AZOROM

Review of Responses to Consultation on an Electricity Storage Policy Framework for Ireland

Summary Report

Prepared by Azorom

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the Environment, Climate and Communications

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TABLE OF CONTENTS

LIST OF FIGURES

Executive Summary

The Department of the Environment, Climate and Communications published their consultation paper *Consultation on Developing an Electricity Storage Policy Framework for Ireland* in November 2022. A total of 68 responses were received form a diverse range of organisations including industry representative bodies, storage and renewable developers, service providers, professional associations and a small number of individuals. Many welcomed the opportunity to input to the development of a framework for electricity storage and there was a high level of engagement with many respondents addressing all or some of the questions in the consultation document.

Respondents envisage a vital role for storage in the future electricity system. In addition to the contribution that storage is already making to the stability of the grid, respondents see that storage will enable the full utilisation of renewable energy resources, contribute to meeting peak demands on the system and will also be important for security of supply.

Respondents envisage that the future system will likely contain a mix of different technologies that will meet the needs for of intra-day, inter-day and longer duration storage. Green Hydrogen is seen as having a role in meeting the longer term storage requirement. Many responses also noted that thermal storage will be an important enabler for renewables to displace fossil fuel in heat production.

Summarising the views of respondents, a paradigm shift is required by government and industry and across a number of key areas to ensure that the vision for storage is realised. Respondents called for:

- Policy development and implementation by the government and EU to encourage the existing and upcoming technologies that will be required to achieve the net-zero targets
- The removal of obstacles to the participation of storage in the wholesale electricity and capacity markets
- Introduction of schemes which will provide the necessary level of assurance around long-term revenues to enable investment
- TSO & DSO having policy and processes on network configurations at local (distribution) and national (transmission) levels that encourage the development of storage
- Supports for research and development of storage technologies
- Timelines in in the planning process to be addressed
- Development and promotion of storage related standards, regulations and guidelines which will give owners, investors and the public confidence in the technologies
- The need to build public support for the energy transition, including communicating the critical role of electricity storage
- A forum of the key players in the industry to discuss issues of mutual interest

1. Introduction

1.1 The Consultation

The Department of the Environment, Climate and Communications published the consultation on their website on the 21st of November 2022. The webpage included a consultation document titled *Consultation on Developing an Electricity Storage Policy Framework for Ireland*.

The consultation document contained sections on:

- The Role of Storage in the Energy System
- The definition of Electricity Storage and Current Technology
- Hydrogen as a medium in for Electricity Storage
- Policy context for Electricity Storage
- Thermal Storage
- Grid issues & Storage
- Spatial Planning
- Safety
- Small Scale, Grouped and Aggregated Electricity Storage

Each section contained a number of relevant questions which respondents were encouraged to address. In total there were **33 questions** posed.

The closing date for submission of responses was the 27th of January 2023. **68 responses** were received to the consultation.

1.2 This Report

This report is a summary of the responses received to the consultation. This report does not aim to reflect the views of the Department of the Environment, Climate and Communications nor of Azorom.

The summary report is organized around the following themes:

- Role of Storage
- Technologies
- Policies and Measures
- Spatial Planning and
- Safety

The section on each theme includes a list of the questions in the consultation paper that relate to each theme.

The views and opinions in this report are the summarized views expressed in the responses to the consultation. Given the high levels of engagement with the consultation and the large number of responses received it is not practical to reflect in detail every opinion expressed across the 68 responses in this report. However, this report reflects the broad thrust and the range of the answers to the consultation questions.

