AWARD

GOOD PRACTICE OF THE YEAR 2021

RGI is a unique collaboration of NGOs and TSOs from across Europe engaging in an 'energy transition ecosystem-of-actors'. We promote fair, transparent, sustainable grid development to enable the growth of renewables to achieve full decarbonisation in line with the Paris Agreement.

For more information, visit our website: **www.renewables-grid.eu**

Imprint

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Foreword

Virginijus Sinkevičius

EU Commissioner for Environment

COP 26, the UN Climate Change Conference, was a step in the right direction tackling climate crises. But we need to accelerate the pace. If we want to limit temperature rises to 1.5 degrees by the end of the century, then we need to reach climate neutrality by 2050. The EU is determined to deliver on that goal. With the EU Green Deal, our strategy for green and sustainable growth, we are taking decisive steps towards a decarbonised economy. We are committed to reducing CO2 emissions by at least 55% by 2030, and to generating 40% of our energy from renewables. The "Fit for 55" package is our roadmap for action and 30% of the EU budget will go to support its implementation. We seek to accelerate the deployment of renewable energy, and build up the grid infrastructure in the very near future. Those changes have to happen – but they have to happen while guaranteeing nature protection. There's a reason for that.

When it comes to fighting climate change, our strongest ally is nature. Forests, peatlands, wetlands, seagrass and other ecosystems do a tremendous job drawing down carbon from the atmosphere, mitigating the effects of climate change, and helping us adapt. But first of all, we have to help Europe's biodiversity first. Only a tiny proportion of habitat types, just 15%, are in good conservation status. It's vital to turn that around.

Last year, the EU adopted a new Strategy for biodiversity. We want to put our nature on a path to recovery by 2030, with effective protection for 30% of our land and seas, and legally binding EU restoration targets, which are now being prepared. We have a strong base to build on. Natura 2000, the EU network of protected areas, is an excellent point to start from. At the same time, we need better infrastructure to produce clean energy and to deliver it to the users.

It's not always easy to reconcile these goals. But when the legal standards are applied correctly, and when civil society is engaged in a transparent process of consultation, new developments can take place in harmony with nature. Strategic planning is essential. It's vital to locate renewable energy projects in places that are least detrimental to nature.

The Commission has developed guidance on renewable energy, energy transmission and nature legislation. Many authorities, economic operators and stakeholders find it extremely helpful in their daily work.

I also salute your efforts to identify, reward and promote best practices in this field. The "Good Practice of the Year" award is an excellent initiative, and I give it my full support.

I encourage you all to continue in these efforts, and to promote nature-friendly solutions for our energy grids. Electricity powers our civilisation. But all civilisations depend on nature.

Introduction

AWARD GOOD PRACTICE OF THE YEAR

Renewables Grid Initiative

mazars

In 2021, the pandemic continued to shape and influence many aspects of our lives and the endurance and resilience of our new coping mechanisms and solutions developed back in 2020 were put to the test even more. However, the record number of this year's submissions for the 'Good Practice of the Year' award shows that the eagerness to innovate and the willingness to contribute to a sustainable future of our planet are stronger than ever across organisations and sectors. We felt very inspired to read about and feel the determination of applicants throughout all award categories to contribute to a swift transition towards an electricity system that can accommodate more and more renewable sources while advancing nature protection at the same time and with the same urgency. We are proud to share the jury's favourite practices with you in this brochure and to reveal the three winners of the unique 2021 competition. Voted upon by our jury of high-level experts, the awarded practices are:

Communication & Engagement

"COMPILE" by the University of Ljublijana

The jury unanimously voted for this practice because of its innovative value, transferability and relevance in promoting decentralised energy transition solutions in remote areas through energy communities. Beyond its technical achievements, the project's exemplary communication approach and success in communities' engagement through a web-based user-friendly guide contributes to connecting the dots between the renewable transformation of different sectors such as transport and heating and the complexity of pan-European grid planning. Find out more on page 10.

Environmental Protection

"Site Wind Right" by the Nature Conservancy

Site Wind Right won this category's award because it brings a valuable contribution to the reconciliation of renewable energy with nature and biodiversity. The sophisticated spatial

planning tool developed by the project detects land areas with the lowest conflict potential to help inform wind development siting decisions, thereby minimising the impacts on species and wildlife habitats in a timely and resource-efficient manner. Additionally, the practice proved transferable and – due to excellent stakeholder outreach methodologies – successful in reducing opposition to wind projects. Read more on page 24.

Technological Innovation & System Integration

"SoLAR" by the SoLAR Allensbach consortium

The jury awarded the prize for technological innovation to SoLAR Allensbach as the practice creates a comprehensive flexibility package for the increased integration of renewable sources into the grid. It includes flexibility at distribution level, energy services to consumers, a virtual battery concept and dynamic grid tariffs, demonstrating the functionality of intelligent sector coupling and a technological lead ahead of policy. In addition, the replicable practice achieved support at both local and state levels thanks to its successful engagement with local communities and authorities. Find out more about the approach on page 34.

We would like to cordially congratulate the three winners and express a sincere thank you to all participants in this year's competition who all enriched our perspectives on good practices and their innovation potential. We would further like to acknowledge the valuable contribution of the international auditing and advisory company MAZARS who accompanied the evaluation process for the eighth year in a row and of the European Network of Transmission System Operators for Electricity (ENTSO-E) who hosted the award ceremony at their premises in Brussels.

An Independent Jury of Experts

Gregg D. Ander

Managing Director of Gregg D. Ander, LLC; Senior Fellow at Navigant Consulting

In his positions, Gregg provides consultative services on a variety of power and energy sector issues. Previously, he was Vice President of Power Strategies at the Energy Foundation and had a 30-year career at Southern California Edison.

Rachel Asante-Owusu

Programme Manager, IUCN

The focus of her work involves promoting measures to safeguard biodiversity, ecosystem services, natural-resource dependent livelihoods and rights from renewable energy and extractive sector operations. Formerly, Rachel was a research scientist in the field of biotechnology.

Susana Batel

Integrated Researcher, Centre for Social Research & Intervention (Cis) - University Institute of Lisbon (ISCTE)

Susana Batel is an Integrated Researcher at the Centre for Social Research and Intervention (Cis) of the University Institute of Lisbon (ISCTE), Portugal, working on the social studies of energy and the environment. Her research examines people's responses to and engagement with renewable energy generation and infrastructures.

Humberto Delgado Rosa

Director for Natural Capital, DG Environment, European Commission

Previously, Humberto was Director for Mainstreaming Adaptation and Low Carbon Technology in DG Climate Action and served as Secretary of State for the Environment of the Portuguese Government from March 2005 to June 2011.

Marie Donnelly

Chairperson of the Climate Change Advisory Council Ireland

As a Director in DG Energy, Marie was responsible for the development of policies and actions on energy efficiency and renewable energy as well as the coordination of research activities in the field of energy.

