Newsletter

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ETN Global is a non-profit association bringing together the entire value chain of the gas turbine technology community. Through cooperative efforts and by initiating common activities and projects, ETN encourages and facilitates information exchange and cooperation to accelerate research, development, demonstration, and deployment of safe, secure and affordable carbon-neutral energy solutions by 2030.

IN THIS ISSUE

Christer Björkqvist
Managing Director

Ambitious but realistic pathways to net zero

The current energy crisis and the ongoing war has triggered policy makers to another reprioritisation among the three elements of the energy trilemma, where security of supply is now the top priority followed by affordability and sustainability. To overcome the threat of gas shortages and power cuts in Europe, 26 previously shut coal-fired power stations were reactivated in 2022. Coupled with policy measures across the EU and a record inflow of LNG the threat has fortunately not come to play this winter. As a result, gas prices have come down, allowing utilities to fill up their natural gas storage to healthy levels around 80%. Additional LNG supply is also expected to come on stream but mainly from 2025, so global gas supply is still set to remain tight in 2023 and 2024 with a wide range of uncertainties. As such, the next two winters are expected to be challenging for both Europe and Asia with security of supply still at risk as well as our decarbonisation targets. As a result of these quick policy switches from left to right there is a lack of appetite by the industry for long-term energy related investments. To overcome this and to avoid major turns and speed bumps on our road to net-zero, we need a resilient, long-term energy policy that can progress in a balanced way on all the three dimensions of the energy trilemma.

Maybe the US Inflation Reduction Act (IRA), adopted in the autumn of 2022 could act as a catalyst and trigger a more balanced and resilient European energy policy and help us get back on track when it comes to our carbon reduction targets. The IRA includes an impressive package of 370 bn USD that, regardless of the name, will mainly be spent on increasing clean energy production and boost electric vehicle industries. However, as it provides generous subsidies to encourage investments within US boarders, many European politicians fear that it will revert investments away from Europe. However, I see it more as healthy competition, where EU needs to react and come up with an industry policy that makes it equally attractive to invest in the EU but without conflicting with the idea of a single market.

The silver lining of this energy crisis could be that it has been a wake-up call for politicians to recognise the importance of a balanced energy policy. As many strategic, forward-looking energy decisions and investments are needed in the near future it is now critical that we contribute with constructive solutions. To do so our Project Board is actively working on a new R&D recommendation report, which will include technology roadmaps with milestones for a portfolio of the most promising pathways to net-zero.

This ongoing mapping process "Ambitious but realistic pathways to net zero" is also the name of our upcoming Annual General Meeting & Workshop (AGM) at the end of March. This is an event not to be missed as it will provide you with an overview of all the new activities, working groups, projects, user meetings and events so you can ensure that you fully benefit of all our activities and actively participate in areas of importance to your organisation. As usual, our AGM will offer outstanding networking opportunities. This year we will also offer an opportunity of additional visibility to our members with a smaller expo at our coffee & lunch breaks and a gala dinner at the Royal Garden hotel, kindly sponsored by Mitsubishi Power. The following Workshop will provide you with both guidance on technology options and an opportunity to influence the setting of truly ambitious but still realistic technical milestones and development targets for these pathways.

From a technical point of view, I am positive that we can deliver the required solutions in a timely manner, but it will require a coordinated cooperation. That's why, I hope to see you all, at our upcoming AGM & Workshop in London. If you have not registered yet, do it today and if you are not yet a member of ETN don't hesitate to sign up as we need your voice and expertise!

ETN published a new report “Addressing the combustion challenges of hydrogen addition to natural gas”

Overview

A new report “Addressing the combustion challenges of hydrogen addition to natural gas” was released in February 2023 by ETN’s Hydrogen Combustion task force. The report presents findings, conclusions and recommendations, aiming to facilitate the introduction of gas turbines firing the full range of hydrogen and natural gas blends to deliver heat & power.

