EASE

European Association
for Storage of Energy

Activity Report 2018

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We would like to extend our sincere thanks to the EASE members who helped make this publication possible.

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The European Association for Storage of Energy

The European Association for Storage of Energy (EASE), located in Brussels, Belgium, is the leading member-supported association representing organisations active across the entire energy storage value chain. EASE promotes the deployment of energy storage to support the cost-effective transition to a resilient, low-carbon, and secure energy system.

EASE was established in 2011 and currently represents more than 40 members including utilities, technology suppliers, research institutes, distribution system operators, and transmission system operators. Together, EASE members have significant expertise across all major storage technologies and applications. This allows us to generate new ideas and policy recommendations which are essential to build a regulatory framework that is supportive of storage.

Our Mission

- **Stimulate** the development and deployment of innovative & cost-effective energy storage technologies;
- **Promote** a fair and future oriented energy market design that recognises storage as an indispensable element of the energy system;
- **Establish** a platform for information-sharing on energy storage technologies and applications.

Why Energy Storage?

Energy storage is an essential enabler of the energy transition. It supports Europe in its efforts to integrate increasing shares of solar and wind into the energy system and to meet its ambitious decarbonisation objectives.

The deployment of variable renewables – wind and solar – is accelerating around the world, driven by massive cost reductions and government and citizens' efforts to fight climate change. In the past decades, Europe has shifted from an energy system dominated by centralised fossil fuel generation that can be dispatched to match energy consumption at all times, to a system with more and more renewables.

The European Union is setting increasingly ambitious targets for the decarbonisation of the electricity, heating, cooling, and transport sectors. In its 2050 Long-Term Strategy, the European Commission envisions a fully decarbonised power generation by 2050, with 80-85% of electricity generation being met by variable renewables.

Although this transformation brings many opportunities – clean energy, less pollution, empowered consumers who can actively produce electricity to cover their own needs and/or to feed into the energy system – it also entails major challenges. Most importantly, what happens when consumers need clean energy but there is no wind, and no sun? How can we address the increasing challenges in the operation of the electricity system due to the increased share of renewables?

Decoupling energy generation and consumption, both geographically and over time, is fast becoming a top priority for the energy sector. Storage is one of the most promising enabling technologies for a renewables-dominated system.

Energy storage technologies allow us to store excess energy and discharge it when there is too little generation or too much demand. There are many different types of technologies in development and on the market today: batteries, pumped hydro storage, thermal storage, flywheels, ultracapacitors, liquid air, compressed air, power-to-gas, and others.

What all storage technologies have in common is that they provide flexibility at different time-scales – seconds/minutes, hours, weeks and even months – which will be essential to achieve a high share of renewables. Storage can help consumers increase their self-consumption of solar electricity, or to generate value by providing flexibility to the system. Storage

Storage site of Chemery, France.

can help defer costly investments in transmission and distribution infrastructure, extending the lifetime of existing assets and helping grids function more efficiently.

Industrial consumers can install storage to reduce consumption peaks, which normally entails costly charges, and to provide back-up power if there is a black-out. In addition, storage at any level can offer system services, safeguarding the secure and efficient operation of the electricity system.

The transport, heating, and cooling sectors today depend on fossil fuels, but through electrification these sectors could run on clean energy with the help of energy storage. For instance, storage deployment could help support the roll-out of very fast charging infrastructure for electric vehicles, particularly in areas with weak grids.

Given the immense value of storage in helping integrate ever increasing shares of renewables, it is no surprise that storage deployments are quickly increasing. According to data from the European Market Monitor on Energy Storage made by EASE in collaboration with Delta-ee published in June 2018, annual installed electrical storage capacity (excluding pumped hydro) is expected to grow almost sixfold between 2015 and 2019, from 0.6 GWh to 3.5 GWh. In the longer term, the European Commission's 2050 Long-Term Strategy foresees an even more significant increase in storage deployment capacity - including pumped hydro storage, power to gas and heat storage - reaching between 250 TWh and 450 TWh by 2050 (up from 30 TWh today).

In order to reach this level of wide-scale energy storage deployment, policymakers, industry, and other stakeholders from across Europe must continue working together to create a supportive regulatory framework that will allow the storage sector to thrive. Public support for energy storage R&D must increase, and barriers to investment must be removed. These steps can go a long way in terms of enabling the European Union to meet its 2030 and 2050 objectives, with the support of a growing innovative energy storage sector.

> Europe must continue working together to create a supportive regulatory framework that will allow the storage sector to thrive. Public support for energy storage R&D must increase, and barriers to investment must be removed. These steps can go a long way in terms of enabling the European Union to meet its 2030 and 2050 objectives.

Storage Lab, Codrongianos, Italy.