Jean-Michel Glachant

Director of the Florence School of Regulation / Robert Schuman Centre for Advanced Studies / European University Institute

Jean-Michel is also the Holder of the Loyola de Palacio Chair in European Energy Policy & Regulation, and vice-president of the International Association for Energy Economics as well as associate researcher at the universities of Cambridge and at the MIT.

Michael Hogan

Senior Advisor at The Regulatory Assistance Project

Michael works on electricity decarbonisation policy, particularly matters related to market design. He previously led the power programme at the European Climate Foundation and has 35 years' experience in the electricity industry.

Catharina Sikow-Magny

Director of Directorate C, Green Transition and Energy System Integration at DG Energy, European Commission

Catharina joined the European Commission in 1997 and has been Director of Internal Energy Market. Previously she has been in charge of the international transport relations team as well as for the trans-European network policy, internalisation of external costs and strategic policy research.

Carl Zichella

Director for Western Transmission at NRDC

Carl was the NRDC's lead western U.S. renewable energy transmission siting expert and serves on a nationwide team working on climate and clean energy issues. Carl also served as a director for the Center for Energy Efficiency and Renewable Technology (CEERT).

Communication & Engagement

Compile

by the Laboratory of Energy Policy at the University of Ljubljana

The EU-funded project shows how energy communities under varying regulatory schemes, leveraging different financing mechanisms and using different technologies can work within grid constraints and find optimisations. The crucial common aspect is cooperation within the community to fully control decentralised local energy systems. This leads to a secure, sustainable and decarbonised energy supply with all actors along the energy value chain engaged.

HIGHLIGHTS

- Results obtained by real implementation of the solutions and progress beyond pure research and theoretical models using active communication
- 13 consortium partners achieved important innovations in all pilots
- First of its kind approach whole-community approach in Slovenia

About the Practice:

The project aims to empower local energy systems and to enable optimal integration and control of all the energy vectors, storage and electromobility options to maximise decarbonisation and energy savings while fostering the creation of energy communities. It creates new ways to stimulate actors in the value chain to cooperate to maximise the societal benefit, foster the adoption of the technological solutions and enable a large-scale replication of the developed technological solutions and business models.

FIND OUT MORE

Read more about the Laboratory of Energy Policy at the University of Ljubljana here

- About the Horizon 2020 project

Italian wind parks travel guide

by Legambiente

FIND OUT MORE

Legambiente is an Italian non-profit environmental organisation founded in 1980. Read more here

- Project website

Parchidelvento.it is a touristic guide in Italian and English which offers readers the opportunity to discover the little-known territories of wind parks, which are interesting laboratories for the energy transition. The website contains information on visits to eleven wind farms accompanied by stories and anecdotes recounted by a journalist, Giuliano Malatesta.

HIGHLIGHTS

- First guide in the world about wind park tourism – new positive touristic approach to wind plants
- Achieved media coverage at national and local level to move the existing debate in a different direction
- Aims to help the debate on RES projects and on solutions that ensure integration into the landscape to gain population's support

About the Practice:

The guide gives people the chance to discover wind turbines, the modern machines that generate energy from wind, and some truly beautiful areas off the beaten track of the more frequented tourist routes. Building a positive narrative about successful experiences around wind energy projects and strengthening the public consensus is important, as in Italy strong opposition against wind and solar projects still exists in many territories. Providing accurate information on risks and impacts, and showcasing that renewable energy sources are the best way to finally free our energy production from dependence on coal, oil and gas, which are responsible for the climate change, becomes all the more important in this context.

Bird-safe energy infrastructure promoted internationally through the Great Ethiopian Run

by Ethiopian Wildlife and Natural History Society (EWNHS), BirdLife Africa & Bulgarian Society for the Protection of Birds (BSPB)

In 2021, the EU funded project Egyptian Vulture New LIFE was the Message Sponsor of the Great Ethiopian Run (GER) – Ethiopia's biggest public event. Diverse communication activities gave huge visibility to the topic of bird electrocution and collision with unsafe or poorly located infrastructure. An MoU was signed between major energy and conservation stakeholders to work together on bird-safe energy infrastructure in Ethiopia.

HIGHLIGHTS

- 12,000 runners wore 'Bird-safe energy infrastructure' on their t-shirts, and over 4 million people were informed via media channels.
- Work with grid operator EEU will identify & adapt hazardous powerlines
- Project partners continue to increase capacity to mitigate bird mortality

About the Practice:

Electrocution and collision with unsecured or badly situated powerlines have been identified as one of the major causes of mortality for vultures and other large birds, which contribute to the vital functioning of ecosystems. Ethiopia is a crucial stop-off on their migration route and thousands of new power lines are planned in the coming years. So that these are built without furthering endangering populations, project partners used the GER to raise awareness about the issue and brought together key energy actors to secure future collaboration for the sake of vulnerable species.

FIND OUT MORE

EWNHS is the BirdLife partner in Ethiopia.

All partners are active within the Egyptian Vulture New LIFE Project

Systemvision 2050

by Amprion

FIND OUT MORE

Amprion is a German TSO, responsible for the grid in North Rhine Westphalia, Rhineland-Palatinate, Saarland and part of Bavaria.

Read more about 'Systemvision 2050' here

To collaboratively discuss visions of the best possible pathways for infrastructure development towards a decarbonised energy system, Amprion partnered with diverse stakeholders from policy, industry and civil society for their 'Systemvision 2050'.

HIGHLIGHTS

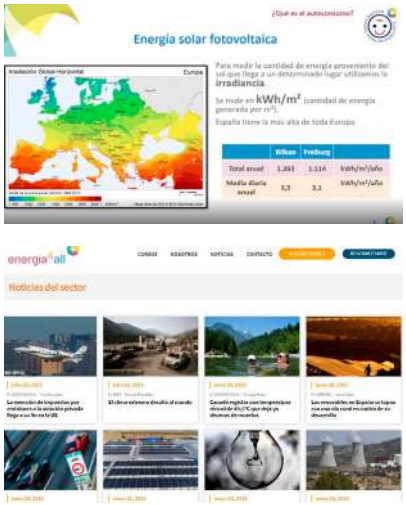
- Evaluates implications for infrastructure needs in a cooperative manner
- 20+ stakeholders from industry, politics, and society joined the project
- Improves the energy system modelling approach and tools based on the requirements of stakeholders

About the Practice:

Project partners involved in the Systemvision 2050 are invited to quantify their vision of climate neutrality via a set of key parameters, such as residential heating demand, installed capacity of wind and solar PV or number of EVs. The parameters of each partner are translated into consistent scenarios and calculated with Amprion's toolset of energy models. This enables results to be highly comparable and thereby helps to objectify assumptions and results. Project contents, including 11 blog articles written by partners, are published on a dedicated website.