Purpose of the study

Gas turbines will play an important role in the energy transition, but also in the long-term to enable a carbon neutral future by extending the fuel capabilities to blends of natural gas and hydrogen (up 100%). However, there are challenges involved when it comes to combustion of hydrogen in gas turbines. This report set out to investigate these challenges and to explore fundamental differences, from a combustion perspective, between natural gas and hydrogen. It takes into consideration the practical implications for gas turbine operation and identifies the impact on key combustion performance indicators; highlights future research & development requirements and recommends a way forward to introduce gas turbines firing the full range of hydrogen and natural gas blends to deliver low-carbon heat & power.

Acknowledgement

This publication is authored by ETN Hydrogen combustion task force, a group of experts representing the whole value chain of the gas turbine technology: manufacturers, users, research universities and service providers. We would like to thank each contributor for sharing their knowledge and experience and a special thanks goes to Dr David Abbott, Emeritus Member of ETN, who led the group of authors and edited the report.

The summary version is freely available on ETN website here, whereas the full report is available for ETN Members-only here. ■

New members

We warmly welcome NEM Energy (the Netherlands), RWTH Aachen University (Germany), MD&A (USA) and Parker Hannifin (UK) who recently joined ETN Global. ETN currently has 118 members from 21 countries.

NEM Energy is a leading equipment supplier in the field of heat transfer technology with close to a century of experience, known for its quality and innovation with a focus on people and safety. NEM supplies solutions for power generation, oil & gas and many other industries, from design to aftermarket services.

RWTH Aachen University, Institute of Power Plant Technology, Steam and Gas Turbines, is involved in research on energy conversion machines in the field of power plant technology, energy storage technologies and beyond. Through many years of activity in this field of research, the department has built up extensive expertise in the conceptual design, layout and operation of large-scale experimental test rigs typically based on air (possibly other media), using compression and expansion systems alike. Another focus of the department's research activities lies on comprehensive model-based analysis and optimisation of energy conversion processes and systems on an industrial scale.

Mechanical Dynamics & Analysis is dedicated to offering high-quality, on-schedule, and cost-effective repair, services, and parts for steam, gas, and industrial turbines and generators that result in repeat business and positive customer feedback.

Parker Hannfin focuses on the development, production and sales of technologies, systems and components in the field of motion and control. Parker supplies products in nine technologies: hydraulics, pneumatics, electromechanical, filtration, process control, fluid and gas handling, sealing and shielding, climate control and aerospace. Besides products, Parker also delivers complete systems and power units. Within filtration gas turbine inlet filtration, Parker Gas Turbine Filtration (GTF) division develop and produce high quality gas turbine air inlet filters and systems that provide exceptional performance in a wide range of environmental conditions. Whether you need a cartridge, vCell, pocket or panel filter or a complete gas turbine inlet filtration, power augmentation and acoustic system, our solutions portfolio is designed to meet your operating goals. ■

Interview with John Fransen, COO of NEM Energy

John Fransen, COO, NEM Energy

What is the core business of NEM Energy?

NEM is a provider of Heat Recovery and Exhaust Solutions. Our products recover heat from gas turbines of any make. We serve both the industrial gas turbine range as well as the largest machines available on the market, for onshore and offshore applications. Our installed base of Heat Recovery Steam Generators (HRSGs) is the largest amongst all suppliers globally and we provide services throughout the complete lifetime, also for third-party delivered installations. Our core competence is the heat transfer, but we are also strong in project execution. A few years ago, we delivered 24 HSRGs in one project, which was at that time, the largest ever. We calculated that the steel required for the HRSGs only had a total weight of roughly 14 Eiffel towers.

Our Dutch head office focusses on the Heat Recovery business while our German Branch on the field diverter and damper systems. Although gas turbines are our focus, our products are not solely used to recover waste heat from gas turbines. For instance, recently we also provided a heat recover system for an energy storage facility in Germany.

What is the unique value proposition that NEM Energy can offer to your customers?