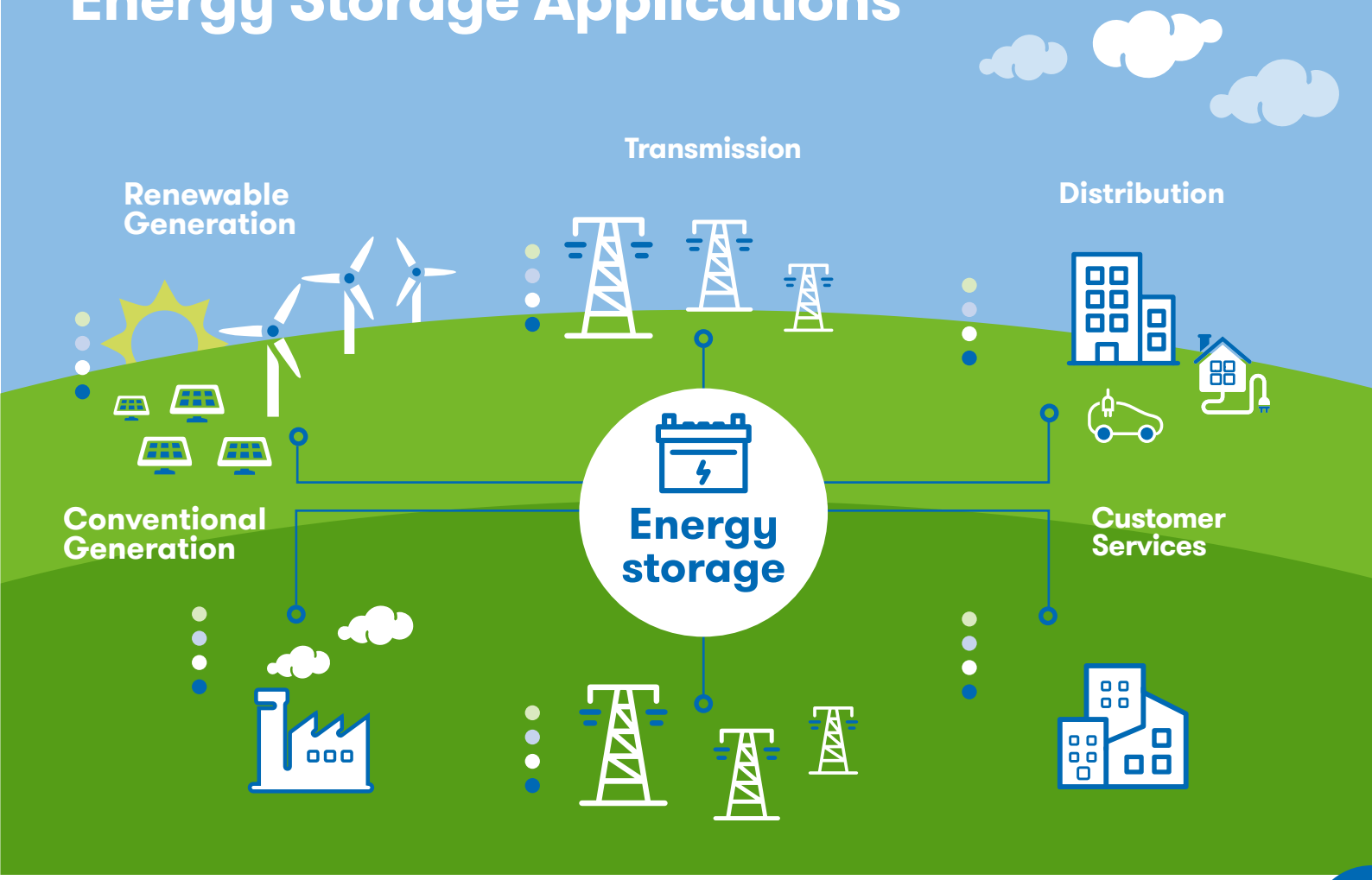
Energy Storage Technologies

EASE and its members support the development of all energy storage technologies, which can be deployed in different configurations and suit a wide range of applications, easing the integration of renewables and enabling the decarbonisation of the energy system.

In order to clarify the diversity of storage technologies, EASE suggests a classification into five families: chemical, electrical, elctrochemical, mechanical and thermal. Being a field that evolves constantly thanks to research, the technologies that belong to each category may also evolve over the years – therefore, the list should not be considered as exhaustive.

- **Chemical**
  - Ammonia
  - Drop-in Fuels
  - Hydrogen
  - Methanol
  - Synthetic Fuels
  - Synthetic Natural Gas
- **Electrochemical**
  - Classic Batteries
    - Lead Acid
    - Li-Ion
    - Li-Polymer
    - Li-S
    - Metal Air
    - Na-Ion
    - $Na\text{-}NiCl_2$
    - Na-S
    - Na-Cd
    - Na-MH
  - Flow Batteries
    - Vanadium Red-Ox
    - Zn-Br
    - Zn-Fe
  - Hybrid Supercapacitors
- **Electrical**
  - Supercapacitors
  - Superconducting Magnetic Energy Storage (SMES)
- **Mechanical**
  - Adiabatic Compressed Air
  - Diabatic Compressed Air
  - Liquid Air Energy Storage
  - Flywheels
  - Pumped Hydro
- **Thermal**
  - Latent Heat Storage
  - Sensible Heat Storage
  - Thermochemical Storage

Energy Storage Applications



It is possible to integrate energy storage at all levels of the energy system: generation, transmission, distribution, and consumption. Energy storage does not fit neatly and entirely into any of these phases – but can play a relevant role in all of them. EASE has classified the possible applications and contributions that energy storage can provide in the energy system, organising them according to the segments of the energy system:

Renewable Generation

- Distributed generation flexibility
- Capacity firming
- Limitation of upstream disturbances
- Curtailment minimisation
- Ancillary services renewable energy sources support

Conventional Generation

- Support to conventional generation
- Black start
- Arbitrage
- Electric supply capacity

Transmission

- Primary, secondary and tertiary frequency control
- New ancillary services
- Participation to angular stability
- Investment deferral
- Improvement of the frequency stability of weak grids
- Transmission support

Distribution

- Capacity support
- Reactive power compensation
- Distribution power quality
- Limitation of upstream disturbances
- Intentional islanding
- Contingency grid support
- Dynamic local voltage control
- Investment deferral

Customer Services

- Provide continuity of energy supply
- End-user peak shaving
- Manage time-of-use energy cost
- Provide particular requirements in power quality
- Compensation of the reactive power
- Limit upstream disturbances
- Electric vehicles integration
- Demand charge management
- Continuity of energy supply

Foreword by Miguel Arias Cañete

Miguel Arias Cañete
European Commissioner
for Energy and Climate Action

Five years ago, when this Commission started, President Juncker set a very clear priority for it: the objective of making Europe a global leader in energy transition through the delivery of the Energy Union. At the time, such statement was a vision, but today it has become something else - a necessity. Gladly, we have various instruments to achieve this goal at our disposal.

Fighting climate change has become a challenge that is fully compatible with profitable business, driving investments, innovation, growth and jobs. The clean energy transition is a perfect example of that, representing an opportunity to all actors involved.
As time goes by, more and more industries, communities, institutions and researchers are coming to this realisation, which is why worldwide, the energy system is already transforming. The European Union needs to be at the forefront of such transformation, making sure that we are leading this change rather than simply reacting.

Indeed, thanks to our joint efforts, 2018 was a particularly significant year for energy in Europe. Right before the year ended, we finalised the negotiations around the Clean Energy for All Europeans package, the most advanced and comprehensive regulatory framework concerning energy transition ever proposed. This package includes also for the first time a definition for energy storage. Its implementation will require wider efforts from all stakeholders, but will allow the European electricity sector to transform entirely.

Within the package, a new Renewable Energy Directive was proposed, binding European member States to a target of 32% of renewables deployment and a 32,5% target of indicative energy efficiency for 2030. We also agreed on the future electricity market design, which will allow for new actors to enter the electricity market. In particular, consumers and communities will be empowered to actively participate in it: they will be able to produce electricity for self-consumption, store it, and sell their surplus back to the market. This feature of the European energy system of the future will make it more efficient, cost-effective, and flexible - and is made possible also thanks to energy storage technologies.

Battery Energy Storage System in Tynemouth, United Kingdom.

We foresee the European electricity sector of the future having at least an 80% share of renewables by 2050, with sectors being coupled for a more efficient performance. In all of these provisions, the role of energy storage is immense.

