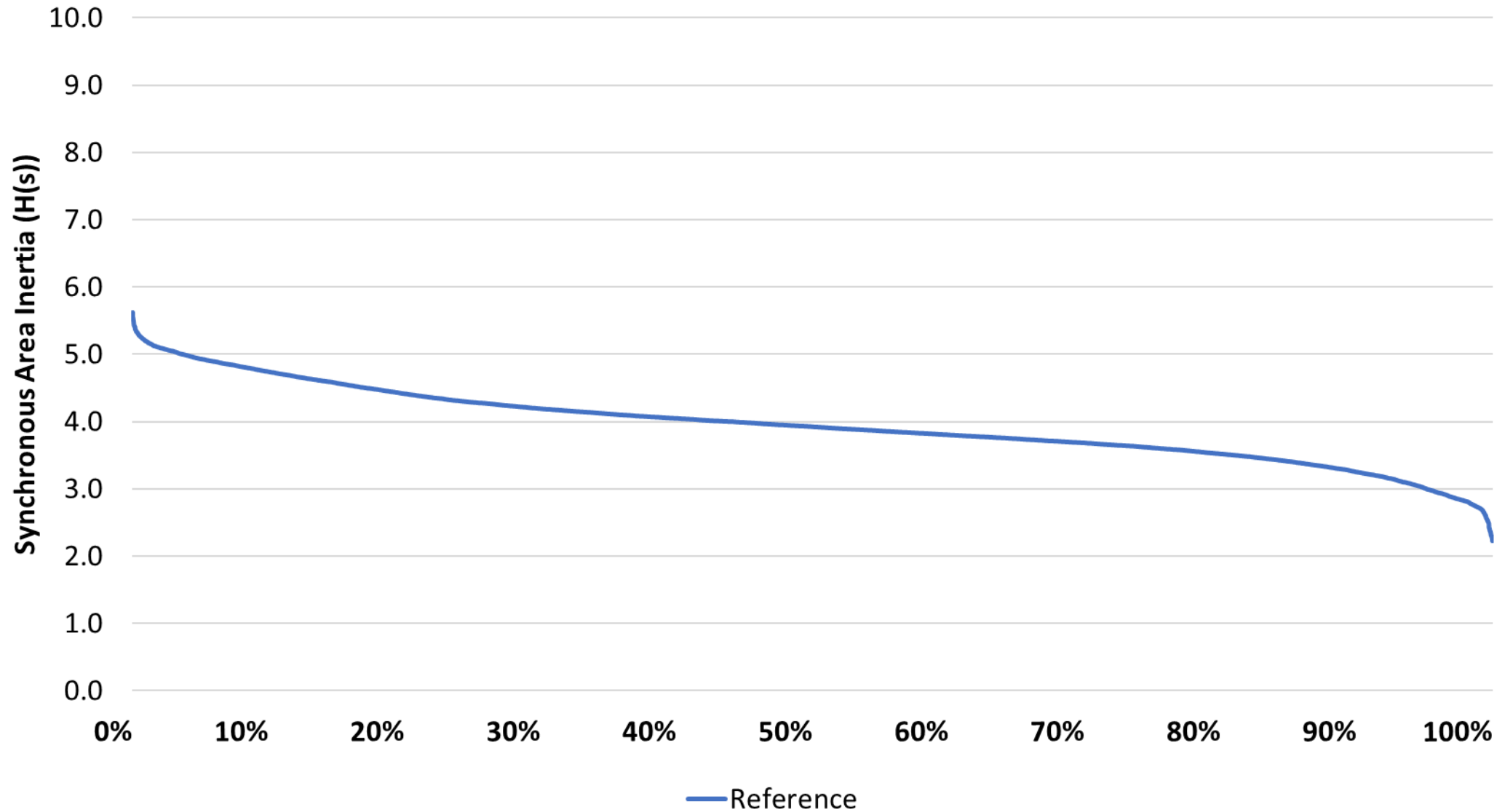
Scenarios



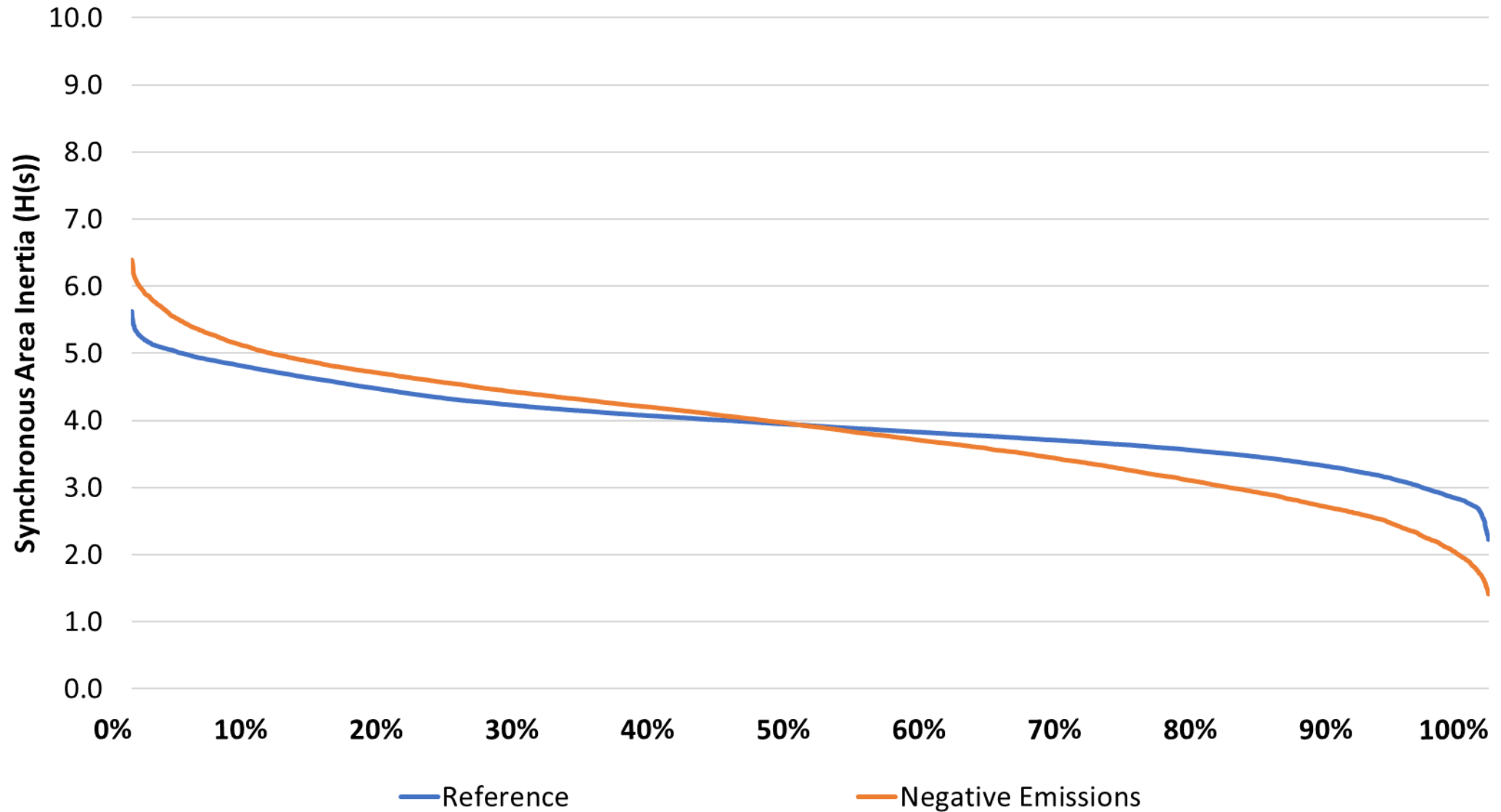