2. Overview of Consultation Response

2.1 Number of Responses

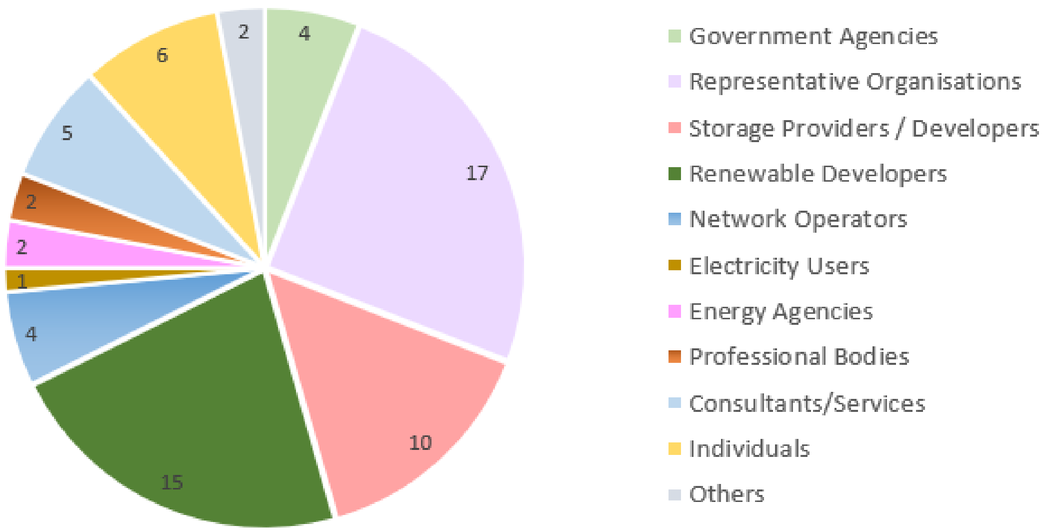

Figure 1 - Categorisation of Respondents

Figure 1 above shows a breakdown of the 68 respondents. As can be seen from the graph, industry representative organisations, storage solution providers / developers and renewables developers made up the majority of the respondents. However significant responses were received from various other parties and individuals that added a breadth and depth to the consultation response.

2.2 Level of Engagement

The 68 responses amounted to 811 pages. In addition, some responses included attachments.

Some respondents provided a general commentary including key points and then addressed each of the 33 questions in turn. Others addressed a small number of topics and questions that they had particular interest in. A small number provided information relevant to the topic without addressing any of the questions per se.

Nine respondents addressed all the questions in the consultation document. Figure 2 below shows our analysis of the number of respondents that addressed each of the questions in the consultation.

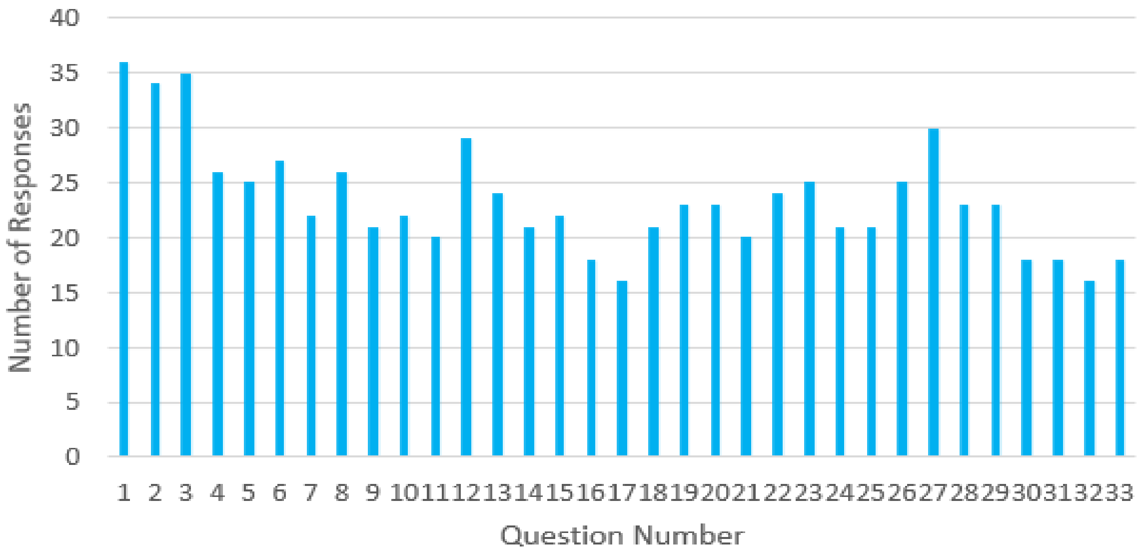

Figure 2 - Number of Responses per Question

We found crediting a respondent with answering a question was not an exact science. In some instances we credited respondents with addressing a question where they had relevant content but not under a specific heading containing the question. Also, in some cases respondents when answering a question simply referred to an answer given to a different question. This was understandable as some of the questions in the consultation were similar.

2.3 Methodology for Summarising the Responses

The approach we adopted to analyse the responses received and develop this report was as follows:

- The questions were grouped into themes:
- A template was prepared for note taking based on the themes and their associated questions
- Submissions were reviewed and notes recorded in the standard template

The notes were then consolidated by theme. The consolidated notes then formed the basis of the report write-up.

3. Summary of Responses

3.1 Role of Storage

Q1. In broad terms, what future role do you see for electricity storage in the energy sector?

Q30. What role do you see for small-scale aggregated storage over the next ten years in supporting the decarbonisation of the electricity sector and how do you see the area developing?

Many of the respondents asserted that various types of storage will play a key role in the electricity system of the future fulfilling the following functions:

- **Provision of System Services**

  A number of respondents pointed out that storage is already deployed in Ireland to provide system services, such as fast frequency response, to help maintain system stability.

- **Maximising the benefit of the Investment in Renewables**

  Many of the respondents pointed to potential role of storage to reduce constraints on renewable generation. One respondent provided a report that suggests that over supply can be reduced by 60% and constraint volumes by 90% with effective management of energy storage.