It is clear that EASE work with the European Institutions in the last few years has paid off and that energy storage has been recognised as a cornerstone in the energy system. Energy storage represents one of the crucial enablers in our aim to achieve the decarbonisation of the energy sector.

Due importance must also be given to research and innovation, which allow the energy sector to constantly improve. The Horizon2020 programme was key in the deployment of energy research and innovation in Europe: between 2014 and 2020 the European Commission expects to have invested 10 billion euro in technologies that support energy transition. In 2018 we proposed a new framework for research, Horizon Europe: in this plan, a higher budget of 100 billion euro was envisioned, of which 50 billion should be directed at energy, climate and mobility. European research can focus on areas such as smart grids, demand-response, and energy storage. Users should be able to charge their electric vehicle when prices are low and reduce their consumption when prices are high. This is one of the fields in which we have to embrace the technology transition. That's why we have doubled the funding for energy research under the new proposed Horizon Europe programme.

The energy transition is happening everywhere. The wider use of renewable energies, increased electrification and development of new technologies will be a key element in this transition. This is not just about the way electricity is produced, but also about how electricity is stored and used.

So all together we can make the transition happen.

Miguel Arias Cañete

> The European Union needs to be at the forefront of the energy transition, making sure that we are leading this change rather than simply reacting.

Welcome by EASE President Ms Eva Chamizo Llatas

Ms Eva Chamizo Llatas
EASE President

2018 has been another exciting year for the entire energy sector, and particularly for the energy storage industry. With the approval of the Clean Energy for All Europeans package and the publication of the 2050 Long-Term Strategy, greenhouse gas emissions reductions, decarbonisation and energy storage were put at the very top of the European Union agenda.

The 2050 Long-Term Strategy seeks to accelerate the massive changes across the energy system that we have experienced these past years: the rise of renewables, the uptake of clean mobility, electrification of heating and cooling, digitalisation, and an increasing involvement of consumers. These changes show no signs of stopping. EASE embraced this transformation through a ll of its activities, led by its vibrant, innovative, and diverse membership.

It is clear that without significant storage deployments, a net-zero emissions power sector by 2050 will simply not be possible. This is why EASE members are so committed to supporting the deployment of all types of energy storage systems to provide valuable flexibility to the energy system: pumped hydro storage, batteries, power-to-gas, power-to-heat, liquid air, compressed air, flywheels, supercapacitors, etc. All technologies have a role to play in the energy transition.
Our Storage4EU publication demonstrated the many different storage technologies and applications. It highlighted that storage is not a technology of the future – it is here today, providing a variety of applications to ensure a cleaner, more efficient, and more secure energy system.

Another project that I am immensely proud of is the Energy Storage Global Conference 2018, which served as an information platform for the global energy storage community and policymakers such as Mr Maroš Šefčovič, Vice President of the Commission for the Energy Union, to advocate for improvements to the market design and European policy with respect to energy storage, and to draw attention to the need for more European funding for energy storage research, development, and deployment.

A forward-looking market design is indeed key to accelerate the deployment of storage technologies. The existing regulatory and policy framework is in some cases not conducive to the deployment of storage technologies. EASE therefore followed closely the discussions on the Electricity Market Design files and was pleased to see that a definition of energy storage is covering all storage technologies

Ms Eva Chamizo Llatas at the European Union Sustainable Energy Week 2018 in Brussels, Belgium.

and applications, thereby clarifying the regulatory framework in which consumers owning an energy storage facility will not be subject to any double charges.

EASE complemented its advocacy efforts with the publication of various documents and studies on energy storage. EASE released in September 2018 the position paper on solar+storage, stressing the need of an appropriate regulatory and tariff framework to support sustainable growth of the solar+storage sector in Europe.

During the same month, EASE also published a reply to the European Commission's informal publication on the future of energy storage, mapping out the path towards large-scale deployment of energy storage technologies in Europe. Finally, the second edition of the European Market Monitor on Energy Storage (EMMES) realised in collaboration with Delta-ee, which was published in June 2018, provided a more thorough understanding of the current energy storage market in Europe and its trends.

Last but not least, EASE also concentrated its efforts on promoting research, development and demonstration (RD&D) for energy storage, notably in the Connecting Europe Facility and the forthcoming Horizon Europe and ETS Innovation Fund funding programmes. EASE got involved in three new R&D projects – Hydropower-Europe, Muse Grids, and SMARTSPEND – and awarded our third annual EASE Student Award.

It is truly a privilege for me to be involved in this thriving sector which contributes actively to the decarbonisation of our entire economy. Much has been achieved and much more still needs to be accomplished: working on the implementation of the Clean Energy for All Europeans package, preparing the discussions on the upcoming Gas Package, supporting further energy storage R&D funding, and more.

I would like to extend my sincere thanks to the EASE members and Secretariat, who together have furthered the EASE mission with dedication and passion. I very much look forward to working hand-in-hand with all of the EASE members and our many partners across Europe to promote and strengthen the storage sector in 2019!

> It is truly a privilege for me to be involved in this thriving sector which contributes actively to the decarbonisation of our entire economy.

2018 in Circles

January

NGK Europe and **BSEF - The International Bromine Council** joined EASE.

February

EASE submitted a response to the ENTSO-E public consultation **All Continental European and Nordic TSOs' Proposal for a Cost Benefit Analysis Methodology.**

March

EASE presented at the **High Level Roundtable on Energy Storage and Sectoral Integration**, hosted by the European Commission - DG ENER in Brussels, Belgium.

EASE met with the **European National Energy Storage Associations** in Düsseldorf, Germany.

April

EASE presented at the **7th Energy Storage International Conference and Expo 2018**, organised by the China Energy Storage Alliance in Beijing, China.

EASE presented developments on energy storage in the European Union at the **Energy Storage Association Conference** in Boston, USA.

EASE attended the **Ten-T Day 2018 Conference** organised by the European Commission in Ljubljana, Slovenia, to discuss smart, sustainable and safe mobility.

EASE submitted a reply to the public consultation regarding the establishment of the **ETS Innovation Fund**.

May

EASE participated in DG ENER's meeting on **Mid-century Zero Emissions Strategy for the EU** in Brussels, Belgium, providing feedback on technology developments for storage devices.

EASE hosted an **Informal Brainstorming Workshop on Energy Storage in the Grid Connection Network Codes** in Brussels, Belgium.

EASE attended the **3rd EU Electricity Regulatory Forum**, organised by the European Commission in Florence, Italy and presented its views on market design and policy for energy storage.

June

EASE was partner of the **Decarb Europe** Report and presented it during the **Decarb Europe Forum 2018** in Brussels, Belgium.