Energía4All

by Fundación Renovables



Fundación Renovables created the Energía4all project as a tool to provide free, accessible, high-quality information and training around the energy transition which makes participants an active and decisive part in the energy field who can use gained knowledge to actively participate.

HIGHLIGHTS

- Energy experts provide high-quality, open-source materials in different formats.
- Empowers citizens and makes them aware of current issues, but also solutions to face the climate emergency

About the Practice:

Recognising that - due to the complexity and opacity of the energy model - many citizens are unaware of how it functions, the role they can play on it and the importance of sustainable energy use, Fundación Renovables created an extensive online education programme. They created four free courses on topics such as climate change, self-consumption and electric vehicles, with hour-long public seminars, engaging games and news-scans. The project aims to support the creation of an active citizenry which feels motivated to engage with the energy transition.

FIND OUT MORE

Fundación Renovables is a Spanish civil society organisation which seeks to promote and accelerate the change of energy model with savings, efficiency and renewables. Read more here

- About Energía4All

Field study on HVDC underground cable impact on soils and crop production

by TransnetBW and the University of Hohenheim

FIND OUT MORE

TransnetBW is one of four German transmission system operators located in the Southwestern part of the country. Read more here

- Brochure: Field Study (German)

Using the example of the SuedLink energy transition project, the University of Hohenheim and the transmission system operator TransnetBW are investigating the impact of the construction and operation of 525 kV high-voltage direct-current ground cables on soils and crop production. The influence is examined on agricultural land at four locations in southern Germany.

HIGHLIGHTS

- The study will examine the effects of HVDC on crop production and also create knowledge to enable technical optimisation for future constructions
- Research results will not only apply to SuedLink, but can also be transferred to other underground cables by creating a data model for further studies

About the Practice:

This scientific investigation aims to answer a multitude of relevant questions for electricity cable deployment and operation. How does the soil density and structure change as a result of excavation, cable installation, and then backfilling of the soil material? How does differential decompaction affect the soil function and the soil fertility? How does the potential heat loss caused by the simulated underground cables affect the soil temperature – also in relation to soil moisture? How do these changes impact plant growth, yield and crop quality? Answering these questions in a scientifically sound way contributes important findings to the dialogue with affected farmers or other stakeholders.

Don't stop! Digital citizens' participation in grid expansion in the coronavirus era – and after

by TenneT

FIND OUT MORE

TenneT is the TSO responsible for several German states and the Netherlands.

Read more here

- TenneT Digital Info Markets

The practice offers digital solutions for maximum flexibility and low-threshold participation formats in the approval processes for new construction projects. This includes digital consultation hours, online lectures, studio interviews and interactive digital "info markets" for all new projects – all of which will remain in place in the post-pandemic era to serve as complementary modules of participation.

HIGHLIGHTS

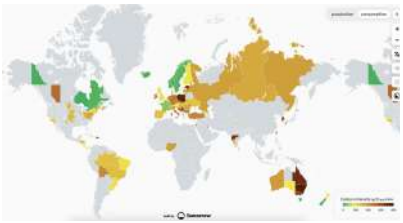
- The concept and execution of digital info markets on the project websites is new and innovative: it is a virtual, 1:1 version of the physical info market concept including geo-data-based online participation tools and video explanations
- Noteworthy aspects: speed of implementation; number of digital dialogue events (roughly 150); strategic overall concept for digital participation that can also be used in the post-pandemic period.
- Broader and new target groups reached with 13,000+ unique page views on the 15 digital project info market websites

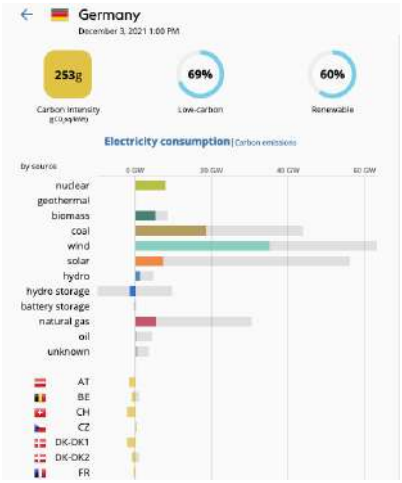
About the Practice:

To prevent Covid-related restrictions from stalling stakeholder communication and thereby causing additional delays in the projects, the various digital formats developed were geared to stakeholder needs and the process stage. Moreover, a digital standard had to be defined that would enable all stakeholders to receive equal treatment and that could be easily adapted for each project. Targeted, cost-effective information transfer was used to facilitate faster, more direct communication.

electricityMap

by electricityMap





FIND OUT MORE

ElectricityMap (previously known as Tomorrow) is a start-up company. Read more here

- Live electricityMap

The electricityMap app is a public real-time visualisation that shows where electricity is coming from and how much greenhouse gases were emitted to produce it across the world on an hourly basis. The map colours regions and countries based on the carbon intensity of their electricity production and consumption, and displays the breakdown according to different modes, making a distinction between low carbon and renewable sources.

HIGHLIGHTS

- Open-source data source for electricity emissions to encourage larger integration of RES into the grid – thanks to generalisation of load shifting strategies
- Intuitive interface allows a wide audience to understand the concepts of the visualisation and makes information actionable
- Unique in provision of data consolidation and forecasting services at global scale, for macro signals, such as the carbon intensity

About the Practice:

ElectricityMap believes the information precedes action and by empowering citizens and organisations with real-time insights that are grounded in reality, better and more informed decisions will be made. A precise understanding of hourly production and consumption mixes across the world is paramount to taking initiatives, such as installation of new renewable capacity, or load shifting, that will allow for a 24/7 fossil-free electricity system. Additionally, providing real-time, hourly data is granular enough for citizens and organisations to adopt a data-driven decision framework for reducing their own consumption. In fact, the information provided has already led many to actively engage in reducing their own footprint.

From system operators to professional TV broadcasters

by Elia Group

FIND OUT MORE

Elia Group is a transmission holding company which owns two subsidiaries (both of which are TSOs): Elia in Belgium and 50Hertz in Germany. Examples of their broadcast events include:

- Stakeholder's Day: e-mobility
- Final of the Open Innovation Challenge 2021

Elia Group quickly adjusted to the reality of COVID-19 lockdown measures and organised 8 high-profile Group-wide events that were livestreamed throughout the pandemic. Alongside this, teams from across the Group engaged with local stakeholders about specific projects in Belgium (led by Elia) and Germany (led by 50Hertz) through different digital means.

