

Regulatory barriers to energy storage deployment: the UK perspective

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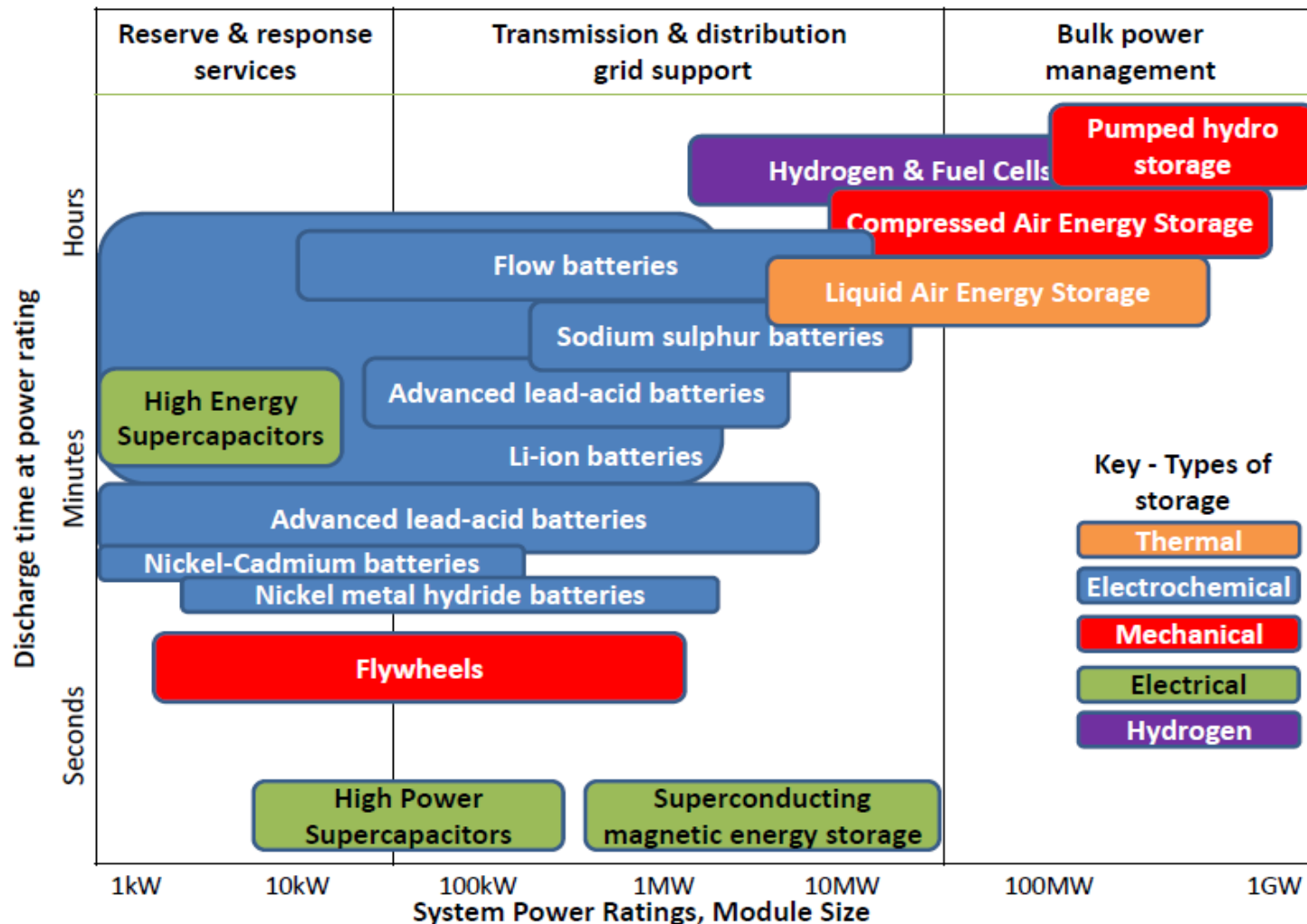
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Regulatory barriers to energy storage deployment: the UK perspective

- Role of energy storage (ES) in electricity systems
- Regulatory definition of storage
- Ownership and operation by DNOs and TSOs
- Business models for DNO and TSOs
- Market design
- UK and international initiatives

Energy storage is mostly PHS, but...



