



Valuing Electricity Storage in Markets

IRENA Storage Roadmap –
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Institute for Energy and Transport

JRC recently published a literature review on storage valuation



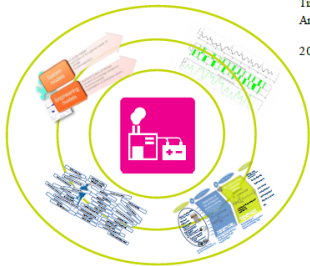
JRC SCIENTIFIC AND POLICY REPORTS

Assessing Storage Value in
Electricity Markets

A literature review

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2013



Report EUR 24054 EN

Joint
Research
Centre

Methodology

Are there generally accepted methodologies to assess the economics of electricity storage?

Profitability

How does the profitability of electricity storage look like from different angles?

Regulation

How does electricity market regulation impact the storage business case?

Storage value is assessed in two fundamental ways

Mathematical formulation

Typical application

Engineering
Studies

Maximise profit
resulting from (different)
storage revenue streams

Assess the **profitability**
of power storage from the
investor's point of view
Applied to current system,
often arbitrage + reserve

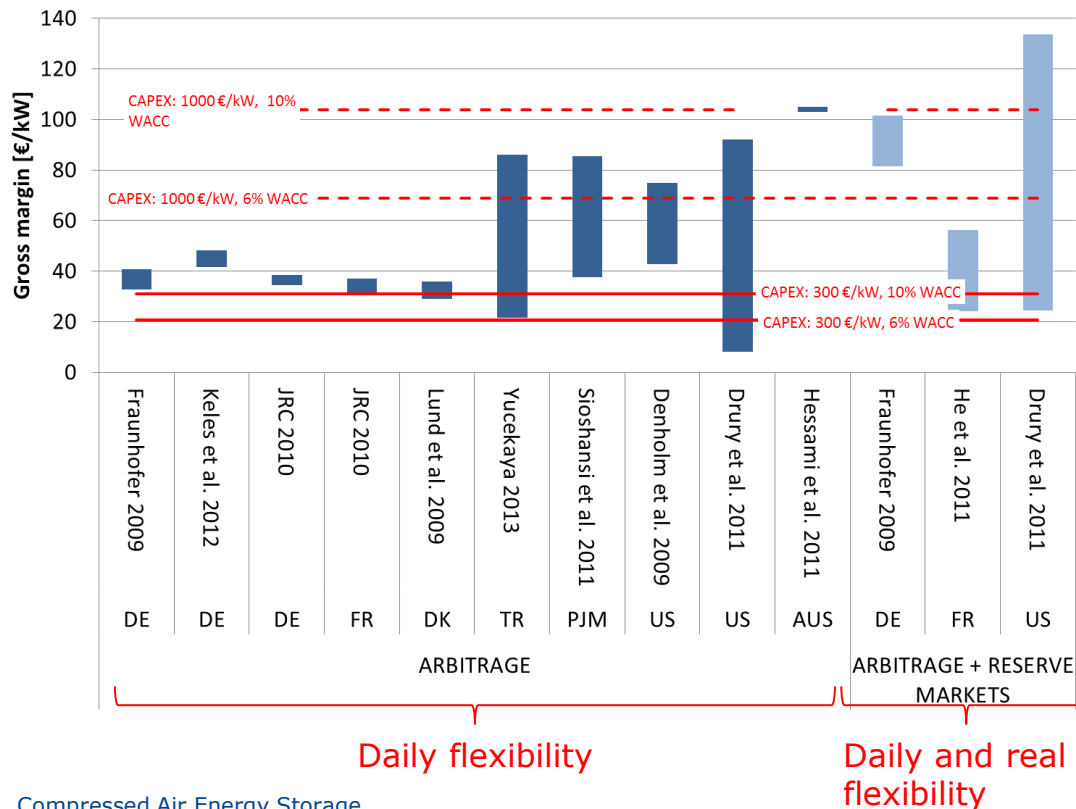
System
Studies

Minimise total costs of
operating the power
system

Assess **benefit** of adding
storage to the generation
system
Applied to future systems,
x-value chain assessment

