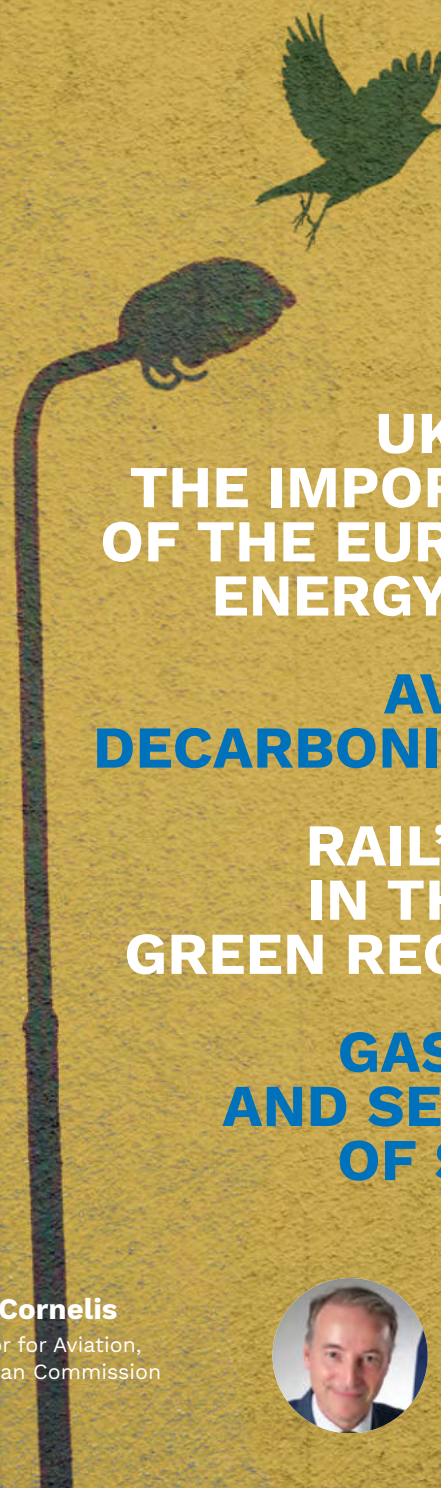




# europaean **energy**innovation

Connecting Europe's Stakeholders in Energy and Transport



**UKRAINE:  
THE IMPORTANCE  
OF THE EUROPEAN  
ENERGY UNION**

**AVIATION  
DECARBONISATION**

**RAIL'S PART  
IN THE EU'S  
GREEN RECOVERY**

**GAS GRIDS  
AND SECURITY  
OF SUPPLY**

Includes editorial contributions from:



**Morten Helveg  
Petersen**  
MEP



**Filip Cornelis**  
Director for Aviation,  
European Commission



**Kristian Schmidt**  
Director, DG Mobilty  
and Transport,  
European Commission



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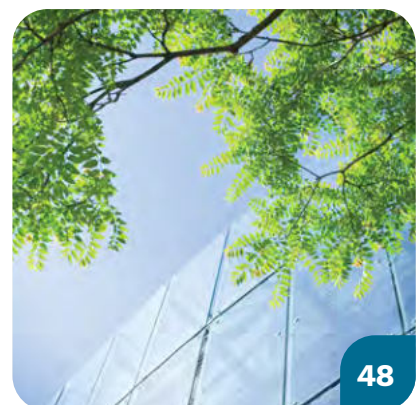
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# Foreword

*Two people are afraid of an empty rifle:  
The one with the rifle,  
and the one without it.*    **–Hazara proverb**

This publication stands proudly on a platform of mitigating anthropogenic climate change through new technologies and new applications of existing technologies. But we simply cannot ignore the emerging catastrophe in Ukraine. Its ramifications extend far, far beyond the colossal injustice being visited upon that country and upon her people.

The response has so far relied upon deploying economic measures against the invader, and supplying humanitarian aid and military hardware and intelligence to the invaded. But Europe faces a dilemma because of its carbon habit. More precisely, because of its dependence on Russian fossil carbon – a dilemma that is manifest in the huge impact of the conflict upon the price of energy. According to Bruegel, the bloc relies on Russia for 40% of its gas, whose value to Russia was about €200 million per day in February, and is now about €500 million

per day. However, in turn, Russia needs Europe's money. Its oil and gas revenues in 2021 were worth 9.1 trillion rubles (€108 billion before sanctions crashed the value of the ruble), or some 36% of the country's budget. Moscow's international reserves currently amount to some €570 billion, its highest ever. The sanctions no doubt impede access to these funds, but Russia clearly has a very considerable war chest.

The inescapable fact is that energy has a significant role for both sides in this conflict. High stakes, indeed: for if Brussels is conscious of the destabilising effects of supply uncertainty on prices, then so too is Moscow. And Moscow holds the keys to the pipelines. A further twist is the fate of Ukraine's nuclear energy capacity... the word Chernobyl resonates down the decades, while Zaporizhzhia, the largest nuclear power plant in Europe, is in the front line. Meanwhile, agriculture may only have a very distant relevance

to this publication (unless it has to do with land use and biofuels), but it is nevertheless salutary to note here that the issue of wheat lurks somewhere in the background. In 2019, Russia and Ukraine together exported more than a quarter of the world's wheat, according to the Observatory of Economic Complexity. Food prices are therefore another factor in the complex economic relationships woven into the conflict.

So far, nearly all of Europe's major climate initiatives have embraced a timeframe of years to decades. For example, 'Fit for 55' aims to reduce annual fossil gas consumption by 30% by 2030. However, the recent emergency summit in Versailles committed Europe to phasing out dependency on Russian fossil fuels by 2027. REPowerEU will now seek to reduce demand for Russian gas by two thirds before the end of this year. Elsewhere, Germany, which had aimed for 100% renewables by 2040, has already brought its target forward

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by five years. Still over a decade away, but solving the world's climate and energy problems was never going to be an overnight affair. Unfortunately, though, the situation in Ukraine is somewhat more pressing; it may have taken a war to sharpen minds, but we can only applaud faster decarbonisation – but with a stern caveat. However urgent the political imperative, replacing Russian gas with LNG, or gas from elsewhere, will not benefit the climate one jot.

Morten Helveg Petersen MEP is clear on the matter: “the war in Ukraine”, he says means that “policies, which were impossible three weeks ago, are now possible.” For him, this means significantly speeding up energy independence. *That* requires establishing the European Energy Union, and he singles out slow deployment of renewables, the electricity grid and energy efficiency as major issues – but not the only ones. Petersen is equally clear that this initiative comes at a price for European citizens and businesses. Piotr Kuś echoes the theme: the Russian invasion of Ukraine has brought the balance between competitiveness, security of supply and sustainability into sharp focus. Emphasising the role of ENTSOG in security of gas supply, he outlines the significance of gas infrastructure, co-operation between supply operators and the integration of low carbon gases, including hydrogen, into the network as we face this exceptional situation.

Even as Ukraine pleads for a no-fly zone above its soil, Marian-Jean

Marinescu expresses outrage and advocates banning the sale of aircraft, spare parts and equipment to Russian airlines, as well as banning Aeroflot from flights to, from or above the European airspace. After emphatically rejecting the idea of limiting air transport on emissions grounds, he focuses his attention on the Fit for 55 package and the social impact of any measures on jobs. He appears less than impressed. Elsewhere, Filip Cornelis examines the integration of air transport into a decarbonised society. Noting the obvious problem of heavy reliance on fossil liquid energy, he reviews the role of the Sustainable and Smart Mobility Strategy and the Green Deal, meaning air traffic management, carbon pricing measures, global market based mechanisms, funding of research and deployment of green projects. A concrete measure is the requirement for increasing proportions of sustainable aviation fuels, beginning in 2025.