Generation Share



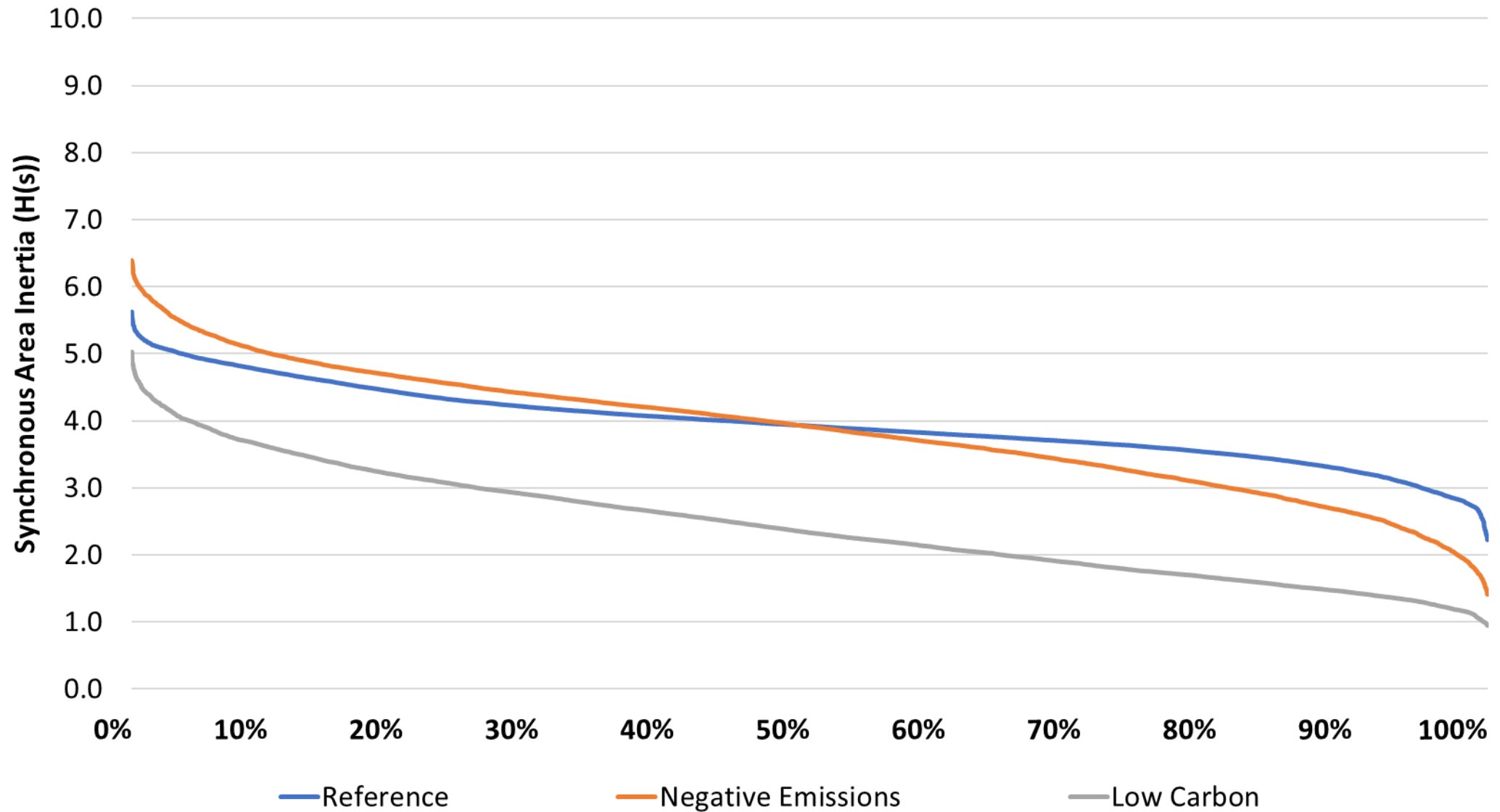
