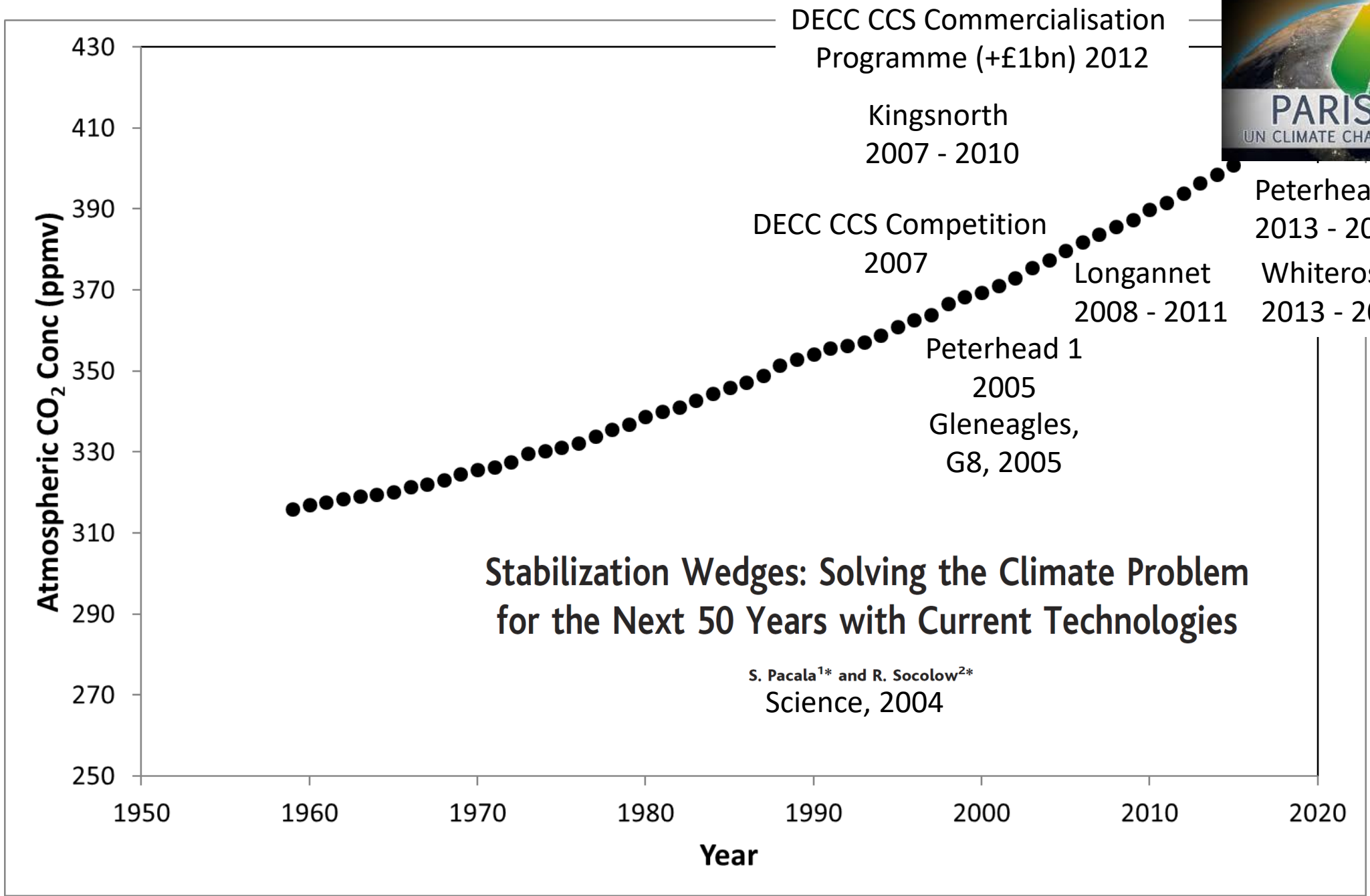


What is the value of CCS?

