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stoRE Workshop

Energy Storage in the Irish Power System

2nd of October, Galway Bay Hotel

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Agenda

- About the stoRE project
- stoRE publications so far
- Consulation process - Results
- Discussion – Action List
- Networking

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About the stoRE project

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stoRE: Main Facts

- Financed through the “Intelligent Energy for Europe” programme, which is managed by the Executive Agency for Competitiveness and Innovation (EACI)
- From May 2011 to 30 April 2014
- **Aim:** facilitate the high penetration of intermittent renewable energies in the European grid by unblocking the potential for energy storage infrastructure
- **Overall objective:** help creating the regulatory and market conditions that will give incentives for development of the necessary storage infrastructure

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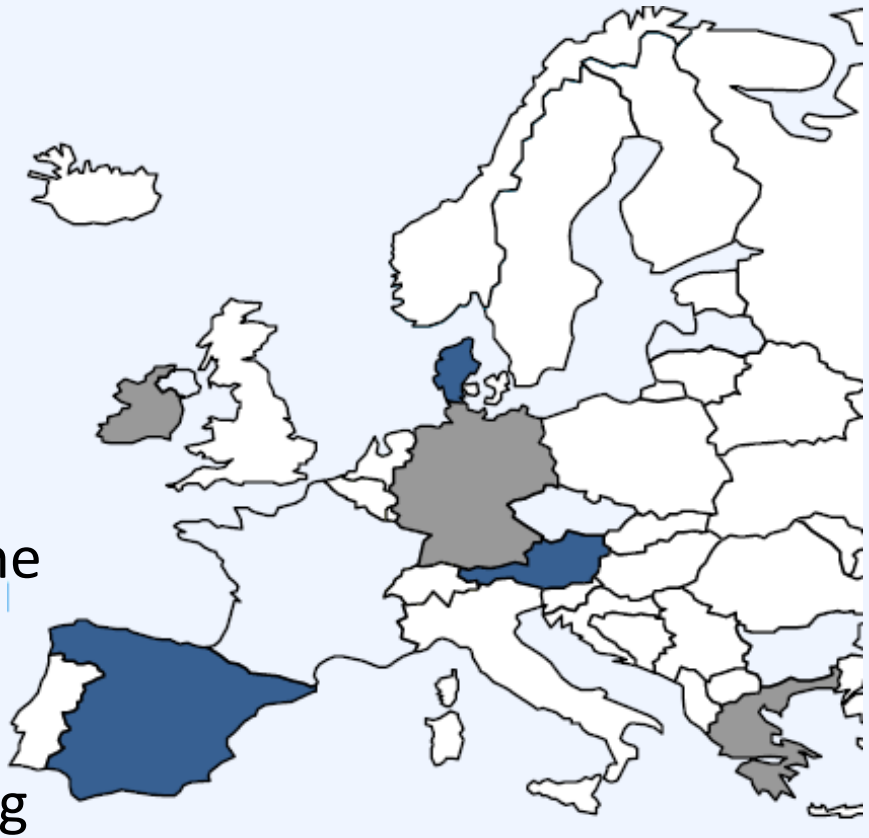
stoRE: Specific Objectives

- Remove environmental barriers while ensuring that the environment is protected
- Assess and review the regulatory and market conditions:
  - on a European level
  - in the 6 target countries
- Engage key actors to implement the recommendations for regulatory reform
- Improve the general understanding of the role energy storage can play in a sustainable future



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Publications so far

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Publications

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Facilitating energy storage to allow high penetration of intermittent renewable energy

D2.1
Report summarizing the current Status, Role and Costs of Energy Storage Technologies

(Source: RenewableEnergyWorld.com)

(Source: VERBUND)

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- Pumped hydro energy storage (PHES) – most mature and widely used energy storage technology (EST)
  - Several MW to 2 GW with discharge time up to 100 hrs depending on storage volume and reservoir.
- Compressed air energy storage (CAES) – only two worldwide, still needs fossil fuel
- Major application: output smoothing of variable energy on multiple time scales and energy arbitrage

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Publications

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Facilitating energy storage to allow high penetration of intermittent renewable energy

Role of Bulk Energy Storage in Future Electricity Systems with High Shares of RES-E Generation

Deliverable 2.2

(Source: VERBUND)