Kristian Schmidt reviews the evolution of the TEN-T network linking 424 major European cities. A key component is Rail, where 160km/h travel or faster is planned by 2040. This is part of the ambition to double high-speed rail traffic by 2030, and triple it by 2050. There is an action plan to facilitate cross-border traffic- both passenger and freight. More on rail: Andrey Novakov MEP explores factors connecting the two biggest stories of our times. He points out that electricity is the “Achilles Heel” of the rail sector – energy prices impact both day-to-day operating costs and infrastructure

and network investment. Novakov has practical suggestions for turning these problems into opportunities. Perhaps the most immediate is to finance a European Refugee Pass for those fleeing Ukraine, but he also suggests state aid flexibility for short-term financial support and the simple acceptance that EU funded-projects will cost more. The principal benefit he sees stems from the greenness of Rail, which will help decarbonise transport and contribute to the EU's green recovery. Stirring, he concludes that “Europe does not need 30 of national signalling systems, European railways should speak the same language.”

A great fire ravaged Rome for six days In July of AD 64, destroying 70 percent of the city and leaving half its population homeless. Historical accounts have given rise to the popular notion that Emperor Nero entertained himself by playing the fiddle while his city burned. If the first casualty of war really is truth, and whether you believe TASS or Deutsche Welle, we must not allow ourselves to fiddle while Kyiv burns. Or Mariupol. Or Kharkiv...

It might also be expedient to verify that the weapons we are using are actually loaded. Or, as Epictetus put it: “It's not what happens to you, but how you react to it that matters.”

And there is much more for you to read inside...

**Michael Edmund,**  
**Editor**

# The European Energy Union remains

By Morten Helveg Petersen, Member of the European Parliament for Renew Europe, and Vice-chair in the Com

In the fall 2014, I was shadow rapporteur on a report on energy security, which at the time was a hot topic in the European Parliament. It was shortly after the Russian annexation of Crimea, and while working on the report it made a big impression on me, just how scared of Russia's Vladimir Putin all my Eastern European colleagues in the European Parliament were.

For those of us living at relative distance to Russia, it was perhaps easier to brush off the threat from Russia, as some irrelevant leftover from The Cold War, but for neighbour countries, the threat was serious indeed. Today, everybody realises the fear of Putin was well-founded. Indeed, that was also the conclusion of the report we issued shortly after: energy policy is security policy, and Europe's dependence on Russian fossil fuels can become a security threat to the European Union. Then, as well as now, the answer to the security threat from Russia is the Energy Union.

Back in 2014, the creation of a brand new European energy union was the most important and highly prioritised project for the European Commission. On paper the Energy Union is about mitigating climate change, and create an internal market where energy can flow freely across Europe's borders. However, the Energy Union is also about security policy, geopolitics, and high-level foreign relations.

Clean energy is amongst the most fundamental tools in European security policy, and the math is rather clear. While the EU currently is dependent on oil and gas from Russia, the Russian economy is equally dependent on the European market. In a way, this offers an

explanation to Putin's aggression: if he was ever to utilise Europe's dependence on Russian fossil energy as security politics, it had to be sooner rather than later, before the value of fossil fuels would disappear entirely with the emergence of the European Energy Union.

Seemingly, Vladimir Putin was in fact willing to give up the Russian economy in order for him to fulfil his imperialistic ambitions. Or perhaps he simply miscalculated the situation, and banked on a quick invasion of Ukraine, while all of Europe would argue internally over refugees. Whatever reasoning were behind Putin's aggression in Ukraine, Europe still faces that original threat of Putin shutting off the energy supplies from Russia to Europe.

At this point in time, however, we are past the point of no return. The war in Ukraine has created a paradigm shift in European politics - policies, which were impossible three weeks ago, are now possible. This is not least the case in energy politics because today, everybody in Europe understands that energy politics is security politics, and European politicians are ready to act on it. The recent Council meeting at Versailles confirmed that member states are in the same boat as the Commission and the Parliament. The European unity has been quite remarkable, and there is no doubt the green energy transition will pick up steam now and accelerate quicker than anticipated. After all, a war in Europe offers much more proximity than some distant future with higher temperature.

In any case, it spells the end of Europe's dependence on Russian fossil energy, the only question left is how quickly it can be done. I am

a keen proponent of an established end-date in 2027. This implies short, medium and long-term planning and evaluations, and such an ambitious time limit will help to ensure that no opportunities to introduce clean energy at the cost of fossil energy are left behind underway.

We cannot live with the fact that Europe's dependence on Russian oil and gas sponsors Putin's war machine in wars designed to bring evolving democracies straight back



# s the answer to Putin's aggression

Committee on Industry, Research and Energy

into the Dark Ages. Consequently, Europe must seize the moment and plan the road to energy independence, even if it comes at a price for European citizens and businesses. I think we are beyond the point of imagining the current crisis will be free of costs, in fact Putin's refusal to fill up Europe's gas reserves already drove European energy prices through the roof months ago, and is just another reminder of why we must be energy independent from Russia as soon as possible. The

long-term answer to the short-term challenges remains the establishing of the European Energy Union.

The next few weeks will provide us with more answers about concrete measures to set Europe free of Russian energy supplies, but there are obvious areas to address. The slow deployment of renewables is of particular concern to me. We also have to make sure the electricity grid is suited for a quicker energy transition, address energy efficiency,

install more heat pumps, boost European biogas production, and much more.

On the positive side, the window is open for progressive, green policies right now. Europe will seize the moment and go green faster than expected while opposing tyranny and defending democratic values in the process. Even if this happens in the shadows of a terrible war, it is exactly what Europe should stand for, and what I want to fight for. ●



# Turku invites residents to join climate effort

Turku has made good progress in its carbon neutrality goals. Now the city is also encouraging companies, communities, and residents to join the city in its efforts on behalf of the climate. Even small day-to-day acts are significant in its efforts on climate change.

Upper secondary school student **Aisha Abudu**, 17, took part in a Fridays for Future demonstration in Turku a couple of years ago, inspired by Greta Thunberg.

“It was great to see that there were plenty of young people there. These kinds of demonstrations and movements are of great significance. They send the message to decision-makers that climate issues need to be taken seriously. We also need them to take concrete action quickly. This is about the future for us all.”

Abudu now serves as Chairperson of the Turku Youth Council where young

people can promote their interests while advancing their possibilities to wield an influence. Through the Youth Council they get a chance to take part in meetings of the City Council, the City Board, and municipal committees, where they have the right of attendance and the right to speak.

“Much has already been done for the climate in Turku – and in Finland in general. Turku has set a good plan to achieve carbon neutrality by 2029. But here, as well as elsewhere, we should have taken action earlier.”

## “Everybody is needed”

Abudu says that in her own daily

life, the efforts made by Turku can be seen in the increased number of electric buses, for example.

“An example of my own climate action is that I usually walk or use public transport, and my food is mostly plant-based. I also have a green electricity contract for my home.”

Abudu says that despite feeling climate distress she takes an optimistic view of the future.


“People can ease their anxiety by trying to get involved and by taking concrete action themselves. I believe that a large proportion of people think the same way that I do. However, everyone is needed on board. Everyone can make climate-wise decisions.”

## Empowering youth and access to information

The Mayor of Turku, **Minna Arve** emphasises that it is important for young people to be able to look to the future with confidence.

“As lack of knowledge increases despair and fear, children and young people should have access to information on climate-related decisions and the opportunity to influence these decisions if they want to.”

