

Policies for storing renewable energy

RE STORAGE

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IEA-RETD 
Renewable Energy
Technology Deployment

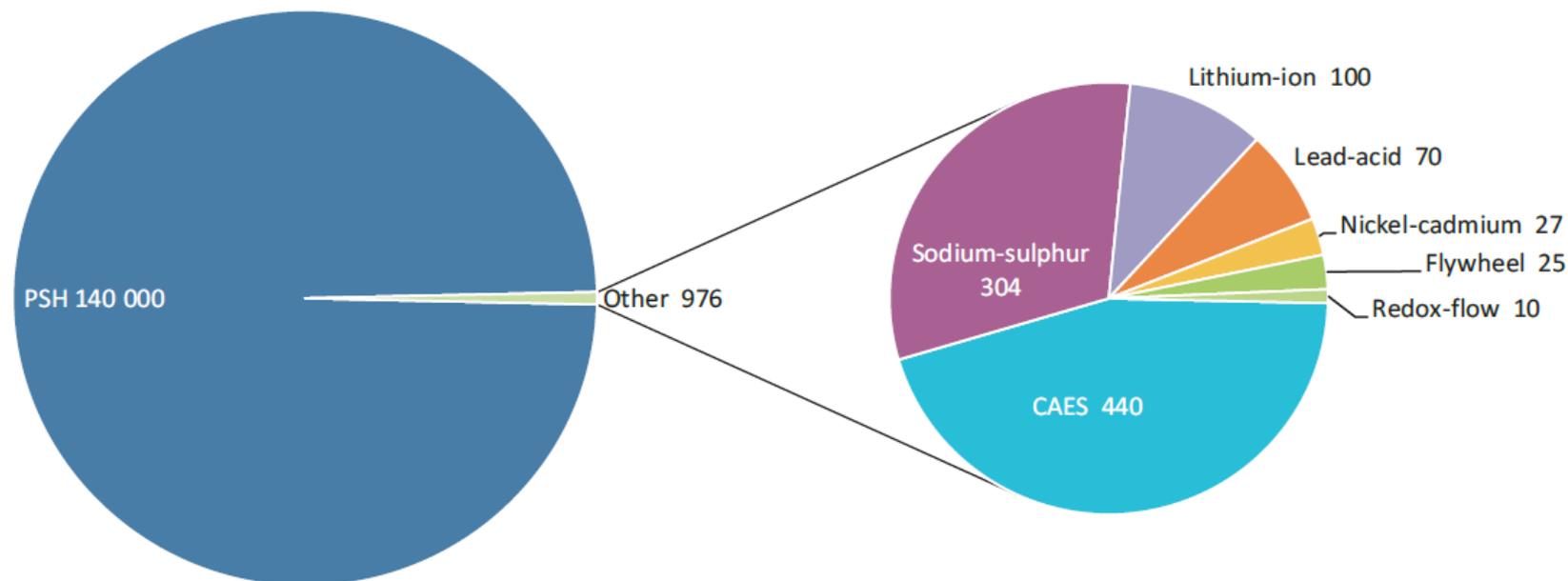
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Storage: Valuable in a high RE scenario... but hard to deploy

- Important for integration of variable renewable energy – “enabling technology”
- Multiple applications supporting RE deployment:
 - Ramping
 - Frequency response
 - Load shifting
 - Congestion alleviation
 - Lower levels of curtailment
- Poor fit in current frameworks
- Making a business case can be hard



'New' storage is vanishingly small



Current installed storage capacity is entirely dominated by pumped storage hydro electricity (PSH)