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- Increased non-dispatchable RES-E:
  - →More frequent and uncertain price fluctuations
  - →Increases demand for control reserves
  - →Higher balancing demand for conventional power plants
  - →BUT! Increasing part-load and decreasing full load of conventional thermal plants → less economical
- Non-dispatchable RES-E favour deployment of bulk EST
- Bulk EST fit especially well for short-term market; secondary and tertiary control and intraday markets
- Transmission grid extensions → widen the balancing area

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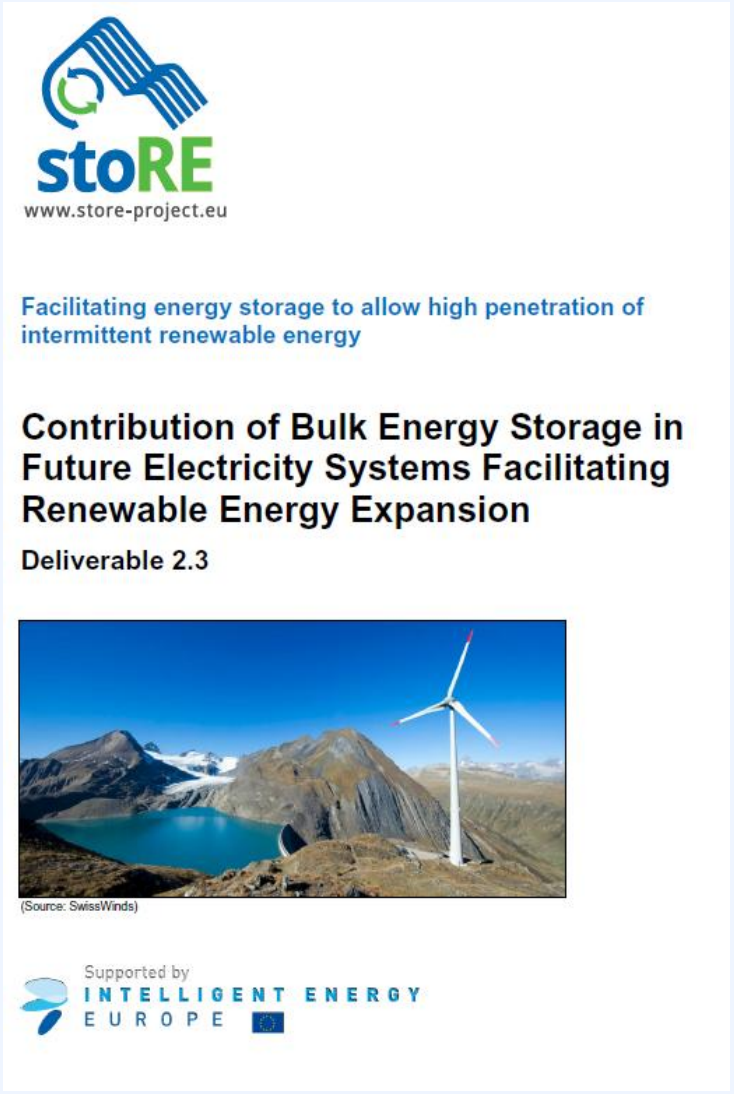
Publications



- Matching of bulk EST potentials with the spatial dispersion of future RES-E and existing thermal power plant-portfolio on regional level in EU
- Four Regions; Central Western Europe, Central Eastern Europe, Iberian Peninsula and the Nordic Region
- age-related phase-out of thermal power plants → additional new power plant capacities are needed in many electricity regions already by 2030.
- In general, existing and new PHES is needed (as well as additional flexible thermal power plant units) in almost all the EU regions to (partly) cover the future electricity generation gap