Piera Patrizio, Yoga Pratama, Niall Mac Dowell

Imperial College London





The Right Hon. Claire Perry MP



“We need CCUS, [but] it remains a pre-commercial technology. [In the UK], we want to have the option to deploy CCUS at scale during the 2030s, subject to costs coming down ”



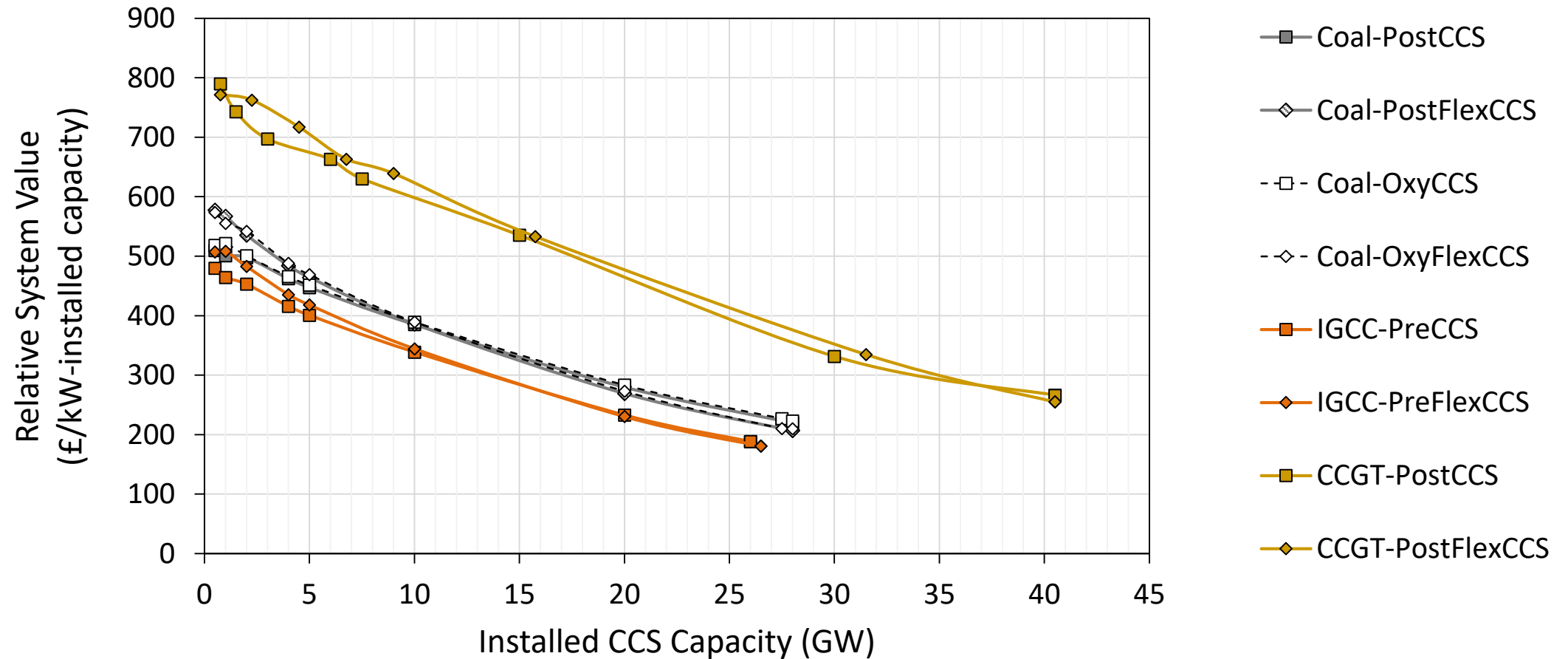
Some key questions

1. Does CCS *have* any value?
2. How helpful are cost targets?
3. Should we believe in unicorns?
4. Other kinds of value?