“Good cooperation with the Turku Youth Council makes it possible to pass on information and strengthen youth empowerment. It is wonderful to see that young people are so well aware of how their own choices can



Mayor Minna Arve and Youth Council chair Aisha Abudu emphasise that everyone is needed in climate-related activities. It is essential that the youth have access to information on decisions related to the climate and chance to influence decisions if they wish to do so.





Efforts made by Turku can be seen in the increased number of electric buses, for example

be effective, and like Aisha they are considering matters such as food and transportation.”

#### Climate work creates well-being.

Mayor Arve says that thanks to persevering work, Turku has succeeded in cutting its emissions to half of the 1990 level. At the same time Turku’s economy has grown, and new low-carbon solutions and the circular economy have enhanced knowledge, competitiveness, and work.

“Our work on behalf of the climate has also brought international recognition. In 2020 Turku won the title of Europe’s best climate city among mid-sized cities. For three years, Turku has also been on the A List of the world’s leading climate cities kept by the international CDP organisation.

Turku has also applied to join the European Commission’s list of “100 climate-neutral and smart cities by 2030”. The goal of the list is to support at least 100 European cities in their efforts to achieve carbon neutrality by 2030.

Turku wants to be a proud forerunner in climate-positivity and to encourage others to take the same path.

“The goal is to show that sustainable life increases well-being, eases

everyday life, and gives rise to new business, while preventing global warming!”

#### The 1.5-degree life campaign

The city of Turku can reduce about half of the area’s emissions through its own action, but the rest of the emission reductions will require efforts from all businesses, communities and residents.

With the 1.5-degree life campaign the city of Turku encourages its residents to make climate-friendly choices. The name of the campaign refers to the limit set in the Paris Climate Accords for the rise in temperatures.

Project Specialist **Iris Kriikkula** and Project Specialist **Lotte Suveri** of the City of Turku point out that small and simple climate action can involve matters such as the use of energy, transportation, consumption, or eating.

“The City of Turku encourages companies and organizations in the area to join the climate action with the help of Climate team. The Climate Team is a network that encourages and inspires the local companies to start their climate work. For example it organises events such as breakfast meetings, where companies can be shown the latest energy-efficient technologies among other climate solutions.” Suveri says.

#### The importance of preparation

In their fresh report, the UN Intergovernmental Panel on Climate Change (IPCC) notes that some of the effects of climate change are already irreversible, which means that it is necessary to prepare and to adapt.

Senior Specialist **Miika Meretoja** says that the climate plan currently being updated pays special attention to adaptation.

“The city of Turku has sought to learn from two Japanese cities, Nagano, and Obuse, who have lengthy experience of typhoons and cooperation among residents in crisis situations.

Typhoons are unlikely to reach Turku in the future. Climate change and extreme weather conditions affect developing countries in the south much more severely than the developed countries of the north. However, Turku needs to prepare for lengthy heat waves and floods of runoff water caused by heavy rain.

“Also, in exceptional weather conditions, help might be needed from all city residents. In practice, this means, for example, checking in on an elderly neighbour to see if everything is all right. Neighbourhood organisations in Turku could play an important role in coordinating this kind of activity”, Meretoja says. ●

# Clear sky for aviation

By Marian-Jean Marinescu (Romania), Speaker of EPP Group in TRAN Committee

**T**he tragedy in Ukraine is a European one, as in one way or another, it affects us all.

I would like to express once more my solidarity with the Ukrainian people and with the symbolism of their struggle, which is nothing but FREEDOM. Russia's criminal actions shocked us all so I was among those who advocated a ban on the sale of aircraft, spare parts and equipment to Russian airlines, as well as a ban on flights to, from or above the European airspace of Aeroflot aircraft and any aircraft owned, leased or operated by a person related to Russia.

While Ukrainians give their lives for freedom, as many peoples have done throughout history, and we hoped would never see it again, the rest of Europe learn an important lesson: never depend on Russia! Russia's disaster in Ukraine shows us once again that independence from Russia's energy resources is an emergency, that Europe needs to become self-sufficient and rely as much as possible on its own resources. We have to keep the final targets from Green Deal and Fit for 55 but we need to find more realistic ways to reach these targets.

One of the files we are currently working within the EP is the aviation emissions trading scheme (part of Fit for 55 package). Decarbonisation in aviation is much more complicated than in other areas, because there is only one alternative: alternative fuels. Yes, hopefully in the future, hydrogen could be used or small electric motor planes could be produced. But for now, we're just relying on alternative fuels. So the question

is: is less air transport a good idea? Would that work? My answer is: no. I can't understand those who propose all flights less than 500 km away to be banned. And to be replaced with what? Train? This is far from a realistic scenario. Even for countries, like France, where a TGV is available. There are few EU countries that have a TGV available.

Tourism, business life but also

personal life of ordinary citizens would be affected if the air mobility would be limited. So the key now is, from my point of view, setting measures that will encourage the production of alternative fuels. Otherwise, the reduction of emissions will be done by reducing mobility, ie by reducing the number of flights, as prices will go so high that the shrink in passengers numbers will force the companies to cancel many flights.



While working at the FF55 files we introduced bonuses for those who use alternative fuels, and proposed the setting up of a fund for aviation, so that the money goes back into the industry and is used for alternative fuels. Now, with the proposals we have made, 100% of this money will be returned to the industry and directed to the development of technologies, but also to other measures, which will lead to a

reduction in emissions.

Another issue is social. How will these measures impact the jobs? Reducing emissions is necessary, but it must be done with preserving jobs. In the EPP we have set a strategy to jointly table the same set of amendments in #TRAN, #ITRE and #ENVI committees for all legislative files.

The question of impact of these

measures is one of highly importance to me. Therefore I have asked the Commission a written question regarding the cumulative impact assessment of the combined effects of the “Fit for 55” legislative package. I explained that industry plays a key role in the decarbonisation process and that the EU’s climate goals cannot be achieved without its participation, highlighting the huge challenges the EU industry is facing, especially in terms of competitiveness and possible job losses. In his reply, the Executive Vice-President of the European Commission, Mr Frans Timmermans, underlined that “the additional investment needed to meet the 2030 climate and energy targets could have a positive impact on the economy and employment. However, the impact will be different depending on the sector: fossil fuel mining industries will be adversely affected, some sectors will have to transform and emerging ones will grow rapidly.”

The answer of the Commission was unconvincing and vague. In my view, the European Commission, has an unrealistic approach, which we try to fix within the Parliament through our amendments.

Fit for 55 is proving to be a battle of excesses in the European Parliament. The EPP strives to remain balanced and, as always, to impose the middle way. In the age of decarbonisation, we do not want a weak aviation that has been brought down by unrealistic legislative requirements.

We, EPP, we wish a clear sky for aviation. ●



# FUTPRINT50: Collaborating towards sustainable regional aviation

## The Challenge

To address the planetary challenge of Climate Change, aviation needs to play its part and be sustainable. FUTPRINT50 contributes to this goal, advancing knowledge and technologies towards entry-into-service of regional hybrid-electric 50-seat aircraft. Hybrid-electric technologies have the potential to cut down aircraft emissions and offer new and greener regional networks connecting regions facing depopulation challenges, among others. New regional aircraft paradigms are needed to improve mobility and development.

We need to think ahead, not only around the aircraft and its technologies, but consider aviation as a complete ecosystem. As such, FUTPRINT50 tackles this global challenge with an open collaboration framework, to be available to all in the community.

Hybrid-electric propulsion implies great challenges: managing new heat sources, synergistic integration of more efficient propulsors, energy storage and its management, to name a few. To deliver this knowledge, tools and people should venture into the design space and reveal non-conventional and non-standard solutions. This is the way of FUTPRINT50; a consortium of academic, research, and industrial partners from 10 different countries around the world.