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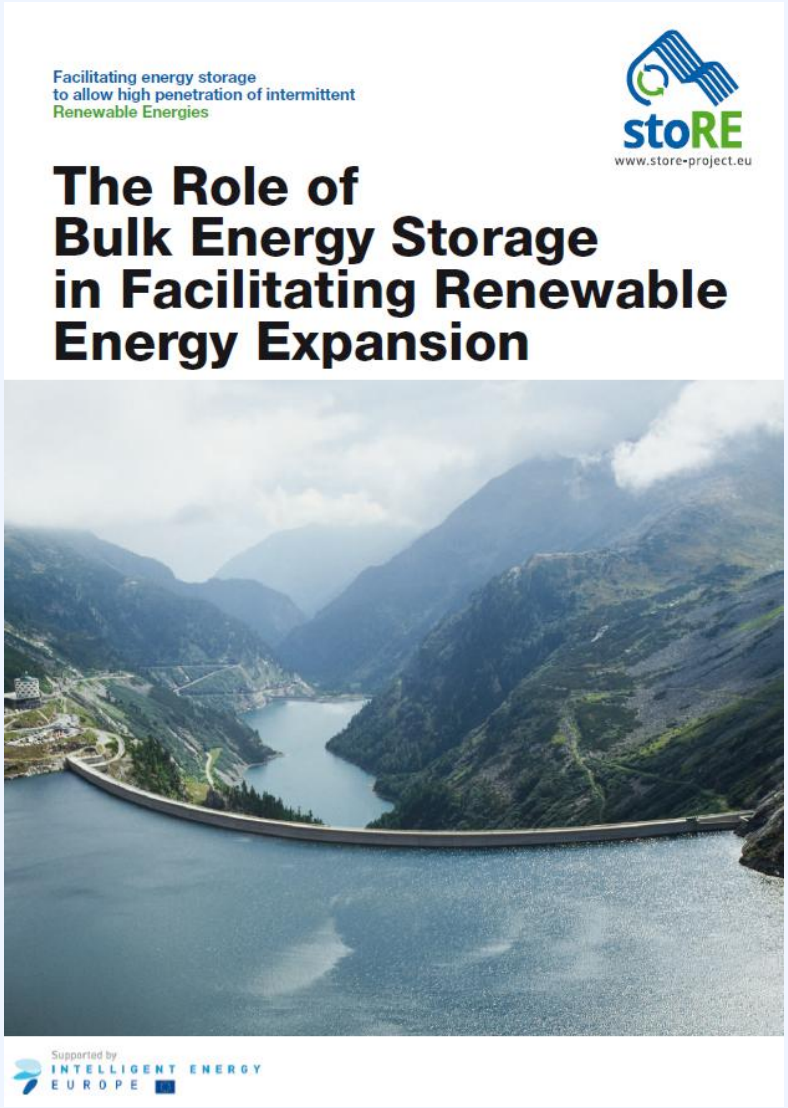
Publications



- This is a brochure summarising the three publications for policy makers and other key actors

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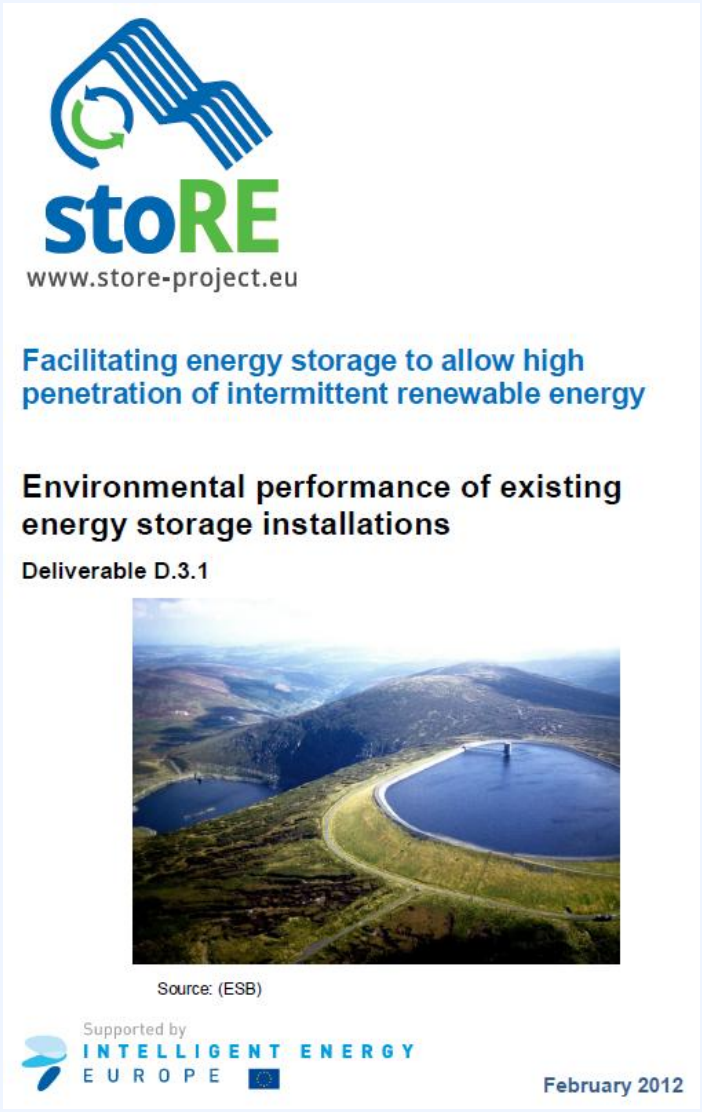
Publications