When you have such a rich history like our organisation, you have an additional value to offer, namely experience and know-how. We were established in 1929 and have almost a century of experience in making steam generators. Our know-how has developed over time and resulted for instance into our proprietary thermal design software, which is second to none. Our experience with different type of boilers, with different codes and standards, with different local regulations gave us the benefit of designing products that satisfy today's customer requirements and tomorrow's market demand. Back in 2018, we presented

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our DrumPlus™ HRSG to the ETN community at the International Gas Turbine Conference. This design allows for an unrestricted gas turbine ramp up so that the operator can provide power as quickly as possible when being called upon by the grid. Meanwhile, we have many units in successful operation. Also, for customers that do not require immediate fast start or cycling operation, we install such HRSGs to prepare them for the future.

How does NEM Energy contribute to the transition to a net zero world?

One of the main pillars of climate policy has always been energy efficiency. Note that our products today already increase efficiency of the installed base of gas turbines a great deal. Our products increase energy output by almost 50% and decrease emissions per energy produced by roughly 30%. It's our goal to install a Heat Recovery system behind every gas turbine. Gas turbines waste heat can be used for steam generation and additional electricity production in a combined cycle, but the heat can also be used to heat up any type of fluid or gas. For instance, we have recently supplied a Waste Heat Recovery Unit (WHRU) for a gas turbine used in a compressor station in Canada where the waste heat in our system is used to heat up a water glycol mixture needed for a natural processing plant located adjacent. Another recent example is for a project in Germany where our product recovers gas turbine waste heat for the supply of district heating.

As heat demand accounts for about half of the total energy demand, heat transfer is key in this transition. NEM is keen on providing solutions for the energy transition moving forward. For gas turbines we provide hydrogen-ready heat recovery solutions and in the wider energy landscape we provide Heat Transfer solutions in electrification. ■

For more information,
visit the website: www.nem-energy.com
or follow NEM Energy on social media

Figure 1: Conversion of an existing open cycle F-class gas turbine into an efficient combined cycle plant, with a NEM exhaust gas by-pass system and Heat Recovery Steam Generator in Chilca, Peru.

ETN President's annual message to the members

ETN President Pedro Lopez highlighted in his letter (login required) to the members dated 23 November 2022 ETN's achievements in 2022 and plans for 2023. He noted that the current energy crisis is a result of combination of events: extreme weather conditions and particularly the Russian invasion of Ukraine, which has increased the pressure on security of supply, but also proved that there is an urgent need to accelerate the technological developments to ensure the rapid shift to use renewable or decarbonised fuels.

The President emphasised that ETN has made it clear to policy makers, the crucial role that gas turbines can and will play not only in the short-term to meet power and heat needs, but also in the long-term to meet the net-zero target. ETN will continue this dialogue throughout 2023 and will try to ensure that gas turbines are also taken into consideration in future energy scenarios through collaboration with organisations that develop them.

The President accentuated that never in the history of ETN has the organisation had as many projects, on-going activities, and new initiatives. 2022 has been a busy year and has provided many new opportunities, such as continued work within existing and new ETN's Working Groups and task forces, Engine-Specific User Groups, and R&D projects, as well as several successful hybrid and face-to-face events and webinars, all of which will enable ETN to develop a portfolio of solutions on carefully selected pathways for our industry to follow.

The President underlined that ETN's success is a result of active participation and involvement of its members, and the organisation's elevated relationship with policy makers. Key objectives for 2023 are to continue to grow the community, making ensure all the voices from across the whole value chain of gas turbine technology are involved and heard and work together to overcome the current challenges the industry is faced with without losing the net-zero priorities.

The organisation has prepared a versatile programme of activities with virtual and physical events in 2023. Please find ETN's calendar here. ■

ETN's webinar series: "R&D activities on sCO_2 in Europe"

ETN's third episode in the webinar series "R&D activities on sCO_2 in Europe" was held virtually on 06 March 2023 at 16h00-17h00 CET. It had over 200 registered participants. This session focused on sCO_2 heat exchangers.

