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ENERGY GEOSTRUCTURES: UNLOCKING HIDDEN HEAT

NEXT STEPS IN BRIDGING THE CLIMATE FUNDING GAP

Includes editorial contributions from:

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Belgian Minister for Energy

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Secretary General
Eurelectric

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Professor of Civil and Geotechnical Engineering
Université de Lille

Power Summit 2024

22-23 May, Lagonissi – Greece

LIGHTS ON

Throughout our daily lives we often take electricity for granted. Whether it is to deliver online education throughout a global pandemic, charge your smartphone to keep in touch with family, or simply keep the lights on, electricity is there.

As our society progresses and as we continue to decarbonise, electricity will become ever more present. It will power your car. It will heat your home. It will power ever smarter solutions, and it will come from a wide range of decentralised clean energy sources. More electricity will be needed for greater decarbonisation.

Keeping the lights on, though, needs the right enablers. As electrification accelerates, the grid that delivers it needs to be expanded and digitalised. Keeping the lights on cannot be taken for granted anymore. At Power Summit 2024, we will be discussing the challenges we face and the opportunities there are to keep the lights on.

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Changing of the Guards

Stewardship will be one of the defining themes of 2024. As around half the democratic world heads to the polls, including pivotal elections in the United States and Europe, this year is likely to result in some seismic political shifts – many of which will be felt most acutely by our planet's atmosphere, oceans and ecosystems.

I was reminded of this at the World Sustainable Energy Days (WSED) conference in Austria last week, where I listened to a number of 'young researchers' present the findings of their recent scientific work. Hearing someone in their early twenties talk about, say, the 2050 Net Zero target somehow feels different to hearing it from a more established figure, who will almost certainly be retired before we reach that milestone.

Similarly, it is the young who have the most to gain or lose from any changes in policy that arise from this year's tumult. Their future, and the momentum we have gathered in our fight to protect it, could now hang in the balance of the ballot box.

"A society grows great when old men plant trees in whose shade they shall never sit" – it's a somewhat hackneyed proverb, attributed apocryphally to ancient Greek wisdom, but it reflects how many of us approach our environmental responsibilities. We are custodians of the environment, rather than merely passive observers, and we all have the power to build, nourish and protect the metaphorical forest on which our descendants will depend.

And it is with this idea of stewardship in mind that I assume the role of editor at European Energy Innovation. It's a very small cog in an unknowably vast and complex machine, but this magazine has, over the years, published some extremely important work from some of the leading thinkers in energy, transport, ecology and sustainability from all over Europe. I am immensely proud to take over as EEI's editor and look forward to working with and for the community in the years ahead – planting trees as we go.

Ed Wiseman

Having run European Energy Innovation magazine for over 13 years I have now decided to retire, and take this opportunity to welcome the new owner and editor, Ed Wiseman.

It has been a pleasure to work over the years with the contributors who have entertained our readers with their knowledge and inspiration. I have always admired their dedication and expertise, so important in helping to reach the goals and targets towards energy efficiency and transport decarbonisation.

I can now welcome Ed to his new post and I am sure he is the right person to take on the publication and inject his experience, youth and dynamism into its future development.

I shall continue to work with Ed in an advisory capacity so as to achieve a smooth transition.

Philip Beausire

The publishers of European Energy Innovation would like to offer their sincere thanks to all individuals and organisations who have contributed editorial images photos and illustrations to the magazine. Whilst every effort has been made to ensure accuracy of the content, the publishers of European Energy Innovation accept no responsibility for errors or omissions.

European Energy Innovation is published by:
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Accelerating towards a sustainable future: The promise of European high-speed rail

By Andrey Novakov, MEP (pictured)

In the push for a greener, more connected Europe, high-speed rail emerges as a beacon of sustainable innovation, poised to revolutionize the continent's transportation landscape.

As the European Union sets its sights on ambitious climate targets and seeks to foster greater cohesion among its member states, the development of a comprehensive high-speed rail network stands as a linchpin in realizing these objectives.

The EU's vision for a unified European railway area is bold and forward-thinking. With strategies aimed at doubling high-speed rail by 2030 and tripling it by 2050, alongside the establishment of nine core transport corridors, the stage is set for a transformative shift towards greener, more efficient mobility. However, implementing this vision is not without its challenges.

One of the foremost hurdles lies in the fragmented nature of existing high-speed rail networks, particularly in Eastern Europe, where many cities remain disconnected from the broader network. As described by the European Court of Auditors in 2018, the EU high-speed rail network is "not a reality but an ineffective patchwork". Despite efforts to expand infrastructure and promote technical harmonization, regulatory obstacles and slow development hinder progress towards a truly integrated European rail system.

In a recent report published by the European parliament's Policy Department for Structural and Cohesion Policies, one of the key findings is that the European Cohesion Policy should prioritize supporting new high-speed rail services, as they can replace short-haul flights in the future. This contributes to reducing CO_2 emissions, especially considering that half of EU Member States currently do not have high-speed rail services.

Moreover, high-speed rail plays a pivotal role in advancing Europe's transition to a more sustainable future by significantly lowering greenhouse gas emissions from transportation. As the continent aims to achieve climate neutrality by 2050, shifting towards low-carbon transportation modes is essential. High-speed rail offers a practical alternative to air travel for medium-distance trips, substantially cutting emissions while providing passengers with a fast, convenient, and environmentally friendly travel option.

Being a member of the European parliament since 2014 and president of Rail Forum Europe since 2020, I follow closely the involvement of the European parliament in the rail sector. The Parliament has used its legislative powers to support most of the Commission's harmonisation proposals, while simultaneously highlighting certain particular aspects

through its resolutions. With the EU Year of Rail 2020, a number of initiatives were developed to highlight the importance of rail in 'door-to-door' transport, as well as to promote work-to-work and home-to-work solutions.

However, the Parliament's resolution on railway safety and signalling (adopted in July 2021), along with the TEN-T revision that has been recently concluded, provide a number of provisions to address the main issues identified with ERTMS deployment.

A big step was also the EP resolution from December 2022 that supported Commission's action plan to boost long-distance and cross-border passenger rail, but also calling for, among other things, speeding up the construction of new rail lines and prioritising investment in the development of cross-border, long-distance high-speed rail links.

With the unanimous adoption of my report on the implementation of cohesion policy and the future of cohesion policy, the Committee on Regional Development has signalled a major shift towards accelerating investments along the TEN-T. A key reform in this regard is to advance EU payments before the completion of the actual construction works. This will make it easier and cheaper for the governments and the regions to implement the rail projects.

Another important idea about the future of investments is to establish reserve margins within cohesion policy in order to help with the absorption of inflation shock that could otherwise grind railway projects to a halt.

Financing for rail projects, however, is the elephant in the room. The EU designated some 18 billion euro of cohesion policy investments in the 2014-2020. For the 2021-2027 period, EU's cohesion policy will invest 7 billion euro along the TEN-T rail network. At the same time, the scale of investment required is substantial, with estimates reaching EUR 500 billion by 2030 and EUR 1,500 billion by 2050 to fully realise the EU's targets. Yet, funding alone is not enough. High-speed rail must be prioritized as a key horizontal initiative across member states, transcending political divides and differing priorities. Only through concerted effort and collective commitment can the full potential of high-speed rail be unlocked.

The benefits of an expanded high-speed rail network are manifold. Beyond economic growth and emissions reduction, high-speed rail offers a solution to congestion woes, seamlessly connecting capitals and major cities while fostering greater cohesion between Eastern and Western Europe. Moreover, by completing missing rail connections and prioritizing cross-border projects, high-speed rail has the potential to bridge longstanding divides and facilitate greater mobility and exchange.

However, realizing these benefits requires more than just infrastructure expansion. Enhancing the quality of passenger services is paramount, with a focus on digitalization, integrated ticketing systems, affordability, and the promotion of multimodal journeys. Furthermore, ensuring the security of the network is of utmost importance, particularly in light of recent geopolitical developments. Investments must be assessed not only for their economic viability but also for their ability to uphold rigorous security standards, including potential attacks on their integrity and functionality.

Looking to the future, the development of high-speed rail represents not just a means of transportation but a catalyst for broader societal change.

Ideally, future EU Cohesion Policy phases should prioritise regional accessibility investment, aiming to link all major and medium EU urban settlements via a green and smart high-speed railway network that can effectively replace many current regional flights and thus contribute to achieving EU Green Deal goals.

By prioritizing sustainability, connectivity, and security, Europe can chart a course towards a more prosperous and resilient future. As the continent accelerates towards this vision, the imperative is clear: high-speed rail must be elevated as a cornerstone of Europe's sustainable development strategy, embodying the values of unity, progress, and innovation.

The Belgian Presidency: Protect, Strengthen & Prepare, also in the field of energy

The Belgian Presidency occurs during a crucial year for the European Union and the rest of the world. More than 50% of global voters will express their suffrage. Will this have an impact on the trajectory of climate and energy policies of our international partners? Without a doubt!

The world may be hanging on the verdict of the ballot boxes, but one thing seems undeniable: 'Nothing can stop the energy transition.' Those are not the words of the Minister of Energy in Belgium, but the words of John Kerry, the US Special Envoy for Climate, spoken during the IEA's ministerial meeting in Paris last February.

The Russian aggression against Ukraine has affected the gas supply to the European Union, impacting energy prices. Coupled with increasingly frequent extreme weather events in Europe, this situation underscores the urgent need to secure our energy supply, ensure accessibility, and accelerate the transition to sustainable and climate-respectful energy for our economy.

The Belgian Presidency is based on three values that take this evolving world as a starting point: Protect, Strengthen, and Prepare.

These values are also applied in energy policy. By becoming more autonomous and protecting our citizens against abrupt price increases. By strengthening the markets and energy infrastructure of the EU. By preparing a common European energy market.

Five Belgian priorities

In the context, five priorities of the Belgian Presidency for energy have been defined.

Belgium started its Presidency with a focus on renovation. In Europe, buildings account for over a third of greenhouse gas emissions. It is essential to reduce these emissions, either through greater energy efficiency or reduced energy consumption, to achieve climate neutrality by 2050.

The Belgian Presidency organized an event in Brussels in January to stimulate discussions on the best way to overcome remaining obstacles to achieve effective deployment of the renovation wave.

As a second priority, Belgium has chosen to promote European excellence in radioisotopes. Therefore, the Belgian Presidency is committed to securing the supply of medical radioisotopes and enhancing European leadership in the production, development, and sustainable reimbursement of these materials.

Teresa Ribera Rodríguez (Third Deputy Prime Minister and Minister for the Ecological Transition and the Demographic Challenge, Spain), Tinne Van Der Straeten (Minister for Energy, Belgium), Miriam Dalli (Minister for the Environment, Energy and Regeneration of the Grand Harbour, Malta) Belgian Presidency of the Council of the European Union / ©Julien Nizet

With its third priority, Belgium wants to facilitate international hydrogen trade. Belgium is the first country to establish a hydrogen law. Belgium has the second longest hydrogen pipeline network in the world. Furthermore, its ports will be vital to supply Belgium and the rest of the EU with a sufficient amount of hydrogen in the future.

The Belgian Presidency is committed to push the growing international trade in hydrogen, including its derivatives, and aspires to create a liquid market. To achieve this goal, the Presidency will focus on promoting a credible certification system and market platforms, ensuring transparency to trigger the needed investments and make sure the financing tools are fit for purpose.

The fourth priority of the Belgian Presidency is to provide renewable offshore wind energy to all. European maritime basins will become an integral part of the future European energy network. The goal is to adopt Council conclusions on integrated cross-border onshore and offshore infrastructure benefiting all of Europe, including landlocked countries, by sharing best practices among Member States and identifying action points for future Commission initiatives.

“As Europeans, we must ensure that this European wind energy safely reaches our shores and the homes of all Europeans.”

Last but not least, Belgium has placed cross-border energy infrastructure as the fifth priority. The aim of the Belgian Presidency is to advance sustainable energy infrastructure. The transition to a sustainable energy system cost-effectively requires both existing and new infrastructure, including network infrastructure, facilities for hydrogen importation, and CO_2 transport.