Inertia – Continental Europe



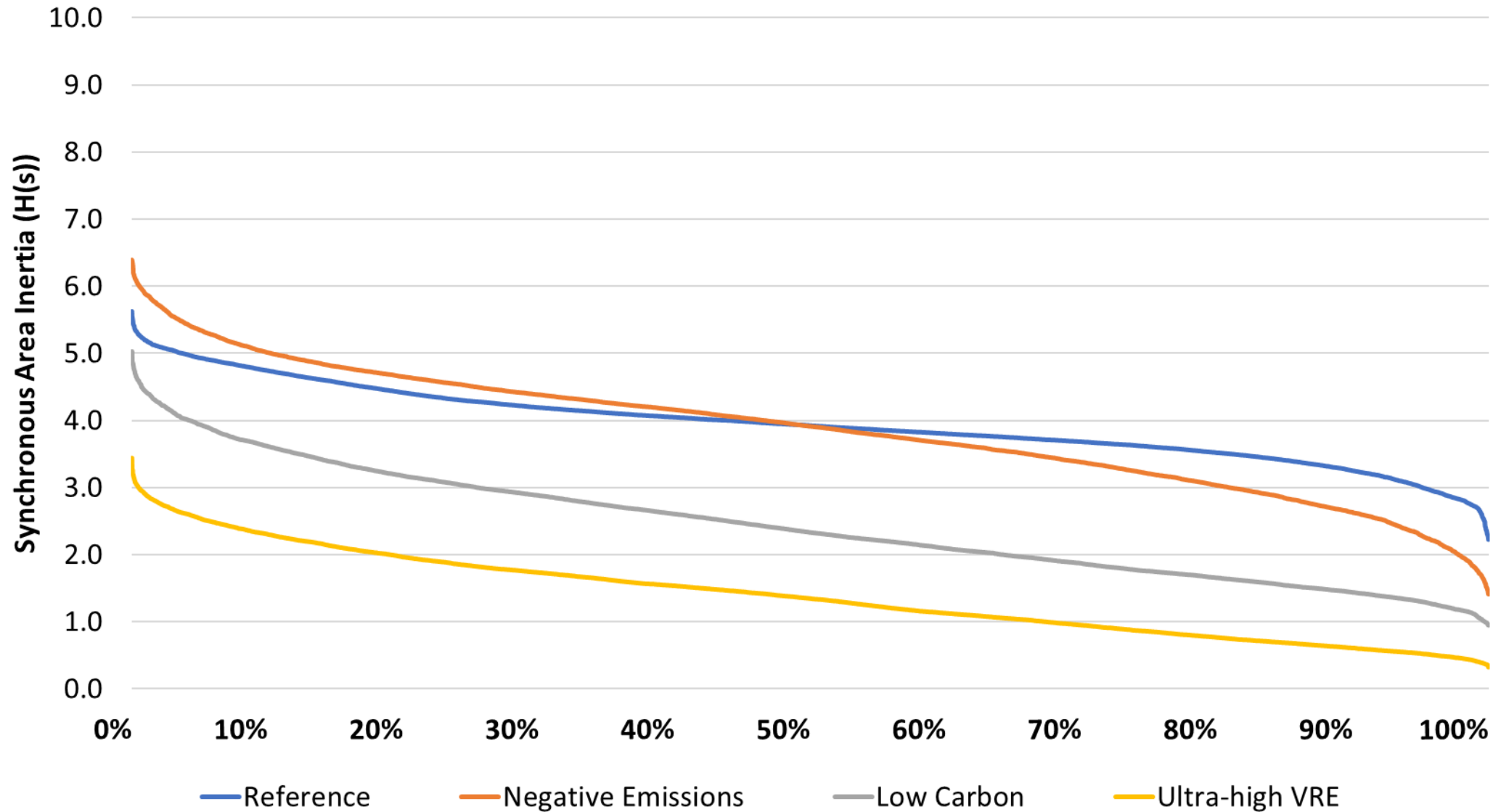