HIGHLIGHTS

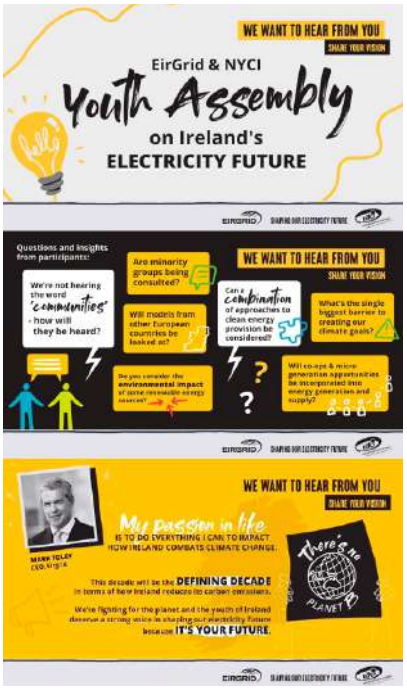
- Kept stakeholders informed through strong digital engagement and reinforced the Group's relationships
- The Group joined forces with partners from across different industries to ensure that their combined contribution to the energy transition is as successful as it can be
- The Group's digital engagement aimed to demonstrate how its grid development and decarbonisation activities are both ambitious and, with the right backing and collaboration, feasible

About the Practice:

The COVID-19 pandemic meant that in-person events in Belgium and Germany could no longer be held. Elia Group is committed to open and regular communication with its stakeholders and quickly adjusted to the new COVID-19 situation by regularly holding both fully virtual and hybrid events for its stakeholders and engaging more widely with local stakeholders online. Each livestreamed event was aimed at a specific target group and care was taken to ensure that as wide an audience as possible was reached by promoting events through social media, the Elia Group website and targeted email campaigns. After they had been held, a recording of each event was published on Elia Group's website, social media channels and was included in press releases and newsletters.

New Public Engagement Strategy and pivoting to Virtual Engagement in response to COVID-19

by EirGrid



FIND OUT MORE

EirGrid operates and develops the Irish high voltage electricity grid. Read more here

- EirGrid's New Public Engagement Strategy

In February 2021, EirGrid published a new public engagement strategy for a cleaner energy future. The 'Pandemic Proof Strategy' for public engagement is underpinned by experiences of the engagement EirGrid undertook on grid development projects and strategies this past year.

HIGHLIGHTS

- Successful completion of 23 public consultation events throughout 2020 and more than 150 events in 2021
- Events ranged in size from 5 stakeholders over an hour to 100 stakeholders over 3 days to 400 stakeholders for a half day forum
- Involves development of a new online consultation portal, hosting of virtual exhibition spaces on projects, the establishing of community forums and creation of information and education videos

About the Practice:

With its new strategy, EirGrid has enhanced its engagement capacity by significantly investing in people (staff) and growing dedicated public engagement resources that prioritise the accessibility of engagement systems, responding to stakeholder needs and embedding digital tools. The overarching goal is to accelerate public acceptance of electricity transmission infrastructure by building trust and introducing participative engagement and co-design processes to projects. The new strategy involves working with partners and stakeholders to deliver improvements including local communities, landowners and industry. The Covid-19 pandemic accelerated the process of adopting new technologies, learning by doing and adapting to the needs of stakeholders.

Digital Terna Incontra

by Terna S.p.A.

FIND OUT MORE

Terna is the Italian TSO.
Read more here

- Practice website

To facilitate a dialogue about specific grid development projects safely and in line with Covid-19 restrictions, Terna launched an open webinar series on their new electricity infrastructure projects, thus engaging various stakeholders in an online public consultation and feeding their views into the development process.

HIGHLIGHTS

- New practice that requested a completely new design to pass from live open days to web meetings
- Increased and eased participation of local stakeholders throughout project phases
- Positive reactions from citizens and trust-building towards new projects across Italy

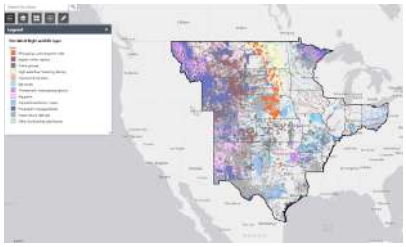
About the Practice:

The practice is aimed at presenting the projects, giving information related to the project phases and collecting data, opinions, reactions from the territory. The first round is made during the spatial planning of the electrical infrastructure to share the localisation of new substations and the routes of new powerlines with citizens. Terna presents the electrical need for new infrastructure, the feasibility studies, environmental context and localisation hypotheses, gathers feedback from the local communities and comes back to the auditors with another webinar to report the feedback and its reflection on the project.

Environmental Protection

Site Wind Right

by The Nature Conservancy



The Site Wind Right (SWR) analysis and online interactive map use GIS technology and >100 data sets on wind resources, wildlife habitat, current land use and infrastructure to help inform wind development siting decisions across 17 states in the Central USA. These states are known as the "Wind Belt" of the USA, accounting for nearly 80% of all existing and planned onshore wind development.

HIGHLIGHTS

- Highlights areas with lowest potential for conflict, allowing impacts to be avoided to the maximum extent possible, thus saving time and resources
- Identified 1,000GW of available wind generation (equal to current US generation from all sources)
- Methodology can be applied in other sectors (e.g. grids) and anywhere in the world.

About the Practice:

Amid a boom in US onshore wind development from the early 2000s onwards, The Nature Conservancy (TNC) recognised the need to provide guidance and data on how to avoid impact on species and habitats. To streamline the development of RES infrastructure with nature conservation, they worked together with industry, government, environmental NGOs and landowners to develop the SWR tool. The open-source map and analyses – which are constantly updated – are accompanied by communication materials, including a business case showing benefits for corporations, which are used for outreach to continually bolster usage and awareness. TNC has developed a similar project for India and plans to expand the project to include solar potential and two additional states in early 2022.

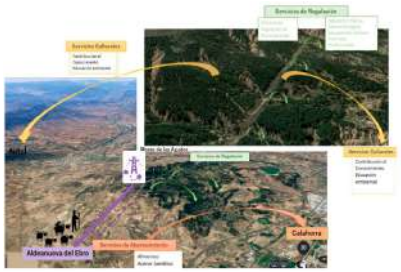
FIND OUT MORE

The Nature Conservancy is a global environmental organisation aiming to conserve the lands and waters on which all life depends.

Read more about SWR here.

Pastoreo en red – Grazing under high voltage lines

by Red Electrica de España



Red Eléctrica de España's collaborative pilot scheme involves using herds of sheep as a nature-based solution to vegetation management in a grid corridor in La Rioja. By moving away from mechanised management and recruiting a local shepherd to graze livestock on the vegetation, this practice benefits local biodiversity and ecosystems, climate resilience, rural populations and the grid operator themselves.