## The Work

Where is FUTPRINT50 now? Hybrid-electric propulsion offers a vast variety of powertrain alternatives, each with their own set of advantages and drawbacks. We investigated multiple hybrid-electric architectures and selected an aircraft

with electrically boosted turboprop engines and wing tip propellers. This is the platform which will facilitate the detailed examination of three key enabling technologies: energy storage, thermal management, and energy harvesting. New models at system and aircraft level are being developed and systematically integrated.

Finally, to truly bring the vision to reality, a technology and regulatory roadmap will be proposed. All actors in the ecosystem need to be at the same readiness level if Hybrid-Electric Regional Aviation is to become reality by the late 2030's contributing to this new shape and type of aircraft of the future.

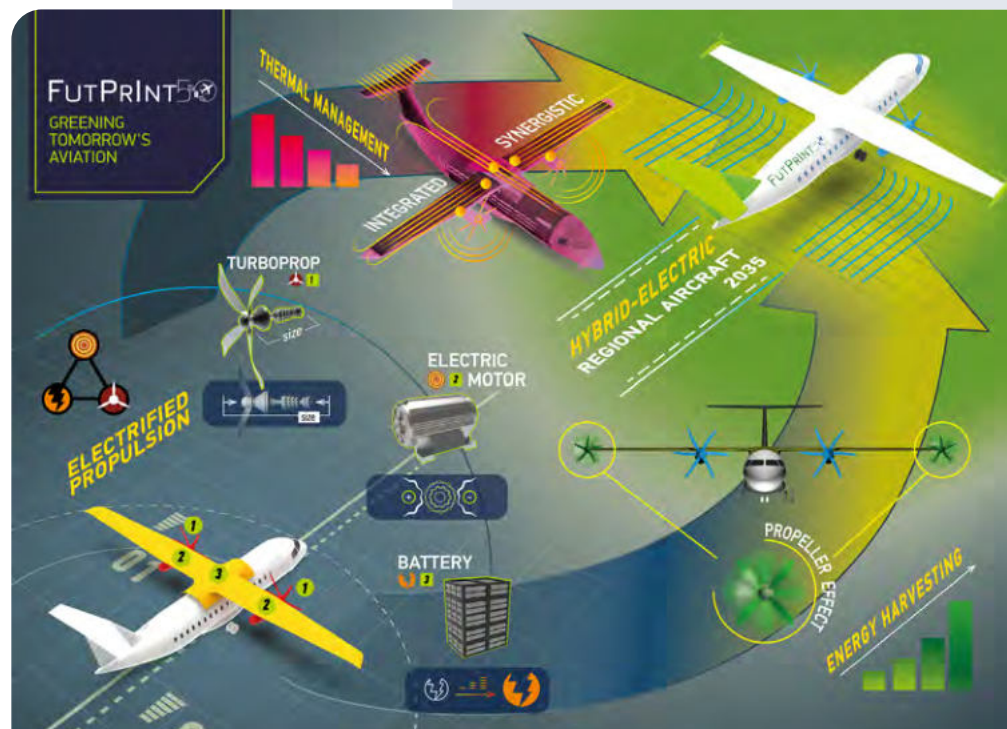
## The Impact

FUTPRINT50 believes in openness. It will offer an open tool, where all research results converge, to be available to anyone interested in hybrid-electric aircraft design.

Open innovation is the way to get the best of hybrid-electric propulsion. This is a great opportunity to evolve aviation and create better and new products and services for Europe and beyond. This is the moment that excites us, as current and future engineers converge into taking a true opportunity to build different aircraft, which can satisfy multiple stakeholders.

It is thinking on those future engineers that FUTPRINT50 fosters its Academy, promoting design challenges aimed to this new generation of professionals. **Our time frame is 2035 to 2040. Looking at design cycles and considering a variety of new systems on board, 2035 is ambitious but together, as a community, we can make it real.** ●

[futprint50.eu](http://futprint50.eu)



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 875551.

# GLycerol to Aviation and Marine prOducts with sUstainable Recycling

Glycerol – an abundant by-product of biodiesel plants – as well as other bio-based feedstocks, can be converted into valuable liquid fuels and reduce the carbon dioxide emissions in aviation and shipping sectors up to 70%.

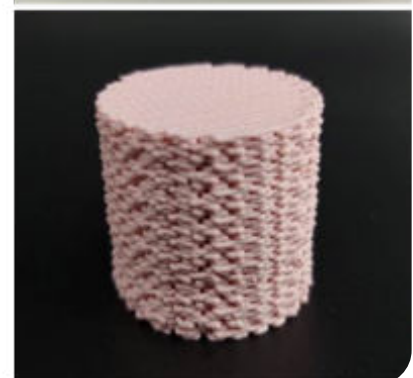
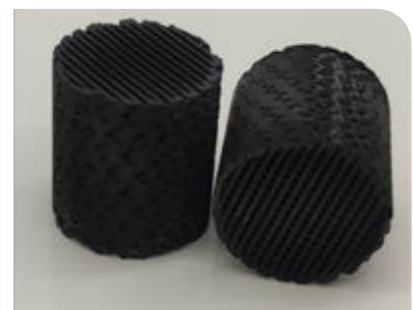
The project [GLAMOUR - GLycerol to Aviation and Marine prOducts with sUstainable Recycling](#), funded in the frame of the European Union's Horizon 2020 research and innovation programme under grant agreement N° 884197, plans to implement two new processes which could produce synthetic paraffin kerosene and marine diesel oil with an energy efficiency of 65% starting from bio-waste materials. The initiative is focusing on a combination of high pressure, auto-thermal reforming/ gasification using chemical looping to produce syngas and the integration of Fischer-Tropsch compact reactor integrated with 3D printed structured catalyst. The GLAMOUR process will achieve a full conversion of the crude glycerol into synthetic paraffine kerosene (FT-SPK) to be used as jetfuel and into marine diesel oil (MDO) with an energy efficiency of 65%. These improvements will increase the overall revenue of existing 2nd generation bio-diesel plants reducing the cost for large scale biomass-to-liquid production processes up to 35% and the CO<sub>2</sub> emissions up to 70%. At the end of the project, the GLAMOUR technology will reach a TRL 5 level of innovation in the field of material science, process engineering, sustainability and socio-economic studies.

The GLAMOUR consortium, composed by 10 partners from six different EU countries led by the [University of Manchester](#), has already achieved some interesting results from the beginning of the project. A

[www.europeanenergyinnovation.eu](http://www.europeanenergyinnovation.eu)

comprehensive campaign has been conducted to optimize the crude glycerol purification by combining physiochemical processes and advanced analytical data processing methods. Current testing includes electric-driven process to further reduce the impurities. In terms of glycerol gasification, new material formulation based on nickel and iron are being tested by project partner to achieve >95% glycerol conversion and a tailored composition; testing of this material is currently ongoing coupled with process modelling to optimize the formulation and process operation. Syngas to kerosene and liquid product has been tested on different conventional and 3D printed samples showing promising results in terms of conversion and yield.

A comprehensive benchmark of the process performance has been carried for about three months with three different catalysts and against commercial micro-structured reactor performance (provided by INERATEC). Full design of GLAMOUR prototype at a TRL5 demonstration has been completed and the equipment required for scale-up the process has been designed and most of the items were ordered for the final TRL5 demonstration that will start later in 2022 in the Netherlands. The conceptual design at industrial scale simulation is confirming the expected Key performance indicators also in terms of life cycle assessment demonstrating the validity of the process and relevance at industrial scale. ●



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 884197.