  One respondent highlighted the potential benefit of strategically locating storage to avoid curtailment due to transmission capacity constraints.

- **Meeting Peak Demands**

  Some respondents pointed to the possibility of storage contributing to meeting peak demand on the system.

  One respondent highlighted the role that flexibility services including storage could play in containing the need for reinforcement of the Distribution system.

- **Security of Supply**

  Many respondents noted that renewable electricity is variable and that periods when renewable electricity production is limited will represent a challenge to the electricity system of the future.

  Storage facilities, if capable of holding energy for long enough could be the basis of electricity generation in these periods and thus contribute to security of electricity supply.

- **Enabling the Renewable to displace fossil fuels in the generation of heat**

  A number of respondents specifically referred to possibility of utilizing electricity generated by renewables to store heat in end user installations (e.g. water tanks) for later use displacing the production of heat by burning fossil fuels.

A number of respondents stated that storage at domestic and community level can absorb local renewable production and reduce peak demand on local substations and networks and thus reduce the need to invest in the infrastructure and also limit losses in the distribution system. A further potential stated advantage is that it can be owned by local communities and householders increasing awareness and participation in energy system transformation.

A few respondents suggested that storage at domestic level is unlikely to make a significant contribution to 2030 goals and that the focus for the moment should be on aggregated storage installed at commercial and industrial sites and thermal storage in particular.

3.2 Technologies

Q4. Do you believe there is a saturation point for battery storage, whereby adding further battery capacity provides limited benefit to the system? If so, how would you define that saturation point? Please provide evidence to support your argument?

Q5. What technologies for electricity storage are currently in use internationally? What are their main characteristics and which ones should be considered for use in Ireland?

Q6. What emerging technologies for electricity storage should be considered for future use in Ireland?

Q7. What are the main characteristics of these emerging technologies?

Q20. What electricity storage technologies exist that can provide Long Duration Storage to balance supply and demand in an electricity system that relies heavily on renewable power?

Q21. Do any emerging technologies have the potential to provide Long Duration Storage in the future?

3.2.1 Overview

A number of respondents referred to the list of technologies in Appendix 1 of the Consultation document *Selected Electricity Storage Technologies* saying that it is a good summary of storage technologies both mature and emerging. Some others pointed to a description of technologies on the European Association of Energy Storage website (c. ref. Technologies | EASE: Why Energy Storage? | EASE (ease-storage.eu)).

Many respondents referred to the need for multiple technologies of varying capabilities and durations. In addition to the lithium ion batteries already on the system, longer duration storage technologies such as pumped storage, compressed air, liquified air, and different battery technologies will be important :

- In managing multi-hour within day weather variability
- Providing system adequacy
- Capturing excess generation

Some respondents highlighted that electricity can be converted to various forms of energy for storage including chemical, heat and gas which can either be re-converted back to electricity or used for other purposes. Hence, they argued that the policy framework needs to include all of these forms of energy storage and use.

Many respondents referred to green hydrogen production and storage saying it will be important in providing security of supply and in managing and providing flexibility in the system. A number of respondents referred to the role that storage of heat generated by renewable electricity will have in the future low carbon energy system.

Some respondents noted that it was important to consider demand response. Whilst it is limited, it is the most cost-effective form of flexibility available.

3.2.2 Batteries

A number of respondents pointed to Lithium Ion (Li-Ion) batteries as a mature technology already deployed in Ireland providing fast response system services in the DS3 programme. Some respondents stated that Li-Ion batteries have a round trip efficiency of > 80%.

Some respondents referred to the limited duration of Lithium Ion batteries and some also highlighted the potential fire risk of this technology. Issues around the sourcing of lithium was also mentioned by a few respondents.

A number of respondents referred to developments in other battery chemistries that offer longer duration (6-12 hours with round trip efficiency of 60% - 80% was quoted by one respondent). Some of these use materials which are more readily available than those required for Li-Ion batteries. These alternative technologies were said to be less energy dense and would have a greater spatial requirement. This is less of a problem in the electricity industry than in EVs where space and weight is at a premium. A number of respondents referred to Vanadium Redox flow batteries specifically and referenced projects where this technology was being evaluated.

In relation to the question posed regarding a saturation point for battery storage, respondents distinguished between short duration and long duration battery storage. Some respondents argued that we were at or close to a saturation point for short duration storage but that there was considerable scope for longer duration battery storage. Many respondents argued the framework should set out the volumes of flexibility and storage for the various durations and ensure incentives and procurement arrangements to meet these requirements. They also argued that the policy should not set a preference or a limitation relating to any particular technology.

One respondent referred to the possibility of the use of second-life batteries for electricity storage. They recommended that this should be considered for future use in Ireland, given the predicted increase in Electric Vehicles (EVs) to decarbonise transport. It also has the benefit of extending the useful life of batteries and minimising recycling.