In working on the theme of networks, we reconcile everyone

With the considerable growth of renewable sources, a key question arises: will the networks be ready in time to support the energy transition? The Global Energy Outlook 2023 addresses this concern. It indicates that “significant improvements in networks are needed in all scenarios to accommodate the accelerated pace of electrification and the rapid expansion of renewable energy sources.”

During the six months of the Presidency, Belgium is working tirelessly to ensure that our European ambitions for renewable energy do not outpace our plans in terms of network infrastructure. Because networks are at the heart of the energy system. Cross-border energy infrastructure promotes competitive energy markets. It enables the free flow of electricity across borders, enhancing competition in the market.

Cross-border energy infrastructure improves the stability and reliability of electricity supply. It facilitates smooth electricity exchange, reducing the risk of outages and power cuts. And most importantly, interconnected networks facilitate the sharing of energy resources across borders. Regions with surpluses of renewable sources such as wind or solar energy can export their excess to areas with higher demand.

As Europeans, we must ensure that this European wind energy safely reaches our shores and the homes of all Europeans. Europe’s ambitions for renewable energies currently exceed its plans for infrastructure, so we urgently need these cross-European infrastructures. And they must be cost-effective, safe, sustainable, and flexible.

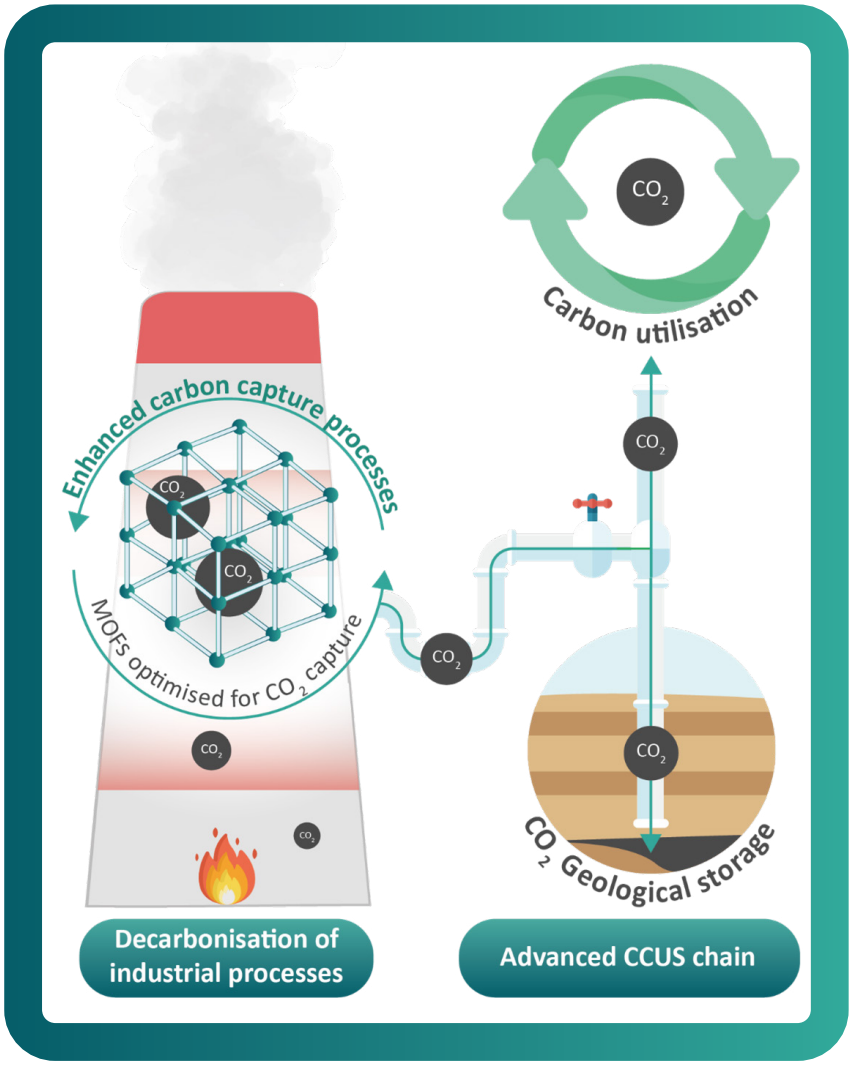
For the Belgian Minister of Energy, Tinne Van der Straeten, the transition to clean energy, born out of climate necessity, was now an economic and security imperative, and that interconnection created a more flexible system to balance geographical variations in wind and solar production.

H2020 MOF4AIR

Demonstration of optimised adsorption capture process using innovative porous materials (MOFs) on three industrial sites

Carbon Capture Storage and Utilization (CCUS) is nowadays a societal need to reduce anthropogenic CO_2 emissions, especially during the ongoing use of fossil fuels in the transitional phase towards renewable energies. CCUS is also essential where the use of renewable energy is difficult or impossible or when unavoidable CO_2 emissions come from the process itself, *e.g.* the decarbonation reaction in the lime or cement sectors. The use of industrial CO_2 as a carbon source in chemical production has been extensively investigated for a less carbon-intensive and more sustainable chemical industry.

The amine-based CO_2 absorption process, considered as a benchmark solution, suffers from several drawbacks including high energy penalties, solvent degradation, and toxicity. Among diverse separation technologies, adsorption emerges as a highly promising option due to its potential for reduced energy demand, lower cost, and a more favorable environmental impact compared to amine solvent absorption. Ongoing efforts involve the development of new materials to enhance the efficiency of this separation process.



Hybrid porous solids, a recent class of crystalline porous materials, commonly named Metal Organic Frameworks (MOFs) or Porous Coordination Polymers (PCPs) appear to be very promising, for gas separation and purification. These materials are highly tunable, offering quasi-infinite options for crystal structures and chemical compositions. This tunability allows for an extensive range of pore sizes, accessible surface areas, and diverse nature of specific adsorption sites. Combined with a low framework density, they emerge as attractive candidates for trapping gas species and a promising alternative compared to traditional materials like activated carbons or zeolites. However, the performance of these hybrid materials in carbon capture technologies must be assessed at a large scale and under real operating conditions.

Development of a suitable CO_2 capture adsorbent should satisfy (1) high CO_2 adsorption, (2) high CO_2 selectivity, (3) low heat for regeneration, (4) fast kinetics, (5) thermal, chemical, and mechanical stabilities under extensive cycling capacity and (6) obviously low-cost green synthesis procedures.

Adsorption processes are widely established and employed at an industrial scale for activities such as air separation (production of O_2 or N_2), gas drying, and hydrogen purification. Their application for carbon capture still requires development to be optimised.

In this context, the H2020-MOF4AIR

project gathering 14 partners from 8 countries aims to validate and demonstrate the interest of MOFs innovative porous materials combined with optimised capture processes on three demonstration sites. (https://www.mof4air.eu).

MOF4AIR partners have developed a model for designing VPSA (Vacuum Pressure Swing Adsorption) unit and selecting optimal operating conditions for specific applications by minimizing the energy consumption and the footprint. The VPSA unit has undergone experimental validation in a relevant environment (TRL 5) at a lab-scale pilot (1-3 $Nm^3.h^{-1}$ of synthetic flue gas). Subsequently, the entire system is being fine-tuned and demonstrated on three different industrial sites (TRL6), employing a small-scale pilot (50-100 $Nm^3.h^{-1}$) to treat industrial flue gas (capturing 0.5 tons of CO_2 per day): (i) TCM (Norway) is one of the most advanced and the largest post-combustion CO_2 capture pilots. The MOF4AIR pilot will test the project's fine-tuned solution on two flue gases from Equinor Mongstad Refinery: Residual Fluid Catalytic Cracker (RFCC) and gas boiler (MHP); (ii) TUPRAS (Turkey) is the 7th largest refining capacity in Europe. The MOF4AIR pilot will be installed in the Izmit refinery. (iii) SOLAMAT-MEREX, member of Veolia Group (France). The MOF4AIR pilot will be operated in Marseille-Fos-sur-Mer hazardous waste incinerator.

To reach these ambitious objectives, 21 selected MOFs were produced at the g-scale in powder form and characterized extensively (measurements of CO_2 adsorption/desorption cycles under operating conditions, with contaminants (SO_2, NOx, H_2S) and water, mimicking real industrial processes conditions). Simulations were conducted under various conditions (dry/wet, several CO_2 partial pressures, different temperatures).

Following this, five promising MOFs were selected based on their performances, stability, cost, environmental impact, and potential for large-scale production. These MOFs were scaled up to 500 g, shaped, fully characterized, and their adsorption properties assessed. Two MOFs were further chosen for synthesis and shaping at 3-5 kg scale. These MOFs underwent shaping with different binders, and their adsorption properties were investigated: (i) pure CO_2 and N_2 adsorption isotherm experimental measurements; (ii) stability against water and contaminants; (iii) breakthrough curve measurements.

Based on the obtained results and considerations such as ligand price and availability, one MOF has been selected for testing in VPSA at both lab-scale and industrial pilot scale, while another has undergone testing at the lab-scale in an alternative configuration: MBTSA (Moving Bed Thermal Swing Adsorption).

Modelling confirmed the promising results of one of the two MOFs, demonstrating CO_2 purity and recovery higher than the targets (95% for purity and 90% for recovery) using MBTSA process. Simulation with the second MOF as an adsorbent enabled the selection of the optimal bed/column configuration to meet the process targets in the VPSA process.

Both MOFs underwent testing in lab-scale pilots. Concerning MBTSA, first measurements were conducted, but further developments are still needed. Regarding the VPSA, the lab-scale pilot validated the promising results determined through simulation for the selected MOF. Additionally, some requirements were highlighted and will be considered for the operation of industrial pilots. The MOF4AIR pilot on TCM has begun its operation.

MOF4AIR has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 831975.

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The future of European e-mobility e needs open, secure, interoperable d

By Kristian Ruby (pictured), Secretary General, Eurelectric

Electric vehicles (EVs) are the future of road transport in Europe. 2023 witnessed a 25% surge in sales with battery and plug-in hybrid EVs (BEVs and PHEVs) accounting for more than one in five new cars sold. Three years ago, the same car models accounted for only one in 25 new cars sold. By 2030 some 75 million EVs are expected for European roads – shows our latest e-mobility report.

On the infrastructure side, EV fast chargers now boast ten times more power than five years ago, substantially cutting charging times. Meanwhile, battery costs are finally going down after an unprecedented price rise in 2022. Such growth is taking place across all markets which leads us to expect EV sales to outstrip all other vehicles by 2030.

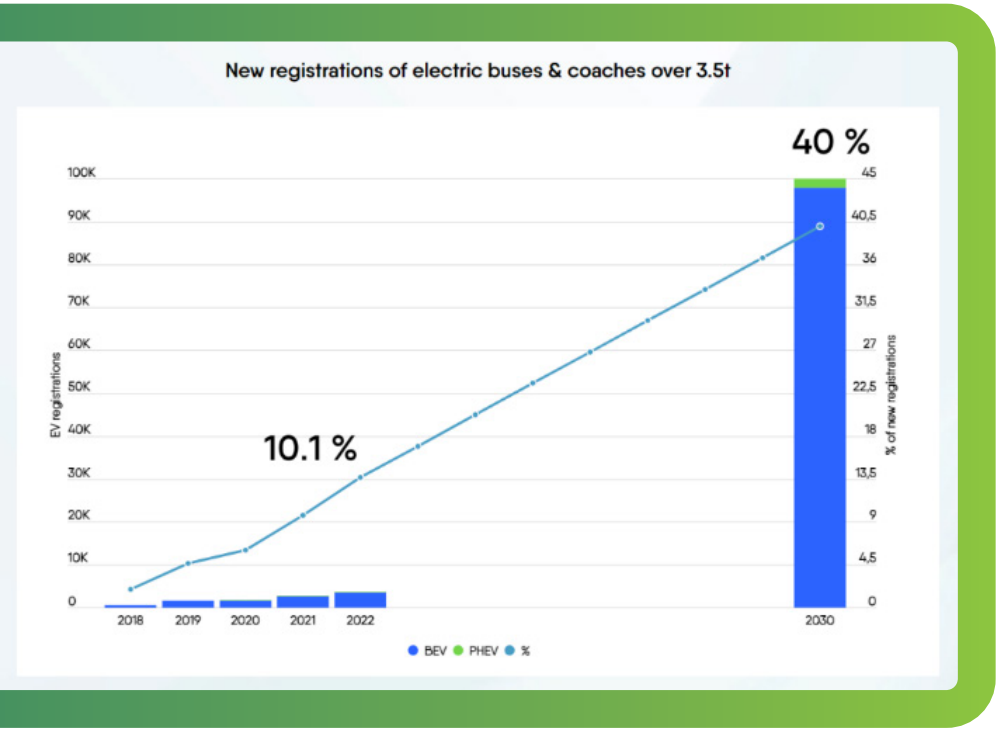
This rEVolution, however, cannot be taken for granted based on compelling figures and performance boosts. It signals the need for an essential transformation of the existing mobility system, underpinned by effective cooperation between all key players.