Source: Taylor *et al.* (2012)

Role of energy storage in electricity systems

1. Balancing supply and demand
2. Improving system efficiency
3. Ancillary services to the grid
4. Auxiliary services

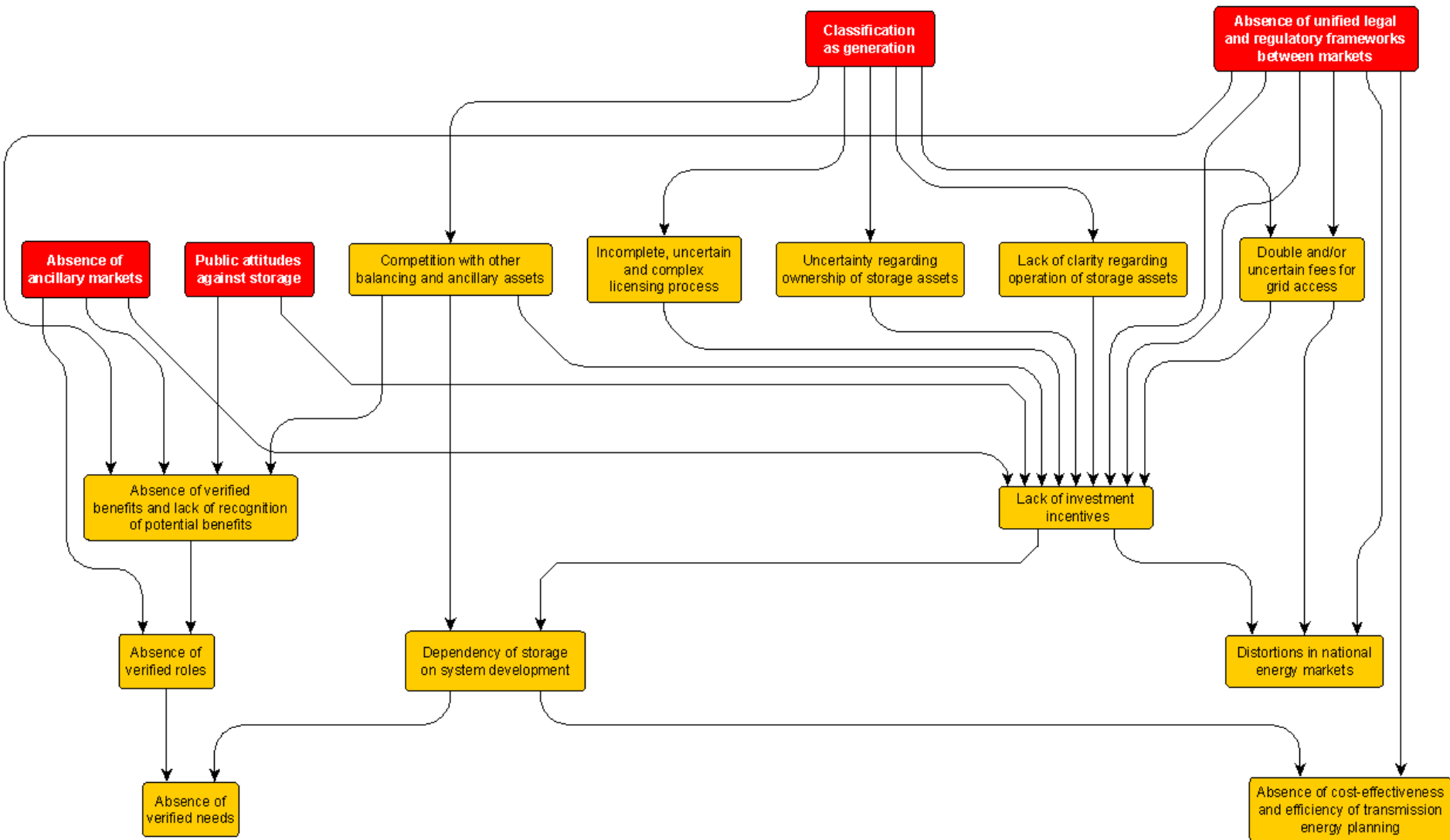
Regulatory definition of storage

- Broad definitions
- ES does not 'generate' electricity
- New definition treating ES as integral part of the system