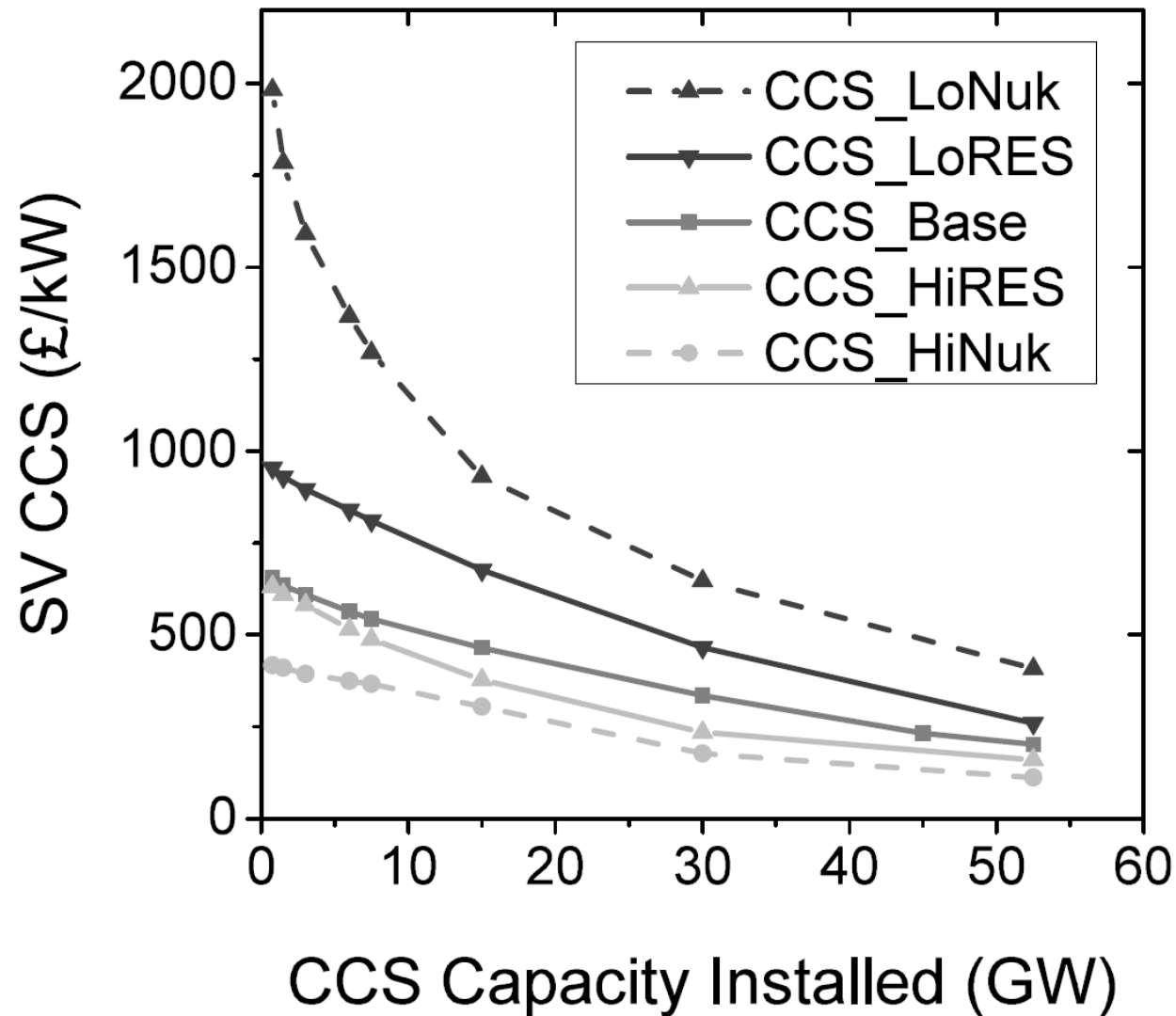
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CCGT-CCS technologies provide the greatest value