HIGHLIGHTS

- Contributes to healthier soil ecology and structure, water and nutrient retention, protects against forest fires and reduces GHG emission
- 'Practical Guide' and manual on 'Benefits of networked grazing' to support replication
- Supports local culture of shepherding through generational learning and provision of new income streams

About the Practice:

Grid operators continually manage vegetation in grid corridors to prevent fires and outages, often through mechanical clear-cutting. To replace machinery with natural means, Red Eléctrica launched a pilot partnership with a small company specialised in agriculture and environment, Agrovidar, and a local shepherd. Over 20 days, for 7 hours per day, 700 animals grazed on the area, consuming 28,000kg of organic matter and returning 14,000kg as manure. Aside from remote sensing, GPS monitoring and drones to track the project, studies by the Universities of Alcalá and Barcelona evaluated the ecosystem services and cultural benefits.

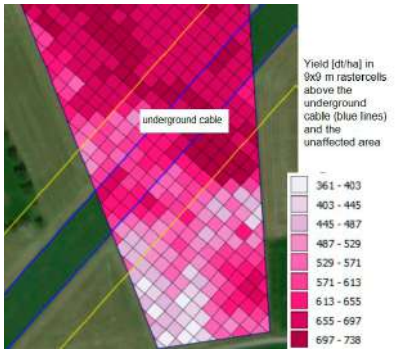
FIND OUT MORE

Red Eléctrica is the TSO for Spain and part of the 'Grupo Red Eléctrica'.

Read more about the practice here

Near-infrared study of agricultural yields above a 380 kV underground cable

by Amprion



FIND OUT MORE

Amprion is one of four German transmission system operators located in the Western part of the country. Read more here

- Information on underground cables and the environment

To assess how underground cables affect crop yields, near-infrared images taken by drones can be used efficiently to visualise biomass vitality and yield. Amprion has used this technique in a monitoring project in three consecutive years accompanying their underground cable pilot in Raesfeld, North Rhine-Westphalia, Germany.

HIGHLIGHTS

- Visualises and assesses yields of entire fields along underground cables under agricultural use
- Enables long-term use, is minimally invasive and less prone to small-scale heterogeneities in soil properties
- Increases knowledge of constructional and operational effects of an underground cable on the yields by repeated monitoring of harvest periods

About the Practice:

After converting near-infrared images into the biomass index NDVI (Normalised Difference Vegetation Index), differences in vegetation density and productivity directly above the underground cable and in unaffected areas of a field can be determined precisely. By correlating these results with measured yield values of specific sampling points, extensive yield illustrations of the entire arable field can be generated. This minimally invasive method does not impair cultivation and harvest significantly, but instead increases the knowledge of cable effects on cultivation and helps to enhance the acceptance among affected farmers, property owners and further stakeholders. The practice is easily transferrable to further high voltage alternating and direct current underground cables and can therefore be of relevance in the priority realisation of HVDC powerlines as underground cables in Germany.

Introducing circular economy practices into the wind industry

by Renewable Parts

FIND OUT MORE

Renewable Parts Ltd. is a supply chain and refurbishment specialist in the wind energy industry. Read more here

- Practice video

Renewable Parts (RP) introduces circular economy practices into the wind energy industry to improve sustainability of wind energy assets by reducing the emissions of carbon and the amount of waste sent to scrap and landfill. This is a practice that can and should be utilised across renewable energy and the energy network to ensure green energy is truly sustainable.

HIGHLIGHTS

- As a pioneer of circular economy in the wind industry, RP had to create new processes and procedures and work with customers to introduce new circular economy reverse logistic practices.
- Development of unique reused packaging for parts including steel braces for yaw gears and wooden boxes for smaller parts.
- RP aims to transfer their expertise to the offshore market as well

About the Practice:

Renewable Parts produces refurbished products for wind turbines, currently mainly yaw gears, to create a sustainable supply chain in the wind industry.

The circular economy practice is a supply chain method used in place of a linear economy to produce and supply items to end-users. Its main objective is to create a more sustainable supply chain throughout industries it is used in by reducing the requirement to create new products which can sometimes be one of the main causes of emissions, and by reducing the number of items that are sent to landfill by refurbishing, reusing, or remanufacturing.

Fish hotels

by TenneT TSO B.V.

FIND OUT MORE

TenneT is the TSO in the Netherlands and in parts of Germany

Read more about their offshore approach here.

To enhance biodiversity around their Offshore High Voltage Station (OHVS), TenneT constructs marine nursery habitats. These 'Fish hotels' are steel constructed covered with mesh to allow entry to small fish and partly filled with shell or rock, keeping larger predatory fish out, thus providing shelter and safe foraging opportunities for small fish.

HIGHLIGHTS

- Potential benefits for diverse fish species and crustaceans, including through increased food availability from faecal deposition
- Part of TennetT's standardised offshore grid design with integrated nature-inclusive measures

About the Practice:

TenneT's goal of having zero net impact on nature by 2025 means that positive practices are needed, compensating for any unavoidable negative impacts on the offshore environment. To create new habitat opportunities for marine life around their OHVS, TenneT worked closely with an interdisciplinary team of engineers, cost and maintenance experts, offshore surveyors, ecologists and NGOs 'Ecocean' and 'The Rich North Sea'. The first fish hotels were installed in 2021 and monitoring commenced soon thereafter. Their robust structure makes them transferable to most conditions and geographical regions and TenneT will continue to share the practice with TSOs and industry specialists.

Incremental Ecological Index (IEI)

by Terna S.p.A.

From the application of the Incremental Ecological Index (IEI) obtained from the analysis and combination of specific ecological indicators measured in the field (vegetation, ornithofauna, entomofauna), Terna intends to obtain information on the ecological status for a given restoration area in order to compare pre- and post-operam and to evaluate the changes in terms of ecosystem quality variations.

HIGHLIGHTS

- The way in which the data of the ecological indicators are put together to obtain information on the ecological status of an artificial neo-ecosystem by applying the IEI equation is an innovative one.
- Unique putting together of indicators, by proposing a fast sampling method capable of providing synthetic and scientifically valid information on the ecological status of a neo-ecosystem.
- The method can be applied to evaluate the ecological status of any neo-ecosystem created through restoration ecology interventions, such as vegetation restoration, masking, etc. as well as to other geographical regions.

About the Practice:

The project's main goal is to define a methodology aiming to evaluate, from a qualitative and quantitative point, changes in the ecological status of the various neo-ecosystems created through mitigation and compensation actions (restoration of vegetation, masking, etc.). The implementation methods of the ecological restoration projects are important to determine the speed with which the neo-ecosystem reaches characteristics close to similar natural ecosystems and are defined in such a way that it can be used long-term.

FIND OUT MORE

Terna is the Italian TSO. Read more here

- Terna's commitment to safeguarding biodiversity

Act Now

by Elia Group

FIND OUT MORE

Elia Group is a transmission holding company which owns two subsidiaries (both of which are TSOs): Elia in Belgium and 50Hertz in Germany.

Download of Act Now video and full strategy report.

Elia and 50Hertz (which are subsidiaries of Elia Group) have developed a strategic action plan that places sustainability at the heart of their business processes. The plan includes a clear path for both subsidiaries to become carbon-neutral and limit their environmental impact.