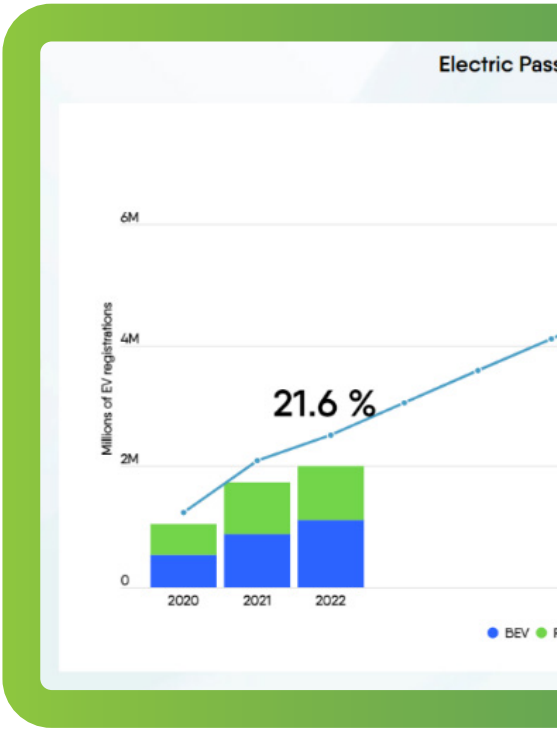
The sheer complexity arising from the number of key actors who work around electric vehicles opens the door to many potential synergies: from original equipment manufacturers (OEMs) and automakers who develop vehicles' hardware and software; to grid operators who provide grid connections; to charge point operators who plan and run charging stations; to e-mobility service providers who ensure charging services to EV drivers and manage transactions. Fostering collaboration between these players is pivotal to the success and seamless operation of the e-mobility ecosystem. The surest way to achieve that is with open, secure, interoperable data.

Data interoperability: the hidden engine of the e-mobility ecosystem

The entire e-mobility ecosystem is reliant on data. Data interoperability is not just a nice-to-have, it is the engine driving everything forward. Charging mechanisms, grid technologies, EV batteries and even customer behaviour insights all rely on the connections made through the sharing of data. We need to make these connections to ensure successful mass market uptake of EVs.

Think about what open and shareable



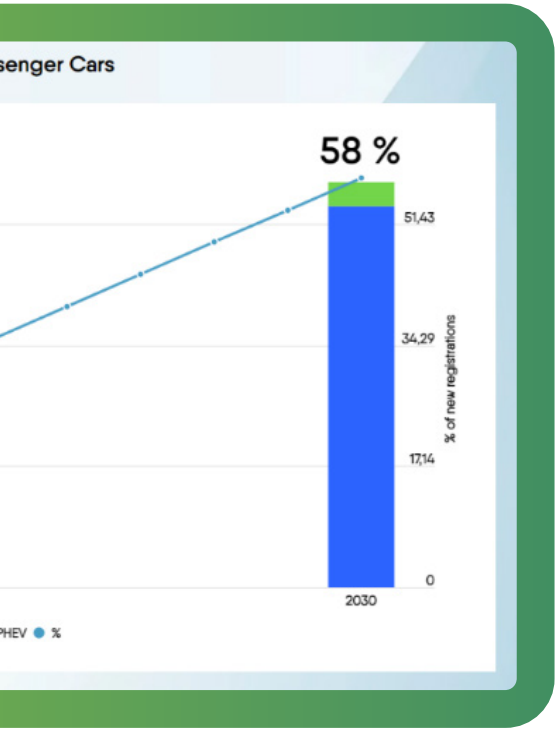


cosystem ata

data could do to improve system efficiency. EV drivers would be able to track all accessible charging stations across Europe. They would be able to charge their car regardless of the region and subscription they have thanks to charging roaming and interconnected payment mechanisms.

Consider how distribution system operators (DSOs) could improve EV integration into the grid thanks to a steady flow of shared data. They could capitalise on smart charging technologies to optimise grid capacity and reduce congestion.

And let's not forget how charge point operators (CPOs) will be able to plan the rollout of much-needed EV charging infrastructure with grid and vehicle data coming from DSOs and EV users.



If data from such activities is withheld or stored in silos, network efficiency will be negatively impacted, hampering the overall customer experience and negating any added value. A future of seamless e-mobility needs a united commitment to fair data sharing across the board.

- Its a whole ecosystem reliant on data; for charging, grids, batteries, customer behaviour etc...

- Three principal e-mobility activities that need data interoperability:
- Charging station optimisation, intelligent grid integration, optimised charging experience: explain these a bit further
- 'Where data is withheld, or formats are inconsistent, there may be knock-on ramifications for efficiency across the network, ultimately impacting the overall customer experience and value.'
- 'Data interoperability is critical for enabling the future state.' – good linking sentence for next paragraph

How do we enable data interoperability?

We've now seen how harmonised data exchange can be applied to many challenges we face in the transition to e-mobility, addressing operational challenges within the ecosystem while improving the overall customer experience. But how can we enable this interoperability?

We at Eurelectric promote the idea that data should be open and shareable, while guarding the privacy of customers and supporting a healthy business environment. The Data Act with foreseen implementation in 2025, provides high-level principles for data sharing. The in-vehicle data act can apply these principles specifically to vehicle data.

Introducing standardised data collection to include the state of battery charge is a great way to inform CPOs and grid networks about likely demand and potential for flexibility services. The open and non-discriminatory access to data should come at an affordable cost, and ensure fair compensation for data owners. Standardised agreements for customer consent, defining common data sets for transfer, and adhering to privacy protocols like GDPR should be upheld.

Getting it right: an eye on data security

Connected devices, including EVs and charging infrastructure, collect and store vast amounts of personal information, vehicle details, charging patterns and billing information. While this data needs to be connected and interoperable, we also realise that it must be secure.

Securing these data exchanges is essential for trust, especially when it comes to supply chains. The many connection points of operational and customer data come with the rise of cybersecurity breaches.

With each data exchange, the potential for these breaches looms larger, highlighting the need for robust data governance and trust.

Getting the mechanics of secure data interoperability right is essential. It creates connections that transcend traditional boundaries, allowing players to acquire new capabilities that go beyond their core activities in energy and mobility.

This opens the door to exciting crossovers and synergies across industry and infrastructure. The intricate web of e-mobility beckons, and key stakeholders will soon all be eager to join this transformation.

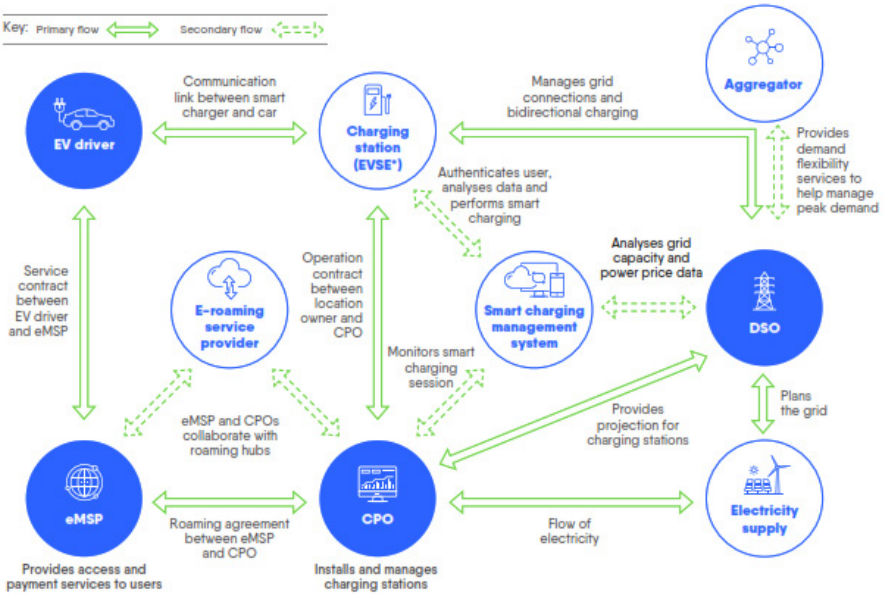
Further opening of the data layer will create the necessary conditions for interoperability, ultimately enhancing the customer experience. Therefore, our call to policymakers is clear – integrate safe data interoperability across all new e-mobility regulations, starting with the forthcoming in-vehicle data act. 'By getting the mechanics of data interoperability right, connections will form across conventional demarcation lines.'

- 'By getting the mechanics of data interoperability right, connections will form across conventional demarcation lines.'

- 'We will see players merge and acquire the assets and capabilities that allow them to operate in the extended ecosystem.'

The connected e-mobility ecosystem

Relationships in the digital e-mobility ecosystem



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Europe's leap forward to cut emissions in the energy sector

By Brandon Locke, Clean Air Task Force

Methane emissions are often described as the lowest hanging fruit in the fight to slow climate change – when this potent greenhouse gas is captured, it can be used to heat homes or power industry, but when it's released into the atmosphere, it traps over 80 times more heat than carbon dioxide over 20 years.

Methane splashed on the global agenda at COP26, when over 100 countries agreed to the Global Methane Pledge, a shared commitment to reduce emissions by 30% by 2030. As one of the founders of the pledge, the European Union's first major contribution was long anticipated – and it was just delivered through bloc-wide regulation to reduce emissions in the energy sector, known as the Methane Regulation. While the final agreement is far from perfect, and still needs to be formally ratified, it takes a major leap forward in the right direction.

Best practices to cut emissions in the sector have been around and employed by some companies for decades, so these common-sense policies codified by the new law are nothing new. These include a ban on routine venting and flaring – something Norway has enforced since 1971 – and routine leak detection and repair (LDAR) inspections. But the EU also included some shiny new tools, such as the first-ever import standard on energy produced abroad, as well as new global data tools that could make cleaner supply chains more competitive.

Figure 1: CATF's Methane Pollution Prevention team has surveyed over 500 oil and gas sites around Europe for methane leaks, finding evidence of emissions in 342 (Credits: Mihai Stoica).

By effectively levelling the playing field for all producers – both within and outside the EU – it may well be one of the most impactful pieces of legislation in the EU Green Deal.

Better data, better mitigation: First off, the regulation tackles one of the biggest issues in the energy sector head on: the lack of monitoring, reporting, and verification (MRV) of emissions data across the value chain. Enhanced efforts to ensure the accuracy of existing emissions will inform better understanding of the efficacy of mandatory leak detection and repair programs (LDAR). Operators will be required to carry out regular surveys of potentially leaking equipment, and if leaks are found, operators must initiate a first repair attempt within 5 days and complete the repair within 30 days.