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# How to integrate the air transport se

By Filip Cornelis (pictured), Director for Aviation, European Commission

Air transport plays a vital role in our economy and daily lives, notably for the millions of us who live or come from islands and peripheral regions and states. It connects citizens with their families and their friends, creates jobs or business opportunities, and provides essential links for the cohesion of cities and regions that are difficult to access. Clean mobility solutions are emerging in other transport modes like the road sector (electric cars are steadily becoming part of our daily lives), but low carbon air travel is not there yet. The sector is particularly difficult to decarbonise, due to its heavy reliance on fossil liquid energy, which is the

only one for the time being able to ensure the energy density requested to lift and fly commercial planes. Aviation still represents around 3% of our economy's carbon footprint. In the face of the COVID-19 pandemic, our society took the full measure of the importance of aviation for the circulation of people and goods. At the same time, this period coincided with intense work at policy and industry level to make air travel restart in a more sustainable way. I am optimistic when I see the latest commitments of the European and global aviation industries to reduce significantly the carbon footprint of air travel<sup>1</sup>. We know that concrete solutions are coming soon: more

direct flights, sustainable aviation fuels instead of fossil energy, more fuel-efficient aircraft or zero emission aircraft. I am convinced that the future of air mobility is sustainable. The key is to combine industry action and bold, efficient policies. Let me explain how I see the latter.

In 2020, the Commission adopted its Sustainable and Smart Mobility Strategy. This ambitious roadmap set the course of policy action to implement the European Green Deal, and comply with the EU's climate objectives of reducing emissions by 55% by 2030 and becoming carbon neutral by 2050. To decarbonise aviation, the strategy announced



# ector in a decarbonised society?

increased action, notably in the areas of air traffic management, carbon pricing measures, global market based mechanisms, funding of research and deployment of green projects, and boosting sustainable aviation fuels. In July 2021, the Commission adopted a set of regulatory proposals to implement into EU law the measures that will allow reaching the EU's climate objectives. Several of those measures contribute to accelerating the decarbonisation of aviation. The revision of the EU Emissions Trading System will oblige airlines to purchase allowances (carbon credits) for all of their carbon emissions by 2027. As the price of carbon credits is increasing, this will encourage

airlines to accelerate the reduction of their emissions. We propose to implement into EU law the global carbon offsetting and reduction scheme (CORSIA), to offset emissions of international flights beyond 2020 levels<sup>2</sup>. The Commission adopted a new regulation to ensure that airlines fly on increasing shares of sustainable aviation fuels (notably advanced biofuels and synthetic fuels), starting in 2025. The tax regime for aviation fuels is also proposed to be revised, to encourage airlines to use more sustainable aviation fuels instead of fossil fuels. Infrastructure at airports will have to cater for electricity supply for stationary aircraft at gates and remote positions, to avoid the use

of engines running on fossil energy, when parked. Finally, the EU must continue to act as one block, together with like-minded countries, to push for ambitious sustainability policies at ICAO<sup>3</sup> level, in particular to agree on a long-term goal for emission reductions.

Alongside these legislative proposals, the Commission is putting forward many other incentives to accelerate the transition towards a green aviation. Just to mention a few, Horizon Europe and the two Joint Undertakings on Clean Aviation and SESAR (air traffic management) will mobilise significant funding in research and development. The Commission is setting up several industrial alliances to de-risk investments and create the necessary collaboration among investors, businesses and public authorities, for instance the Renewable and Low-Carbon Fuels Alliance, the Alliance on Zero Emission Aviation, or the Hydrogen Alliance.

These policy measures proposed by the Commission are an important part of the equation, but ultimately, real change will need to come from the industry. This is a very exciting challenge! As Director for Aviation, I will follow very closely every step of the aviation sector on its journey towards a low carbon future. We owe it to our citizens, and in particular to the young generations, to deliver sustainable flying in the nearest possible future. ●

1 Europe's aviation sector adopted the Destination 2050 initiative. The global aviation industry adopted a 2050 net-zero carbon goal.

2 As a result of the COVID-19 pandemic, during its pilot phase (2021-2023), CORSIA will offset the growth of emissions beyond 2019 level.

3 International Civil Aviation Organisation.

# Rail: Use blue and yellow, if you want

By Kristian Schmidt (pictured), Director, DG Mobility and Transport, European Commission

In December 2020, the European Commission presented its sustainable and smart mobility strategy. The strategy puts European transport on track to achieve a 90% reduction in the transport sector's CO<sub>2</sub> emissions by 2050. Rail is one of the safest and cleanest transport modes, and we cannot meet our objectives without it. However, it will not work unless rail can run across borders, in a single European railway area.

In 2021, we celebrated the European Year of Rail, with plenty of initiatives at local, national and European levels. The most inspiring and symbolic initiative was certainly the Connecting Europe Express which travelled over 20,000 km, visiting 26 countries, with over 100 stops and 33 border crossings. During the

stops, we saw how attached local communities are to their railways, for tourism, business and, standing at the station, feeling connected to the rest of Europe.

The Year raised expectations, and we must now deliver. At the end of the year, the Commission put a powerful rail package on the table, announcing a mix of investments plans, policies and future legislation. First of all, we tabled new plans for completing Europe's transport network (TransEuropeanNetwork – Transport, TEN-T) of rail, inland waterways, short-sea shipping routes, and roads connecting 424 major cities with ports, airports and railway terminals.

On rail, we propose to allow trains to travel at 160 km/h or faster on major TEN-T passenger rail lines by 2040

and the completion of key high-speed lines by 2030.

The other part of the December package is an Action plan to boost long-distance and cross-border rail to help the EU meet its ambitious target of doubling high-speed rail traffic by 2030, and tripling it by 2050. Although the number of people travelling by train has increased in recent years, only 7% of rail kilometres travelled between 2001 and 2018 involved cross-border trips.

To encourage more people to consider the train for trips abroad, the Action plan sets out concrete actions to remove barriers to cross-border and long-distance travel, and make rail travel more attractive for passengers. By 2030, the Commission will support the launch of at least 15





# t to make it green!

cross-border pilots to test the Action plan's approach.

In all this, we must not forget rail freight. Freight already has a strong cross-border dimension with about half of the traffic in the EU being international. The proposal for the TEN-T revision provides for better infrastructure investment planning and strengthened performance monitoring. In addition, a planned initiative on rail infrastructure management and capacity allocation will focus on providing cross-border freight with an improved use of the network, resulting in increased commercial speed, higher reliability and predictability and reduced costs for cross-border rail freight. It will challenge the current national approach to rail infrastructure capacity management and introduce

a stronger EU-dimension. For this purpose, the Commission will consider the benefits and costs of an EU level entity to optimise the use of cross-border capacity and to rigorously monitor traffic performance. The initiative will also consider ways to improve the performance of rail in multimodal transport. For example, the growing container segment provides potential for achieving the mobility strategy's goal to double freight traffic by 2050.

Digital automatic coupling (DAC) contributes to modern and digital European rail freight transport. DAC increases efficiency thanks to automation of processes, ensures energy supply for telematics applications as well as safe data communication throughout the train. The Commission actively

supports the European DAC Delivery Programme (EDDP), under the leadership of Europe's Rail Joint Undertaking and in cooperation with a wide range of stakeholders. The objective of EDDP is to develop, test and specify a digital automatic coupler including a migration plan and the preparation of authorisation and standardisation procedures.