- Six case studies; 5 PHES & 1 CAES across age, size and technology
- Three PHES technologies
  - Closed-loop
  - Semi-open
  - Open system (Pump back)
- Method: Modified environmental impact assessment approach
- Life span – most impacts associated with operation are considered to be long term
- Mainly “negative” impacts have been investigated
- Impacts are site and technology specific and baseline dependent

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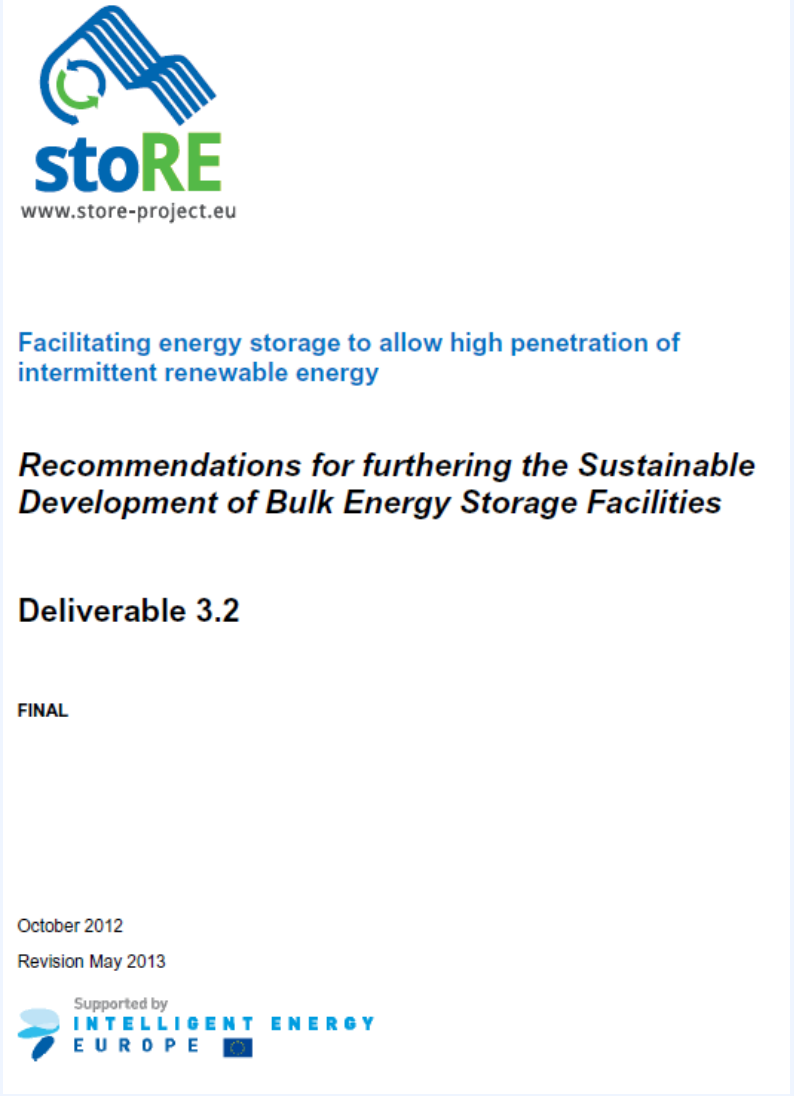
Publications