Source: IEA Technology Roadmap: Energy Storage (2014) Units in MW

Well-structured policy can enable storage to support RE

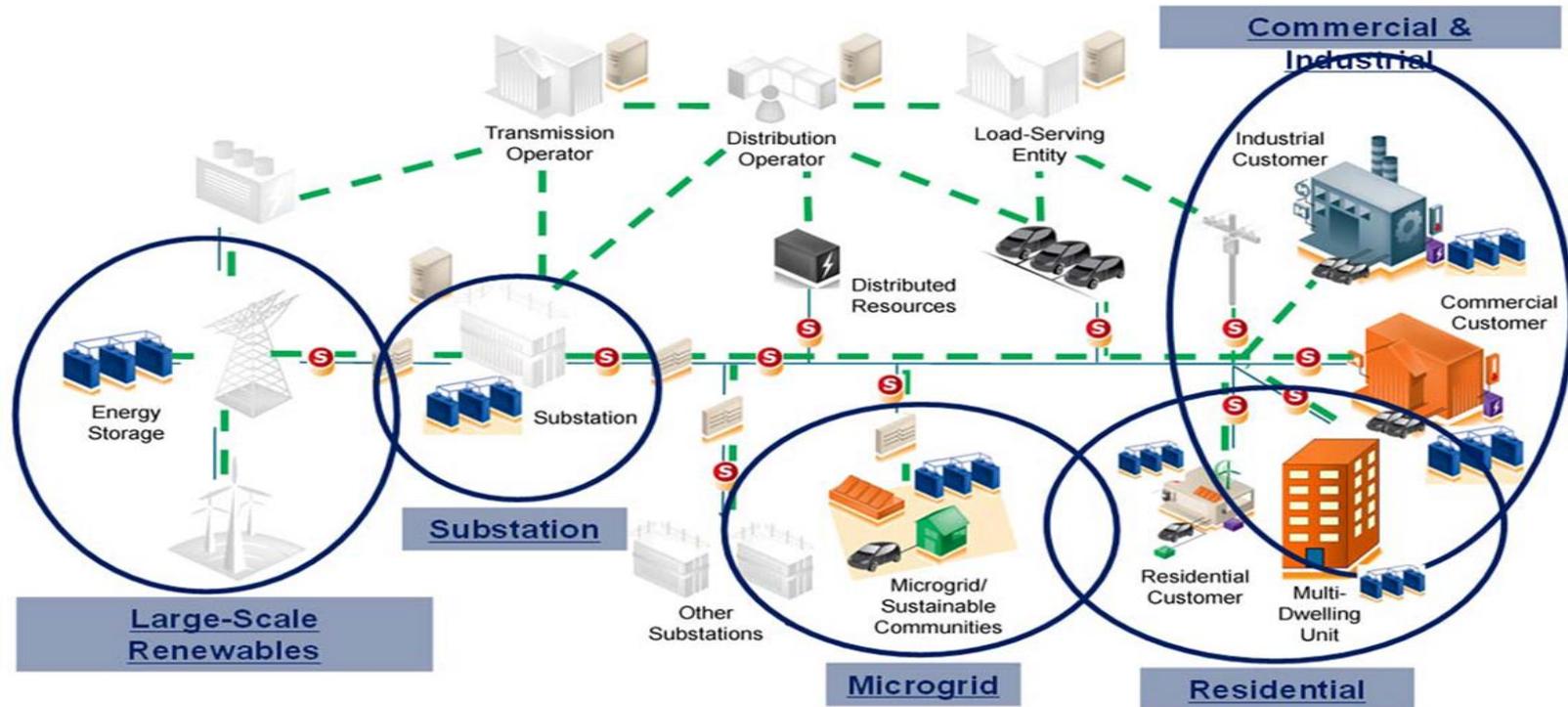
We need:

- Examples of good practice
- Guidelines for prioritisation
- ‘No-regret’ cross-cutting policies
- Policies with potential for short-term implementation, keeping in mind a 20-30 year timeframe

Key question:

“Everybody is talking about storage – what is important for policy makers?”

A complicated landscape requires simplifying tools...