Rail is already largely electrified and has a high energy efficiency. However, around 20% of train engines still run on diesel. Hydrogen and battery electric rolling stock would allow the elimination of remaining diesel operations. Such alternative fuels powered trains can bring rail to zero direct CO<sup>2</sup> emissions, decrease air pollution, and improve rail's multimodal performances – for example, hybrid locomotives can switch from an electrified main line to an un-electrified terminal, eliminating the need for additional shunting locomotives. The Commission is fully aware of the need to replace diesel on non-electrified routes, and of eliminating diesel running “under the wires”. Such routes are frequently the last mile for trains running on the TEN-T network. The development of battery, hydrogen and hybrid trains will be supported under the Europe's Rail and Clean Hydrogen joint undertakings.

The Commission believes in the green power of rail to achieve our ambitious climate targets. But rail can only be effective when borders do not matter. The single European railway area is a legal reality, but a minefield of technical, operational and administrative barriers must be eliminated to reap the full benefits. In short, if we want to make rail as green as possible, we must also mix in blue and yellow stars! ●



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# How rail is key to decarbonise transport and contribute to the EU's green recovery

By Carlo Borghini (pictured), Executive Director, Europe's Rail JU

Rail is the greenest, most environmentally friendly and energy efficient mode of transport, unless you walk or cycle. Rail is set to play a crucial role in helping the EU become climate neutral by 2050 and accelerating the delivery of EU's ambitious climate objectives outlined in the European Green Deal. There is indeed no doubt of its importance when it comes to decarbonising Europe's transport sector as rail is placed at the heart of the EU's green recovery strategy, which also aims to mitigate the consequences of the COVID-19 pandemic.

The European Commission's Sustainable and Smart Mobility Strategy, which was announced in December 2020, sets out targets for Europe's transport system to become more digitalised and environmentally friendly, as well as more resilient to future crises, helping to cut emissions by 90% by 2050 and achieving the targets of the European Green Deal. Among the specific goals for rail are doubling highspeed rail traffic by 2030 as the continent strives for all journeys of less than 500km to be carbon neutral by 2030 and increasing rail freight by 50% of current levels by 2030 and 100% by 2050.

The new Europe's Rail Joint Undertaking, which is the universal successor of the Shift2Rail research and innovation programme, is set to directly contribute to these policy objectives. Officially launched on

21 February 2022, the partnership aims to accelerate research and development in innovative technologies and operational solutions. The programme will make rail services more flexible, more affordable, more reliable and safe, increasing capacity and delivering performance.

Its Multi-Annual Work Programme summarises the various areas that will accelerate the much-needed green transformation. For instance, flagship area four is directly looking at a sustainable and green rail sector. This area has the goal of providing new innovative products and services based on leading edge technologies to minimise the overall energy consumption and environmental impact of the railway system, to make this transportation mode healthier, more attractive and to provide resiliency against climate change at a reduced total cost of ownership.

Moreover, crucial to the green transformation, rail freight is a key focus area of Europe's Rail. This fifth flagship area will contribute to delivering a seamless rail freight system, integrating information and data for all the actors involved, and pushing for fully digital rail freight operations, breaking down existing barriers that undermine the performance of rail freight, such as coupling, brake controls, language issues, and other technologies or operational processes. Successful stories such as the DAC (Digital



Automated Coupler) technology, to be adopted as an EU standard by all Member States, show the added value of the integrated system approach to make efficient use of the new technologies.

In the centre of the Europe's Rail programme is bringing these and the predecessor programme's innovative solutions to the market via a system of systems approach. Shift2Rail has already laid some groundwork in terms of greening rail. For noise, an auralisation and visualisation tool was developed which enables the inclusion of human perception in the assessment of different noise mitigation scenarios when building or upgrading a railway line. On the energy front, an eco-labelling methodology has been proposed that could provide a good basis for the sector for moving forward.

There are many more examples showcasing the work that has already been done, however, much more can still be achieved. With this in mind, the new partnership aims to ensure that rail becomes the backbone of a green, sustainable and carbon-neutral mobility in Europe. ●

# COVID-19 and Russia's aggression on opportunities for the rail sector

By Andrey Novakov (pictured), MEP

There is a link between the future of rail transport, the fallout from the COVID-19 pandemic and the impact of Russia's war on Ukraine. In the EU, rail transport's Achilles' heel is the electricity production and the price of raw materials used by the industry. The corona crisis resulted in unprecedented price hike of raw materials such as steel, copper, aluminium and concrete. The military aggression underlined the Union's energy vulnerability and revealed the (rail) transport sector's exposure to energy supply and inflation in energy prices. Rail companies across the Union already feel the effects of higher electricity prices. This could temporarily "derail" the progress of the rail sector.

Given the two crises, day-to-day operations, the production of rolling stock as well as building infrastructure are much more expensive. High expenses reduce profit margins and the ability of the operators and owners to invest in infrastructure, rolling stock and widening of the network.

The EU could do a few things to turn the latest developments to opportunities. The first thing is to look for ways to provide short-term financial support to the rail sector through state aid flexibility. Member States could then support the companies out of the crisis. Second, it is to make an upward revision of the costs for key EU-funded rail projects in order to consider the inflation. Such a revision should cover the EU funding through the Multiannual Financial Framework as well as the Next Generation EU

funding. Third, to come up with new initiatives that would increase the visibility of the sector. For example, the EU, with the help of Member States, could finance a European Refugee Pass for those who flee from Russia's war on Ukraine. The free rail ticket would contribute to the integration of Ukrainians.

If the EU successfully navigates the sector out of the crises, rail transport could once again revolutionise our economy just like it did in the XIX century.

## **Rail is key to decarbonise transport and contribute to the EU's green recovery**

Rail transport is responsible for only 0.4% of greenhouse gas emissions from EU transport. The sector has reduced its emissions over the past 30 years, facts proving that rail is fully in line with EU ambitious climate objectives. EU aims to become the first climate-neutral continent by 2050. Undoubtedly, the future of Europe is green and building the mobility system that EU needs without strong support for rail sector would be impossible. Europe has already started its one-way journey towards a more competitive and clean economy. This journey will be challenging, but I am convinced that in order to make it a success it should be by train. The questions in front of us is how to enable rail transport to reach its full potential and to contribute to the decarbonisation of the Union in the most effective manner. European Year of Rail was a great initiative during a year that changed our lives and our way of thinking. Covid-19 pandemic had an unprecedented impact on

all transport modes, also heavily affecting rail sector with billions of euros lost. Despite this, the initiative has achieved its objectives, namely to raise the important questions, putting rail in the spotlight and engage citizens in using more sustainable and greener modes of transportation.

The most crucial is that EU is starting to work on concrete solutions and that rail definitely stays at the centre of Union's priorities. Key priorities have been set for European mobility sector and especially the system we want to build for our future – sustainable, safe and affordable. The EU's Smart and Sustainable Mobility Strategy to double high-speed rail traffic by 2030 and double rail freight traffic by 2050. The European Commission proved its strong commitment again in December 2021 with the publication of the Action plan to boost long distance and cross-border passenger rail and the TEN-T Regulation revision which will be of utmost importance to improve rail network in Europe, connecting regions and remove obstacles for more efficient and competitive rail freight and multimodal transport.

Rail transport is a part of European history, there is a clear signal from the European Commission that the sector should stay at the centre not only of the debates but of the future initiatives. Ensuring the decarbonisation of the transport sector in Europe will be a question of a very strong partnership between politicians, experts and industry. Bringing ideas and priorities into reality and turning them into real success would be only possible with the joint efforts between

# in Ukraine are both crises and

policy-makers and authorities, railway undertakings and infrastructure managers. A holistic approach is needed in order to contribute to rail sector development, while guaranteeing EU's green recovery.