HIGHLIGHTS

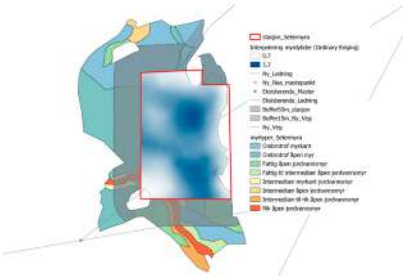
- Functions as an overall compass which guides daily business and ensures that all activities are being carried out with a focus on this century's most urgent environmental challenges
- Accelerates the transformation of the transmission industry so that it can reach carbon neutrality and embeds sustainability at a corporate level
- Sets an example for a holistic take on ecological and social sustainability for TSOs and defines concrete and measurable objectives

About the Practice:

Act Now is both a vision statement and a clear action plan which focuses on embedding sustainability across the Group through the application of the UN Sustainable Development Goals. It provides the Group's subsidiaries with coherent guidelines and planning strategies and acts as a yardstick against which the Group's path to decarbonisation can be measured. Concrete outcomes which have so far been achieved in accordance with the plan include a 30% reduction in CO2 building emissions (compared with 2018) and an almost 100% recycling rate for transformers and pylons. In the long run, Act Now will help Elia and 50Hertz to align their strategies and efficiently plan their activities whilst keeping the goal of decarbonising their operations in mind and helping to limit the Group's environmental impact.

Carbon calculator to estimate CO_2 emissions from excavation and degradation of peatlands

by Statnett



Statnett, in cooperation with NINA (The Norwegian Institute for Nature Research), has developed a Carbon Calculator to estimate how different land use plans affect greenhouse gas emission, with a special focus on peatlands. The tool estimates the carbon content in soil that will be affected by excavation and drainage, thereby adding to a better foundation for decision making when planning new grid projects.

HIGHLIGHTS

- Calculates the amount of soil carbon at potential construction sites
- Increases environmental responsibility and reduces greenhouse gas emissions during construction work
- Optimises the placement of new electrical infrastructure that provides climate friendly renewable energy

About the Practice:

Peatlands cover approximately 9% of Norway's land area and are the terrestrial habitats with the highest amount of carbon storage. Construction activity leads to draining and emission of CO_2 but these emission figures have historically not been recorded and reported. The Carbon Calculator is a tool that calculates the amount of soil carbon at potential construction sites, thereby providing aid to reduce greenhouse gas emissions during construction work and the optimisation of routes for new electrical infrastructure that help preserve vulnerable and important natural areas. The approach has already gained attention nationally and Norwegian authorities are looking into using the calculator for future wind power development.

FIND OUT MORE

Statnett is the Norwegian transmission system operator. Read more here

- Statnett's new framework for Greener encroachment on nature


Technological Innovation
& System Integration

SoLAR Allensbach
Intelligent Energy Sector Coupling

by Easy Smart Grid GmbH, Community of Allensbach – Local Agenda 21, International Solar Research Center ISC Konstanz e.V., European Institute for Energy Research EIfER

FIND OUT MORE

Easy Smart Grid GmbH developed the patented technology used in the project.

Read more about SoLAR here.

The project SoLAR aims to prove functionality of intelligent sector coupling through the coordination of many flexible devices in a grid cell within a residential development. The cell reacts to the availability of variable renewable energy in real-time and considers actual and forecasted prices, thus allowing each prosumer to decide when to use their devices.

HIGHLIGHTS

- Aims to increase electricity self-consumption rate from 50% to over 80% and reduce grid load.
- Realises “virtual batteries” with benefits for stability, resilience, cyber protection, and cost
- Develops proposals on how to provide system services through real-time tariffs designed to integrate the approach into current and future energy markets.

About the Practice:

SoLAR was conceptualised by the Local Agenda 12, a citizen climate protection initiative who sought to supply the community mainly from RES, assuming that all energy sectors (electricity, heating and mobility) will be widely electrified and intelligently coupled. Based on the patented technology of Easy Smart Grid GmbH (ESG) and with regional state funding, the project was implemented in a new residential development with 22 households and connected with an existing building with 3 households. It includes smart control of a CHP unit, 12 heat pumps, several dozen household appliances, a number of charging units for electric vehicles (EVs) and some battery storages. Electricity is produced locally with rooftop-PV and the CHP unit.

MIO – Reaching the next level of digitalising offshore grid operation

by 50Hertz & Energinet

The Master Controller for Interconnector Operation (MIO) is the first integrated digital tool to enable higher utilisation of offshore infrastructure than usual, since it integrates market signals while having a high focus on integration of renewable energy. It harmonises the requirements of the electricity market and the generation of wind-dependent electricity in the Baltic Sea.

HIGHLIGHTS

- Provides constant and reliable data for the day-ahead market (by checking wind forecasts, outage planning, etc.)
- Handles massive data in real time and calculates available capacity of meshed interconnector
- Keeps voltage level and reactive power exchange within given limits
- Protects assets from overload

About the Practice:

MIO is the "brain" of a complex hybrid energy system that consists of converters, offshore wind farms and cables which are all connected to each other as well as the grids of both Germany and Denmark.

The MIO's most important task is the optimal use of this interconnection whilst preventing the line and operating facilities in the substation from overload . As part of this process, the MIO controls the market-based exchange of electricity between Denmark and Germany, not only on the basis of forecasts, but also by ensuring the necessary voltage stability and system balance. It incorporates the complete offshore grid, the wind farms and the converter station, and handles massive amounts of real-time data from different sources, applying it to system operation. Its innovative nature and complexity make it an ideal blueprint for operating offshore grids – even those of bigger scale.

FIND OUT MORE

50Hertz is one of Germany's four TSOs. Energinet is the Danish TSO.

Project website

X-FLEX

by ETRA I+D

FIND OUT MORE

The project is coordinated by ETRA I+D, a large business group dedicated to putting at the service of society the most advanced technologies in the areas of energy, mobility and security.

Project website

X-FLEX is an end-user driven project that aims to design/develop/demonstrate a set of tools, to integrate the emerging decentralised ecosystem of renewable energy sources (RES) and flexibility systems into the existing European energy system, in an efficient and cost-effective manner, to create more stable, secure and sustainable smart grids.

HIGHLIGHTS

- The project will create and integrate synergies across several energy flexibility sources and technologies, promoting cooperation among all the actors of the smart grid and energy market, in an efficient and cost-effective manner.
- Identification of 31 use case-related pilot site needs and definition of 194 requirements to cover various fields of the product aspects.

About the Practice:

The four X-FLEX's pilot sites are complementary and include different conditions, infrastructure and stakeholders, facilitating the replicability of the practice in various locations in the future. In this context, a Replication and Deployment Handbook will be delivered at the end of the project. Furthermore, X-FLEX project products will be built on several tools demonstrated in previously successful EU projects (all part of BRIDGE initiative) enabling higher impact, shorter time to market and a favourable context to the large-scale replication.