EASE exhibited and presented at **Electrify Europe 2018**, in Vienna, Austria.

EASE and Delta-ee released the second edition of the **European Market Monitor of Energy Storage** (EMMES).

The ETIP SNET Vision 2050 publication, to which EASE members contributed, was released.

Fluence and **Advanced Lead Acid Battery Consortium** joined EASE.

July

EASE published its "**Study on Energy Storage Demand Outlook**".

EASE organised a session during the **EU Sustainable Energy Week** on "Smart Grid, Renewables and Storage" in Brussels, Belgium.

August

September

Storengy joined EASE.

EASE published its "**Solar+Storage**" position paper.

EASE submitted a response to the public consultation **The Future of Energy Storage in the EU**, in the framework of the Electricity Coordination Group.

EASE attended the **Charge for Change: Innovative Technologies for Energy-Intensive Industries** Conference hosted by the Austrian Presidency of the EU Council and held in Linz, Austria, and signed the Hydrogen Initiative.

EASE attended the **31st Madrid Forum** to discuss the developments of the internal gas market, focusing on Power-to-Gas.

October

EASE organised and attended the **TSO 2020 Power to Hydrogen Mid-Term Workshop**, in Brussels, Belgium.

EASE organised the **3rd Energy Storage Global Conference** (ESGC) in Brussels, Belgium. The three-day event focused on energy storage technologies, policy, and markets.

EASE submitted a response to the European Commission's public consultation **Strategy for Long-Term EU Greenhouse Gas Emissions Reductions**.

EASE announced the **3rd EASE Student Award** winner, Ankit Takle.

RTE France and **Cellcube** joined EASE.

November

EASE published **Storage4EU**, a collection of energy storage projects and business cases developed by EASE members in Europe.

EASE co-hosted a workshop with the Vlerick Business School and the Horizon 2020 STORY project on **Business Models and Regulation for Storage** in Brussels, Belgium.

EASE presented EASE's views on energy storage on islands at the 2**nd Clean Energy for EU Islands Forum** in Lanzarote, Spain.

The EASE General Assembly elected Mr David Post as EASE Vice-President and Dr Etienne Brière as Treasurer for the period 2018-2020.

EASE exhibited and presented at **European Utility Week** in Vienna, Austria.

Kick-off of the **Muse Grids** project, whose goal is to to deliver a key contribution to the roll-out of multi energy management systems in the context of local energy communities.

December

Solar Turbines joined EASE.

Kick-off of the **Hydropower-Europe** project, which aims to bring the hydropower community together and develop a research and innovation agenda.

Start of the **SMARTSPEND** project, a platform exploring how investments in R&D in clean energy can be increased at the European level.

EASE Activities in Policy

2018 was a turning point for energy storage policy at the European level, with major pieces of legislation being approved by the European institutions. As every year, the EASE policy team has worked hard to ensure that the European regulatory framework evolves in a way that allows energy storage to have a strong business case and achieve its full potential to support a smooth and efficient energy transition.

2018 started with the publication by the Council of the European Union and the European Parliament of their respective approaches on the proposals for a recast Electricity Directive and recast Electricity Regulation (Electricity Market Design files). Throughout the year, EASE continued to work on a wide range of issues including the electricity network codes, the assessment of energy storage projects in the Ten-Year Network Development Plan and Projects of Common Interest, Horizon Europe, the ETS Innovation Fund, clean mobility, and energy storage on islands. EASE also attended high-level events and initiatives that aim at shaping the future of the energy system, such as the Florence Forum on the internal electricity market, the Madrid Forum on the internal gas market, the Clean Energy for EU Islands forum, and the High-Level Conference "Charge for Change" focusing on hydrogen.

EASE concentrated most of its efforts on the final discussions on the Clean Energy for All Europeans package: EASE engaged with the European institutions during the trilogue discussions on the Electricity Market Design files until a final agreement was reached on 19 December 2018. EASE is proud to have had a role in ensuring that the present and future European regulatory framework recognises the role of energy storage technologies and supports their deployment on a level playing field with other technologies. In short, 2018 has been busy in the policy field!

Clean Energy for All Europeans Package

Electricity Market Design

Together with the members, the EASE Secretariat analysed the approaches of Council of the European Union and of the European Parliament for the Electricity Market Design files. We then identified some main points that required further lobbying efforts during the trilogue discussions, which see the European institutions come together to discuss the files and reach a common agreement:

1. The energy storage definition (article 2§47 of the Electricity Direc-

Intensium® Max Energy Storage Container, Finland

tive): we worked on making sure that the energy storage definition is technology neutral, encompassing all storage technologies and applications.

2. The ownership of storage by regulated entities (articles 36 and 54 of the Electricity Directive): we sought to ensure that multi-service business cases will be allowed when by exception a regulated entity will have been given the right to invest in a storage facility. Multi-service business cases see a regulated entity and a market player share the ownership and/or operation of a single storage facility to maximise the value of this asset.
3. Long-term contracts for storage in the balancing market (article 5§9 of the Electricity Regulation): EASE advocated for the possibility to have three-year contracts in the balancing market to allow for longer-term visibility of storage revenues.

We were proud to see that most of our lobbying efforts paid off: the definition which was finally agreed upon covers not only electricity in/electricity out technologies but also electricity in/energy out technologies. Contracts up to one year will also be allowed in the balancing market in various cases. The value of storage is clearly recognised in several provisions:

- Storage is highlighted as a key element of the energy system;
- Storage is identified as a resource that should be subject to non-discrimination in network charging policy;
- The principle of market-based procurement for non-frequency ancillary services, including the participation of energy storage, is recognised.

EASE thanks the European institutions for their hard work and commitment on these two files and will now follow closely their transposition and implementation at Member State level.

Renewable Energy Directive

The European institutions also reached an agreement on the proposal for a recast Renewable Energy Directive.

EASE was very pleased to see that the European Union set an ambitious binding renewable energy target of 32% for the European Union for 2030, which is likely to trigger a 55% share of renewable energy sources in the electricity sector. High renewable energy targets will not only help accelerate the energy transition, but also lead to a greater deployment of storage technologies across Europe. With this Directive, the European institutions also enshrined the right of active consumers to generate, storage, and consume their own electricity. This can support the installation of solar+storage systems at customer level:

- Charges and fees on self-consumed energy until 2026 are banned;
- Consumers can be remunerated for the self-generated renewable electricity fed into the grid at market value.

Finally, the European Union raised its ambition for the use of renewables in the transport sector, as well as the heating and cooling sectors. This is a promising development for storage technologies which are key to decarbonise and support the integration of higher levels of renewables in these sectors. EASE members follow these developments very closely, notably within the EASE Energy Storage and Mobility Working Group.