At the first place, rail needs funding – proper financing is essential for the future of the sector. Member States should significantly speed up their investments in existing and new infrastructure, strengthening territorial cohesion and improve connectivity between EU regions. The completion of the TEN-T network should not be put at risk, because of the poor planning and diverging priorities especially regarding cross-border projects. A strong TEN-T demands us to be ten times bigger in investments and implementation.

I truly believe that rail gives us this unique opportunity to achieve

climate-resilient transport system of the future, while maintaining competitiveness and affordability. Moreover, rail will be a key factor for the further development of freight transport in EU.

In the aftermath of the pandemic and Brexit, we are observing a critical shortage of heavy-duty vehicles drivers, nevertheless freight transport demand is growing. The current modal split is still highly unbalanced, e.g. 76.3 % for road freight transport, followed by rail and inland waterway transport -17.6 % and 6.1 % respectively. Transport is a system and its good functioning depends on all different modes of transport. (Introducing restrictions for one mode of transport is not an efficient measure to promote more sustainable modes of transportation.) Greener and cleaner modes need more incentives, giving them the

opportunity to explore their full potential and capacity. I would like to see more goods going by train, this is the way to meet growing demand, while neutralizing the negative environmental impact.

Secondly, EU rail sector needs to be attractive – make traveling by train easier, the most efficient and pragmatic choice. EU economy is still recovering from covid-19 pandemic, customers' demands are evolving. The "safe" became the new black, the sector should help citizens regaining trust in public transportation.

From customers' perspective, I am convinced that improving and optimizing services will be vital for the rail sector. Reservations for rail journeys should be as simple as booking a flight, more user-friendly and accessible. Diversifying services is another pillar of the sustainable and green recovery of the EU mobility system. The renaissance of night trains is a perfect example how rail could be a part of the solution for the EU's recovery – first as an alternative to a short-distance flights and secondly as a tourism opportunity.

Finally yet importantly, we should not lose our focus on research and innovation in the rail sector as key instruments to drive the evolution of a digital, competitive and sustainable European railway system. In this context, we need to speed up the development and the deployment of these technologies in passenger, freight and intermodal services. Investing in European rail traffic management system (ERTMS) will enable the creation of a high capacity integrated European railway network and eliminating barriers to interoperability. Europe does not need 30 of national signalling systems, European railways should speak the same language. ●



# Gas Grids

Responding to the market and security of supply crisis, while embracing energy transition challenges.

By Piotr Kus, General Director, European Network of Transmission System Operators for Gas (ENTSOG)



Since its creation in 2009, ENTSOG has been contributing to European Competitiveness, Security of Supply and Sustainability. With the relevant market and security measures in place, we were ready to further support Europe's focus on addressing climate change and reform its energy system. The Russian invasion of Ukraine and the resultant impact on energy security have made us acutely aware that maintaining a balance between all three priorities of the European Energy Policy Triangle has become a crucial challenge to address.

The gas transmission system operators (TSOs) have been instrumental in operating the gas system safely and at reasonable costs to the consumers. ENTSOG and its members, the gas TSOs, believe the European gas grid can offer the necessary solutions to address the impacts that arise from these challenges.

## **Facilitating cooperation to manage the network, analysing the European gas infrastructure**

In 2017, the Security of Supply Regulation entered into force, strengthening the measures to safeguard European security of gas supply. ENTSOG continues to play an important and significant role in this context, by facilitating cooperation between the gas TSOs to manage emergencies and minimise potential negative impacts from disruptions to supply or to infrastructure. ENTSOG has established specific groups — Regional Coordination, or ReCo, Teams — which are groups of TSOs assigned to supply corridors, and

who can provide relevant information via ENTSOG to other stakeholders and EU bodies, such as the Gas Coordination Group, the European Commission, and the Member States. ENTSOG coordinates the ReCo activities on an ongoing basis, 24/7.

ENTSOG also undertakes short-term analysis of the preparedness of the gas infrastructure for the upcoming gas seasons. We assess if the infrastructure can store gas for the upcoming summer or if the infrastructure can enable supply and demand adequacy for the upcoming winter, given an available supply. Fostering innovative solutions, ENTSOG builds on the well-established Transparency Platform and will soon provide gas flow information dashboards with regularly updated data on the latest situation in the transmission and storage systems. We hope that this will add transparency and visibility for the stakeholders along the whole value chain in managing the security of supply and energy crisis.

In the longer perspective, the work undertaken for the Ten-Year Network Development Plan (TYNDP) includes an evaluation of the planned infrastructure, and how it may support the EU energy system to meet the Paris Agreement and

Green Deal objectives, whilst also providing a secure and affordable network. Our goal is also to contribute to the achievement of net-zero decarbonisation by 2050. ENTSOG incorporates sustainability as one of crucial aspects of its activities, by repurposing and retrofitting the existing gas infrastructure and facilitating the integration of renewable and low carbon gases, including hydrogen, into the network. Retrofitting and repurposing of existing pipelines is much more economic than building new infrastructure, with cost reduction of 52-83%, according to the recent Re-Stream study<sup>1</sup>.

#### **The importance of stakeholder engagement**

All of these tasks are performed in full transparency and with intensive stakeholder engagement. Transformation of networks can be successful only by working with stakeholders along the whole gas value chain. Creation of ENTSOG's Advisory Panel for Future Gas Grids provides such a platform, to exchange ideas on how to best repurpose and retrofit the gas grids by 2050. ENTSOG also addresses specific technical challenges and for that it has established the Prime Movers' Group on Guarantees of Origin and Certificates – an expert group, which focuses on a pan-

European Guarantees of Origin system facilitating the European market for renewable and low-carbon energy. Furthermore, the technical challenges and feasibility to handle gas quality in fluctuating blends, as well as pure hydrogen grids in our future gas system, are discussed in the Prime Movers' Group on Gas Quality and Hydrogen Handling. ENTSOG also facilitates the roundtable on clean hydrogen transmission and distribution, as a part of the European Commission's European Clean Hydrogen Alliance.

#### **Strengthening Europe's energy system to be secure, sustainable, and affordable**

One of my goals since joining ENTSOG as General Director at the start of this year, is to maintain and further strengthen the association's role to contribute to a secure, sustainable, and affordable energy future for all European citizens. Namely, due to the exceptional situation and the need to update the Security of Supply Regulation provisions, as proposed by the European Commission, ENTSOG will provide a catalogue of practical solutions for short to medium term security of supply, whilst also addressing the longer-term goal of integrating hydrogen and biogas at industrial scale into our grids. ●

*“ I believe ENTSOG will continue to be proactive, providing technical expertise on gas transmission related topics on a European level, as it has been demonstrated over the years. ”*

<sup>1</sup> <https://www.carbonlimits.no/project/re-stream-reuse-of-oil-and-gas-infrastructure-to-transport-hydrogen-and-co2-in-europe/>

# The reuse of oil and gas infrastructure

By Manon Simon and Gaëlle Cauchois, Carbon Limits

In the European Green Deal, the EU has set itself the ambitious target of achieving climate neutrality by 2050, with an intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.<sup>1</sup> The ambition of the EU increases the necessity of decarbonizing the industry, energy and transportation in Europe. Carbon Capture and Storage (CCS) and carbon-free energy carriers based on hydrogen are technologies which could significantly contribute to achieving the EU goals. Both CCS and large-scale hydrogen usage require transportation infrastructure. Reusing existing oil and gas infrastructure can lead to more cost-efficient deployment of CCS and hydrogen technologies and limit the costs of achieving EUs climate ambitions. The aim of the Re-Stream study was to provide fact-based elements to this statement and to identify relevant infrastructure and define what technical adaptations and investments would be required to unlock its potential for reuse for both CO<sub>2</sub> and 100% H<sub>2</sub>. The Re-stream study was performed by Carbon Limits and DNV for four European industry associations (IOGP, Entsog, GIE and Concawe) and published in November 2021.