3.2.3 Pumped Storage

Two responses were received from pumped hydro storage developers and a number of other respondents commented on this technology.

The advantages of pumped hydro storage projects that are cited by respondents include:

- It is a well-established technology internationally and in Ireland
- Pumped Hydro storage projects provide a long duration output, substantially longer than say the Lithium-Ion batteries currently on the system
- Pumped hydro storage projects have a high level of round-trip efficiency
- Pumped hydro storage projects can have a very fast response time and thus can make a substantial contribution to system services
- Pumped Hydro storage projects do not suffer from degradation over time
- Pumped hydro storage projects have a very long operational life with minimal maintenance requirements

Challenges of pumped hydro storage projects were also cited, including that pumped hydro storage projects require particular geographical features and substantial capital investment.

3.2.4 Green Hydrogen Storage

Q9. What role do you see for green hydrogen storage in helping to decarbonise the electricity sector vis-à-vis other long-duration storage technologies?

Q10. How do you see the hydrogen storage industry developing in Ireland over the next ten to fifteen years and do you think green hydrogen storage is likely to dominate the long duration storage sector as we reach 2050?

A number of respondents referenced the particular role that green hydrogen storage could potentially play in the future electricity system in terms of security of supply. They pointed out that:

- Stored green hydrogen and associated hydrogen based generation could be part of the solution to “Dunkelflaute” events i.e. longer periods of time (days / weeks) when there are low wind speeds and low levels of sunlight and so little renewable energy can be generated.
- Stored green hydrogen could be used to balance supply and demand between seasons.

One respondent stated that green hydrogen has a low “round trip“ efficiency when used in power generation, particularly in conventional combustion technologies such as turbines and therefore it is not an optimal fit for shorter intra-day or inter-week storage.

One responded stated that utilization of stored hydrogen for electricity production requires converting it back to electricity utilizing hydrogen compatible gas turbines or fuel cells. They stated that these technologies have yet to be proven on a large scale and it will take many years for the infrastructure to be developed. Therefore, green hydrogen storage is unlikely to make a significant contribution before 2030.

One respondent recommended that new gas generation plant should be mandated to be renewable gas or hydrogen ready or be capable of being converted to 100% hydrogen.

Possible options for storage of green hydrogen that were cited include salt caverns, aquifers and depleted gas/oil reserves. One respondent referred to the possibility of the development of a large scale salt cavern storage at Islandmagee in Northern Ireland. It is envisaged that this facility would be initially used to hold natural gas but could be converted to a storage facility for green hydrogen. Another respondent said that hydrogen interconnectors, hydrogen networks and localised storage may collectively reduce the requirement for large scale storage facilities.

One respondent said that storage technology should comply with the three criteria set out in the Department’s Energy Security Review consultation. They suggest that a “strategic onshore Energy Storage facility” can provide an optimum energy security and decarbonization solution to the electricity sectors and other sectors of the economy. Such a facility could be designed to facilitate the commencement of green hydrogen storage and distribution.

3.2.5 Thermal Storage

Q11. What role do you see for thermal storage in terms of its ability to support the decarbonisation of the electricity/industry sector?

What advantages/disadvantages does it pose vis-à-vis other storage technologies and what changes, regulatory or other, would be required?

What role do you see for thermal storage as a long-term (e.g., seasonal) energy storage in Ireland?

Many respondents highlighted the role that thermal storage could have in utilizing electricity generated from renewable sources to displace fossil fuel as a source of heat in industrial, commercial, district heating and domestic settings. Generally, heat is stored close to the point of use. To maximise efficiency, heat pumps should be used to convert electricity to heat.

A number of respondents highlight the potential role of district heating in the energy system of Ireland in the future where it is envisaged that the source of heat will be renewable electricity displacing fossil fuel. Estimates of 54% (SEAI) and 58% (Europa-Universitat Flensburg 2019) of Irish buildings being suitable for district heating are referenced. Thermal storage facilities would also be part of district heating schemes.

Thermal storage mediums could range from high temperature phase changing materials to domestic hot water cylinders. Tank storage can range from domestic tanks of 100 litres to 200 litres to large scale tanks, for example, there was reference to a 56 million litre tank being installed for a Berlin district heating system.

A number of respondents highlighted Denmark where over 50 GWh of thermal storage is deployed. When there is excess wind generation, electric boilers and heat pumps are activated to produce heat for district heating schemes. If there is no demand for heat at the specific time, the heat is stored until a heat demand occurs.

A number of respondents referred to underground thermal energy storage systems (UTES) that could be part of a district heating system:

- Pit Thermal Energy Storage (PTES)

  This is a large reservoir with a waterproof lining filled with water and covered with a further water proof and insulated layer.

  However, it does require significant land area and favourable ground conditions.

- Aquifer Thermal Energy Storage (ATES)

  This is feasible where there is an aquifer covered by a clay layer.