Large-scale grid flexibility

by FLEXITRANSTORE

FIND OUT MORE

FLEXITRANSTORE is an EU-funded project under HORIZON 2020 framework.

Project website

FLEXITRANSTORE aims to develop a next generation power system flexibility platform, enhance simulation tools and demonstrate innovative grid-flexibility technologies to improve the flexibility resources of the pan-European transmission system. The platform focuses on the integration of Southeast Europe markets, boosts the establishment of a liberalised electricity market and encourages relationship building and knowledge sharing among industry players in the region.

HIGHLIGHTS

- Accelerate the integration of renewables and increase cross-border electricity flows
- Increase flexibility across the energy industry value chain, in transmission, from renewable generators and within wholesale electricity markets

About the Practice:

FLEXITRANSTORE's approach targets the entire energy industry value chain by focusing on flexibility infrastructure, capabilities of demand side response, improved operations, flexible generation and the integration of storage to accelerate RES integration and increase cross border flows from a market and system perspective. Flexibility resources utilised as part of FLEXITRANSTORE include battery energy storage systems, power flow controllers, active substation controllers, dynamic line rating technology, as well as wholesale market demonstration and clearing. Convincing testing phases have already led to non-consortium TSOs wanting to pilot the solutions within their systems.

EUSysflex

by EirGrid

FIND OUT MORE

EirGrid is the Transmission System Operator in Ireland and Coordinator of the EU-SysFlex project.

Project website

The H2020 funded project EU-SysFlex aims to solve the power system challenges associated with integration of variable renewable generation required to meet the European 2030 50% RES-E target while ensuring stability, reliability and resilience through flexibility and market and system services.

HIGHLIGHTS

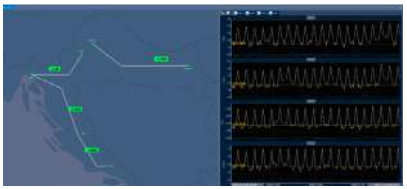
- Synergistic approach combines system-level analysis with bottom-up exploration of technology capability and deployment in a real time grid environment
- A 'roadmap for change' created to guide the transition to a decarbonised European power system

About the Practice:

On the road to decarbonisation, there will be significant challenges for power system operators and electricity markets and new technologies and approaches will be vital. Recognising that collaboration will be essential, for example to deliver on sector-coupling and increased consumer involvement, a consortium of 34 TSOs and DSOs, aggregators, technology providers, research and academic institutions and consultancies from 15 EU countries came together for EUSysFlex. They together perform diverse tasks which seek to identify system-wide long-term needs, unlock technological flexible capability, enhance TSO/DSO cooperation and European scale data interoperability and standardisation.

CROSSBOW

by ETRA I+D



FIND OUT MORE

CROSSBOW is an EU-funded project under HORIZON 2020 framework.

Project website

The project offers 9 different tools to foster transmission networks' cross-border management and a higher penetration of clean energy whilst reducing network operational cost through a shared use of resources among system operators in Southeastern Europe (SEE).

HIGHLIGHTS

- Provides technical toolset including 9 transparent and easily manageable products – acknowledged by the EU Innovation Radar – including a RES regional coordination centre, a regional operation centre balancing cockpit, virtual storage plants and a cooperate ownership of flexibility assets platform
- Analyses cross border energy storage management and alternative configurations of hybrid power plants combining wind, PV, biogas and hydro

About the Practice:

CROSSBOW aims at the successful market deployment of technological solutions to increase the shared use of resources across SEE as well as the flexibility and robustness of the regional transmission network. Its solutions enable higher penetration of renewables whilst reducing network operational costs and improving the economic benefits of RES and storage units. In the course of the project, CROSSBOW has made a significant impact on commercial operation and innovation activities, which will contribute to creating more than 7000 jobs, providing better access to quality energy services and saving 3 Mtons of greenhouse gas emissions.

Using Mixed Reality (MR) on the Modular Offshore Grid (MOG)

by Elia

FIND OUT MORE

Elia is the Belgian transmission system operator and a subsidiary of Elia Group. Read more here

Introduction to the Microsoft HoloLens 2

The use of mixed reality (MR) remote assistance technology for inspecting and maintaining the Modular Offshore Grid (MOG) aims to support the continued integration of renewable energy into the Belgian electricity grid, since it allows maintenance operators to access real-time digital advice and guidance on how to quickly fix issues that arise on the MOG.

HIGHLIGHTS

- Synergistic approach combines system-level analysis with bottom-up exploration of technology capability and deployment in a real time grid environment
- A 'roadmap for change' created to guide the transition to a decarbonised European power system

About the Practice:

The practice involves maintenance operators on the MOG using a Microsoft HoloLens 2 (Mixed Reality smart glasses), allowing them to share their real-time view of the MOG with remote experts, and receive audio/visual assistance from them. The HoloLens 2 overlays digital content/information on top of the video feed of the real world. The MOG is a switching platform 40 km off the Belgian coast which transports the electricity generated by four wind farms to the mainland. It therefore permits the integration of renewable energy into the Belgian electricity grid. The Hololens 2 reduces the time and cost involved in bringing experts to the MOG itself and decreases CO_2 emissions related to transporting external experts to the MOG.

TRINITY

by ETRA I+D

FIND OUT MORE

The project is coordinated by ETRA I+D, a large business group dedicated to putting at the service of society the most advanced technologies in the areas of energy, mobility and security.

Project website

TRINITY is a project that enhances cooperation and coordination among the Transmission System Operators of South-Eastern Europe (SEE) in order to support the integration of the electricity markets in the region, whilst promoting higher penetration of clean energy.

HIGHLIGHTS

- TRINITY has defined 3 pilot scenarios in 8 SEE countries to maximise the benefits brought by the cross-border collaboration and to address the market integration, TSO coordination and RES promotion.
- The project solutions are being designed to be repeatable for long-term use and transferable to other regions.
- Calculations show that the project will increase 14.95 TWh of RES production, reduce 10.58 $MTCO_2eq$ and allow a price decrease of 7€ per MWh consumed during the first five years after the project end.

About the Practice:

Electricity consumption in SEE is up to twice as high as in other parts of EU, causing a higher burden on SEE households with high electricity costs. The project aims to enhance cross border trading and balancing energy exchange while ensuring electricity market integration and increasing the share of RES in SEE. In this context, it also investigates the improvement of system operation security and reinforces coordination, interaction and communication among the key energy actors of the region

EMPOWER

by Smart Innovation Norway A/S

The Horizon2020 project developed a local electricity trading platform and Norway's first microgrid in order to prove that significant reduction of greenhouse gas emissions and an increase of energy efficiency require radical changes in our relation to energy, and also to encourage active citizen participation in the electrical system.