- Focuses solely on environmental issues
- Investigates relevant directives for project development
- Provides examples highlighting issues
- Development is developer driven
- Timescale ~15years from inception to commissioning
- Provides 5 recommendations
  - Establish a need
  - Develop plans and programmes
  - Identify viable sites at strategic level
  - Develop clear guidelines and document best practice
  - Facilitate planning and approval procedures

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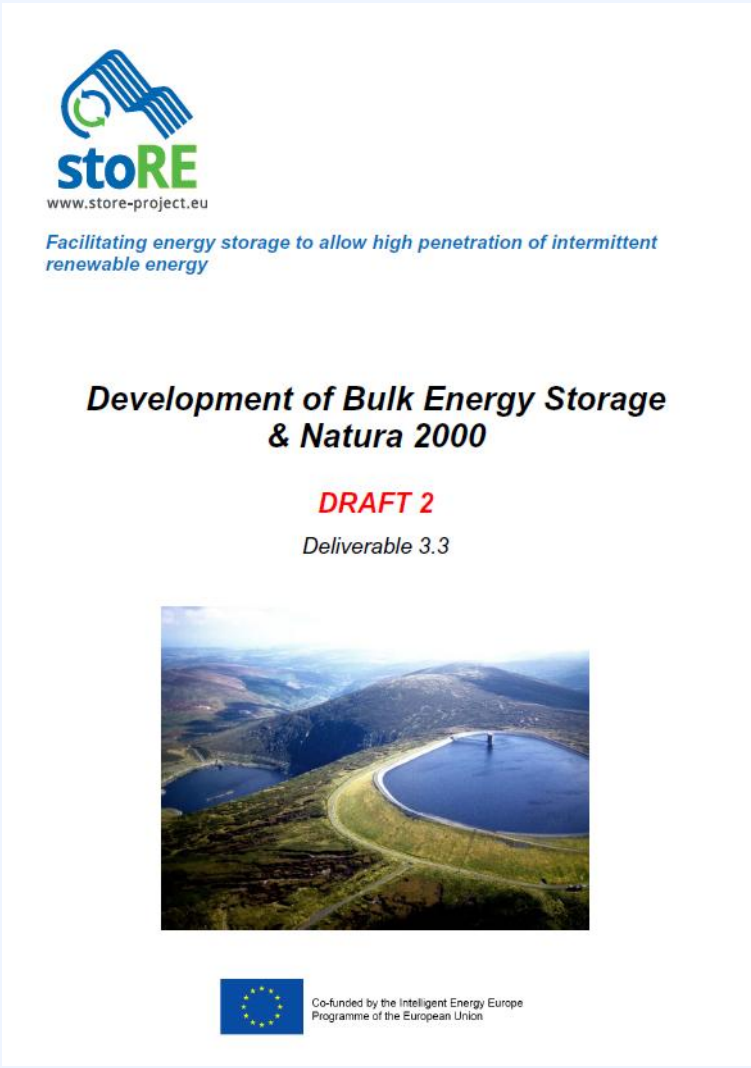

- To provide sector specific guidance on how best to ensure that PHES and CAES developments are compatible with the provisions of the Habitats and Birds Directive with particular focus on Article 6 procedures.
- The appropriate assessment process ‘tests’ the plan or project in the context of maintaining or achieving the favourable conservation status of qualifying habitats and species within a site
- Currently in Draft – Feedback is welcome! (store website under ”news”)