These solutions can be used as an inter-seasonal storage for district heating with heat energy being captured in the summer and released in the winter.

A number of respondents included the graphic in Figure 3 below (source not available) which shows the CAPEX cost / MWh of thermal storage relative to battery and pumped storage technologies. This graphic indicates that the specific costs of higher capacity thermal storage are lower than certain types of battery storage and pumped hydro storage.

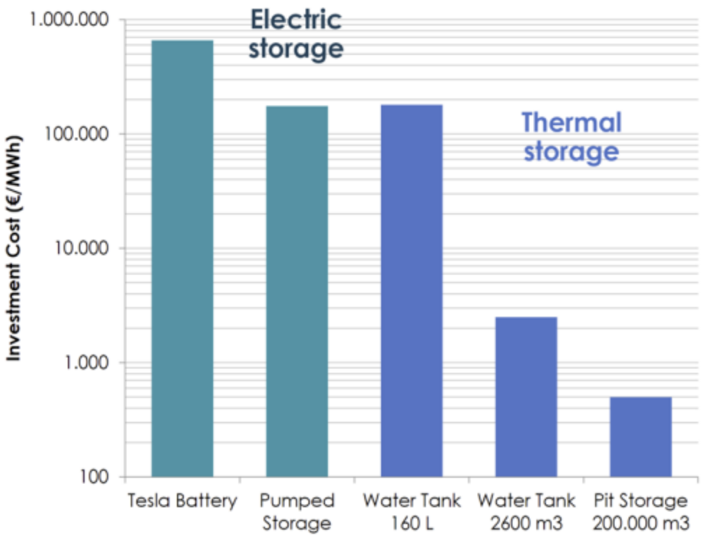

Figure 3 - Energy Storage Cost Comparison

A number of respondents referred to the thermal storage as providing dispatchable demand which can be a source of flexibility and system services to the TSO. Electric boilers and heat pumps charging thermal storage facilities can be disconnected in the event of a contingency on the electricity system.

3.2.6 Storage and Demand Side Response

> Q8. In terms of creating a balanced portfolio of technologies, how do you see the relationship between storage and demand-side response, alongside other flexibility measures, developing if Ireland is to meet its decarbonisation objectives?

Some respondents pointed to the similarity between demand side response and storage in that both technologies enable the time shifting of demand to better match the availability of generation and to manage network constraints. Many respondents argued that that there is a role for both in providing flexibility and that behind the meter storage already operates as part of demand side units providing the same services as front of meter storage assets.

It was suggested by some that demand side response is the cheapest form of flexibility but that it is limited by the needs and behavior of end users. One respondent stressed that there is substantial potential for storage in locations where the need for flexibility is greater than what can be provided by demand response.

A number of respondents asserted that the future power system will need flexibility from multiple sources and that the policy should ensure that providers can compete fairly to provide the best outcome for the system and the ultimately electricity customers.

3.3 Policies and Measures

Q2. What barriers exist that might prevent electricity storage from fulfilling this role or roles?

Q3. What regulatory and policy measures are needed now to ensure that electricity storage does fulfil its optimum role in the energy system?

Q24. Do you agree with the barriers to long-duration storage as outlined above? Are there other barriers not included here that need to be considered? Please provide supporting evidence if possible.

Q25. Are specific incentives or regulatory changes needed to address these barriers?

3.3.1 Policy Framework

Many respondents expressed the view that cooperation, collaboration, and engagement between DECC, the CRU, the System Operators, and industry is crucial to progressing the development of energy storage in Ireland. Many respondents welcomed this policy consultation with some indicating that it was urgently required.

Some respondents noted that the Policy framework must respond to the evolving nature of EU energy policy. In this regard the RepowerEU Plan was mentioned by many respondents and especially the Recovery and Resilience Facility (RRF) of the plan.

Many respondents stated risks faced by developers in the industry. For example, no decisions on follow-on to system services contracts, long decision and implementation timeframes, and proposals for changes to DS3 tariffs after investment decisions had been made.

While it was acknowledged that issues were being progressed, some argued that the timeframes were too long and that in the interim short-term solutions were needed to bridge the gap. This was especially true in order to attract long-term storage and it was strongly expressed that action needed to be taken now to ensure participation over the next few years. One respondent summarised by saying that it '*is essential that the Department addresses risk and certainty through an interim set of solutions and a permanent framework regarding energy storage investment and market participation'.*

A number of respondents made the point that Green Hydrogen needed to be considered in a much broader context than electricity storage because any policy needs to take account of the potential use of hydrogen for heating and transport as well as how it will be merged with natural gas in the existing gas grid and its potential for export.

3.3.2 Changes to Markets Arrangements

Q12. Do the current arrangements for the procurement of system services provide an effective marketplace for electricity storage units to offer these services to the TSO?