The following experts spoke, presenting challenges they encounter in their research and daily business:

- **Savvas Tassou**, Director of the Institute of Energy Futures, Brunel University London: *"Fundamentals, challenges and recent research and development activity on sCO_2 cycle recuperators and coolers"*;
- **Daniel Georges**, Design Engineer & Natalie Sarpong, Thermal Engineer, Heatric: *"Printed circuit heat exchangers for sCO_2 power cycles"*;
- **Xavier Guerif**, R&D Director, Kelvion Thermal Solutions: *"Improvement of dry air cooler for the condensation of the CO_2 using enhanced tubes"*.

The webinar series are free and open to both ETN members and non-Members but require a registration. They were launched in September 2022 bringing together eight participating projects: CARBOSOLA (German national project), COMPASsCO2, CO2OLHEAT (coordinated by ETN), DESOLINATION, SCARABEUS, sCO_2-Efekt (Czech national project), CO2-4-NPP, and SOLARSCO2OL. Please visit our events page to learn about the upcoming episodes in these series. ■

ETN's Annual General Meeting (AGM) and Workshop

ETN's 19th AGM and Workshop titled "Ambitious but realistic pathways to net zero" will be held in London on 28-29 March 2023. We are being generously hosted by one of our members Imperial College London.

Our 2-day event brings together representatives from the entire gas turbine community providing an opportunity for its members to get an overview of all ETN activities, find out the needs and requirements from users' perspective, explore development opportunities, map out technical pathways; and to explore, discuss and exchange ideas with GT experts.

Programme

The main programme looks as follows:

- 28 March: AGM (13:00-17:45 GMT)
- 29 March: Workshop with 2 parallel Technical Committee sessions (08:30-16:30 GMT)

Registration

Registration is open and all our ETN Members are invited to register via our event webpage.

Sponsorship and exhibition opportunities

Our event provides an excellent opportunity to increase your visibility and to display your latest technology developments and offered services to the entire gas turbine community. great chance to explore future partnerships and cooperation in line with the market trends.

Our gala dinner event sponsor is Mitsubishi Power and exhibitors include Mechanical Dynamics & Analysis, Alba power (Sulzer brand) & Mitsubishi Power Aero.

If you are an ETN Member and interested in becoming a sponsor, please find the sponsorship package on our event webpage. ■

Additive Manufacturing Working Group launching a new industry-led initiative

Additive Manufacturing Working Group is launching a new joint industry led project titled "**High temperature turbine blade alloy for additive manufacturing**". The project will seek to identify and validate high temperature alloy for manufacturing using laser powder bed fusion (LPBF) process. The target alloy will have material characteristics and temperature capabilities upwards of 1000°C suitable for stage 1 gas turbine blade application.

The project will aim to identify candidate material(s) and develop it to TRL levels 3 to 4. This will include LPBF process development, key material property evaluation and capability demonstration using LPBF by manufacturing of a select turbine blade geometry.

ETN extends the invitation to industry, research and academic partners with an interest in collaboration for alloy development, LPBF process development for complex material and geometry, and material testing and validation to come forward. If you are interested, please send an email to Rene Vijgen or Nicolo Cairo. ■

ETN's SGT-A35 & LM-2500 User Group Meetings

ETN's SGT-A35 User Group Meeting will be held on 10-11 May 2023 in Aberdeen, United Kingdom supported by Shell, Total Energies, BP and Equinor. The LM-2500 User Group Meeting will be held on 06-08 June 2023 in Sunbury-on-Thames, United Kingdom, generously hosted by British Petroleum.

Participation is open to global owners & operators of the specific engines.

Registration

Registration will open beginning of March 2023 on the dedicated event webpages:

- SGT-A35 User Group Meeting
- LM-2500 User Group Meeting.