Best practices to monitor and report these emissions have existed for years, including through the successful initiatives such as the Oil and Gas Methane Partnership (OGMP), which provides a framework (OGMP 2.0) to improve the accuracy

of their methane emissions reporting over time by reconciling source-level emission estimates with site-level emission estimates. The new Regulation builds on OGMP 2.0's voluntary approach, and levels the playing field by requiring all operators putting gas, oil and coal on the European Union market – including those outside the EU's borders from 2027 – to reconcile both types of estimates, in order to find missing emissions sources in an iterative way, and moves both domestic and international suppliers to incorporate measured emission data.

The Regulation also adds two crucial additions, first, independent verification, putting enough confidence in the data for it to be leveraged for regulatory purposes. Second, it commits to publishing the data on a public, transparent platform. This Methane Transparency Database, combined with the new super-emitter response program, allow for a market-based approach, where procurement and investment decisions are informed by efforts to reduce methane emissions.

Unpacking the phased approach to imports:

Over 90% of the gas and oil consumed in the EU is produced abroad, meaning that including imported energy in the scope of the Regulation was one of the most important factors determining its ultimate impact. Ahead of the final agreement, Clean Air Task Force estimated that a Regulation that includes imports in its scope could reduce up to 20 times more emissions than one that only focused on the EU's domestic oil and gas industry.

Ultimately, the final agreement landed on a phased approach to imports, with reporting obligations starting in 2025, MRV obligations in starting in 2027, and a performance intensity standard in 2031.

The final agreement is significant because while the timeline is somewhat delayed, it declares with confidence that an "intensity performance standard" is both possible, and forthcoming. This standard will effectively limit the maximum emissions per unit of oil or gas. It will kick off in 2027, when the European Commission will publish a methodology for calculating methane intensity, which importers will start reporting on the following year. By 2030, the Commission will set maximum intensity thresholds, and the following year all producers putting energy on the EU market will need to comply or face penalties.

Off the heels of a major energy crisis, these proposals naturally raised concerns over the potential negative price, cost, and trade ramifications of an import standard. However, Clean Air Task Force and Rystad modelled the potential impact and found that with new energy supplies expected to shift global markets starting in 2025, the import standard would have minimal cost for suppliers of gas and oil, and even less impact on consumers. At most, prices would rise about 1% due to the import standard.

What's Next for Member States, Operators, and Trading Partners?

With the Regulation expected to be in force by mid-2024, the clock is now ticking for companies and Member States to prepare for its implementation. Member States will have 12 months to appoint at least one competent authority to enforce the new rules, which will require sufficient funding and capacity building. European operators will need to begin planning leak detection and repair programs and measurement campaigns for MRV reports, and start communicating a methane mitigation strategy across all levels of their companies.

Outside of the EU, trading partners will need to begin considering future obligations, and how to align domestic legislation with new standards. By establishing a global scope, the Regulation is also an encouragement to all major importers, such as Japan, South Korea and the United Kingdom, to move in a similar direction and establish complementary intensity performance standards. By encouraging action for collective, global action, the EU's new rules add serious momentum to tackling the lowest hanging fruit in the climate crisis.

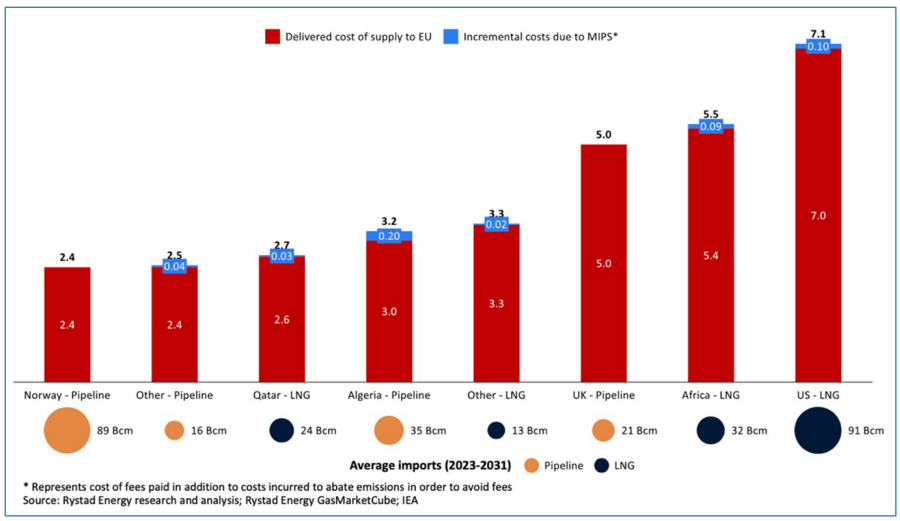


Figure 2: Potential increased costs for gas exporters are small relative to the total cost of supply
For the highest-cost imports – US LNG – costs could amount to around 1% of the cost of supply

How to reduce energy consumption with innovative solutions? The answer is beneath our feet

By Prof Hussein Mroueh (pictured), professor of Civil and Geotechnical Engineering at Université de Lille, France

In a constantly developing world, with a rising population and technological developments, we need energy. Energy and environmental problems are closely related since it is nearly impossible to produce, transport, or consume energy without significant environmental impact.

European energy consumption escalates annually, with buildings responsible for half of the total usage. Residential sectors heavily rely on energy for space heating, cooling, and hot water, contributing up to 80% of consumption according to the latest figures from Eurostat.

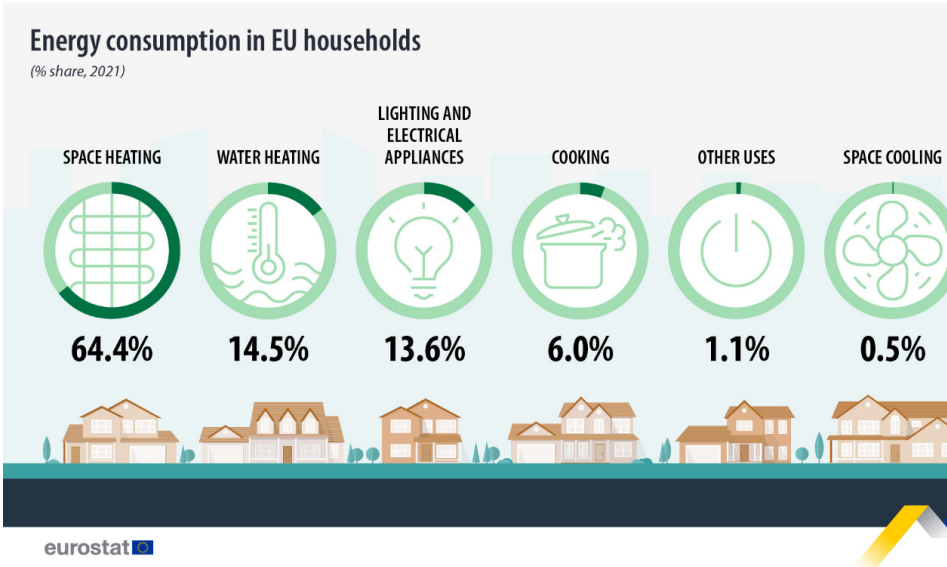
In a climate change emergency, it is crucial to develop local and affordable low-carbon energy sources with low environmental impact. When electricity gets cleaner, switching to super-efficient ground source heat pumps for heating and cooling can help cut down on using non-renewable energy and lower CO_2 emissions.

However, high capital investment costs and installation time remain significant barriers to uptake.

Despite the enormous potential, geothermal energy systems see fewer installations compared with other renewables. Since the 1980s, the development of Energy Geostructures (EGs) has allowed shallow geothermal energy (SGE) to be exploited from structural concrete elements in contact with the ground (e.g. piles foundations, retaining walls, tunnels) by integrating heat exchanger pipes into them.

Energy Geostructures represents a promising innovation in the realm of sustainable energy solutions. These structures integrate ground heat exchange systems within various ground-contact infrastructures, such as retaining walls, piles, tunnels, and other buried structures. By leveraging the stable thermal properties of the earth, Energy Geostructures offers an efficient means of heating and cooling buildings, reducing energy consumption, and mitigating environmental impact.

One of the key advantages of Energy Geostructures lies in their ability to tap into the Earth's natural thermal energy, providing a renewable and low-carbon alternative to conventional heating and cooling systems. By circulating fluid through embedded pipes within the structures, heat exchange with the surrounding ground occurs, allowing



Source: *Eurostat*

for efficient temperature regulation of buildings above.

Despite their considerable potential, Energy Geostructures face several challenges that hinder their widespread adoption and implementation at a large scale. One of the primary technical challenges involves the design and optimisation of these structures to ensure optimal heat exchange efficiency while maintaining structural integrity. Achieving the right balance between thermal performance and structural stability requires sophisticated engineering and modelling techniques, as well as careful consideration of site-specific conditions and constraints.

Another technical challenge is the integration of Energy Geostructures with existing building and infrastructure projects. Retrofitting older structures to incorporate these systems can be complex and costly, requiring coordination among various stakeholders and disciplines.

There is a need for understanding among developers, contractors, and policymakers regarding the benefits and feasibility of these systems. Overcoming misconceptions and promoting education and training initiatives are essential for fostering greater acceptance and uptake within the construction industry. The lack of political awareness and promotion activities creates another barrier to strategic investments for EGS at the city scale, calling for a European network.

Additional Information

View the Action website

View the Network website

Eurostat Energy consumption data

FOLIAGE

Introducing FOLIAGE COST Action

To address the identified challenges, FOLIAGE COST Action – European network for Fostering Large-scale Implementation of energy Geostructure, is a European network of researchers and engineers, all experts in thermal energy efficiency, geological engineering, and geotechnical engineering. This collaborative network gathers 155 researchers, from 32 countries intending to develop collective understanding, share techniques, facilities, and data, and work jointly in disseminating the obtained results across the EU.

“Foliage is a highly dynamic network in which we bring together stakeholders with different backgrounds and skills to promote the use of Energy Geostructures in civil engineering projects, whether as part of new construction or within the context of retrofitting. We aim to overcome the scientific barriers that hinder the promotion of this technology by acting on the increase of knowledge at different levels: technological issues regarding mechanical and energy design, implementation, and finally the socio-economic issues including financial and life cycle analysis. In addition, we aim to identify the potential for coupling Energy Geostructures with other renewables. Finally, we are committed to transferring knowledge to young people and innovators who will be the decision-makers and builders of the future. We are implementing these principles and concepts for the benefit of our university community, as part of a full-scale demonstrator, with three main objectives: demonstrate the effectiveness of the technology; stimulate research in geothermal energies, and re-design our pedagogical provisions.” says, Prof Hussein MROUEH, the Action chair.

FOLIAGE COST Action is collecting all needed information to reduce these barriers and foster development by creating a multi-disciplinary network between the different stakeholders (local authorities, communities, developers, designers, academics, contractors, ...).

Energy Geostructures represent a promising track for achieving energy efficiency, sustainability, and resilience in the built environment. By collaborating across disciplines and sectors and investing in research, innovation, and policy support, FOLIAGE COST Action aims to unlock the transformative power of Energy Geostructures and accelerate the transition to a more sustainable future.

Heat pumps take centre stage in tackling climate change

By Jozefien Vanbecelaere (pictured), head of EU affairs, European Heat Pump Association

A short year ago, Europe's heat pump sector was celebrating its best ever sales figures.

With the urgent need to tackle climate change clearer than ever, heat pumps were already taking a central spot in the EU's Green Deal and its climate and energy plans for 2030.

Then in early 2022, in response to the terrible Russian war on Ukraine, the European Commission launched a plan to reduce the EU's energy imports. The plan centred on increasing the number of installed heat pumps by 60 million in 2030.

The heat pump sector was also recognised as a key net zero industry in the EU's plans to boost domestic clean tech, also in part triggered by the global reaction to the war.

The clear support at EU level, alongside sky-high gas prices and national support measures to help consumers invest in electric heat pumps pushed sales to 3 million in 2022.

In response to demand and the new targets, the heat pump sector planned investments in factories, production, R&D and training worth €7 billion to 2025 alone.

Despite the bright picture and the commitment of the sector, it was clear that the ambitious EU targets would be a challenge unless some crunch points for the sector were addressed. These included a shortage of installers, and electricity price issues.