Implications of definition

- Double TNUoS tariffs, DUoS tariffs
- Arguably does not reflect complementary benefits to the transmission network in balancing the wider system across time & space
- Mainly used for balancing, which does not contribute to congestion!
- Double LECs (CCL)

'Exogenous' barriers



New definition

- Zero (or negative) net flow of electricity from the device
- Tariff could reflect the weighted sum of the generation and consumption tariffs
- Unfair advantage?
- Experience from gas market
- Capacity margins vs. encompassing approach

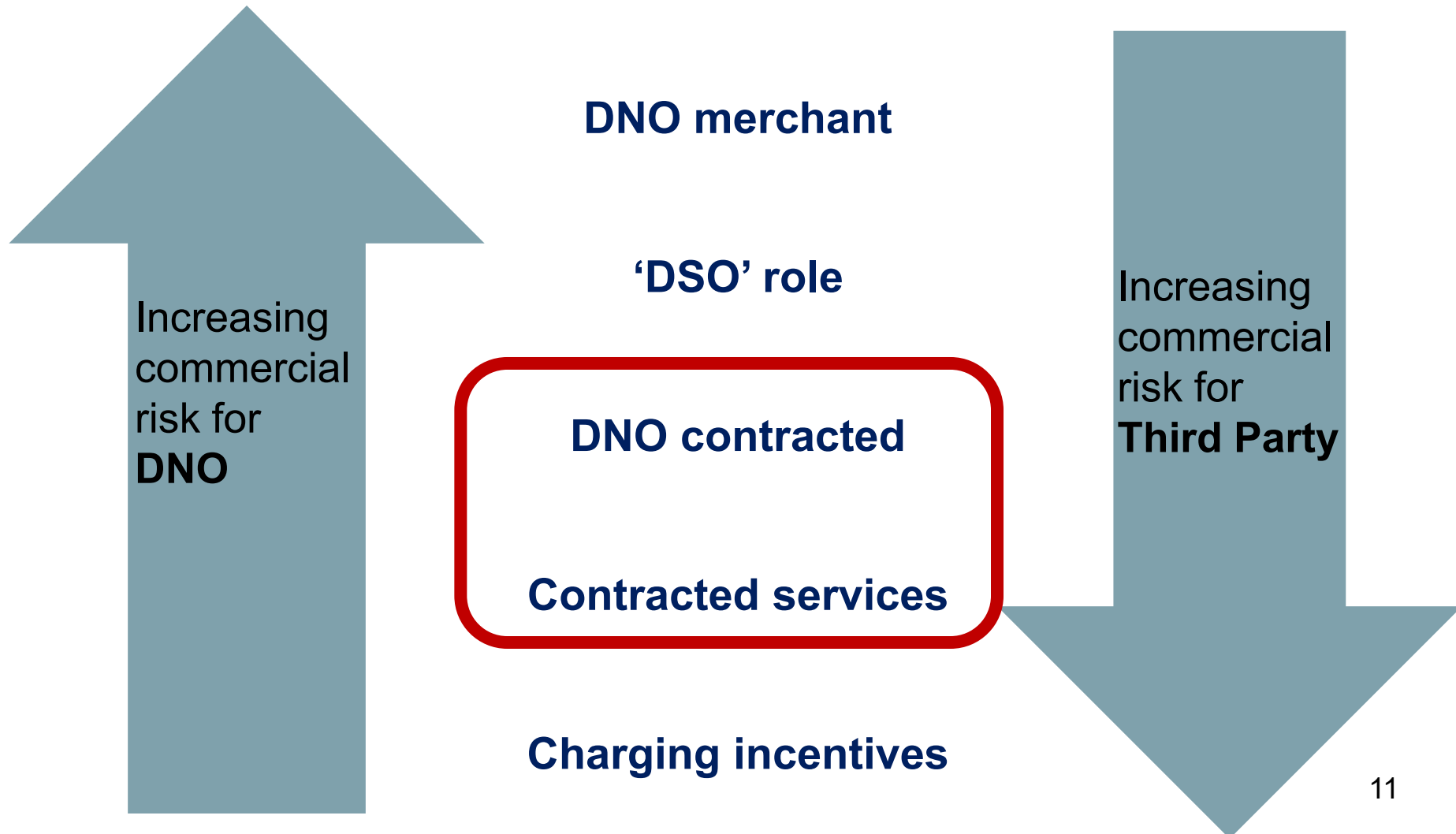
Ownership & Operation by DNOs and TSOs

- DUoS (arbitrage) and TNUoS (reducing peak demand during Triads) offer potential revenue
- But whether revenue streams are realised depends on how storage is controlled and its services sold
- Network operators in best position to realise value

DNOs and storage

- *De minimis* restrictions
- DNOs not bound by ownership unbundling – allowed to own “small” ES
- Cannot operate storage
- Third party must operate asset

DNO business models



Business models

- Complexity of tolling contract (flexibility and efficiency)
- Willingness of TP to take on long-term risk for additional value streams (impact on consumers and system flexibility)
- DNO – Other countries

TSO and storage

- Completely disallowed from owning or operating any form of energy storage
- Competition concerns
- Belgium, Italy

Ownership unbundling

Independent system operator (ISO)

Independent transm. operator (ITO)

Market design

- Balancing activities not included in cash-out prices
- Ancillary and balancing market design reflects historical design of electricity system
- High capital costs and low operating costs
- Treatment of storage in BMU
- Capacity market

Initiatives






- Ofgem – Single cash-outs
- National Grid – Enhanced Frequency Response
- *Aggregate* fast reserve service by BMU service providers, meaning that storage could offer *fast reserve* (50 MW to be provided in 2 minutes)
- Week-ahead tender timescale – long-term forecast limitations, and aggregation
- Performance FR payment in U.S.

Conclusions

- A new **regulatory definition** would facilitate removal of barriers
- Ownership and operation by transmission and distribution **network operators** would help optimise its role, but competition concerns
- **Direct support** for small-scale investments might still be necessary