Programme

Both events include the following:

- User sessions: discussions among users on top-priority topics
- OEM sessions: special session on the latest developments & upgrades, and technical discussions on topics of the highest priority
- Technical sessions with selected Service Providers & Suppliers
- An exhibition area with Service Providers & Suppliers
- Networking dinners

To learn more about the two events, please visit their dedicated web pages: SGT-A35 User Group Meeting & LM-2500 User Group Meeting.

In case you are interested in becoming an exhibitor, please get in touch with ETN office. ■

IGTC 2023: Save the date!

ETN's 11th International Gas Turbine Conference (IGTC) titled "Dispatchable technology & innovations for a carbon-neutral society" will take place on 10-11 October 2023 at Tangla hotel in Brussels, Belgium.

Programme

The conference will include 5 keynote sessions, 6 technical sessions (with 20 technical papers to be presented), an exhibition and plenty of networking opportunities.

The programme looks as follows:

10 October:

- Keynote sessions 1 & 2: "Energy transition to a global carbon-neutral society"; & "Net-zero pathways"
- Parallel technical sessions 1 & 2:
  - Technical session 1: Low carbon solutions
  - Technical session 2: Product sustainability, performance & reliability
- Parallel sessions 3 & 4
- Technical session 3: Product sustainability, performance & reliability
- Technical session 4: Energy efficiency improvements
  - Gala dinner at La Brasserie de Waterloo on Mont-Saint-Jean Farm

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11 October:

- Keynote sessions 3,4 & 5: "Global gas turbine markets: opportunities and challenges towards a low-carbon society"; "Enablers for the energy transition"; & "OEM Technology developments for a carbon-neutral society"
- Parallel sessions 5 & 6:
  - Technical session 5: Low carbon solutions
  - Technical session 6: Integrated energy systems solutions

About IGTC

IGTC is a well-established and renowned biennial conference. Its objective is to demonstrate the contributions and opportunities for our technology in the energy transition as well as in a carbon-neutral society by highlighting the latest technical developments on the identified pathways by the user community.

The IGTC will highlight how our technology can provide solutions to the energy trilemma of sustainability, security of supply and affordability in a balanced way. Also, global opportunities for gas turbine technology in key markets will be presented and the latest R&D developments that will help to accelerate the transition to sustainable energy systems by adapting the gas turbine technology to carbon-neutral fuels, hybrid power systems and alternative heat sources.

For manufacturers, suppliers and service providers the conference provides an unprecedented opportunity to reach out to the global gas turbine user community and policy makers and to highlight your commitment to provide the required energy solutions and services. Parallel to this it provides an opportunity for the gas turbine research community to disseminate your latest research achievements and open the eyes of user and policy makers on future developments and expected contributions by our technology to reach the net-zero targets.

Sponsorship and exhibition opportunities

This conference provides an exclusive opportunity to show your role and commitment in the energy transition as well as contributions to the development of a carbon-neutral society.

If you are interested in learning more about the event or becoming a sponsor, please find more information on our event webpage. ■

ETN Global, as part of larger consortiums, has been awarded two new projects, which have been successfully launched in January 2023:

Innovation in Supercritical CO_2 Power generation Systems (ISOP) project

ISOP is a 48-month research and development project, with a total budget of EUR 4.45 mil., which will run from January 2023 until December 2026. The project is funded by the European Union through Marie-Sklodowska-Curie sub-programme (MSCA) of Horizon Europe and United Kingdom Research and Innovation (UKRI) public body.

The project aims to explore sCO_2 based power generation systems' technology and its potential through further research & development. By providing specialised training for 17 doctoral researchers to help establish the backbone of sCO_2 technology the objective is to become a major contributor to the 2050 zero emissions target and lead to a crucial change in thermal energy power cycles.

ISOP consortium is composed of 16 partners: nine industrial beneficiaries, seven academic beneficiaries, and six associated partners. During the course of the project, ETN will receive two doctoral candidates. One will be placed for a period of 12 months, starting mid-2023 and working on the topic *"Market uptake of supercritical CO_2 power systems to enable carbon-neutrality by 2050"*. The second candidate will be placed for 6 months and will cover the topic *"Large Scale Energy Storage based on sCO_2 systems"*. Candidates' secondment period will be specified later.