Accordingly we at the European Heat Pump Association, along with the European Climate Foundation – a Brussels-based NGO - convened a group of just over 20 associations, charities, thinktanks and national representatives, as well as officials from the European Commission itself. The aim was to work together to build a report describing the barriers to a faster roll-out of heat pumps, and the ways to overcoming them.

At the kick-off meeting of this group, the EU officials present announced the very positive news that the Commission would work on a 'Heat Pump Action Plan' and our report would be welcome as key input.

We accordingly developed the report, known as the Heat Pump Accelerator, and handed it over to EU Energy Commissioner Simson in June 2023. We continued to input consistently and regularly to the Commission as it developed the Heat Pump Action Plan.

HEAT PUMPS:
THE HEART OF EUROPE'S ENERGY FUTURE

European Heat Pump Association - EU policy priorities 2024-2029

Heat pumps offer a clean, cost-effective way to decarbonise heating and cooling. Three to five times more efficient than gas boilers, they slash energy imports, energy use, and greenhouse gas emissions. Heat pumps also provide stability against fluctuating energy bills.

To unlock their full potential, EU legislators and decision-makers must take the lead in developing the necessary policy and financial conditions for the acceleration of the clean energy transition.

The European Heat Pump Association (EHPA) has outlined **five key priorities to put clean heating and cooling at the heart of Europe's energy system today for a brighter tomorrow**. Here's an overview:

Set clear policy direction and targets

Ensuring consistent, streamlined and ambitious long-term policies on heat pumps is vital for attracting demand for them and investments in the EU's manufacturing and workforce.

Make heat pumps affordable for all

There is an urgent need to shield low-income households from high energy prices and support their access to cleaner and, ultimately, cheaper to run heating and cooling solutions like heat pumps.

Strengthen industrial leadership and skills

Europe's heat pump sector is a world leader. It provides more than 161,000 direct jobs already today, with the potential for many more.

Unlock the full potential of large heat pumps

Large heat pumps serve a crucial role in industrial electrification and energy integration. Able to reach 200°C, they can efficiently utilise waste heat from industrial processes, wastewater, and other sources for district heating and industrial applications, so boosting circularity.

Use heat pumps' flexibility to support the energy system

Heat pumps provide flexibility by heating when electricity costs are low and shutting off during peak times, reducing costs for the EU's energy system and consumers.

Read EHPA's manifesto in full

ehpa

ehpa.org

What's more, the need for the Plan became starker still as 2023 progressed and the bright sales picture of the previous year faded. The sector experienced 5% decline in 2023 sales compared to 2022 according to figures from 14 key European markets. What's more, the trend overall quarter by quarter was downwards. Now, manufacturers are having to cut jobs and report a gloomy outlook for 2024.
This decline has come about because gas prices have fallen while electricity prices remain high and there are still tax breaks on fossil fuels and on boilers running solely on fossil fuels. In many countries, like France, Germany and the UK, the energy transition in heating has been made into a political issue – as a result, ambitions have been lowered and end-users become uncertain and prefer to stick to the status quo.

It is crucial to boost the heat pump market by continued commitment to the technology, stable policies, strong consistent and forward-looking measures and a market environment shaped towards making clean technologies the ones that are economically most attractive. A strong heat pump market will allow Europeans to reap the benefits: decarbonisation, job creation, a competitive clean tech industry, energy independence and lower energy bills.

EHPA and our members had expected the announced Heat Pump Action Plan to bring together these measures in order to reap the many benefits. We were surprised, if not dismayed, to be informed by the European Commission, just before Christmas 2023, that it would delay the publication of the heat pump action plan until after the EU elections. This is exactly the opposite of the economic and ambitious political framework needed to shape a strong home market for a successful industry.

This is why with over 60 CEOs and industry leaders we recently sent a letter to the European Commission president von der Leyen. In it we call on her to set it in motion immediately to put Europe back on track for the energy transition as well as for energy independence and climate neutrality.

Postponing the Heat Pump Action Plan challenges the accelerated deployment of technologies crucial for achieving Europe's energy and climate targets. It also undermines investments in industrial production in Europe affecting the over 160,000 direct current and many more future jobs in manufacturing and installation.

In the US, the ambitious IRA provides continuity, legal stability, and generous financial support for heat pumps. Postponing the EU plan risks jeopardising Europe's industrial leadership on net zero technologies, just as the US, Asia and other regions are also ramping up their commitments on clean and heat pump technologies.

If we want heat pumps to get back on track and deliver on all the climate, energy and economic benefits they offer, delivering rapid and clear high level policy support in the form of an EU Heat Pump Action Plan is essential.

The European Heat Pump Association (EHPA) represents the European heat pump sector. Our over 170 members include heat pump and component manufacturers, research institutes, universities, testing labs and energy agencies.

EHPA advocates, communicates and provides policy, technical and economic expertise to European, national and local authorities, and to our members.

We organise high level events and manage or partner in multiple projects.

We work to shape EU policy that allows the heat pump sector to flourish, and to become the number one heating and cooling choice by 2030. Heat pumps will be a central part of a renewable, sustainable and smart energy system in a future decarbonised Europe.

Sun + Sewage = Fuel + Fertilizer

The recent revision of the EU Directive on Urban Wastewater Treatment (UWWTD) calls for stricter discharge standards, as well as achieving energy self-sufficiency in the 22,500 plants (WWTP) in Europe. Today, these facilities consume 15,000 GWh/yr of electricity, corresponding to two nuclear power plants of 1,000 MW. To minimize the environmental impact and carbon footprint of WWTP, five low-cost technologies to produce useful resources from wastewater were demonstrated at the El Bobar WWTP in Almería (Spain), as part of the LIFE project Ulises, funded by European Union under Grant Agreement no. LIFE18 ENV/ES/000165.

In traditional WWTP, excess sludge is transformed in anaerobic digesters into biogas, normally used in cogeneration engines to cover part of the electricity needs of the plant. In Ulises, the raw biogas was upgraded to biomethane, meeting the requirements for vehicular use (UNE-EN 16723-2) with the ABAD Bioenergy® system, and this renewable biofuel was tested in a fleet of passenger cars. Since the beginning of the project in July 2019, the vehicles have travelled more than 21,000 kms in urban and extra urban cycles, with an average consumption of 4.8 kg of biomethane per 100 km driven.

To replace the conventional aerobic treatment process in the water line, an Upflow Anaerobic Sludge Blanket (UASB) reactor was operated at ambient temperature to remove organic matter from wastewater and produce biogas. Thanks to a novel pulsed feeding system PUSH® (European Patent EP 3009408), this pre-treatment removes more than 90% of raw wastewater solids (TSS), as well as more than 75% of the chemical oxygen demand (COD) with a Hydraulic Retention Time of 12 h. Per m^3 of treated wastewater, gas production can reach up to 100 L, containing close to 80 % of CH_4 – which allows to generate about 1 kWh of thermal energy – compared to conventional aeration that consumes up to 0.5 kWh/m^3 of electricity, and produces five times more excess sludge.

To reach reclaimed water quality requirements for agricultural irrigation, a novel photo-Fenton process using H_2O_2 dosing to generate hydroxyl radicals was tested with a Raceway Photoreactor on a scale of 100 m^2 to eliminate pathogens and micropollutants. Class B of the new water reuse regulation EU 2020/741 with an E.coli number of less than 100/100 ml could be reached with up to 2 $m^3/m^2/d$ at acidic pH.

Furthermore, 85% removal of Contaminants Emerging Concern (CEC) was achieved, to meet the requirement of the new UWWTD 2022/541 for the elimination of micropollutants and drugs such as venlafaxine, ketoprofen or diclofenac, that are not sufficiently eliminated in conventional treatment.

In addition to obtaining high quality reuse water, Ulises tested two different processes to recover nutrients as a valuable product, working on both the solid and liquid phase after centrifugation of the sludge:

- Enzymatic hydrolysis of dewatered biosolids generate biofertilizers based on peptides and amino acids, with biostimulant properties for plant growth.
- Struvite precipitation is applied on the concentrate obtained with a membrane-based system.

Contact details:
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www.aqualia.com

European Commission

11-13 JUNE 2024

EUROPEAN SUSTAINABLE ENERGY WEEK

Net-zero energy solutions for a competitive Europe

#EUSEW2024
ec.europa.eu/eusew

DRIVING NET-ZERO SOLUTIONS

TAKE PART IN EUSEW

Let's shape Europe's energy future together! This year's hybrid, interactive event, taking place both online and in Brussels, provides an excellent opportunity to come together, exchange ideas, share expertise and create synergies.

ATTEND A POLICY SESSION (11-13 JUNE)

Join sessions gathering industry representatives and policymakers, EU project partners, entrepreneurs and members of civil society to discuss boosting the EU's long-term competitiveness, resilience and efficiency through net-zero energy solutions. Registrations open in April 2024.

VOTE IN THE EUSEW AWARDS

Take part in the online public vote from 30 April to 2 June and discover who will take home the Awards for Innovation, Local Energy Action and Woman in Energy.

CONNECT WITH INSPIRATIONAL ENERGY PROFESSIONALS

Visit the Energy Fair in Brussels to meet other professionals advancing net-zero solutions, learn about their projects and exchange the latest insights in the field.

ORGANISE OR PARTICIPATE IN SUSTAINABLE ENERGY DAYS

Register your Sustainable Energy Day or discover online and physical events taking place around the world, engaging local communities between March and June 2024.

SPARK YOUTH ENGAGEMENT

Participate in the fifth edition of the European Youth Energy Day, a platform designed for young professionals (aged 18-34) dedicated to clean energy and climate change mitigation. Become a Youth Ambassador and help champion the net-zero energy future of Europe, spreading awareness and empowering others to join the cause.

EUROPEAN SUSTAINABLE ENERGY WEEK 2024 18TH EDITION

Organised by the European Commission, the European Sustainable Energy Week (EUSEW) is the biggest annual event dedicated to renewables and efficient energy use in Europe.

On 11-13 June 2024, the 18th edition of EUSEW will take place in a hybrid format, allowing both participants and speakers to attend either online or onsite, under the theme: 'Net-zero energy solutions for a competitive Europe'.

Since 2007, EUSEW has grown into a vibrant and diverse community of energy stakeholders, which meets annually to debate the latest developments and ideas in the sector.

Do not miss this year's high-level Policy Conference, the EUSEW Awards or the fifth European Youth Energy Day, as well as opportunities to discover new net-zero energy solutions at the Energy Fair.

Europe's industrial revolution for efficient buildings: shaping the future

In the midst of a crucial electoral season, EU citizens will cast their votes to shape Europe's future. In pursuit of a more sustainable and competitive Europe, the energy efficient buildings industry stands at the forefront of change. As over 85% of today's buildings will still be standing in 2050, the revised Energy Performance of Buildings Directive (EPBD) has the potential to boost the efforts for the renovation of buildings, enhancing competitiveness and bolstering resilience in the process.

By Adrian Joyce (pictured), EuroACE – Energy Efficient Buildings, a partner organisation of the European Sustainable Energy Week 2024

The multiple benefits of energy efficient buildings for the economy

Efficient buildings hold the key to a brighter future. At the building level, energy efficiency solutions significantly reduce energy consumption, resulting in lower energy bills. These solutions also offer greater comfort, improved health, and increased productivity, all of which have a substantial positive impact on the European economy.

Europe has long championed energy efficiency solutions for buildings to play their part in climate mitigation. Yet, as we approach the critical point of massively accelerating energy renovations, upscaling energy efficiency solutions, hiring and training more workers, a holistic and dedicated approach to the efficient buildings industry is needed.

Investing in energy renovations and empowering the next generation of skilled workers

Behind every successful industry are skilled workers, and the energy efficient buildings sector is no exception. Training and expanding the workforce are top priorities. Investing in energy renovation of buildings can create an average of 18 jobs in the EU for every €1 million spent.

These jobs stimulate local economic activity and pave the way for a sustainable future.