Engineering studies show wide range of profitability

CAES¹ study range of results

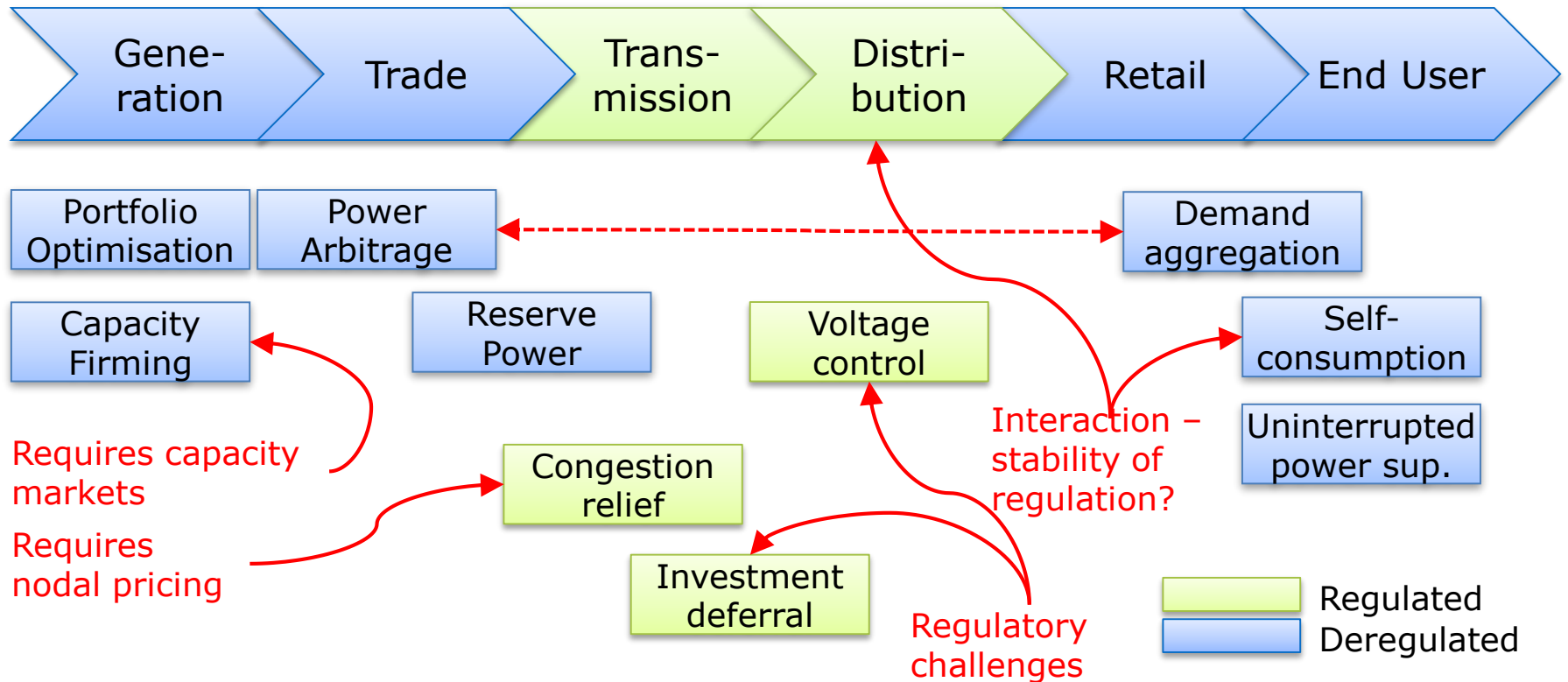


Key trends

- Wide variety of results from across studies
- Only a few studies assess value of real term balancing
- Positive business case is not a given and depends largely on the IRR expectations of the investors
- Potential additional revenue streams related to power transport (not assessed by the studies shown here)

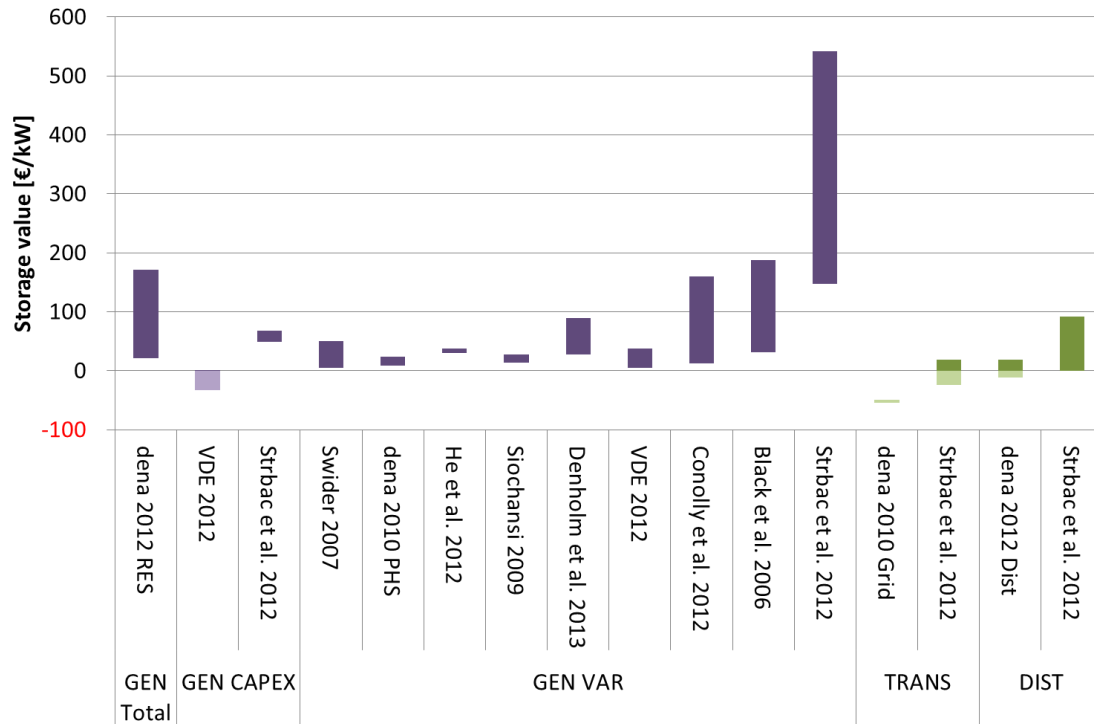
Potential system benefits of storage along entire value chain

Electricity value chain



System studies strongly diverge in the quantification of storage value

System study range of results



Key trends

- System benefits from storage differ across value chain
- Storage can drive costs down or up for both generation and
- Storage value for distribution grid value negative in DE if operated on arbitrage model (dena 2012 dist)

→ **Mixed picture, many gaps!**

The JRC report on storage valuation makes recommendations in 3 areas

Recommended further analysis (see pages 56-61)

Methodology

- Improve modelling of reserve margins and power prices
- Create simplified tools for rapid generation of price tracks
- Assess storage in transmission grids with simplified models
- Understand role of storage in distribution grids

Profitability

- Systematic studies on services 'mutualisation'
- Optimum techno economic parameters
- More studies with out of the box scenarios

Regulation

- Impact of market designs for RES-E integrator
- Impact of capacity mechanisms



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