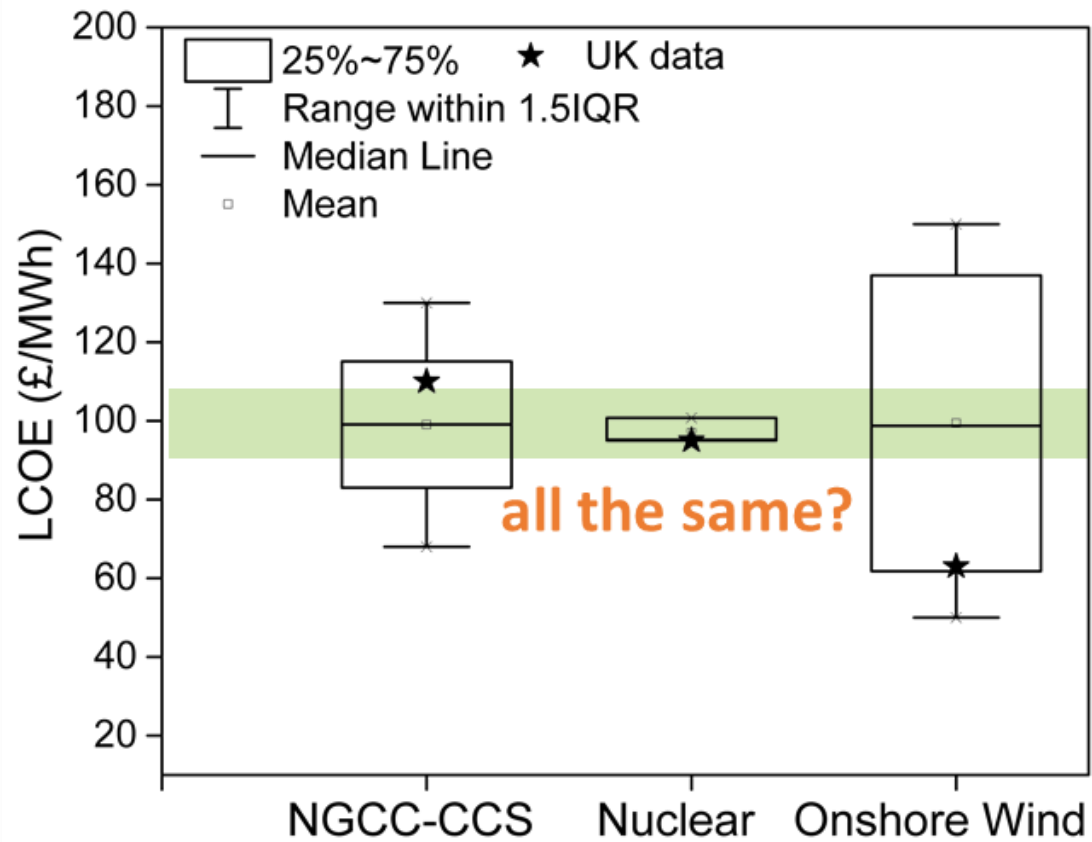


Value of CCS is context specific

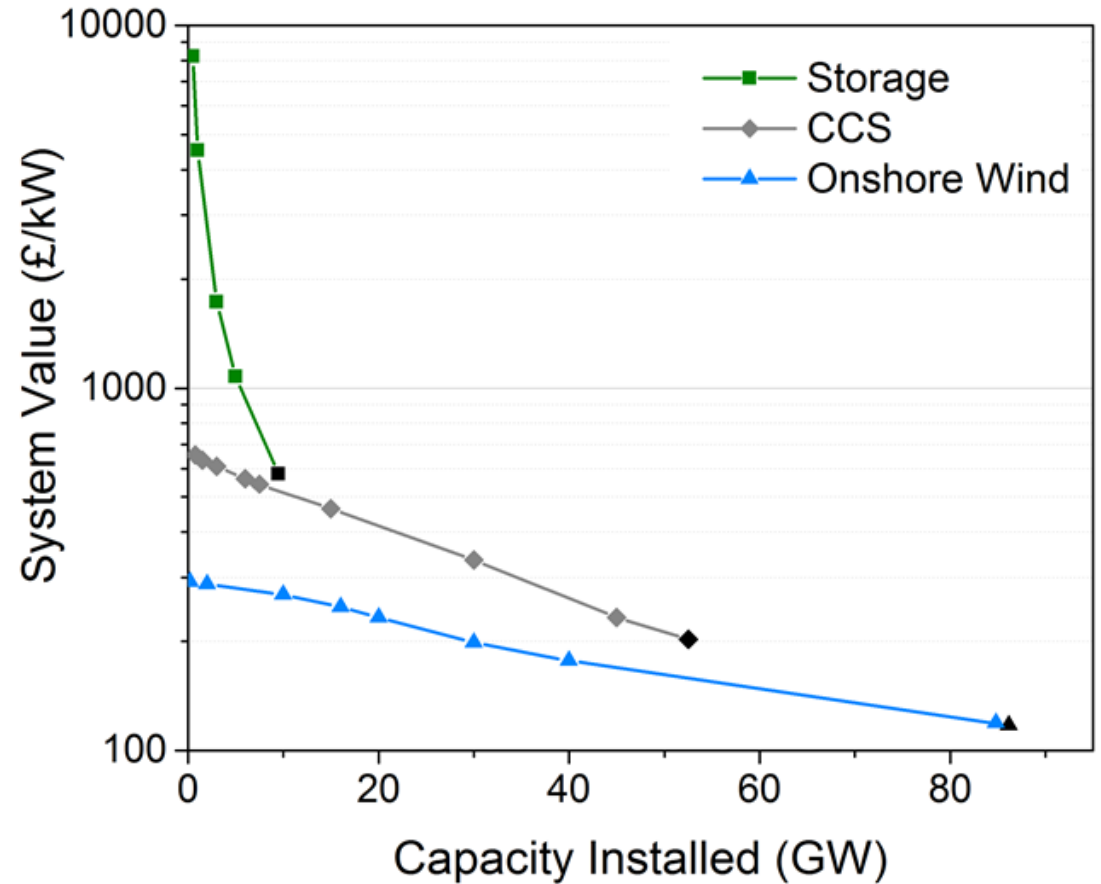


Value \neq cost

LCOE



System Value



Some key questions

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How helpful are cost targets?

- We know that CCS
 - Is integral to least cost decarbonisation targets
 - Provides value to the electricity system
 - Is vital to decarbonising industry
- Yet we persistently
 - Hear that the “cost must come down”
 - Wait on new technologies
 - Set isolated cost targets