To drive this transformation further, the provision of affordable funding for energy renovations is key. Additionally, improving collaboration between the European Commission, EU regions, and cities can streamline the process and unlock private finance, making energy renovations more accessible to all. Funding is available, e.g. via the Recovery and Resilience Facility and the newly created Just Transition Fund but it must be channelled towards the sectors which can drive the green transition.

Decarbonising Europe

Above all, the industry is ready to decarbonise Europe. Buildings account for one-third of the EU's greenhouse gas emissions, making their decarbonisation a top priority. Existing energy efficiency technologies can be used to fully decarbonise homes and workplaces, paving the way for a greener and more sustainable future. The "Buildings Breakthrough" launched at COP28 brings together countries from all over the world with the aim of decarbonising the built environment.

Digitalisation: revolutionising how we create and use buildings

Digitalisation is also playing a pivotal role in the transformation of buildings. Technologies like digital twins, energy-efficiency metering technologies, submeters, and building automation control systems are revolutionising the way we gather data and optimise building operations but also how we design buildings. They also empower citizens and businesses to become active participants in the energy market, generating and storing energy on-site. With more renewable energy being produced in Europe, digitalisation will be key to support its roll-out.

Way forward: Europe's industrial revolution for efficient buildings

The energy efficient buildings industry is at the forefront of a green revolution in Europe. Its commitment to sustainability, job creation, and economic growth makes it a driving force for positive change. By supporting energy efficiency cleantech, developing industrial policies, and investing in energy renovations, we can all contribute to a brighter and more sustainable future for Europe. For this, we need:

- a dedicated industrial policy for energy efficient buildings
- swift and complete implementation of adopted EU legislation
- an Energy Efficiency Academy to support upskilling and reskilling of workers.

Adrian Joyce is the Secretary General of EuroACE – Energy Efficient Buildings and Director of the Renovate Europe Campaign. He is a professionally qualified architect who, having graduated from University College Dublin in 1984, has spent 17 years in private practice.

Useful links:

1. General information on energy efficiency for buildings in the EU
2. The European portal for energy efficiency and renewable energy in buildings
3. Infographic: Buildings in the Fit for 55 Package
4. Report: How cohesion policy funding is used to support renovation (2021-2027)
5. Briefings: Speeding up the delivery for renovation: investing in skills and advisory services

Energising equality: unveiling diversity's role in the sustainable energy sector

By Marine Cornelis (pictured), Executive Director at Next Energy Consumer, Digital Ambassador of the European Sustainable Energy Week 2024

In a world crying out for sustainable energy solutions, diversity, equity and inclusion (DEI) still represent an untapped potential. Why are those notions essential to a just energy transition? How can organisations promote these values to innovate and prosper?

Embracing diversity: more than a trend

The energy sector, a pivotal player in greenhouse gas emissions and historically suffering from a lack of diversity (with women representing only 22% of its workforce), faces significant challenges. In this context, diversity, equity, and inclusion (DEI) become critical for a successful and equitable energy transition. A diverse workforce fosters innovative, effective problem-solving and better solution adoption. This is echoed by the International Energy Agency (IEA), which stresses that DEI is key to addressing the urgent need for universal energy access by 2030, as highlighted in the joint IEA-IRENA-World Bank-WHO report on SDG7. However, the energy sector is currently lagging in implementing effective DEI initiatives, often limiting them to anti-discrimination measures.

Intersectionality: a path to energy justice

Beyond gender-based discrimination, the energy sector must embrace intersectionality – the recognition that various social categorisations like class, race, ethnicity, sexual orientation, and others intersect, leading to complex forms of discrimination. Acknowledging this is crucial for designing targeted, inclusive, and equitable solutions. As demonstrated by EU projects like EmpowerMed, CEES, Sun4All or PowerUp, addressing intersectionality is key to combating energy poverty and promoting energy justice, ensuring the energy transition is inclusive and leaves no one behind.

Inclusive practices in energy organisations

For the energy sector to mirror the diversity of the communities it serves, knowledge building and bias combatting are essential. The European Commission's Equality Platform for the Energy Sector or the European Solar Sector's Diversity Award are examples of initiatives promoting equality. Organisations must foster inclusive cultures where diversity is valued and tokenism is avoided. This involves fair hiring practices, ongoing education, awareness programs, and mentorship opportunities. Leaders must be proactive in creating and adapting inclusive policies.

Diversity: the fifth driver of energy transition

The European Sustainable Energy Week has been instrumental in bringing forward the four drivers of the energy transition: democratisation, decentralisation, digitalisation, and decarbonisation. Joshua Atkins, the founder of the NGO "Pride in Energy" which advocates for LGBTQI+ rights in the sector, in the Energ' Ethic podcast, suggests adding a fifth 'D': Diversity. Valuing diverse experiences and perspectives is crucial for the cohesive and effective advancement of the energy sector.

Conclusion: shaping a sustainable future

In conclusion, integrating diversity, equity, and inclusion in the energy sector is not only a moral imperative but also a strategic necessity.

It's imperative for energy organisations to actively incorporate these values into their strategies, fostering a culture where diversity is celebrated, equity pursued, and inclusion is the standard. This approach will pave the way for a more sustainable and equitable future in energy.

Marine Cornelis is behind Next Energy Consumer, an international policy consultancy at the forefront of the social aspects of energy and climate transitions. Marine is passionate about empowering people and communities as we move towards a greener, more sustainable future. Her work specialises to under-represented population segments, such as women and ethnic minorities. Through her work, she bridges civil society, scientific communities, businesses and policymakers. Her Energ'Ethic podcast highlights the inspiring individuals driving worldwide improvement in energy and climate fronts. Her vision has earned her recognition as one of the first ambassadors of the European Climate Pact. She works in Europe, Africa, Latin America, and the Middle East.

Useful links:

1. European Institute for Gender Equality https://eige.europa.eu
2. EU Platform of Diversity Charters https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/combatting-discrimination/tackling-discrimination/diversity-and-inclusion-initiatives/eu-platform-diversity-charters_en
3. European Network Against Racism (ENAR) https://www.enar-eu.org

A boost for investments in EE with Energy Savings Insurance

GoSafe with ESI is now market-ready in Croatia, Greece, and Slovakia, marking a significant step towards accelerating the transition to energy efficiency in these countries. GoSafe with ESI is an innovative business model based on an Energy Savings Insurance (ESI), that facilitates the acquisition of energy-efficient equipment by small and medium-sized enterprises (SMEs).

What is GoSafe with ESI?

GoSafe with ESI enables businesses willing to install energy-efficient technologies to de-risk this investment by having the energy savings of high-performing systems guaranteed, hence securing their expected financial returns. It combines a set of financial (a surety insurance product and access to finance) and non-financial (a standardised contract, an external technical validation and an online platform) tools to deliver this.

By incorporating the GoSafe with ESI solution into their offerings, technology providers can largely differentiate their services, tackle the perceived mistrust in energy-efficient technologies, winning the most sceptical clients.

Who can benefit from GoSafe with ESI?

The solution benefits companies that wish to enhance productivity while lowering energy costs. It can be applied to various technologies from lighting to refrigeration systems, as well as HVAC equipment and solar PV.

By incorporating energy-efficient technologies, SMEs can also contribute to the decarbonisation of their activities, achieving climate objectives and meeting existing or upcoming regulations on the topic.

Why is GoSafe with ESI targeting SMEs?

Decarbonising SMEs represents a critical opportunity to mitigate climate change as they account for 13 percent of total energy consumption on average in the European Union. Greek, Croatian and Slovakian SMEs have some of the highest energy intensity ratios of the continent, which stands above 1200 MWh/mn€ (for comparison, in Portugal this ratio stands below 400 MWh/mn€).

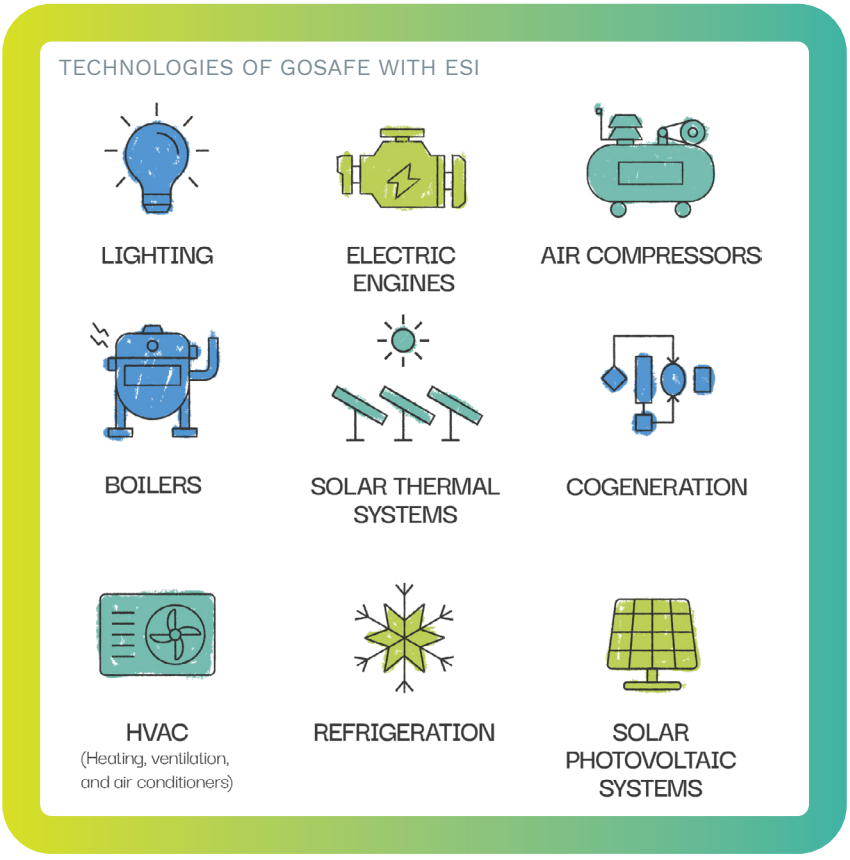
But improving efficiency and clean energy access for this category of businesses is also crucial to build the resilience of the local economies and households as SMEs generate more than half of EU countries' value-added and employ on average 65 percent (up to 70 percent in Greece) of their workforce.

GoSafe with ESI is tailored for SMEs through its standardised tools:

Finally, energy efficiency can deliver tremendous savings for businesses, constituting a major solution to better respond to energy price raises.

How to take part?

The GoSafe with ESI solution is implemented by the ESI Europe 2.0 project, facilitated by the BASE Foundation, the Croatian Society for Sustainable Development Design (DOOR), the Greek Centre for Renewable Energy Sources and Saving (CRES), and the Slovak Innovation and Energy Agency (SIEA) with fundings from the Horizon 2020 Research and Innovation Programme. The tools have been developed and adapted to the local context, insurance companies and financial institutions in each of the countries



have been engaged - now it is time for action!

First movers benefit from a special package of advantages: the personalised support of the ESI Europe 2.0 team for applying technical methodologies, contract negotiation, accessing insurance and financing, coverage of validation costs and a unique opportunity for visibility via articles and videos to be disseminated in Europe and around the world. Technology providers and companies wanting to upgrade to energy efficient systems are welcome to reach out to our team and visit our website www.gosafe-esi.com for more information. We look forward to receiving your contact!

Still curious about the ESI model?
The ESI model was created in 2015 by BASE Foundation and the Inter-American Development Bank (IDB). After a successful implementation in multiple countries of Latin America, it has been spreading around the world: from Europe to Asia and Africa.

To consolidate all the knowledge about the model and the learnings from these multiple experiences, BASE Foundation published a comprehensive white paper.

From exclusive insights stemming from various rollouts of the model to case studies spotlighting unique pilot projects, the document aims to contribute to the knowledge surrounding energy efficiency risk mitigation and financing, and inspire further innovation and replication of successful practices. The Energy Savings Insurance White Paper will inform and empower stakeholders, policymakers, financial institutions, and other entities interested in implementing similar models globally. Access the Energy Savings Insurance white paper here.