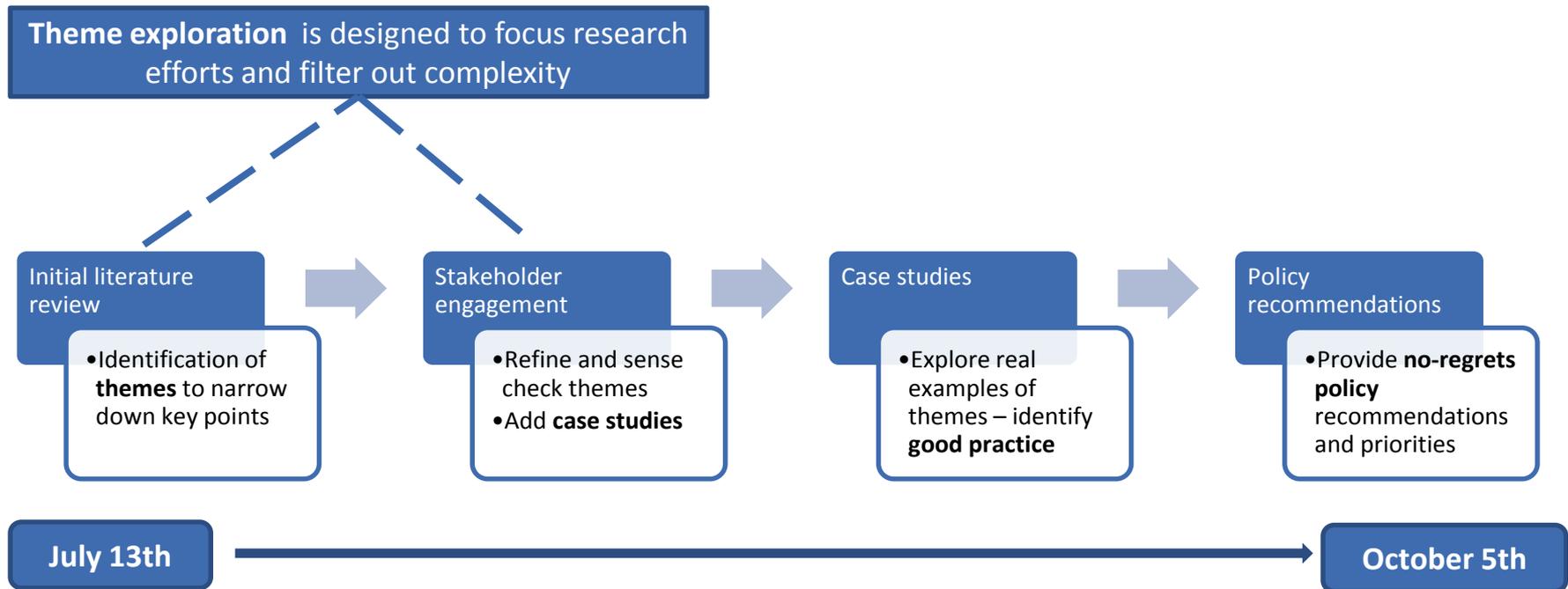


- Large variety of actors
- Inherently cross-sectoral
- Several competing technologies

Source: EPRI (2010)

Project approach

- Approach based on the identification of themes
 - Identify and isolate key issues
 - Use case studies to illustrate possible solutions
 - Generalise findings to overall policy recommendations



Theme #1: Remuneration mechanisms currently fail to mirror new needs for flexibility

- Markets based on marginal cost **rarely compensate energy storage** for system benefits such as:
 - Distribution system investment deferral
 - Increased system efficiency
 - Environmental benefit of avoided peaking plant start-ups
- Ancillary service markets based on the opportunity cost are particularly unfavourable
- Opportunity tied to arbitrage business models is inherently self-limiting
- Investors may undervalue energy storage in high RE systems due to policy and revenue uncertainty

Theme #2: Difficulty accessing multiple markets and revenue streams

- Studies suggest that **no single revenue stream provides an adequate return on storage investment**
- Regulatory barriers of market access, grid fees and codes come from centralised energy market design
 - e.g., classification of storage assets as ‘generation’ limits transmission system operators from making full use of them
- Regulatory frameworks can prevent energy storage operators from achieving ‘benefit-stacking’ from different value streams

Theme #3: Delivering flexibility across market and sector boundaries

- RE transition is accompanied by a trend to **increasing electrification**: cross-sector energy storage can be pivotal
- **More interconnection** and **more decentralised generation** creates a complex, evolving landscape
- Storage developers may struggle to develop products suited to different markets or across borders / regions
- Some examples:
 - Vehicle-to-Grid
 - Power-to-Gas
 - Regional storage

Theme #4: Limited knowledge and data availability on energy storage performance and standards

- Limited knowledge and data on performance, reliability and durability increase both **industry and investor uncertainty**
- Few formal standards guide evaluation and reporting of the performance of energy storage technologies
- Storage assets are regulated by technical standards from various sectors, but coherent internationally valid standards are still under development

Some suggested case studies

- **US: FERC Order 755 – valuing storage benefits**

755 addresses compensation for the additional benefits offered by certain energy storage systems when providing frequency regulation services

- **US: Oncor Texas cancelled storage deployment**

Oncor cancelled a \$5 billion investment in grid integrated storage in Texas. It would have been ‘generation’ which Oncor, a TSO, is not allowed to own

- **UK: Smart Storage project**

The project specifically seeks to trial the multi-purpose application of storage for a range of different system benefits to help maximise value

- **Germany: Falkenhagen Power-to-Gas plant**

The Falkenhagen Power to gas plant is located in a region with low demand and a very high concentration of wind turbines

Discussion

Questions, comments or suggestions?

THANK YOU!

For additional information on RETD

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