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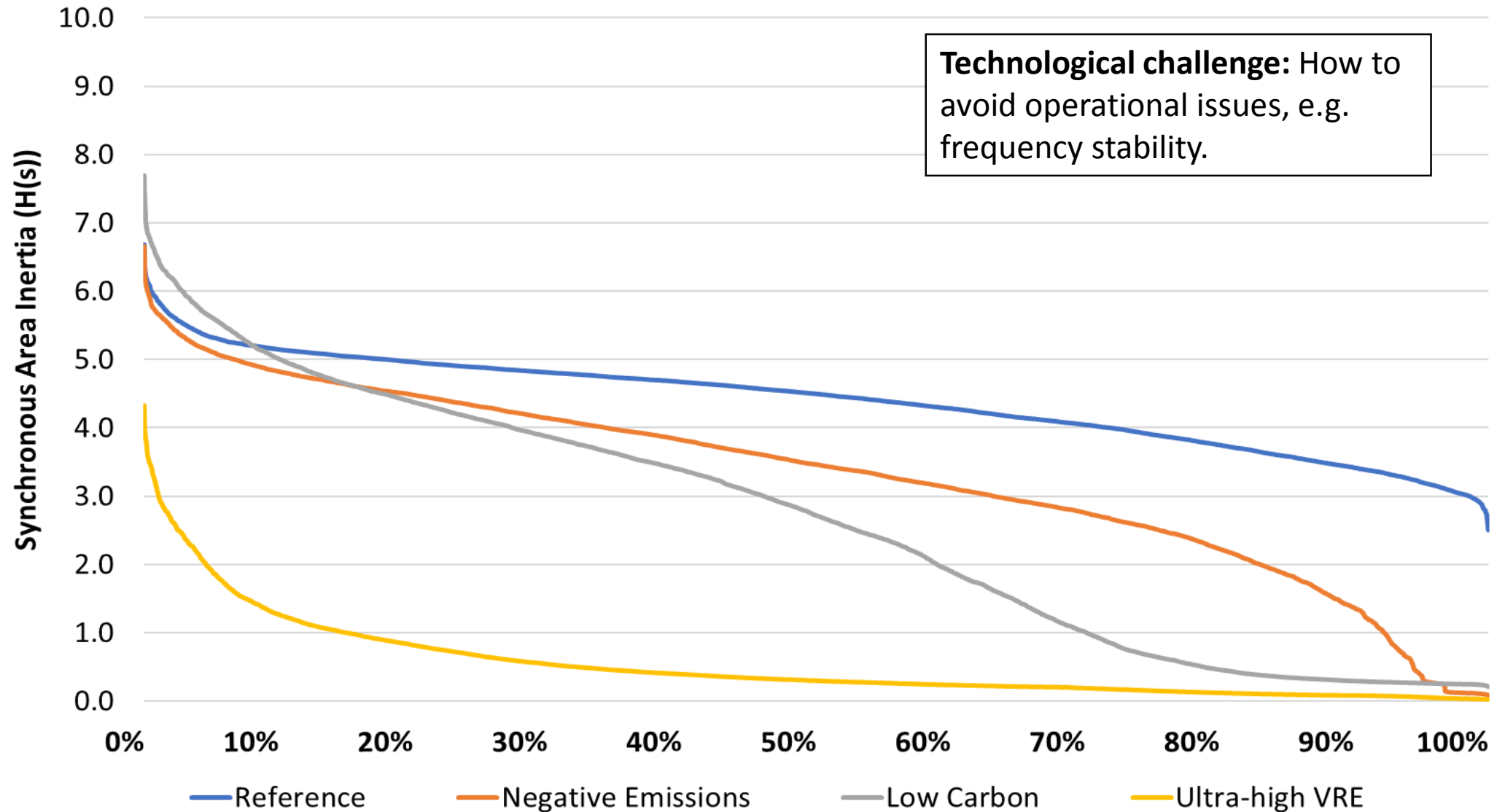
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