GOSAFE WITH ESI STANDARDISED TOOLS

- a clear and concise **contract** that facilitates negotiations between technology provider and client
- a simplified **methodology for energy efficiency measurement and monitoring** that is based on the IPMVP© and validated by an external third party
- a **surety product** that is more flexible and advantageous than an equivalent bank guarantee or other risk insurance instruments
- **access to financing** through banks interested in supporting this market segment in their decarbonisation
- an **online platform** to facilitate the smooth exchange of project documentation between technology provider, client and validation entity, developed in blockchain for a secure transfer of information

Visit our website: www.gosafe-esi.com

"It is an exciting moment for our ESI Europe 2.0 project to onboard pilots and see the GoSafe with ESI solution fully functioning in the three markets!"

Viola Buli, BASE, ESI Europe 2.0 project coordinator

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The ESI Europe 2.0 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033691

Partners

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Curbing Energy Demand: Not Tomorrow, but Now

Europe is bringing CO_2 emissions down, by 8% last year, with two powerful strategies: expanding renewables and reducing energy demand. While renewables often garner the spotlight, energy efficiency has an equally vital role to play in Europe's decarbonisation and energy security. However, energy reductions require good planning. In this article, we delve into how energy efficiency policies can effectively steer this downward trend, and we introduce a new online tool to measure its benefits.

By Davide Sabbadin, Acting Policy Manager for Climate and Energy, and Alberto Vela, Senior Communications Officer for Climate and Energy at the European Environmental Bureau (EEB), a partner organisation of the European Sustainable Energy Week 2024.

Energy efficiency unlocks many strategic doors

Firstly, it is a cornerstone of the EU's triple climate target architecture – emissions reductions, renewables, and efficiency goals, which reinforces and enables one another. Within this interplay, efficiency paves the way for renewables to achieve decarbonisation.

Secondly, amidst energy insecurity in the EU, efficiency offers a clear solution to cut reliance on energy imports.

While scaling up renewables is critical in the long run, deployment takes time. In the short term, efficiency is crucial for cutting dependence on fossil fuels from petrol states.

Finally, using less energy to achieve the same results yields great economic benefits for


Davide Sabbadin


Alberto Vela

administrations, industries, and households.

Beyond cost savings, it improves air quality, creates jobs, reduces energy poverty, increases assets value, and more.

What is efficiency about?

Energy efficiency is about the various measures taken to reduce wasteful energy consumption, from building insulation improvements to the use of more efficient appliances.

Energy efficiency is already integral to ongoing market transformations in Europe. Heat pumps using renewables are up to 5-7 times more efficient than gas and hydrogen boilers respectively, in terms of primary energy consumption.

Electric cars are 60-70% more efficient than combustion vehicles. Electrifying our economy with current techs can already achieve savings given the intrinsic and huge energy losses from fossil fuel combustion.

Dangerous distractions

Despite the introduction of an efficiency-first principle and compulsory targets in the EU Energy Efficiency Directive, improved energy-savings is not yet a given.

The focus on unrealistic 'cure-all' technologies is distracting demand-side actions. The EU Commission's recently proposed 2040 climate targets, for instance, have been criticised for overselling carbon capture and storage, which many consider a costly and unproven tech. EU funds to be invested into Small Modular Reactors, have also been questioned as many experts consider them too costly and nascent to make a substantial impact on climate change.

On the contrary, energy efficiency with renewables has proven to be climate-effective over the years. The savings resulting from Ecodesign and Energy Label, for instance, have been so major that all large economies have followed.

Pressure to plan

The Paris Agreement Compatible (PAC) scenario, a reliable decarbonisation model, suggests the EU can nearly halve its energy demand to achieve climate neutrality by 2040.

While the 'Fit for 55' package has spurred energy efficiency planning at national and local levels, such as for heating transition and building renovations, the urgency to meet efficiency and renewable targets is straining ministries and local governments, who often lack resources for modeling and planning demand-side measures.

Simulating energy savings

Decision-makers are increasingly relying on energy modelling tools to move the transition forward.

REFEREE, the latest free online energy planner under development, will help users to quantify the socio-economic impacts of efficiency policies in a specific region or country.

For example, users will be able to determine how many jobs a member state could create by increasing the annual rate of building renovations, how the air quality index could improve by implementing energy-saving measures in industry, buildings, and transportation, or how much public money could be saved by switching to more efficient public lighting.

Useful links:

1. https://refereetool.eu/
2. https://eeb.org/library/saving-energy-for-europe-report-spring-2023-update/
3. https://eeb.org/library/reality-check-the-case-for-a-targeted-use-of-carbon-capture-and-storage-ccs/

SMEs in Europe: Great potential, but money rules

By Christel Liljegren (pictured), managing director of the Southern Sweden Energy Agency (Energikontor Syd) and Vice-President for Mobility and Transport at FEDARENE, a partner organisation of the European Sustainable Energy Week 2024

Great potential, but money rules! The experiences from our various projects aimed at companies in recent years show that there is still significant potential to make energy use more efficient in this target group, with measured efficiency improvements ranging between 15 and 35%.

European Sustainable Energy Week 2024

In Sweden, the rise of energy prices in the fall/winter 2022 led to a growing demand for the expertise and knowledge of the energy agencies and for participating in different support initiatives. Numerous connections were established with companies throughout the regions, revealing the influence of financial considerations on the willingness to transition. This insight is valuable for future efforts, especially when the impact of lower energy prices can lead to decreased engagement and implementation of the clean energy transition in businesses.

Clearly communicated energy and climate (sustainability) initiatives enhance competitiveness in a business environment marked by rising sustainability reporting and a growing demand for sustainable, fossil-free value chains. Strategic energy management builds awareness of a company's energy system, empowering SMEs to minimize unnecessary energy use, optimize technology, and make informed decisions on investments or upgrades—resulting in reduced energy costs for business development or profit. This understanding of their energy system enables businesses to quickly adapt to operational changes, escalating costs, or unforeseen events.

Recommendations gathered from small and medium sized enterprises in our area to policymakers:

- Create incentives and establish incentive systems for SMEs to participate in energy efficiency initiatives, aiming to enhance involvement and performance. Clear communication about savings and motivation is crucial.
- Recognize the significance of energy audits by offering support

and subsidies for companies to engage experts. Emphasize the reduction of expensive energy items and encourage the shift to sustainable alternatives.

- Support companies in strategic energy management by establishing internal organisations and appointing energy managers. Provide resources and incentives to fortify internal structures.

Energy efficiency is crucial for small and medium-sized enterprises, the backbone of many European Union economies. Adopting energy-efficient practices enhances competitiveness and reduces operational costs for these businesses, vital in a dynamic business landscape with tight budgets.

As the EU focuses on sustainability and climate change, enterprises prioritising energy efficiency align with regulations and market trends, contributing to both environmental sustainability and financial resilience. Recognising this importance is key for enterprises continued role in EU economies. Regional energy agencies, collaborating with municipalities and regions, play a crucial role as agents of change in driving climate adaptation efforts, supporting businesses in these endeavours.

Christel is the Managing Director of The Energy Agency of Southern Sweden (Energikontor Syd). Christel has her whole career worked within different sustainability projects – from strategic waste management to energy behavioural projects and a lot in between. From 2011 she's been working in the energy agency and since 2017 she has been the CEO. Christel is a member of the board of Energikontoren Sverige, the national association for the Swedish regional energy agencies, and a Vice-President for Mobility and Transport at FEDARENE.

FEDARENE (European Federation of Agencies and Regions for Energy and the Environment) is the collective voice on the energy transition for regions and local/regional energy agencies. FEDARENE's members drive the energy transition and climate action in their territories through ambitious policy development and strategic facilitation actions.

Useful links:

1. https://energikontorsyd.se/
2. https://fedarene.org/

The ‘youthmath’ of COP28: Climate action through the eyes of three Young Energy Ambassadors

EUSEW 2023 and COP28 finally propelled youth engagement in the energy transition. COP28 featured the largest initiative to date to involve young individuals in the COP process. Yet, the current energy crisis demands swift action. Will the youth revolutionize the traditional energy industry to secure sustainable energy for all?

By Giorgia Epicoco[1], Livia Kalossaka[2], Margarita Samsonova[3] – EUSEW 2023 Young Energy Ambassadors.


1


2


3

The UN Climate Change Conference has the responsibility of assessing global progress in climate action. And COP28 must be praised for showcasing significant strides, particularly in youth engagement, education, technology, and overall inclusivity.

COP28 for Youth: decision-makers in the making

Finally! COP28 marked a turning point for youth involvement. It established the role of the Presidency Youth Climate Champion and introduced the first-ever Youth Stocktake. It also launched the COP28 Youth Climate Delegates Program to ensure fresh perspectives and unconventional solutions were accounted for in the negotiation process. To further assist young participants, COP28 offered the use of first generative AI for climate change data. Finally indeed, youth participation surged.

COP28 for education: green, energet(h)ic, and cool

COP28 also put education very high in the agenda. The ‘Green Education Hub’ is the first ever dedicated pavilion, highlighting the pivotal role education plays in creating awareness and fostering innovation to address climate change. Efforts to encourage environmental careers, especially in renewable energy, were underscored, with initiatives like the Energy Transition Careers Compass aiming to bridge skills gaps.

Promoting environmental careers as high-demand, well-paid, and flexible became a priority, showcasing their tangible impact on the planet and offering career flexibility. Predictions of one million solar industry jobs in Europe by 2025 further emphasized the sector’s potential.

Meeting the growing demand for climate action also requires fast-tracked technological transfer. A

proposed climate exchange program could facilitate global knowledge sharing, attract skilled professionals, and drive collaboration, leading to innovative technologies, improved policies, and effective mitigation strategies.

COP28 for renewables and ICT: breaking the gaps in industrial commitment

The Global Stocktake also finally acknowledged the need to transition from fossil fuels, with 122 countries committing to triple global renewable energy capacity by 2030. The ICT sector also stepped up for the very first time, delivering corporate agreements to reduce emissions and e-waste regulation through the ITU Green Digital Action.

But transitioning to clean-tech solutions also necessitates attention to materials. Integrating AI, simulation, quantum computing, and machine learning can accelerate progress to diversify material sourcing, especially in Europe, to restore and ensure industrial competitiveness and green tech availability worldwide. Youth is uniquely positioned to innovate and deliver with the connections, will and digital skills that will allow us to understand and build new technologies.

To this end, also addressing uncomfortable questions such as around intellectual property should also be further emphasized within COP processes to allow for the interoperability of critical technologies. Multilateral funds to acquire intellectual property rights and climate technologies must be sought, yet carefully avoiding over-relaxing green tech IP rights, which could encourage reliance on secrecy.

COP28 for all: bridging science, creativity, and innovation

COP28 ensures the importance of multilateral discussions at a time of growing geopolitical tensions. It brought together 85,000 diverse voices to enrich the discussions and hold decision-makers accountable. But further addressing critical topics and make sustainable energy discussions more accessible involves bridging the gap between science and creativity. For this, the Young Energy Ambassadors will work to make sure the EU Sustainable Energy Week becomes a catalyst of such efforts. Such events are becoming catalysers of knowledge sharing and policy ideation. With events such as the world-café style cocreation workshop, the 30 selected young energy ambassadors from 22 countries had the chance to engage in a productive session with think tanks and EU representatives where several ideas were proposed to shape the clean energy transition. The results, visible online (https://interactive.eusew.eu/eyed/) in an infographic were then presented on stage during the Youth Energy Day.

About the authors

Livia Kalossaka is a PhD-trained materials scientist and EU Young Energy Champion. Livia is deeply passionate about driving sustainable innovation and empowering young people to take action.

Margarita Samsonova is an environmental content creator and founder of Behind the Greens Media - sustainability & content creation media agency that focuses on showcasing compelling nature's solutions stories.

Giorgia Epicoco is a social and environmental sustainability expert working at the intersection of technological development for the advancement of the energy transition.