Please read the full press release about the launch of the ISOP project here. ■

If you are interested to learn more follow us on in

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

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FLEX4H2 project

The FLEX4H2 is a 48-months project with an overall budget of approximately EUR 8.7 mil. and will run, between January 2023 and December 2026. The project is funded by the EU Horizon Europe Research and Innovation Framework Programme under the Clean Hydrogen Partnership and the Swiss Federal Department of Economic Affairs, Education and Research, State Secretariat for Education, Research and Innovation (SERI).

The FLEX4H_2 project aims to move technological frontiers for low-emission combustion of hydrogen to fuel modern gas turbines at high firing temperatures and pressures, beyond the latest state-of-the-art. This will be achieved whilst maintaining high engine performance, efficiency, fuel and load flexibility, without diluents.

The consortium is composed of nine partners from six European countries.

Please read the full press release about the launch of the FLEX4H2 project here. ■

If you are interested to learn more, please visit our webpage https://flex4h2.eu/ and follow us on in &

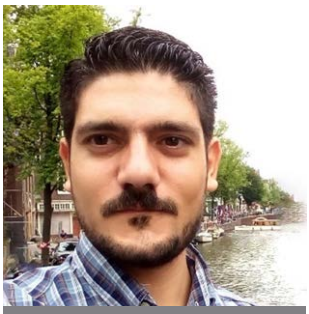
This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101101427

The ROBINSON approach: replication and business planning for local communities

Interview with project partners George Arampatzis and Nikolaos Savvakis

The ROBINSON project aims at demonstrating the replicability of the modular Energy Management System (EMS) and the developed concepts depending on the islands' needs on the Follower islands (Western Isles of Scotland and Crete). To learn more about the Robinson approach we have interviewed George Arampatzis and Nikolaos Savvakis from Technical University of Crete.

George Arampatzis, Associate Professor at Technical University of Crete



Nikolaos Savvakis, Postdoctoral Research Fellow at Technical University of Crete

1. What is the role of the Technical University of Crete in the ROBINSON project?

Technical University of Crete (TUC) contributes to one of the primary goals of the ROBINSON project: to ensure the uptake and facilitate the replication of the Energy Management System (EMS) and the novel energy technologies that are demonstrated and validated at the "lighthouse" island (Eigerøy).

Although the main focus is on issues and plans concerning the replication of the solutions in the two ROBINSON "follower" islands (Crete in Greece and Western Isles in Scotland), the overall approach to replication extends on two levels:

- At the first level, the replicability of the proposed solutions is validated (i.e. it is proved that they can be replicable and not a one-off solution limited in application to the particular conditions and scope of the Eigerøy). At this stage, a concise Sustainability & Replicability Analysis is conducted including a techno-economic analysis (sustainability, economic feasibility, technical feasibility) and an internal & external environmental analysis, focusing on the boundary conditions that may make replication possible or impossible.

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- At the second level, a comprehensive replicability plan is developed, to ensure that ROBINSON solutions will be replicated, primarily in the "follower" islands. For this purpose, some replication support tools have also been developed, including a Web Evidence Base, Business Models, Application Guidelines and a novel Replication Roadmap Tool.

2. *The strategic objective is to demonstrate the replicability of the EMS and the developed concepts on the Follower islands. What are the steps foreseen for this activity?*

ROBINSON has established a systematic approach to ensure and support the replicability of its solutions. The steps foreseen in this procedure are:

i. Provide evidence to convince strategic stakeholders about the replicability of the solutions;

ii. Identify the application range for ROBINSON, including conditions, constraints, assets, limitations and define users and use cases, as well as the baseline for ROBINSON applications;

iii. Research the market and identify the marketability of ROBINSON solutions and its critical factors;

iv. Identify the business models needed to replicate ROBINSON to other locations and assist in the business planning of the replication projects;

v. Map and propose funding sources and schemes for replication of the ROBINSON concept to other locations, including connections to private investors and planning;

vi. Produce an Overall Replication Plan and guidelines for applying and upscaling ROBINSON solutions;

vii. Produce specific detailed Replication Plans for the two "follower" islands.