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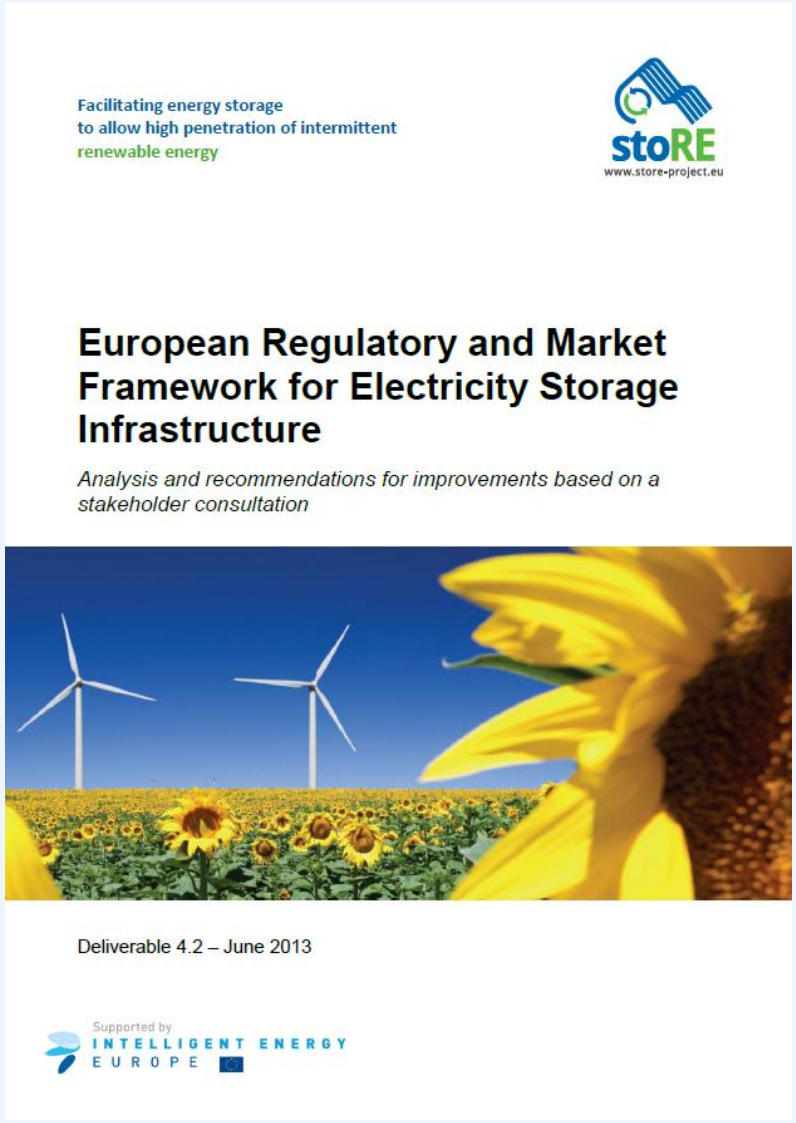
Publications



- Identifies the key elements of the European market framework that potentially create unfavourable conditions for the development and operation of electricity storage infrastructure and provide policy makers with recommendations for possible improvements

- Provides recommendations to
  - The European Commission
  - ACER[1] and ENTSO-E[2]
  - Project developers and other stakeholders involved in electricity storage

[1]Agency for the Cooperation of Energy Regulators
[2]European Network of Transmission System Operators for Electricity

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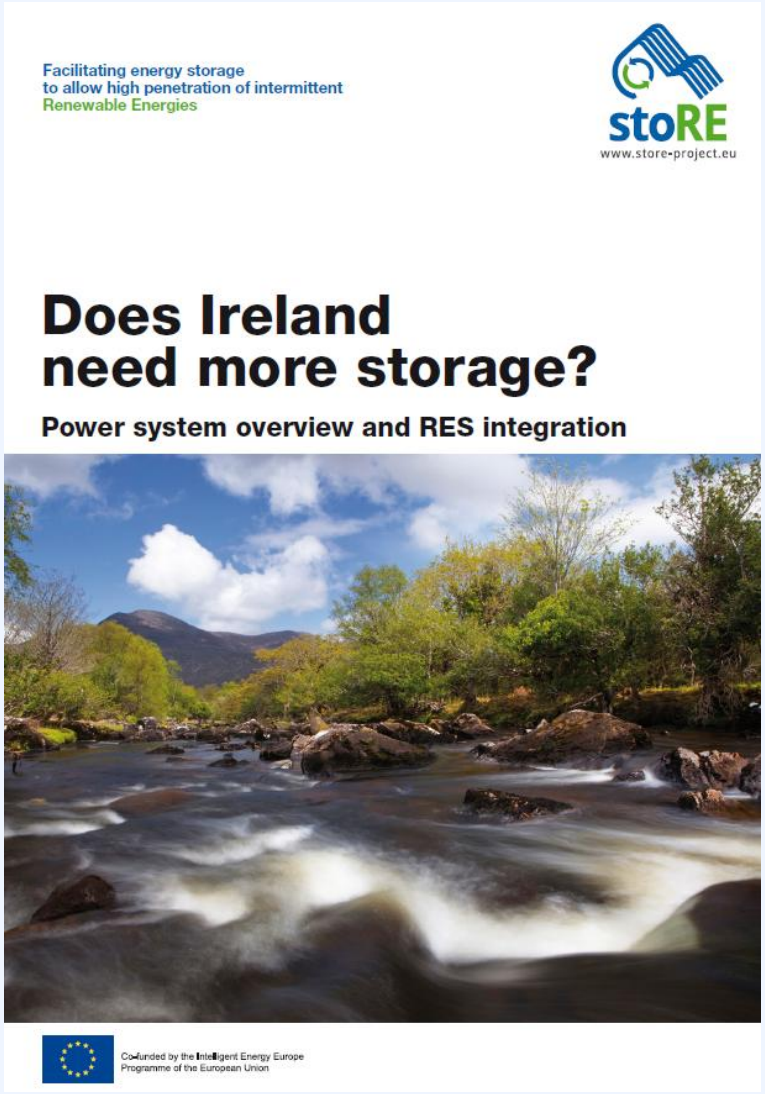
Publications