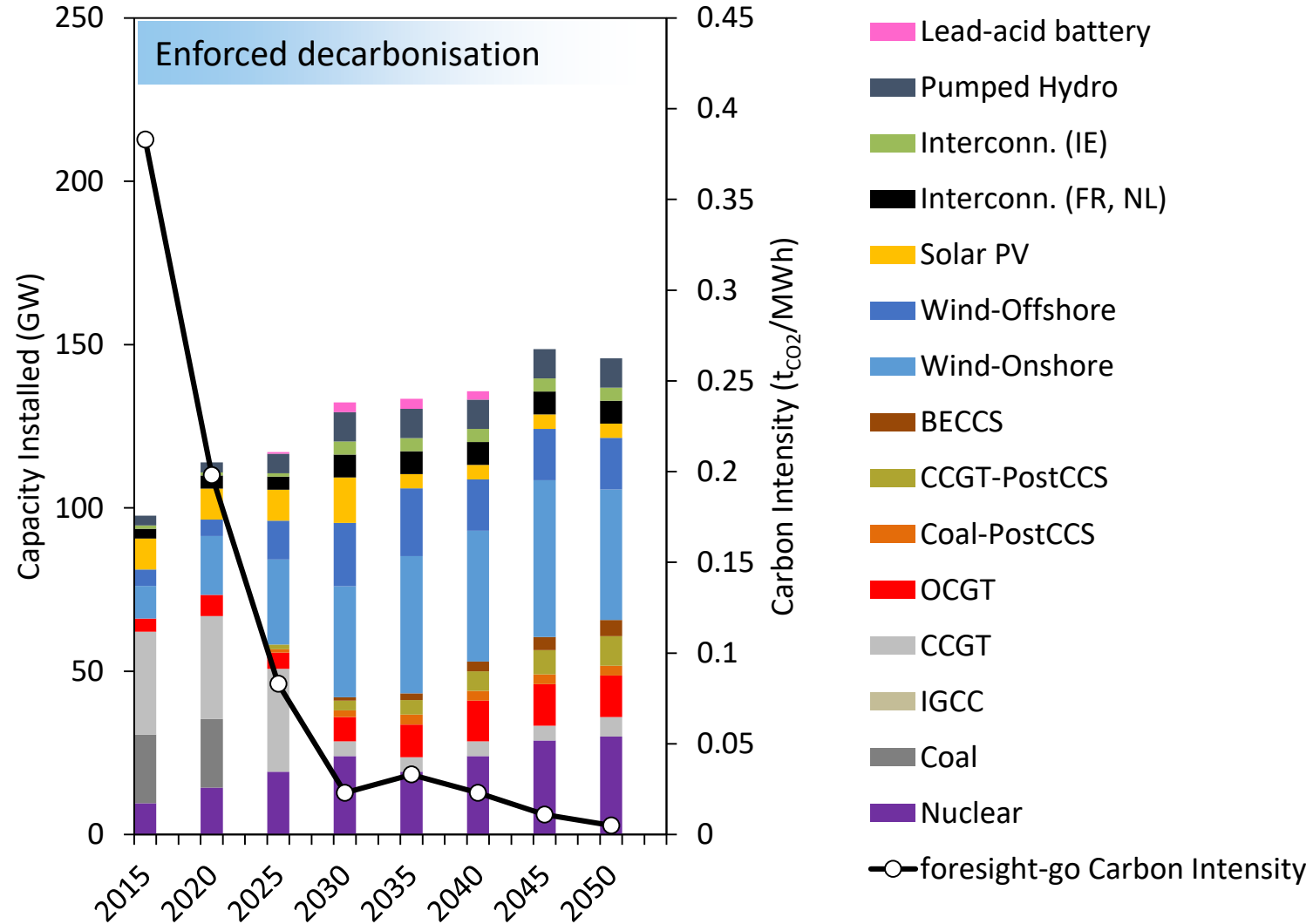
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