Laborelec cvba, Brussels, Belgium

2050 Long-Term Strategy

In November 2018, the European Commission presented its strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050, which seeks to establish a vision on how the European Union can deliver on the Paris Agreement. The strategy assesses different pathways for the European Union to achieve greenhouse gas emissions reductions between -80% by 2050 (compared to 1990) up to net zero greenhouse emissions by 2050. All scenarios developed by the European Commission converge on one element: storage capacity will significantly increase to enable integration of higher shares of variable renewable energy sources in a faster, more efficient way.

Total stationary storage explicitly used in the power system (i.e. pumped hydro storage, stationary batteries and chemical storage, including the indirect storage effects of producing e-fuels for the final consumers) is expected to reach between 250 TWh and 450 TWh by 2050. This is a significant increase from today's storage capacity, especially as these estimates do not take into account behind-the-meter storage, thermal storage, or storage through smart charging and vehicle-to-grid applications of electric vehicles.

In 2019, EASE will build upon the main conclusions of the 2050 Long-Term Strategy and further explore the contribution of storage to this strategy.

European Battery Alliance

European Battery Alliance and Strategic Action Plan for Batteries

The discussions on the European Battery Alliance continued in 2018. After several months of discussions among European Battery Alliance members, the European Commission incorporated the main takeaways in the "Strategic Action Plan for Batteries" published in May 2018.

This plan effectively identified hurdles for the battery sector and their takeaways:

- Securing access to raw materials and secondary raw materials;
- Supporting scaled European battery cell manufacturing and a full competitive value chain in Europe;
- Developing and strengthening a highly skilled workforce along the whole value chain;
- Supporting the sustainability of the European battery cell manufacturing industry with the lowest environmental footprint possible;
- Ensuring consistency with the broader European regulatory and enabling framework.

More will be done in 2019 to see how these measures could be implemented. EASE will continue to be involved in the European Battery Alliance to advocate for technology neutral policies that support energy storage deployment across Europe.

Vanadium Redox-Flow Battery Cellcube FB 200-800, Pellworm, Germany.

Horizon Europe – What's New

Financing from the European Union is still needed to foster the development of energy storage in Europe, and EASE is actively involved in the shaping of funding programmes through its project management team. In 2018, EASE engaged with a wide range of stakeholders and got involved in different platforms to bring energy storage as a key topic in the next framework programme of the Commission: Horizon Europe.

Horizon Europe is the European Commission's proposal for a € 100 billion research and innovation funding program of seven years (2021-2027). This new programme will be launched in 2021 with the aim of boosting research and innovation and will replace Horizon 2020, which was the biggest research and innovation programme of the European Union with nearly €80 billion in funding, available from 2014 to 2020.

The 3 objectives of the Horizon Europe programme are:

- Supporting the creation and diffusion of high-quality knowledge;
- Strengthening the impact of R&I in supporting European policies;
- Fostering all forms of innovation and strengthening market deployment.

Horizon Europe will consist of three pillars (Open Science, Global challenges and industrial competitiveness, Open Innovation). The second pillar contains five clusters; particularly relevant for EASE is the "Climate, energy and mobility" cluster, since "Energy Storage" is one of its 9 topics. Within the same cluster, topics such as "Energy systems and grids", "Communities and cities", "Smart mobility" and "Clean transport and mobility" also prove to be interesting as they envisage a role for energy storage.

EASE welcomed the European Commission's proposal to invest €15 billion in the "Climate, energy and mobility" cluster. The envisaged starting date for Horizon Europe is 1 January 2021, and EASE hopes to achieve great results within the programme.
Horizon Europe is an instrument that the European Commission provides to organisations and individuals to tackle major energy challenges while supporting their work through the financing of large infrastructure projects and internal R&D. The access to a wide European network gained thanks to the participation in the consortium fosters business opportunities, creates synergies with other industries and enables public and private partnerships.

Moreover, it represents an opportunity to influence policy-making through the development and sharing of research and knowledge. Overall, the participation in EU-funded projects is a great added value for businesses of any size and EASE is proud to support its members and facilitate their access to these funds.

EASE Activities in R&D

Through its involvement in different EU-funded projects, EASE continues to support innovative projects that further research, development, and deployment of different energy storage technologies.

INTENSYS4EU project and ETIP SNET

Since November 2016, EASE has been participating in the INTENSYS4EU project (INTegrated ENergy SYStem, a pathway for Europe), which aims to:

- Support the integration of innovative solutions in view of hosting 45% of variable renewables by 2030 while operating the energy system in a safe, stable, and secure way;
- Extend the research and innovation roadmaps through permanent and direct interactions with the impacted energy system stakeholders and all the European Union Member States in view of validating the portfolio of innovative solutions via appropriate funding mechanisms.

To reach these goals, EASE and the INTENSYS4EU consortium have set up the European Technology and Innovation Platform – Smart Networks for Energy Transition (ETIP SNET). This platform brings together key experts and stakeholders from across the smart grids and storage sector to discuss and advise European policymakers on innovation and research-related topics.

In October 2018, Mr Eliano Russo (Enel) took over the Vice Chairmanship of the ETIP SNET Governing Board, a position previously held by former EASE Vice President Mr Thierry Le Boucher (EDF). Within the ETIP SNET, EASE is also contributing to Working Group 2 on "Storage Technologies and Sector Interfaces", whose Chair and co-Chair are EASE members, Ms Cristiana La Marca (Enel) and Mr Carlos Arsuaga (CIRCE).

Through its involvement in the Governing Board and Working Group 2, EASE succeeded in designating energy storage a key element of the "ETIP SNET Vision for 2050", released in June 2018 during a High Level Event that gathered a wide range of stakeholders and European Union officials.

Finally, throughout 2018, EASE also participated in the elaboration of the recommendations made during the sessions on "Storage Technologies and Sector Interfaces" at the ETIP SNET regional workshops organised in Zagreb, Helsinki, Brussels, and Madrid.

TSO2020

The TSO 2020 "Electric Transmission and Storage Options along TEN-E and TEN-T Corridors for 2020" project launched in February 2017. This project - funded under the Connecting Europe Facility - aims to exploit synergies between power storage solutions and alternative transport infrastructure needs. It will use existing power cable networks to dispatch the electricity flows from the Cobracable, a high-voltage direct current interconnector between Denmark and the Netherlands, to a nearby major gas network facility. Existing gas storage facilities and the national gas pipeline network (power to gas) will be

unlocked to absorb the hydrogen. Local businesses will provide hydrogen distribution via road transport in the Netherlands and in the western part of Germany.