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Realising Energy Storage Technologies in Low-carbon Energy Systems
An EPSRC-funded project

Regulatory barriers to energy storage deployment: the UK perspective

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Energy storage could make an important contribution to balancing a low-carbon energy system in the future for the UK, and the technologies have high export potential. A rapidly-growing family of technologies that can meet multiple system needs are in development. Innovation is required to reduce the costs of storage technologies, but their widespread deployment into electricity markets that is required to underpin this innovation is not occurring.

This briefing paper examines the regulatory barriers that power-to-power energy storage technologies are facing in the UK and in other major international markets. We consider that the creation of a new regulatory definition would facilitate the removal of barriers to the deployment of storage. Allowing transmission and distribution network operators to own and operate storage would enable its role in the system to be optimised, as long as competition concerns could be satisfied. However, some direct support for small-scale investments might still be necessary, perhaps using a similar approach to California. Many countries are facing the same challenge and initiatives to encourage deployment of energy storage are underway in Germany, Italy, Belgium and the United States. The value from investment in UK research efforts could be lost without similar action.

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The authors are solely responsible for all of the content in this paper. Any views expressed in this paper are the authors' and have not been endorsed by any of the organisations associated with the RESTLESS project. The authors wish to thank the UK Engineering and Physical Sciences Research Council (EPSRC) for financial support via grant EP/R010466/1.

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An Overview of the UK Market

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Working Paper 1

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May 2016

Acknowledgments



UNIVERSITY OF
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The University of
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EPSRC
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UKERC
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