- Brochure, full report available at www.store-project.eu
- Full report and brochure available for each target country
- Investigates current system data and future development plans
- Modelling of 2 future scenarios; 2020 Scenario and an 80% RES scenario
- Determines the need for energy storage in Ireland with and without interconnector capacity
- Shows clear benefits from development of additional energy storage capacity by 2020, including increased overall RES-E share and a reduction in curtailment of wind energy.

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Stakeholder Consultation

The questionnaire

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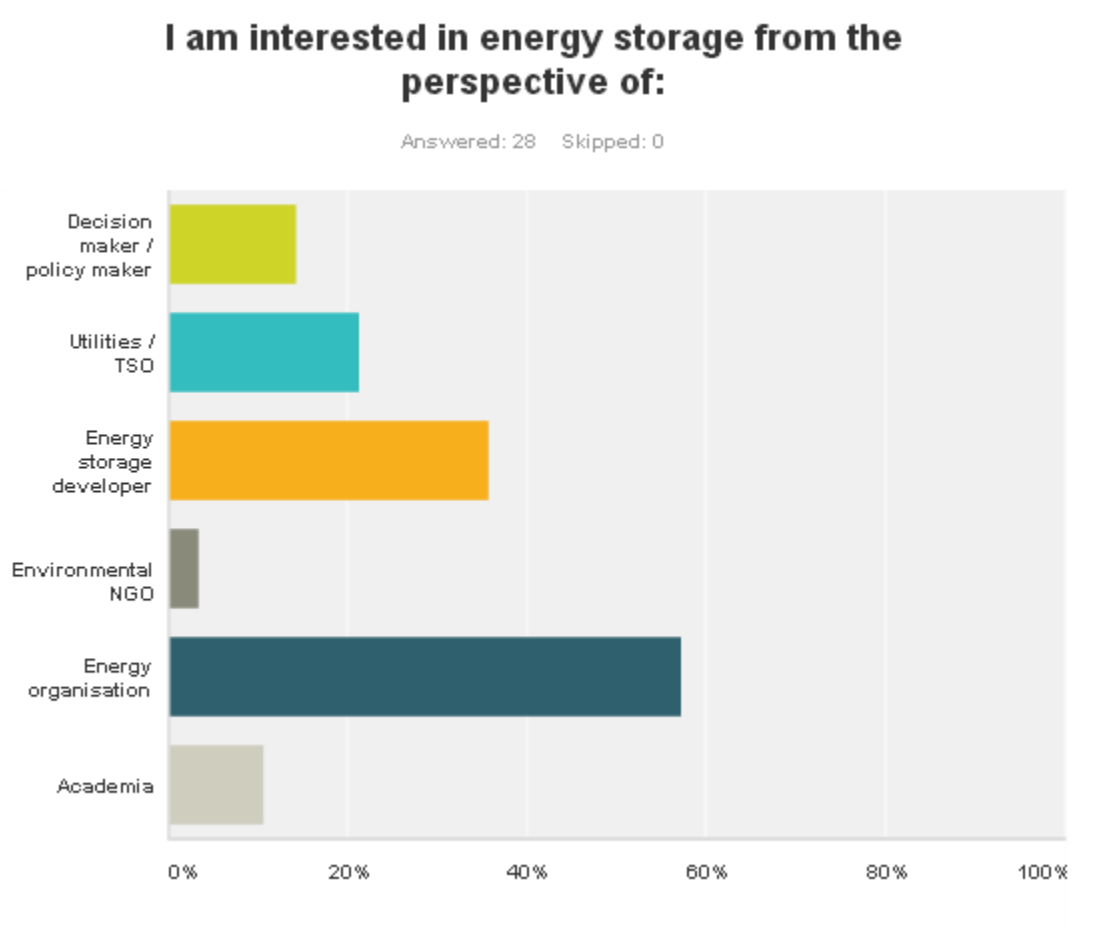
Interest perspective