EASE is leading a cost-benefit analysis study activity conducted by three of its members – DNV GL, Tractebel, and CIRCE. Moreover, as co-leader of the dissemination and stakeholder engagement activities, EASE organised a Power-Hydrogen workshop in October 2018 to communicate and exchange the preliminary conclusions of the project activities to wider stakeholders.

Muse Grids

Muse Grids started in November 2018. The project aims to develop new models and tools to coordinate interactions between different energy systems and networks (the so-called Smart Energy Systems), promoting the optimised management of Local Energy Communities, demand-side management, and increasing the share of renewable energies in the global energy mix. Through this project EASE will support the deployment of multi-energy storage systems in energy islands. EASE will lead the dissemination, communication and policy promotion activities and provide cost-benefit analysis studies supported by CIRCE.

Supercapacitor-based grid Energy Storage System.

Hydropower-Europe

The Hydropower-Europe project started in November 2018. The project aims to bring together stakeholders from across the hydropower sector in a forum in order to develop a Research and Innovation Agenda, as well as a Technology Roadmap to monitor the implementation of that agenda.

The TR will put forward the current status and European potential for pumped energy storage including its role in flexible generation. EASE will lead Work Package 2 on Hydropower-Europe Community Support. Three EASE members (Iberdrola, CENER, GE) will be involved directly as linked third parties. Enel and CIRCE will support the project.

SMARTSPEND

In December 2018, the SMARTSPEND project began. The project's aim is to promote collaboration and development of cross thematic synergies among actors who are interested in bringing new clean energy innovations to the market. EASE, together with project partners, expects to promote the development at the national and European level of cross thematic synergies among actors who are interested in bringing new clean energy innovations, including energy storage, to the market. At the end of the project, adequate financial strategies to mobilise investments and complementary funding from private and public actors will be defined. EASE will lead the "Access to Risk Finance" work programme and contribute to all other activities. The mission of the programme is to provide more and better design of public support for energy technology R&I, with a focus on national support. The project has two pillars: under the synergy one, partners will bring all the non-nuclear energy sectors together for a focused discussion on their common interests around technology development and non-technological barriers to the uptake of their technologies. Under the financial strategies pillar, energy sector stakeholders will be invited to discuss their common needs for financing, and compare the way in which each federates its European energy R&I interest and presents it to the European Commission.

Energy Storage Global Conference 2018

The Energy Storage Global Conference (ESGC) has become an essential gathering for the energy storage community in Europe and beyond. Storage experts and policy stakeholders came to share and exchange about the future of the energy transition and energy storage prospects.

With the support of our sponsors EDF, ENGIE, and Iberdrola and many exhibitors, the Energy Storage Global Conference 2018 took place on 24 - 26 October 2018 in Brussels. Over 300 attendees, 75 speakers and 16 exhibitors discussed all recent and future technological, legislative, economic, and financial developments in the energy storage field in a unique conference. Meanwhile, the exhibition area, networking dinners and site visits gave the participants the opportunity to experience the technologies first-hand and discuss innovative ideas outside of the traditional conference format.

Mr Maroš Šefčovič, Vice-President of the European Commission in charge of the Energy Union, kicked off the three-day conference by recognising the prominent role of energy storage in the energy transition and in the decarbonisation of the European economy. He reassured the energy storage community that he is committed to offer more space to storage in present and future policy-making.

2018 was a ground-breaking year for energy storage, as acknowledged by speakers during the first day of the event. These speakers presented state-of-the-art storage technologies and the applications they can provide to integrate more variable renewable energy sources and contribute to the flexibility and stability of the grid. During the second day, key policymakers and stakeholders from Europe and beyond presented their ideas to tackle legislative barriers to storage and strengthen the deployment of storage on a level playing field with other technologies. Such deployment can only by possible thanks to strong economics and investment predictability, as further explained by day three's speakers.

The Energy Storage Global Conference 2018 proved that the energy storage sector is rapidly evolving and innovating. Investors, academics, companies and associations who attended the conference left Brussels enriched by a variety of key lessons learned and policy messages to share at national levels.

The EASE Secretariat would like to thank the European Commission, our sponsors and all participants for attending the Energy Storage Global Conference 2018. We look forward to welcoming all storage stakeholders again in Brussels in 2020. The fourth edition of the ESGC will undoubtedly showcase the many developments that the energy storage sector will experience in the next two years!

24 October 2018

The first day of the ESGC, organised in collaboration with the Joint Research Centre of the European Commission (JRC), focused on energy storage technologies. Mr Maroš Šefčovič, Vice-President of the European Commission for the Energy Union, EASE President Ms Eva Chamizo Llatas and Mr Piotr Szymański, Director for Energy, Transport and Climate at the JRC welcomed participants to Brussels.

Attendees learnt about the latest developments in cutting-edge storage technologies, from next-generation batteries to hybrid energy storage applications. EASE strongly supports RD&D and used the conference to recognise Mr Ankit Takle with the third EASE Student Award for his thesis on heat pump integration in district heating networks.

Some attendees also participated in a visit to the battery park and control room of the Engie Drogenbos Power Plant, one of the first installations in Belgium to provide frequency regulation services with batteries. All in all, Day 1 presented a wide range of technical information on current and future storage technologies and applications.

25 October 2018

On the second day of the conference, the ESGC brought together European Union policymakers, National Regulatory Authorities, and speakers from around the globe to debate the most pressing challenges to the development of energy storage, to learn from best practice examples, and to discuss and advocate for a fair and supportive market design and regulatory framework. A dedicated panel analysed the Clean Energy for All Europeans package and its implications for the storage sector and also elaborated on best practices shared by previous speakers working at national level and abroad.

Discussions followed in the afternoon on energy storage in transmission and distribution grids, as well as on storage and mobility. Mr Klaus-Dieter Borchardt, Director responsible for the Internal Energy Market from the Directorate-General of Energy of the European Commission, concluded the second day of the conference with a keynote speech during the Gala dinner.

26 October 2018

The third and final day of the conference was dedicated to the business and economics of energy storage projects.

Speakers presented the revenue streams available to the different actors of the storage value chain, the costs and barriers faced by these actors and how investors can be stimulated to invest in storage.

Eight project developers concluded this day by sharing their experience in the energy storage business: they introduced their different projects/technologies, revenue streams, and key success factors that make their projects viable.

Mr Patrick Clerens handing out the Storage4EU brochure to Vice/President of the European Commission and Commissioner for the Energy Union Mr Maroš Šefčovič

Storage4EU: The Best Energy Storage Practices from EASE Members

EASE members are proudly leading the deployment of innovative energy storage solutions all around Europe. However, many stakeholders are not aware that energy storage technologies are already on the market today, providing immense value across the energy system. For this reason, EASE decided to showcase the most innovative and inspiring projects in a campaign called Storage4EU.