Recommended links

1. https://www.carbonbrief.org/analysis-which-countries-have-sent-the-most-delegates-to-cop28/
2. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/quantum-computing-climate-change-2023.pdf
3. https://doi.org/10.1016/j.respol.2023.104819
4. https://gem-report-2023.unesco.org/
5. https://napglobalnetwork.org/wp-content/uploads/2023/09/napgn-en-2023-public-engagement-on-climate-change-adaptation.pdf
6. https://www.ipcc.ch/site/assets/uploads/2017/08/Climate-Outreach-IPCC-communications-handbook.pdf
7. https://www.ecowatch.com/cop28-renewable-energy-goals.html
8. https://www.weforum.org/agenda/2023/11/energy-efficiency-cop28-renewables/

Supporting affordable and social housing in taking on the challenge of renovation

By Sorcha Edwards, Secretary General, Housing Europe, a partner organisation of EUSEW 2024

The only way to reach the objectives of reducing CO_2 emissions by 55% by 2030 and carbon neutrality by 2050 is to encourage a decarbonisation that is very specific to the different contexts across Europe. The good news is the necessary technologies for a fast transition are here, but the affordable housing sector might need some more support. This is why the European Affordable Housing Consortium, SHAPE-EU, led by Housing Europe, was established as the point of reference for a socially-inclusive Renovation Wave and New European Bauhaus. A set of guiding blueprints will be drafted based on the 100 lighthouse projects of the Affordable Housing Initiative.

Finding the most efficient solution for everyone

The district-level approach is the best option for a just energy transition. Not only it allows important cost reductions, achievable through economies of scale, industrialisation, bulk logistics, etc., but it also enables the housing providers and developers to engage with the community, push for a human centred renovation and added sense of ownership and belonging of their homes and neighbourhood.

'Lighthouse districts', from the Affordable Housing Initiative, represent models of integrated approaches, involving the use smart energy efficient solutions, people-centred business models, and co-creation practices with the residents at the neighbourhood level and engaging several disciplines – creative, green, digital, mobility.

One of these projects is drOp, aiming to come up with a district renovation methodology, addressing the needs of social housing from Spain, Italy and Estonia and transforms these neighbourhoods into smart and inclusive ones.

The objective is to develop solutions for positive social change, creating new opportunities within the local economic environment, all while relying on advanced technologies and cultural and creative activities. Once again, a key focus is the involvement of the community.

ÖrebroBostäder - The first public housing provider in Sweden to require temporarily hiring jobless inhabitants

Using what was done best to do even better

The Consortium partners have as a priority to bring all these good practices forward. They have put together a handbook of inspiring examples. Delivering Affordable 'Lighthouse Districts' in Europe aims at encouraging to explore the limits of what is possible, create a new appetite to renovate better, and tap into a new level of ambition.

Such an example is the case of ÖrebroBostäder, the first public housing provider in Sweden to include as a condition in the procurement the obligation to hire jobless inhabitants as construction workers for a limited period.
In addition, the planning of the intervention aimed at fostering social cohesion in the neighbourhood.
10,000 residents, 32,000m^2 area of intervention and €40,000,000 total cost of renovation are just a few figures that can indicate the scale and impact of the project.

The Wir inHAUSer project, from Salzburg, Austria, is an example of zero carbon refurbishment, integrating a shared mobility concept and a resettlement programme.

The Wir inHAUSer project from Salzburg, Austria - an example of zero carbon refurbishment

It can be described as remarkable in terms of its comprehensive (award-winning) concept to minimise carbon footprint through energy use, where the innovative mobility approach assumed a pioneering role.

Following a step-by-step approach makes the process easier

While examples of what has already been done are a valuable resource, it has also been important to create a set of guidelines that make that task of an inclusive energy efficient district level renovation seem approachable.

Planned to be published at the end of the project, they will focus on different aspects including temporary accommodation for tenants during the renovation period or ensuring cost-neutrality for residents after the renovation operation.

The Renovation Helpdesk is another tool of the project, composed of experts that have the experience of carrying out a lighthouse district. They have volunteered to help other project leaders that are just starting the process to renovate their stock and offer affordable, safe, and suitable housing for their residents.

A mission that is far from being over

After two years, the capacity-building programme is approaching its finish line, an occasion that will be marked with the "Launching 100 lighthouse districts" conference at the European Committee of the Regions on February 21, 2024.

Sorcha Edwards is General Secretary of Housing of Europe, the European Federation of Public, Cooperative and Social Housing since 2014. Housing Europe brings together public, cooperative and social housing providers from across Europe. Sorcha leads the team and coordinates the network for maximum impact aiming at better regulation, better knowledge and better finance for housing in EU and International policy-making. Under her leadership Housing Europe has become a point of reference for sustainable housing systems in Europe and beyond.

Recommended links (please include a selection of 3-5 resources, which were not hyperlinked in the text itself and would be beneficial for readers to further explore within the topic of the blog).

1. Renovate Together Forum – a LinkedIn community on district level renovation
2. ProLight project – a lighthouse district project, part of the 'Social and affordable housing district demonstrator (IA)' call
3. SUPERSHINE project – a lighthouse district project, part of the 'Social and affordable housing district demonstrator (IA)' call

Bridging the climate financing gap: seizing the opportunity

A total of almost EUR 185 trillion is required to deliver Net Zero by 2050. Despite climate finance having grown consistently over the last decade, we are far behind what is needed to meet the goals of the Paris Agreement. As the saying goes 'we can pay the bill now or pay dearly in the future'. Let's see how far we have reached and what stands in our way.

By Alba Forns Albuixech (below left), COO & Co-Founder of Climatize and Kristina Lyubomirova Lazarova (below right), Head CEO Office at the Bulgarian National Electricity Company
Both authors are EUSEW Young Energy Ambassadors

Understanding climate finance

The term climate finance refers to **a wide variety of financial instruments** that are distributed to address climate solutions. These range from grants and loans provided by large **public** institutions such as governments or multilateral funds, to green bonds, carbon taxes or **private** funding. All financial resources are either allocated to **mitigate** the impacts of climate change or **build resilience** and **adaptation** to the new reality we live in.

Although there has been an intensive and rapid allocation of funds, current financial flows must increase **at least three-fold** in order to achieve the Paris Agreement targets. The key challenges include **insufficient funding**, especially seen in **private sector reluctance**; **global disparities** and **transparency issues** among others.

Importance of bridging the gap

70% of the infrastructure investment needed for the low-carbon transition shall be deployed in the **emerging markets and developing economies** that face **multidimensional crises**, including political and economic instability, corruption and environmental challenges. Climate finance flows have grown consistently over the past decade, but they still lag far behind what is needed to meet the goals of the Paris Agreement. €5.7 trillion of climate finance is required annually between now and 2030, and €6.7 trillion by 2050, to deliver Net Zero – a total of almost EUR 185 trillion. The actions towards the effects of climate change in vulnerable communities and ecosystems shall be handled with priority and due justice.

As a means to bridge the overarching gap, **global cooperation and the role of climate finance** in achieving sustainability goals must be strengthened to promote economic and social benefits of climate action for all.

Key players in climate finance

Climate finance involves a number of stakeholders that play crucial roles in advancing the agenda on the way to net zero. On the one hand, **international entities** such as UNEP-FI, EIB, EBRD, etc. provide **blended financial solutions** by increased public funding and mobilised private capital flows. In addition, **well-governed, enabling policy frameworks are crucial to help leveraging public and private finance** into meeting the climate-related pledges. Next, **private investors** contribute to the climate capital market due to the imposed **ESG/sustainability regulations**. Last, but not least – **social awareness, engagement and acceptance** are pivotal if we are to meet the goals in the foreseeable future.

Challenges and barriers

Market conditions and legal frameworks are, however, not always set right to foster climate finance.

- **Political and financial sector misalignment**: There are relevant policies and regulations in financial and corporate sectors, however they often are ineffective because of **piecemeal** or **lack of coordination.** This leads to **misalignments with net-zero objectives**, **impeding an effective mobilization** of public and private finance for climate solutions.

- **Surge in inequality and global trust erosion:** There's a significant lack of trust between the Global North and South regarding financing for the transition. The failure to fulfil the $100 billion pledge made in Copenhagen in 2009 exemplifies strained relations.

- **Limited climate data and analytics:** Gaps in climate data and analytics impede the development of credible transition plans, **hindering effective scrutiny and execution** of climate finance strategies while opening the door to corporate **greenwashing**.

In order to tackle the challenges and barriers previously exposed:

- **Stakeholder alignment: Public finance needs to unlock private finance** by being deployed in an **optimized** manner and ensuring viability across every stage of development, from R&D to first of a kind (FOAK) projects, public procurement and ongoing subsidies as well as concessional funding mechanisms. **Policy needs to catalyse private capital flows** transcending short-term political cycles. Laws and regulations must be calibrated to encourage clean energy investments.

- **The public sector should take the lead in paving the way for the private capital market** by directing capital towards crucial decarbonisation technologies that currently lack commercial viability. This includes areas such as carbon capture, nuclear energy, green hydrogen, and industrial sectors like cement or steel.

- **Just transition via increased cooperation:** This entails an expansion of funding mechanisms similar to those employed in Just Transition Mechanism with the Just Transition Fund. These resources will be utilized to retire and decommission fossil fuel infrastructure, concurrently offering financial support and employment opportunities for current workers. Multilateral development banks and development finance institutions must secure additional capital to support these initiatives, **directing their funding strategically to leverage private finance** and amplify the impact of such programs.

- **Addressing knowledge gaps and keeping stakeholders accountable.** A well-informed and accountable ecosystem via investing climate data infrastructure and transparency via public awareness will foster progress toward global climate goals.

Where do we go from here?

The shift towards an economy that is low-carbon, resilient, and equitable presents the greatest investment opportunity of our lifetime. Concerted climate action and investment could add a net €20 trillion to the global economy, equivalent to a rise of up to 4.4% in global GDP by 2070 (relative to business as usual).

Solutions to close the financing gap are complex and multifaceted ranging from stakeholder alignment, international cooperation and

addressing knowledge and keeping stakeholders accountable. Institutions that are well prepared to embark on net zero pathways will be able to leverage decarbonisation-focused policy shifts to become technology innovators and align their practices with ethical and social responsibility standards.

Abbreviations

1. **UNEP-FI:** United Nations Environment Programme Finance Initiative
2. **EIB:** European Investment Bank
3. **EBRD:** European Bank for Reconstruction and Development
4. **ESG:** Environmental, Social and Corporate Governance

Alba Forns Albuixech is the COO and Co-Founder of Climatize, an impact investing platform bridging the climate finance gap by making it easy, transparent, and accessible to invest in renewable energy projects and potentially earn a return. Since launching in May 2023, over $2,200,000 have been invested in solar projects that support frontline communities via the Climatize platform. Alba was recently selected as Forbes 30 Under 30 Social Impact 2023, is a EUSEW Young Energy Ambassador, has been nominated for the Earthshot Prize 2024 and is actively involved in the entrepreneurial ecosystem as a startup mentor and public speaker. Her goal and mission in life is to fight for climate justice and inclusion.

Kristina Lyubomirova Lazarova is Head CEO Office at National Electricity Company – Bulgaria. In this role she helps the CEO, the Executive team and the Company become more productive and successful through: Operations: Helping manage the rhythm of the business through OKRs; Communication: Helping develop partnership, communication, and branding campaigns; Strategic initiatives: Helping drive important, cross-functional projects (ESG/Sustainability). In 2023 Kristina was selected as EUSEW Young Energy Ambassador and EU Climate Pact Ambassador. Her main interests are related to active (energy) citizenship and advancing a fair and comprehensive sustainability agenda.

Useful links:

1. UAE Leaders' Declaration on a Global Climate Finance Framework, COP28
2. Laser-focused on Bridging the Climate Finance Gap at COP28, World Bank
3. What is Climate Finance and Why Do We Need More of It?, UNDP
4. Bridging the Climate Financing Gap with Public Policy Instruments, EU Commission

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