However, ROBINSON's replicability activities go further than the two "follower" islands' cases. To make the Sustainability & Replicability Analysis more solid and realistic, additional stakeholders, outside the follower island replication systems, have been engaged and their potential use cases defined qualitatively & quantitatively and subsequently examined. These stakeholders and the corresponding external island are part of the ROBINSON Islands Energy Forum.

3. *What are the main challenges and opportunities that you identified so far?*

The main challenges for a successful replication of the ROBINSON solutions are to provide comprehensive evidence guidelines about the replicability of the solutions and to support the relevant actors in implementing the replication process. Motivated by these challenges, TUC developed two novel tools:

1) A flexible digital Evidence Base (Figure 2), encompassing information of various types (technical designs, plans, knowledge and data produced), produced in ROBINSON. This increases the potential for creating channels for solutions up-scale and uptake and can be used by external decision makers and for preparing the replication plans.

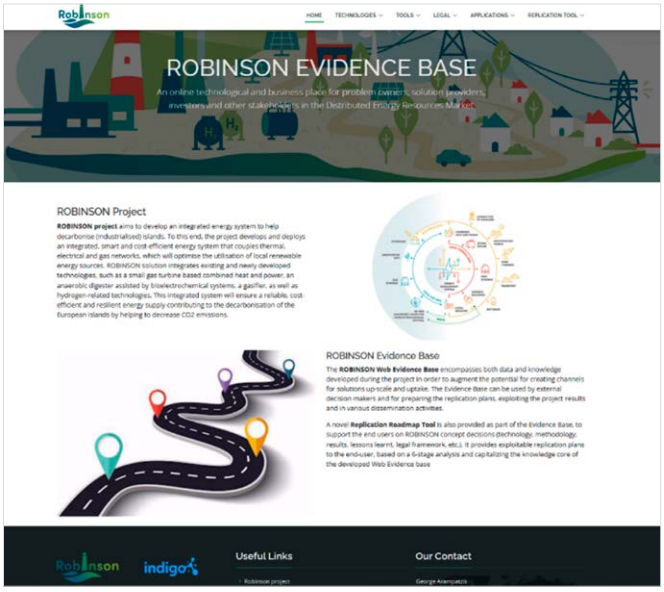

Figure 2: The ROBINSON evidence base.

2) A novel Replication Roadmap tool for applying and upscaling ROBINSON solutions. This tool offers a high level of decision support integration since it extracts and integrates facts and knowledge from relevant sources. An exploitable replication plan is provided to the end-user based on a six-stage analysis (Figure 3). Based on a wide variety of successful application cases, it applies its expertise to new instances by offering Roadmaps, i.e. verified workflow methods, for accomplishing particular goals in any decision step, employing existing knowledge, tools, data, and professional assistance. ■

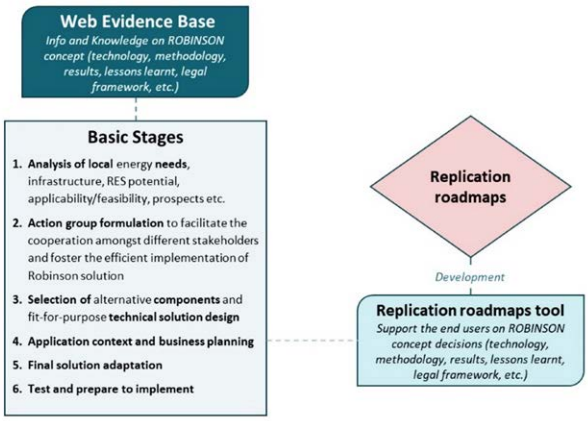

Figure 3: Replication process in ROBINSON project.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752

ROBINSON Islands Energy Forum

The ROBINSON Islands Energy Forum takes place three times a year and aims to be a platform for islands representatives, where they can share best practices, knowledge and experiences, connect with other islands, and interact with experts. Several islands that participate in the forum are active members of ROBINSON's Replication Advisory Board (RAB).