The Storage4EU campaign collects a series of successful stories on energy storage deployed throughout Europe in the last few years that offer a support to the energy transition. EASE wants to show the practical applications of energy storage and the diverse locations in which storage can provide value. European citizens should know that energy storage already exists, while energy storage developers must know what to replicate and what needs to be improved in order to be protagonists of this transition.

EASE received many contributions from its members, covering a wide variety of different technologies and possible applications on islands, in distribution and transmission grids, as well as at customer premises. Storage4EU features the Cortes-Muela pumped-hydro storage plant by Iberdrola, the largest one in Europe, as an interesting example of innovative generation service. Many projects are offering grid services, such as Terna's pilot projects to validate the use of electro-chemical storage in Italy and Uniper's mixed technology battery storage in Germany. Another example is NGK's project in Germany for a hybrid lithium-ion and NAS battery and CENER's extensive research for the Horizon 2020 Story project which focuses on storage deployment in distribution grids. Finally, we learned about the Photon Farmer's bromine battery, a dairy farm in the Netherlands which has proved to be an ideal location for a solar and wind energy storage project capable of offering a stable delivery of power to customers.

While today energy storage offers benefits to everyone, it has the clearest added value and business case in isolated systems and on islands: for instance, EDF made an entire village (isolated from electricity grids due to morphological reasons) in the island of Reunion energy autonomous - thanks to the storage of renewables with batteries and hydrogen. The Storage4EU campaign also showcases a Saft project that seeks to optimise wind power for the Faroe Islands through a lithium-ion energy storage system.

Because our common goal is to provide better storage options to optimise the energy system in Europe by sharing knowledge and advocating for better policy, EASE will keep updating the Storage4EU library. The EASE Secretariat is glad to share these stories with the energy storage community, and would like to thank its members for their contributions.

European Market Monitor on Energy Storage

EMMES is the definitive analysis of the European markets for energy storage and how they are developing

- EMMES is produced by leading 'new energy' research and consulting company Delta Energy & Environment in close partnership with the European Association for Storage of Energy
- Based upon primary research with leading companies and stakeholders – many of whom are members of EASE
- Market data that companies can rely on, and is updated every 6 months
- Analysis of EU policy and all the main country markets in Europe –segmenting the residential, commercial & industrial and front-of-meter sectors
- EMMES is available **free of charge to EASE members and to subscribers of Delta-ee's Energy Storage Research Service**

For more information and to purchase, please contact:

Delta-ee: andy.bradley@delta-ee.com +44 7771 918 392

EASE: b.elzarei@ease-storage.eu +32 2 743 29 82

Pump Hydro Storage Facility, Grand-Maison, France.

What to expect in 2019?

2019 will undoubtedly be another ground-breaking year for the energy storage sector, and EASE will be at the forefront of discussions with policymakers and other stakeholders to shape the future energy storage industry.

In 2019 and beyond, EASE will focus on a number of key areas to further the development and deployment of energy storage technologies across Europe:

Working with the European Institutions

The European institutions will formally adopt the recast Electricity Directive and Regulation, part of the Clean Energy for All Europeans package. After this important step, the focus will turn to the implementation of these provisions in European Union Member States, and EASE will issue its ideas and recommendations to support further policy measures to enhance the regulatory framework for energy storage. The European Commission will also issue its Gas Package proposals, aimed at updating the rules for the internal gas market, and many of these proposals will be of interest to the power-to-X storage sector. Regarding the electricity network codes, discussions will continue on whether to amend them in order to include grid connection requirements for energy storage devices. EASE will continue to monitor the implementation of the European network codes to ensure that the provisions do not create undue barriers to the deployment of storage and its participation in electricity markets. After the European elections, EASE will engage with the new Members of the European Parliament and College of Commissioners to share with them the role and value of energy storage, and to ensure their continued support for the storage sector.

R&D

EASE will support the discussions on the new Horizon Europe funding programme and continue its work on EU-funded projects, to support energy storage research, development, and deployment. With the support of its members, EASE will kick-start new EU-funded projects: Batteries Europe, ASSET and Battery 2030+. As in previous years, EASE will issue policy papers and recommendations in order to share its expertise on storage technologies and applications with policymakers.

From EASE

EASE Task Forces on Mobility, Multi-Service Business cases, Hybrid Energy Storage Systems, and Energy Storage Applications will finalise and publish studies and recommendations on these topics. The aim is not only to share our members' views, but also to kick-start discussions with policy-makers and other stakeholders. Also, two events will be organised by EASE in 2019 to reflect on the implementation of the Clean Energy for All Europeans package and on other aspects that are key to furthering the energy storage business case.

@EASE_ES EASE

WORKSHOP

EASE
European Association for Storage of Energy

Energy Storage in the Clean Energy for All Europeans Package

22 May 2019 | Brussels

ALL YOU NEED TO KNOW ABOUT THE EFFECTS OF THE CLEAN ENERGY PACKAGE FOR THE STORAGE SECTOR

A diverse group of speakers will share their expertise, presenting innovative energy storage projects, tips to future-proof the energy storage business case and adapt to the new policy framework, and insights on the future services and revenue streams for storage that can be expected to emerge across Europe. Speakers and participants will also zero in on the practical implementation of the provisions on ownership by TSOs and DSOs, grid fees and taxes for storage, and other questions related to the implementation of the Clean Energy package.

TICKETS
EASE Members €249
Non–EASE Members €299

European and National Institutions Complimentary
Opening Dinner on 21 May 2019 Included
All prices are excluding VAT

Closing by EASE Secretary General

Patrick Clerens
EASE Secretary General

2018 was another incredibly productive and exciting year for EASE. Energy storage deployment has continued to accelerate at an astonishing pace across Europe. As our Storage4EU campaign demonstrated, storage is not a promising technology for the future – it is a proven technology that is already being deployed at scale in diverse configurations around the world. The technological developments and innovative approaches in the storage sector show no signs of stopping anytime soon.

2018 was a great year for energy storage, with enormous progress for the community and EASE. But before looking to the future, I would like to pause and reflect on the progress made over the past years. Since its establishment in 2011, EASE has gone through several different stages, mirroring in many ways the broader developments of the storage sector.

In EASE's first years, our major focus was on getting together the major players in the storage sector to kick off discussions on how to bring this promising technology into the mainstream. EASE and its members worked to share the benefits and value of energy storage, and to explain the different technologies and applications to policymakers and other stakeholders.