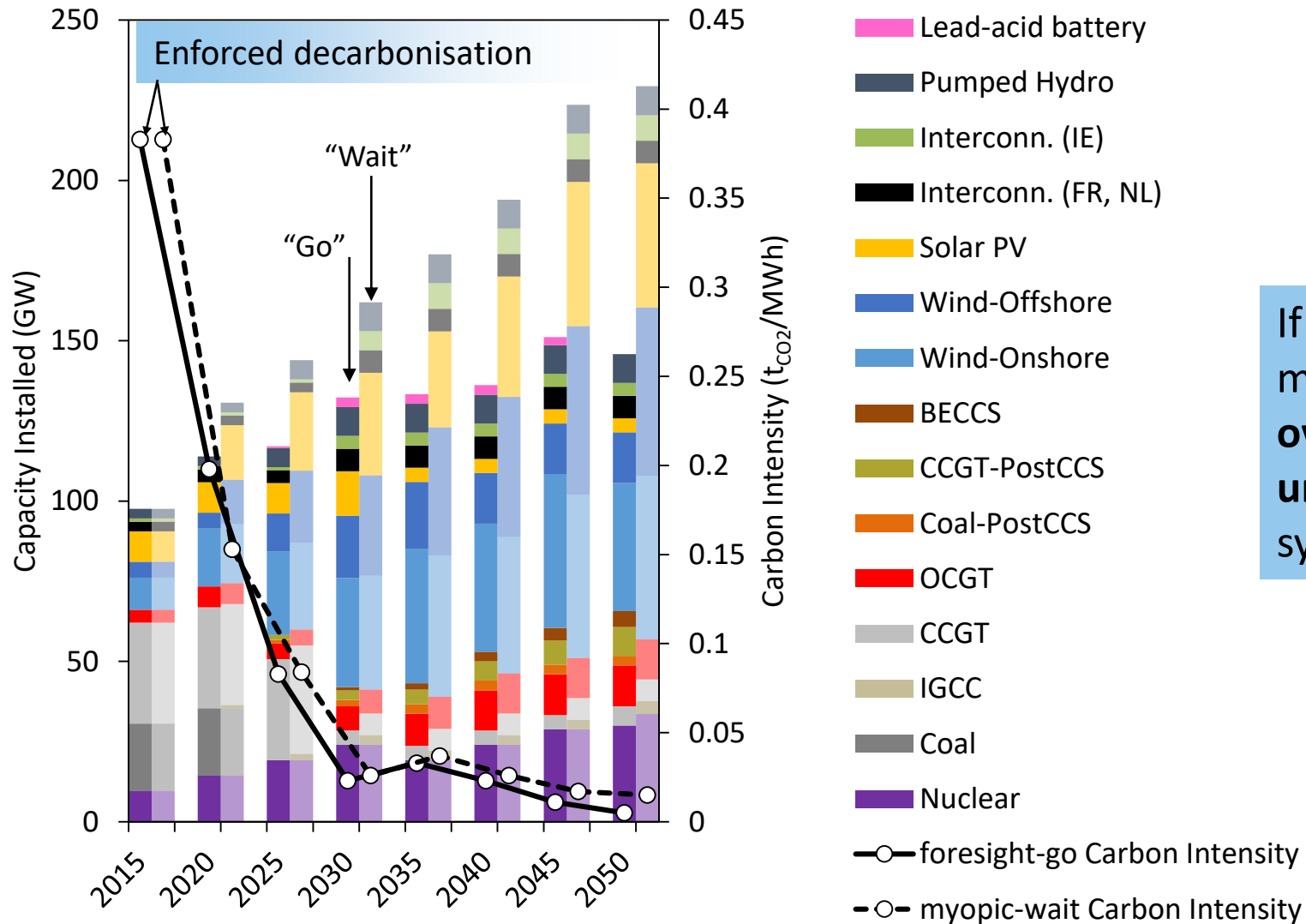
Should we believe in unicorns?