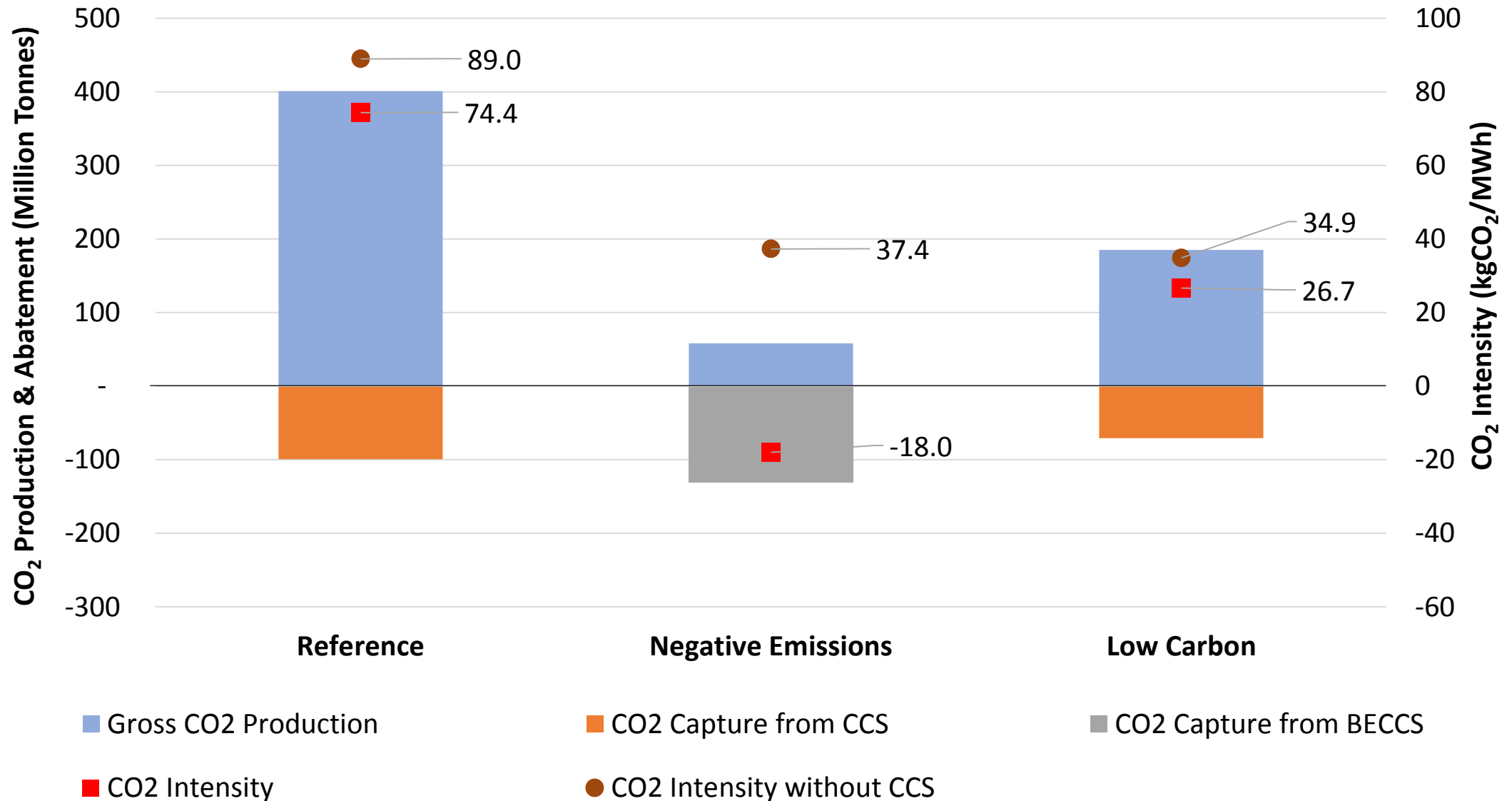
Inertia – Continental Europe