Around 2015, as the Clean Energy for All Europeans package was being prepared, and stakeholders began to take an interest in energy storage and its role in the energy transition, EASE turned its attention to defining high-level principles for the energy market design, and clarifying the RD&D needs of storage technologies. Our efforts paid off: we finally saw policymakers taking an active interest in storage, and taking first steps to integrate storage into various European initiatives and policies, including a definition for energy storage.

In 2018, we saw big strides being made by European policymakers. One major focus of EASE throughout the year was of course the discussion around the Clean Energy for All Europeans package, which addresses many of the biggest barriers to the energy storage market. The 2050 Long-Term Strategy, published by the European Commission in November 2018, underlined the significant amounts of storage capacity that will be needed to achieve a net-zero emissions power system by 2050. Meanwhile, the European Battery Alliance discussions put questions of battery manufacturing, deployment, and sustainability front and centre. Discussions also began on the new EU-funded research framework Horizon Europe, which promises significant amounts of funding for storage research and development.

However, we also shifted part of our attention towards the concretisation of high-level ideas and principles, going more and more into the details of implementing the energy market design, the electricity network codes, and other European Union legislation in areas such as gas, clean mobility, clean energy on islands, battery manufacturing, and sustainability. As the energy storage sector matures, EASE is also working to analyse the different factors that affect profitability: stacking multiple revenue streams, hy-

Mr Patrick Clerens at the European Sustainable Energy Week 2018 in Brussels, Belgium

bridising storage technologies, shared ownership models, and how to tender new storage services.

In addition to all that, EASE worked on an increasing number of projects and activities this year. The Energy Storage Global Conference was a clear highlight of 2018. It was a pleasure to welcome over 300 participants to Brussels to debate all things energy storage: technologies, policy, and markets.

Around the same time, we also launched the Storage4EU campaign to highlight EASE members' innovative storage projects and the value they provide. We published studies on energy storage demand and solar + storage as well as our second edition of the European Market Monitor on Energy Storage in collaboration with Delta-ee. EASE staff travelled around Europe and as far afield as China, India, and the United States to share the experience of the European storage industry and to learn from others.

Actually, there are so many regulatory and policy developments, as well as events and initiatives affecting energy storage that I cannot summarise them all. Energy storage has clearly come a very long way from being the 'new kid on the block'. Still, we have a very long way to go before storage can achieve its full market potential. In terms of technical innovation, energy market design, and regulation for energy storage, there is still much progress to be made. EASE, with the support of its members, will continue to drive progress by advocating on behalf of the European energy storage sector.

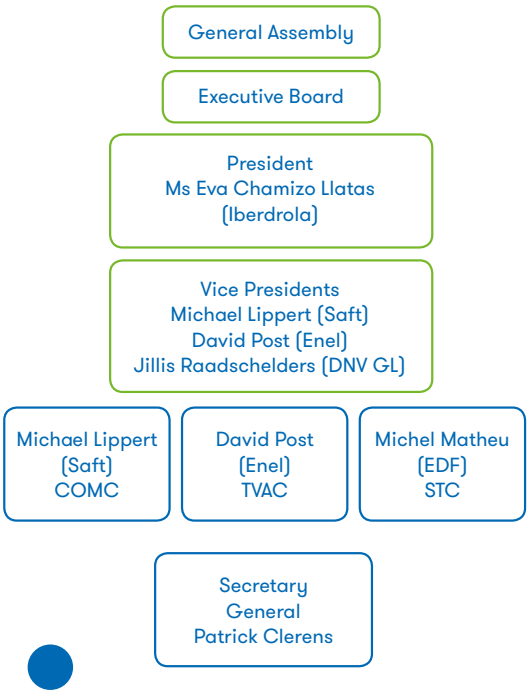
None of our achievements in 2018 would have been possible without the passion and hard work of the EASE members. Working with so many driven and dedicated individuals with a passion for energy storage is a true privilege. In particular, my heartfelt appreciation goes out to the EASE Presidency team and our Committee Chairs, who have really dedicated their time and energy to shape the vision of this association. I am also grateful to the EASE team for their hard work, and to our external partners for the support and interesting discussions. None of this would be possible without all of you coming together around our shared goal: a secure and efficient energy transition, with energy storage as a main enabler.

2018 was a whirlwind of a year, and one we will work hard to top. Here's to an even busier and more successful 2019!

“None of our achievements in 2018 would have been possible without the passion and hard work of the EASE members. Working with so many driven and dedicated individuals with a passion for energy storage is a true privilege.

EASE Structure and Organisation

2018 - 2020



As a non-profit association, EASE is governed by an Executive Board elected by the members of the General Assembly and has several bodies dedicated to the various aspects of energy storage and the associated challenges and opportunities.

The EASE presidency is currently held by Ms Eva Chamizo Llatas, Director of European Affairs for Iberdrola and Head of the Iberdrola Brussels Office. 2018 was her first year in office and we look forward for the next years to come, until the end of 2020. The work of EASE President is supported by three Vice-Presidents, and three Committees:

The Technology and Value Assessment Committee (TVAC), chaired by Mr David Post (Enel), is responsible for acquiring and delivering hard data about energy storage applications and business cases.

The Strategy Committee (STC), chaired by Mr Michel Matheu (EDF), is dedicated to developing and executing a medium and long term vision, outlook and perspectives on the development of policies related to the energy storage sector in Europe.

The Communications Committee (COMC), chaired by Mr Michael Lippert (Saft), is responsible for informing external stakeholders about the benefits energy storage has to offer.

Mr David Post (Enel) was elected Vice-President in November 2018, along with Mr Etienne Briere from EDF who was elected Treasurer.

The General Assembly and the Executive Board are responsible for all association-wide decisions, whereas the Committees and the underlying Coordination Group, Working Groups and Task Forces are involved in topic-specific decisions and tasks.

EASE Secretariat as of December 2018

Patrick Clerens
EASE Secretary General

Jean-Michel Durand
Technical Advisor

Brittney Elzarei
Senior Policy Officer

Marine Delhommeau
Policy Officer

Doriana Forleo
Communications and Events Officer

Emin Aliyev
Project Officer

Thomas Otuszewski
Project Officer

Glen Dimplex Quantum Smart Electric Thermal Storage Heater

EASE Partners

EASE aims to act as a single coherent body in the international energy storage system, with its starting point being the European setting. Therefore EASE is continuously in discussion with partners who share the same goals, exchanging information, supporting valuable initiatives and enlarging the network of energy storage stakeholders.

Each year, EASE organises two meetings with several European National Energy Storage Associations. In 2018, representatives from Austria, Germany, France, Italy, the Netherlands, Portugal, Spain and the UK came together to discuss energy storage challenges and opportunities across Europe.

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