- We typically assume perfect foresight
- This is not the world we live in...
- Can we trust in technological optimism?
- What is the least regrets strategy?

Perfect foresight capacity expansion

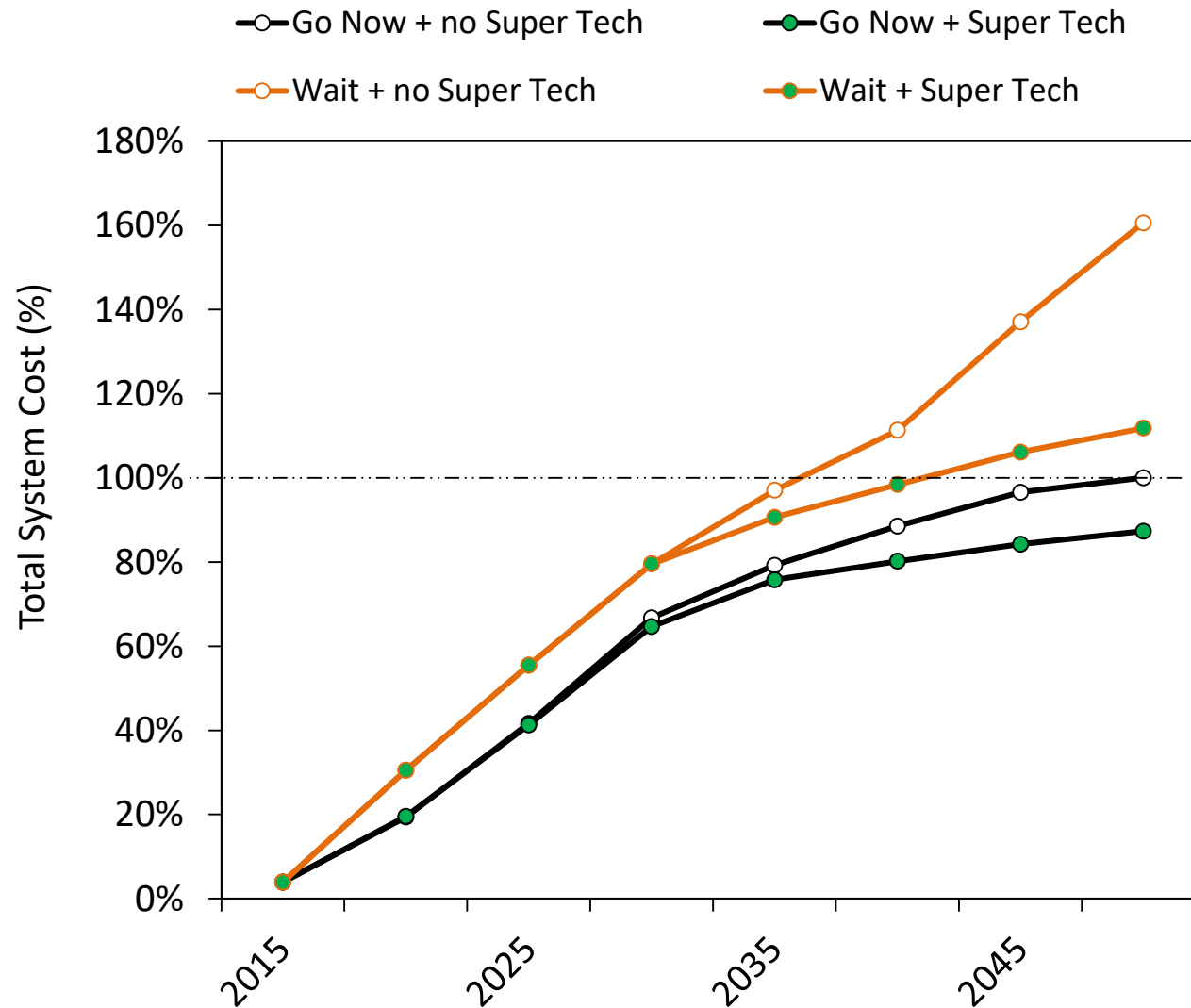


Imperfect foresight capacity expansion

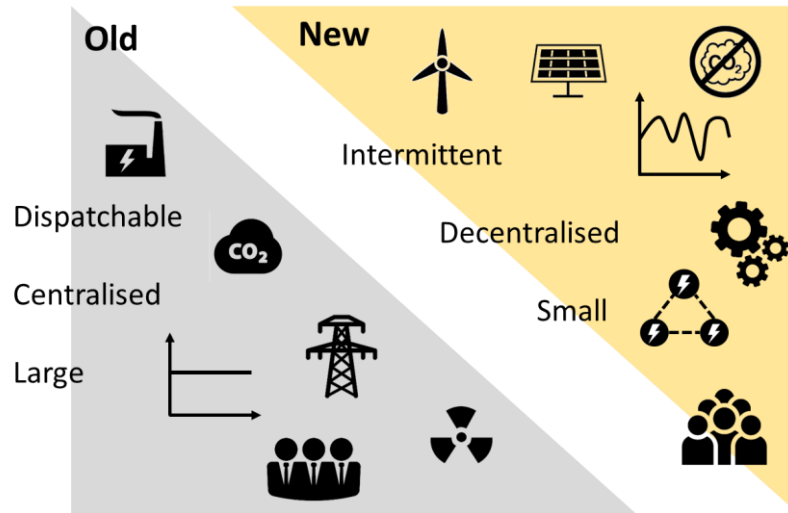


If the “super tech” fails to materialise, we have an **overbuilt and underutilised** power system.

Myopia in planning affects operation and cost



What does matter?



The power system is changing...

“+” → “+++” = low → high value

*modelled as minimum stable generation point, up-/down time

Technology Feature	Value in future power systems
High Efficiency	+
High Flexibility*	++
Low CAPEX	+++
Dispatchability	+++
Firm capacity/ancillary service provision	+++
Low OPEX	+
High Rate of Deployment	++

Some key questions

1. Does CCS *have* any value?
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Can we measure social value?

- We need more than just a discussion around technologies...
- Wider social impacts are becoming popular (COP24, UN SDGs)
- How do we account for social equity in evolving energy systems?
- It's an intertwined word...

Some key questions

1. Does CCS *have* any value? YES!
2. How helpful are cost targets? Unhelpful, and simplistic...
3. Should we believe in unicorns? No!
4. Other kinds of value? Jobs; across all levels of the economy...