Q13. Do the current arrangements adequately compensate electricity storage units for the services that they to the grid? Are there any services which storage provides to the grid that are not currently adequately compensated?

Q14. Do the current arrangements for the advance procurement of generation capacity services provide an effective marketplace for electricity storage units to offer these services?

Q15. Are there any changes to the current arrangements that would allow a more effective use of electricity storage to provide capacity to the electricity market?

Many respondents asserted that the existing market structure and arrangements do not provide a revenue stream for investments in longer term (> 2Hr) storage and cite the following specific issues:

- **Day Ahead and Balancing Markets**

  The inability of storage to participate fully in the day ahead market and balancing market and the restrictions on charging were cited by many respondents as a major revenue limiting restriction.

  Many respondents referred to the need for changes in the TSOs scheduling and dispatch systems to allow storage installation to participate in the wholesale markets. Some respondents recognised that the TSOs work programme could deliver the necessary changes but are concerned about the time scale.

  One respondent suggested that as an interim measure that the TSO could be directed to set a non-zero MW deemed firm access quantity for batteries. In addition, a “Follow-PN approach” could be introduced that would involve the default dispatch of the storage asset against positive FPN as per any ex-ante position.

  A number of respondents also highlighted the volatility in market prices and thus uncertainty in the revenue that might be earned through arbitrage over the long term.

- **Capacity Market**

  The price cap in the capacity auctions being based on best new entrant gas generation plant is not favorable to storage developments that have a higher CAPEX per MW relative to gas generation plants.

  Furthermore storage has de-rating factors applied due to limitations on duration compared to gas plants which limits the revenue that can be earned by storage entities in this market.

  Some respondents propose adjustments to the existing auction process involving:

  - Removal of de-rating factors for storage
  - A scalar to be applied to storage capacity offered to recognise that storage is a zero carbon technology with the capability of capturing excess renewable generation

- A longer duration contract could be offered to storage with a higher investment limit

Other respondents proposed a separate auction for storage effectively recognising it as a separate system product.

One respondent went as far as saying that CRM payments should be phased out for fossil fuel generation.

Some of the respondents acknowledged that market issues are being addressed but it was stressed that the time taken to make decisions and to develop enabling systems is too long. It was recognised that '*in the longer term, EU target model for net zero will be developed'* but in the meantime short-term fixes were needed.

3.3.3 Supporting Investment in Storage

Q22. What policy and market arrangements, if any, are needed to facilitate investment in Long Duration Storage?

Q23. Are there other ways in which Government can support the acceleration of long duration storage in terms of promoting research and development?

A number of respondents highlighted that generally storage technologies have large upfront capital costs and for this reason it is important to have more certainty and less risk about the potential revenue stream.

Many respondents suggested schemes similar to the Renewable Energy Support Scheme (RESS) need to be put in place for longer duration storage to provide a level of certainty about revenues over a substantial period. One respondent put forward some principles on which a scheme could be based:

- Bidders would bid in a required revenue floor
- Proposals would be ranked based on the difference between the calculated benefit to the system and the cost (the bid revenue floor)
- Benefits would be calculated based on full system and network model and should take account of locational benefits
- Successful projects would participate in the markets ensuring efficient near time operation of the markets
- A fixed proportion of revenues arising above the floor price during the term of the contract would be shared with customers

There was a strong feeling among respondents that the market should decide what technologies were employed and that any services sought should be technology neutral.

Many respondents felt that it was necessary to establish firm targets for different storage durations.

Some respondents felt there was a place for grants for R&D and one respondent felt that this was especially true for domestic level products and market participation.

In relation to green Hydrogen storage specifically, one respondent argued that hydrogen storage would need to be in place ahead of demand to enable growth of the market. i.e. before commercial revenue streams are in place. They argued that the scale of investment would be such that revenue guarantee schemes would need to be put in place to underpin the investment risk.

3.3.4 Network Connections and Charges

Q26. Discuss how the current network tariff structure affects the business case for storage in Ireland. What changes, if any, do you propose?

Q27. Are changes needed to the way that applications for new grid connections for storage units are considered under the CRU's Enduring Connection Policy? Are there additional opportunities to connect behind-the-meter storage at generator sites or demand-customer sites that would not involve the need for additional grid construction?

Apart from the market issues many respondents referenced network related issues that negatively impact on development opportunities for storage. The following are cited as barriers to the development of "hybrid "projects that would allow storage to share connections with wind or solar assets:

- Multiple legal entities are not allowed behind a single connection
- Installed generation capacity cannot exceed 120% of the permitted maximum export capacity (MEC)

Also, the last enduring connection policy decision (ECP-2) limited the number of storage and other system services projects that would receive connection offers to 10 per annum.

Respondents proposed changes to connection policy, processing of connection applications and use of system tariffs.