The first forum took place in October 2020 and it has become a regular event since.

The upcoming online webinar will take place on 18 April 2023 at 15h00-17h00 (CET) and the session will focus on the *"Strategies for the commercialisation of technologies"* for the decarbonisation of islands.

The following projects will present their strategies:

- **ROBINSON project**

Project objective: develop an integrated energy system to help decarbonise (industrialised) islands. This entails a development of a smart, modular and optimised Energy Management System, which will integrate existing and newly developed technologies, such as a small gas turbine based combined heat and power, an anaerobic digester assisted by bio electrochemical systems to enable the conversion of liquid waste into biomethane, a mobile innovative wind turbine, a gasifier to convert bio-waste to energy, as well as hydrogen-related technologies (electrolyser and storage system). The system will be demonstrated on the island of Eigerøy (Norway) and lab-scale level replication studies will be conducted for the island of Crete (Greece) and the Western Isles (United Kingdom).

- **E-LAND – Integrated multi-vector management system for Energy isLANDs**

Project objective: to develop an E-LAND Toolbox for Multi-Energy Islands including tools and methods addressing the business, society and technology challenges. The project will be tested in three real life pilots in Europe and through simulations with two cases in India.

- **Insulae H2020 project**

Project objective: to provide an Investment Planning Tool (IPT) able to create action plans for the islands to generate their own sustainable and low-cost energy. Demonstration programme takes place on Unije island (Croatia), Bornholm (Denmark) & Madeira (Portugal) and replicability programme includes 4 follower islands (Menorca, Spain; Norderney, Germany; Marie-Galante, Franc; and Chios-Inousses-Psara, Greece).

If you interested to learn more, please visit our event webpage. ■

Upcoming meetings and events

Meeting/Event*	Date	Location
ETN Annual General Meeting & Workshop	28-29 March 2023	London, UK
ETN Board Meeting	28 March 2023	London, UK
ETN Project Board Meeting	28 March 2023	London, UK
ETN YEC Meeting	28 March 2023	London, UK
ROBINSON Islands Energy Forum	18 April 2023	Virtual
ETN's SGT-A35 User Group Meeting	10-11 May 2023	Aberdeen, UK
ETN's LM-2500 User Group Meeting	06-08 June 2023	Sunbury-on-Thames, UK
ETN's 11th IGTC "Dispatchable technology & innovations for a carbon-neutral society"	10-11 October 2023	Brussels, Belgium

** Please note that full list of ETN's meetings and events can be found on our website.*

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ETN at a glance

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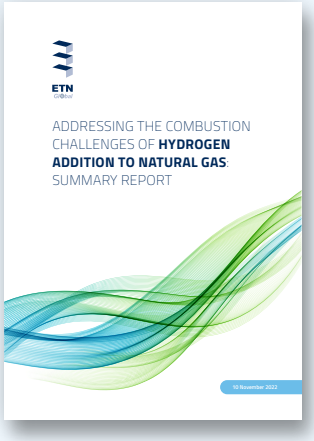
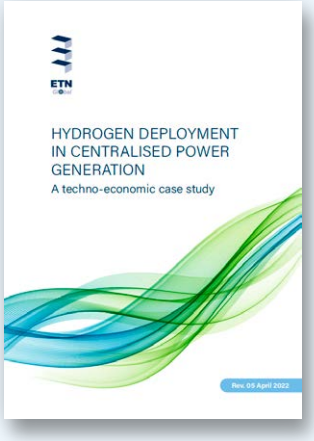
A summary report – Addressing the combustion challenges of hydrogen addition to natural gas



Hydrogen deployment in centralised power generation



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