HIGHLIGHTS

- New ICT-based cloud system for the project and its local trading application developed by eSmart Systems
- Development of completely new use cases and business models thanks to the smart meters
- Case studies with data from approx. 35 relevant benchmark business models and companies and multi-country study with 830 participants from four countries to measure prosumer acceptance and optimise business model.

About the Practice:

The project developed and verified a new market design for local marketplaces for electricity trading through a cloud-based ICT solution while designing innovative, prosumer-oriented business models relevant for the market design and implementing full bi-directional and secure communication between the market and business layers. The practice also encouraged micro-generation and the active participation of prosumers to exploit the flexibility created in demonstration sites in order to prove the viability of the concept and create synergetic benefits for all inhabitants connected to the local grid.

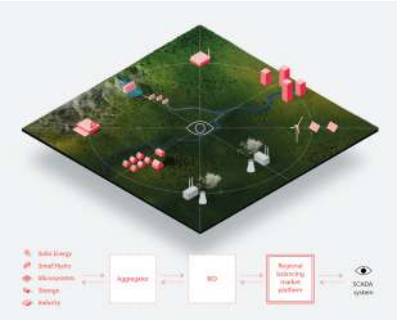
FIND OUT MORE

Smart Innovation Norway A/S is a company whose main purpose is to practice independent, applied research within the fields of renewable energy and information technology. Read more here.

Project website

FutureFlow

by ELES, d.o.o.



To open balancing and redispatching markets to new competitive sources of flexibility, four Central-Eastern European TSOs (ELES from Slovenia, APG from Austria, Mavir from Hungary and Transelectrica from Romania) have designed a unique regional cooperation scheme.

HIGHLIGHTS

- Provides Europe-wide solutions for automatic frequency restoration reserve (aFRR) balancing and redispatching services, including distributed and renewable resources
- Integrates the aFRR markets of 4 European TSOs via a system where virtual power plants would provide flexibility to TSOs on a common aFRR market platform

About the Practice:

This practice aims to respond to Europe's low carbon strategy by gathering relevant experts (energy producers, retailers, grid operators) to create a flexibility scheme. This scheme targets the integration of renewable energy sources and a wide range of demand response sources and is practically and economically viable for wide usage. So far, prototype aggregation platforms for aFRR and a prototype regional balancing and redispatching platform with Common Activation Function (CAF) for aFRR have been developed and successfully tested. Furthermore, the activation results were evaluated, and all involved parties made constant system improvements resulting in a near market-ready system.

FIND OUT MORE

ELES is the Slovenian transmission system operator. Read more here.

FutureFlow.eu

IEGSA Platform

by INTERRFACE

FIND OUT MORE

Read more about the project here.

The Horizon-2020 funded INTERRFACE project designed, developed, and implemented a new Interoperable pan-European Grid Services Architecture (IEGSA), which acts as the interface between the power system (TSO and DSO) and customers, allowing the seamless and coordinated operation of all stakeholders to use and procure common services.

HIGHLIGHTS

- Optimises the use of distributed resources through coordinated procurement of grid services
- Increases market liquidity for grid services and facilitates scaling up of new, widely-compatible services
- Mitigates grid congestions to activate local flexibility resources for system balancing

About the Practice:

Recognising that the European energy transition requires improved integration of all possible flexibility resources, the INTERRFACE consortium – made up of 42 industrial and academic partners from 16 countries – developed a platform which encourages numerous actors to collaborate and achieve coordinated access to resources and can offer a regulatory framework to improve system efficiencies. Following intensive research and testing, the IEGSA platform was deployed in 9 European countries: Finland, Estonia, Latvia, Italy, Slovenia, Hungary, Romania, Bulgaria, and Greece.

DA/RE: The network security initiative

by TransnetBW GmbH and Netze BW

DA/RE is an IT-platform that facilitates coordination between TSOs, DSOs, generating units and storage units focused on facilitating participation in the mandatory, state scheme 'Redispatch 2.0' for decentralised congestion management.

HIGHLIGHTS

- Cloud platform and optimisation across voltage levels allocates flexibility and reduces whole system costs
- The modular concept allows a future expansion of the platform to include direct connection of units that do not meet current regulatory requirements to include smaller providers below the 100 kW threshold

About the Practice:

The 'Redispatch 2.0' scheme was introduced by the German Federal Ministry of Economic Affairs and Energy (BMWi) to enable grid operators to take action to avoid grid bottlenecks, and indeed to oblige them to act when required. The DA/RE platform was developed by TSO TransnetBW and DSO Netze BW, in order to facilitate grid operators across the voltage levels to coordinate their redispatch activity regardless of location or control zones. The platform development including pilot and test phases, involving web seminars, information events for relevant stakeholders.

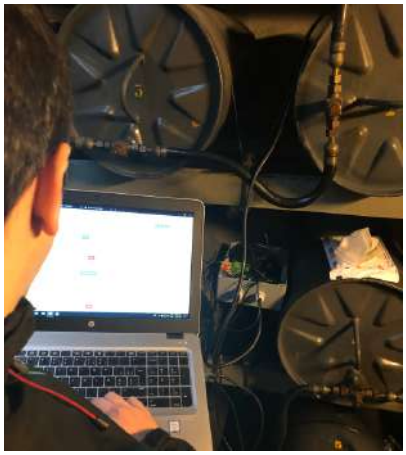
FIND OUT MORE

TransnetBW GmbH is the TSO and Netze BW GmbH is the largest DSO in the German state of Baden-Württemberg.

Read more about the project here.

Using the Internet of Things (IoT) to monitor underground electricity cables

by Elia



FIND OUT MORE

Elia is the Belgian transmission system operator and a subsidiary of Elia Group. Read more here.

In order to reduce the risk and impact of oil leaks, Elia is employing the 'Internet of Things' (IoT) to replace the manual monitoring of the pressure of insulation oil in underground self-contained oil-filled (SCOF) electricity cables. An analytics tool is used to identify long-term trends in the data, enhancing the likelihood of picking up on leaks.

HIGHLIGHTS

- Allows for the continuous digital monitoring of the pressure of insulation oil in SCOF cables
- Increases the safety of staff or contractors involved in the manual monitoring of SCOF cables
- Reduces the time, cost and CO2 emissions associated with manual monitoring
- Optimises the use of current assets to boost the integration of renewable energy into the Belgian electricity grid

About the Practice:

Elia's IoT platform, which is linked to innovative sensor technology, is highly original. The practice was developed by Elia's IoT Center of Excellence, which was set up in 2020 to transform Elia into a fully digital TSO. 20 underground rooms with a dozen technicians were involved in the testing and implementation of the technology, which includes a communication gateway to collect and store data, antenna with strong signals and deep penetration communication technology to send data to the IoT analytics platform. Based on the practice's success, its roll-out to additional SCOF cables across the Group's operational areas is being explored.