3.3.4.1 Connection Policy

Many respondents asserted that it was important to allow sharing of maximum export capacities (MECs) and / or multiple legal entities behind the meter. Related to the later possibility, respondents asserted that the limit on installed generation capacity in excess of the MEC should be removed. It is argued that these measures would enable storage to be developed alongside renewable generation so that the output of the generation could be stored and exported to the grid at a time when it would be more beneficial.

For similar reasons, a number of respondents proposed that private connections which would connect renewable generation to storage facilities including hydrogen production / storage facilities should be permitted.

A number of respondents argued that flexible / non-firm connections should be available to industries with heat demand. This would allow them to import electricity at a time when there is spare capacity in the local grid and use it to generate heat which could be stored and used at later time avoiding the production of heat by fossil fuels.

3.3.4.2 Processing of Connection Offers

A number of respondents suggested that a new batch of connection offers be issued in 2023 but with changes in the criteria that determine which applications get offers that would allow more storage developments receive offers. The changes proposed to the rule set were:

- All hybrid developments be treated as a renewable energy generator
- The limit on the number of system services / storage sites that can receive offers be removed
- There should be a separate prioritization criteria for storage sites base on
    - MWh Capability
    - Earliest planning date

3.3.4.3 Use of System Charges

Many respondents argued Use of System (UoS) charges for storage should reflect the likelihood that flows from storage would generally be countering the background grid flow.

Some respondents argued that the charges in the use of system tariffs that relate to the maximum import capacity (MIC) and to energy import of a site should not be applied for storage facilities. A variation on this proposed by one respondent is that the MIC charge should be based on the “house” load only. A rationale put forward for these proposals was that there was minimal net use of electricity by the electricity storage installation.

A number of respondents put forward the idea that UoS system tariffs for storage should be designed around:

- No Charge related to maximum import capacity
- Dynamic charges based on kWh import and export which
    - would depend on network conditions
    - would be negative i.e. a credit would be applied when export from the storage facility was reducing the demand on the network or in the case of TUoS when import was absorbing renewable generation that would otherwise be constrained off

One respondent put forward that idea that lower TUoS / DUoS tariffs should apply to demand that is dispatchable.

One respondent put forward the view that flexibility which can be provided by demand side response as well as storage should be incentivized not by tariff adjustments but rather by separate flexibility products with the incentives being time varying and also related to the status of the local network.

3.3.5 Storage and Local Flexibility Markets

Q16. Do the current and in-development arrangements for the procurement of flexibility services, including from storage, provide an effective marketplace for electricity storage units to offer these services?

Q17. Are there any changes to the current or proposed arrangements that would allow a more effective use of electricity storage to provide localised flexibility on the electricity distribution system?

In relation to storage, and the development of arrangements by the DSO to procure local flexibility, respondents suggested that:

- Behind the meter storage units would need access to a combination of revenue streams
- Behind the meter storage units should be permitted to participate in both the TSOs system services arrangements and the DSOs flexibility tenders
- End users can use behind the meter storage to import electricity at times when their tariff is low and utilise the stored electricity to reduce or avoid import at times when their tariff is high.

  Revisions of tariff structures could increase the energy cost savings achievable using behind the meter storage in this way.
- Retailers should be encouraged to make tariffs available to customers such that during "high carbon periods" consumers are incentivised to avoid using and storing energy and are instead incentivized to feed electricity into the grid
- If consumption could be dispatched by the TSO and the DSO then active consumers and energy storage providers could help avoid constraints on the generation of renewable electricity in their locality.

3.3.6 Renewable Energy Support Scheme (RESS)

Q18. Do the current RESS arrangements allow project promoters to combine renewable generation with electricity storage in a way that would contribute to the efficient and reliable production and use of renewable electricity?

Q19. Are there any changes to the current arrangements for subsidising new renewable generation projects through RESS that would allow a more effective and beneficial use of electricity storage in hybrid projects that combine renewable generation with storage?

In relation to the Renewable Energy Support Scheme (RESS), respondents generally acknowledged that hybrid and renewable projects were eligible for RESS 2 but some argued that under the existing rules and restrictions hybrid projects could not be competitive in the auction process.

Please note that RESS is a separate policy which is developed by DECC. It is currently in round 3 (RESS 3) for onshore and round 1 (ORESS 1) for offshore. Some of the below has already been captured in the design of those schemes or will be taken into consideration as part of the next schemes. Additionally some of the below issues are policy proposals for the CRU which are already under consideration.

Some respondents suggested that the following changes were required to RESS.

- The issues related to network connections should be addressed; namely
  - Removal of the 120% over-install limit
  - Allowing multiple legal entities behind the meter
  - Allowing dynamic sharing of MEC
- Storage that is part of RESS supported projects should be allowed to participate in the system services and capacity markets

- Charging of behind the meter storage that is part of a hybrid project from the grid should be permitted

  It is acknowledged that this would require enhanced metering at the site.