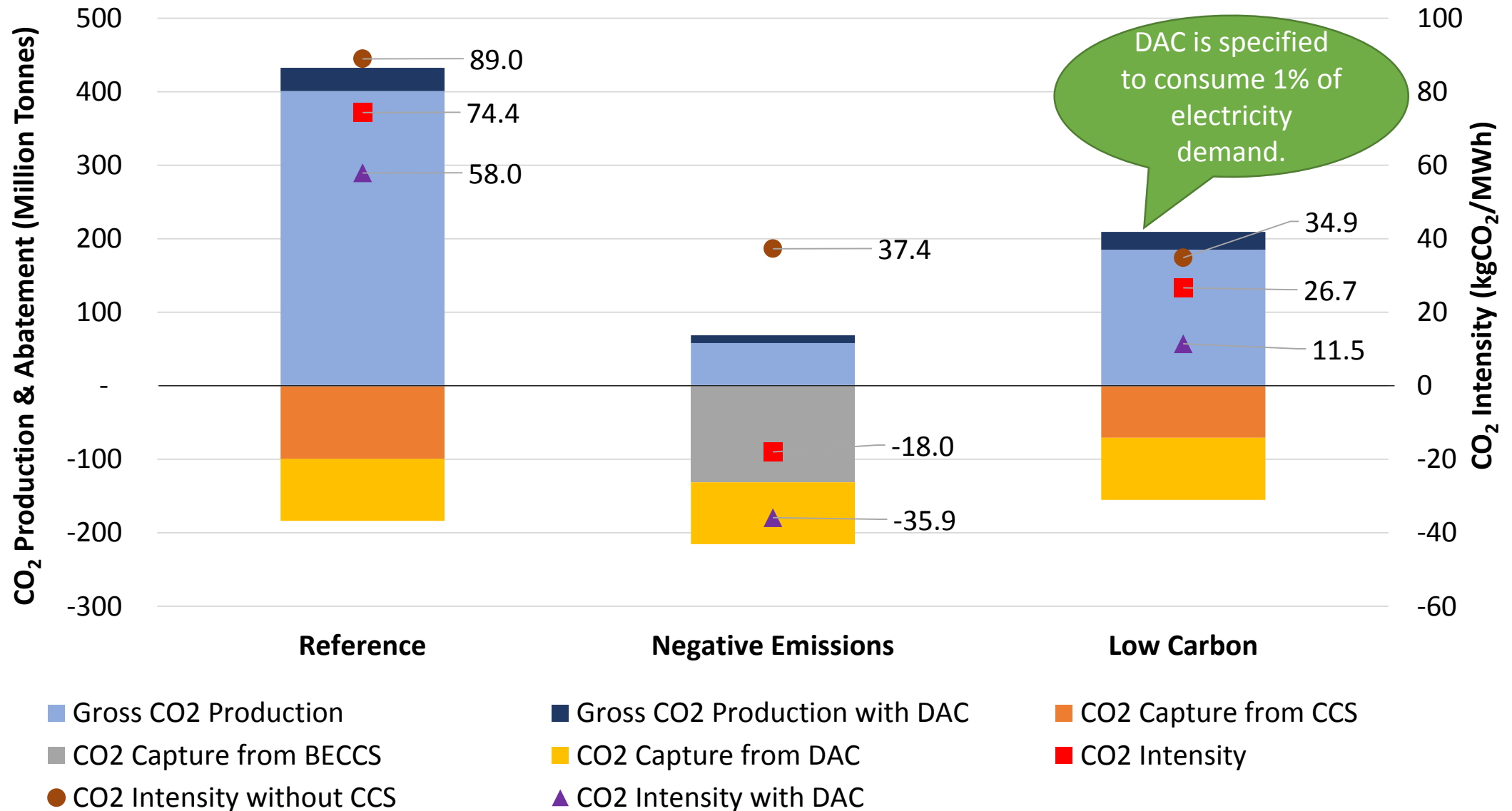
Inertia – Great Britain



Decarbonisation



Decarbonisation with Direct Air Capture



High-level Challenges

- **Technological:**

- System operation; maintain stable, reliable supply
- Negative Emission Technologies; Slow technology development, e.g. no significant progress around CCS

- **Policy:**

- Lack of policy support for Negative Emission Technologies

- **Societal:**

- Lack of commercial buy-in of Negative Emission Technologies

A dramatic photograph of a lighthouse perched on a dark, rugged cliff. The sea is turbulent with deep blue waves and white foam crashing against the base of the cliff. A large, bright white cloud or wave crest is visible behind the lighthouse. The sky is a clear, deep blue. The lighthouse itself is white with a red band around the lantern room. Several small white buildings are situated on the cliff top near the lighthouse. A tall, thin metal tower is visible on the right side of the cliff.

Thank you.
Questions?

All feedback welcome! Email: fiac.gaffney@ucc.ie

Total System Costs