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Do we need storage?

- Today electricity is a “use it or lose it” resource, energy storage to ease peaks and troughs in the current and future wind supply
- Energy storage is key to optimising level of wind integration
- Dependent on the level of expansion of wind energy generation, future requirement/targets in relation to import/export
- To reduce curtailment of wind by enhancing system flexibility and inertia
- To ensure feasibility of the future development of the wind industry in Ireland
- Hedge against failure of interconnection to deliver route to market for abundant Irish wind /wave resources
- To allow for arbitrage import/export of power
- To future proof Ireland for future development in electric vehicles
- Thermal storage (yes), electric storage (no) – district heating, electric vehicles, individual heat pumps
- Security of supply to reduce dependency of imported fossil fuels that will otherwise be used for majority of fast response backup

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Barriers

	Most important					Least important
	1	2	3	4	5	6
Lack of investment motivations & incentives	12	5	3	3	3	1
Lack of definitive storage needs	5	7	5	2	4	4
Double or uncertain grid access fees	2	3	5	4	5	7
Strong interdependence between energy storage & system development	2	5	4	11	5	0
Competition with other technologies for grid flexibility	3	4	5	3	8	4
Siting & planning constraints	3	3	5	4	2	10

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Actions for countering a lack of investment motivation & incentives

- Create funding and incentives to develop the most efficient storage solutions
- Cost comparison : a comprehensive study investigating a holistic view of energy storage in Ireland (cost benefits including economic, environmental, security of supply, flexibility, possible support mechanisms (DCENR/SEAI- short term) – on a 5 year basis?
- Market and ancillary services should reward/encourage cheap energy storage (by Regulator/TSO)
- Clarity around investment environment and returns

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Actions for countering a lack of definitive storage needs

- Identify the need for storage clearly set out for different scenarios (by utilities)
- National requirements should be assessed and run in parallel to renewable energy targets (by DCENR) – long term
- Include target for energy storage for 2020 and associated incentives for developers(by DCNER) – medium term
- Demonstration storage project?
- Further the investigation of initial energy storage needs for Ireland with further detail to establish definitive energy storage need (by EU stoRE project)
- Predictable future market and penetration of intermittent renewable forecast to enable a solid business case (by Policy makers – EU/National/Regulators)

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Actions for countering competition with other technologies for grid flexibility

- Energy Storage needs to be on the EirGrid DS3 agenda (short term)
- Storage needs to be investigated from a technical perspective as comparison to other options (short term)
- Question ERC/ESBN policy of GRID strength only

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Actions for countering strong interdependence between energy storage & system development

- Appropriate framework needs to be set to ensure future development of the wind industry in Ireland (by government)
- Cooperation required between energy companies and the government.
- Foresight required for the future needs of the country incorporating possibly “vote losing” strategies which will be beneficial in the long term

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Actions for countering double or uncertain grid access fees

- Study grid access fees issue – investigate best practise and consult in order to come to clear policy (by EirGrid – Long term)

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Actions for countering siting & planning constraints

- Conduct Strategic Environmental Assessment (SEA)
- Create national guidelines or guidance in relation to energy storage schemes (by DECLG) – short term
- Clear policy stipulating the overriding public importance of bulk EST based on reduction of current dependency on fossil fuels → allow for siting in suitable areas which may support Natura 2000 designations subject to Article VI Stage 3 & 4 assessments

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Other **Actions**

- Round table meeting of all vested interests to explore how to progress from here
- A more proactive CER

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Discussion

Action List

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