- RESS payments should be based on both electricity provided to grid directly and to the storage assets (after adjusting for round trip efficiency)
- Projects involving wind + solar + storage should be deemed eligible in RESS 3
- RESS Projects should be allowed to add storage assets in the future

3.3.7 Small scale and aggregated Storage

Q31. What are the biggest challenges/barriers to ensuring small-scale and EV storage are deployed effectively to support the grid?

Q32. What information or resources would be required to assist prosumers to engage in demand side flexibility and services to the DSO in relation to their storage technologies?

Q33. Time of Use Tariffs and Smart meters are widely available in Ireland. What other technical, market, regulatory and/ or digital arrangements need to be put into place to support prosumers to engage in demand side flexibility and services to the DSO in relation to their storage technologies

Respondents suggested several types of information and resources would be required to enable and support prosumers to engage in demand side flexibility and services to the Distribution System Operator (DSO) in relation to their storage technologies. These included:

- Technical information:

  Prosumers would need detailed technical information about their storage technologies, including information on system capacity, power output, and energy efficiency.

- Connection and integration guidelines:

  Prosumers would need guidelines on how to integrate their storage technologies into the grid, including information on how to connect to the grid, how to communicate with the DSO, and how to comply with grid codes and regulations.

- Market and tariff information:

  Prosumers would need information on the various markets and tariffs available to them, including information on how to participate in demand response programs, how to sell excess energy back to the grid, and how to access any subsidies or incentives that may be available

- Data management and monitoring tools:

  Prosumers would need data management and monitoring tools that allow them to track their energy production and consumption, and to communicate with the DSO.

- Cybersecurity guidelines:

Prosumers would need guidelines on how to protect their storage systems from cyber attacks and how to comply with cybersecurity regulations

3.4 Spatial Planning

Q28. What policy changes might be needed to help set standards, regulate construction and monitor operations of electricity storage units and related planning issues?

There were several significant submissions on the issues of Spatial Planning. Respondents suggested that the following should be considered:

- The Planning Process needs to be changed and streamlined to ensure approval and delivery of energy storage projects in a timely fashion
- To achieve this, the government should highlight the benefits of storage technologies and ensure that the wider public is informed on an ongoing basis of delivery of the various technologies and initiatives
- Public acceptance of several of the REPowerEU initiatives is in place e.g. Electric Vehicles, Photovoltaic, Solar heating, Heat pumps, high insulation design in houses etc. It is important that these are used to promote future developments required to achieve REPowerEU
- Greater certainty is required in the Planning Process to provide an environment for investment in energy storage projects
- It is important that spatial planning needs for energy storage are considered in line with any EU Directives, particularly with provisions included in RePowerEU
- REPowerEU focuses on faster permitting of renewable energy infrastructure and a key suggestion is that energy storage is included in these considerations as an overriding public interest in Irish planning legislation
- EU environment legislation should be adopted and reflected in Irish legislation
- The involvement of the Transmission System Operator (TSO) and Distribution System Operator (DSO) are imperative to ensure the appropriate decisions are made on the type and location of electrical energy storage systems
- Should any changes to planning arrangements for storage energy systems be proposed in the future, consultation on and engagement should be carried out with industry
- The government will need to communicate that electricity storage is one of the safer ways in which we can transition successfully from having to rely on fossil fuels to produce our energy
- There will different solutions which will be location specific:
    - Geographically due to specific natural conditions e.g.:
        - Caverns for underground storage
        - Hydroelectric pumped storage
    - Electricity System conditions:
        - Specific locations on the distribution system that will benefit from stored energy technologies
        - Specific locations on the transmission system that will accommodate and benefit stored energy technology for system stability and security

3.5 Safety

Q29. How should Government communicate and engage with the public regarding the critical role of electricity storage in supporting the energy transition, and the safety measures which are in place?

There were several significant submissions on the issues of safety and communication with the public, in particular the introduction of electricity storage into various environments e.g. residential.

Some respondents made the below points/recommendations regarding safety:

- New methods & technologies for storing electricity are required to achieve REPowerEU and to maintain distribution and transmission system stability. These technologies bring their own advantages and challenges from a number of aspects including societal acceptance
- EU standards and regulations should be adopted in Irish standards
- The responses included a small number which highlight potential safety hazards related to electricity storage technologies.
- A number of submissions addressed options for risk mitigation e,g. through the application of standards and regulations pertaining to design, installation and operation of storage systems
- The government will need to communicate that electricity energy storage is one of the safer ways in which to transition successfully from having to rely on fossil fuels to produce our energy
- To demonstrate this, the government should highlight the benefits of storage technologies and ensure public awareness / education regarding electricity storage technologies.
- A communication / education and information strategy is required and should include implementation of technologies in other EU countries and internationally