65 pipeline operators participated in the Re-Stream study, providing data that could be analysed within the Re-Stream project for approximately 58,000 km of pipelines<sup>2</sup> (+24,200 km assessed by operators themselves as suitable for H<sub>2</sub> reuse) representing half of the total offshore pipeline length and approximately 30% of the onshore oil and gas pipelines.

## Initial technical screening

An initial technical screening was undertaken considering data

provided by the pipeline operators. This analysis does not replace a full pipeline requalification process that would require way more inputs for each pipeline. The criteria used for this initial screening are the material of construction and pipeline design characteristics (e.g. for CO<sub>2</sub>, to check the resistance against running ductile fracture), the internal pipeline condition, safety matters, age and transport capacity. For calculations, design pressures have been adapted according to standards and flow requirements.

Other parameters such as, among others, the chemical composition, the heat treatments of the material, the welding procedure specification, the way a pipeline has been operated over the years and pipeline safety risk are also factors that play an important role in the possibility for reuse of a pipeline. However, these parameters could not be considered at screening level, as these are pipeline specific.

**Of the approximately 58,000 km pipelines assessed in this project (around 41,700 km onshore + 16,300 offshore)<sup>3</sup> for which data were received, the initial screening showed that technically:**

FOR CO<sub>2</sub>

- There are no general technical showstoppers identified for transporting CO<sub>2</sub> in the gaseous phase in the existing onshore and offshore pipelines.
- CO<sub>2</sub> transport in dense phase is possible in more than half of the offshore pipelines considering the current state of knowledge/standards. An additional 40% of the offshore length would require more testing, analyses

and/or update of standards to be reusable.

- A very small portion of the onshore pipelines would be reusable for CO<sub>2</sub> transport in dense phase considering the current state of knowledge/standards and limitations in design. Approximately one quarter of the onshore length could be reusable provided positive results from more detailed analyses and/or tests.

FOR H<sub>2</sub>

- Most of the offshore pipelines can be reused for H<sub>2</sub>.
- Onshore, close to 70% of the pipeline total length can be reused considering the current state of knowledge/standards. The remaining length of the pipelines is promising for reuse but would require more testing and/or update of standards to be reusable. None of the pipelines analysed can be categorically excluded from reuse as of today.

It is noteworthy that for the pipelines assessed to be reusable considering the current state of knowledge/standards, pipeline requalification processes should still be undertaken, and testing might be needed. Some factors may affect the allowable operating conditions, hence impacting transfer capacity. Indeed, as mentioned earlier some criteria could not be considered for this initial screening.

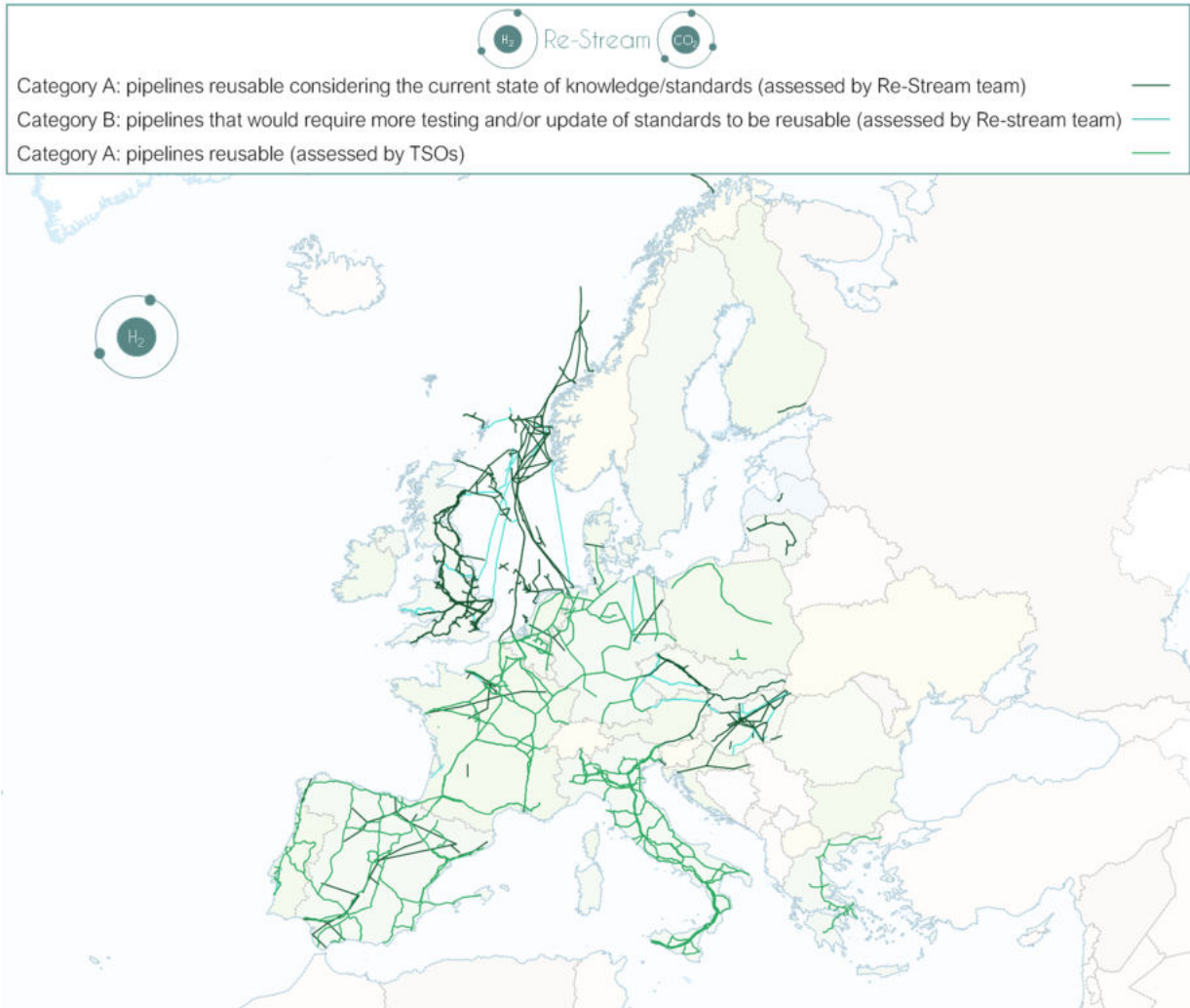
## Initial business opportunity review

The locations of sources (CO<sub>2</sub> emitters / H<sub>2</sub> storage / H<sub>2</sub> producers) and sinks (CO<sub>2</sub> storage locations / H<sub>2</sub> storage / H<sub>2</sub> consumers) were identified and a minimum pipeline length for business opportunities was calculated. There are some clear opportunities:



# re for hydrogen and CCS in Europe

Figure 1: Example of results – Re-stream assessment of reuse of oil and gas pipelines for 100% H<sub>2</sub> transport



Source: data provided by pipeline operators, Re-Stream team analysis

## FOR CO<sub>2</sub>

- A minimum of around 70% of the existing offshore pipeline length is relevant for CO<sub>2</sub> transport as many of the long pipelines are linking harbours to CO<sub>2</sub> storage locations.
- Regarding onshore pipelines, a minimum of 20% of the pipeline length shows some business opportunities linking sources to

sinks (harbours or onshore storage sites). It is very likely that this proportion would grow significantly if the automatic approach undertaken in the study would have allowed for only part of the pipelines to be reused or for pipeline connections to be better considered.

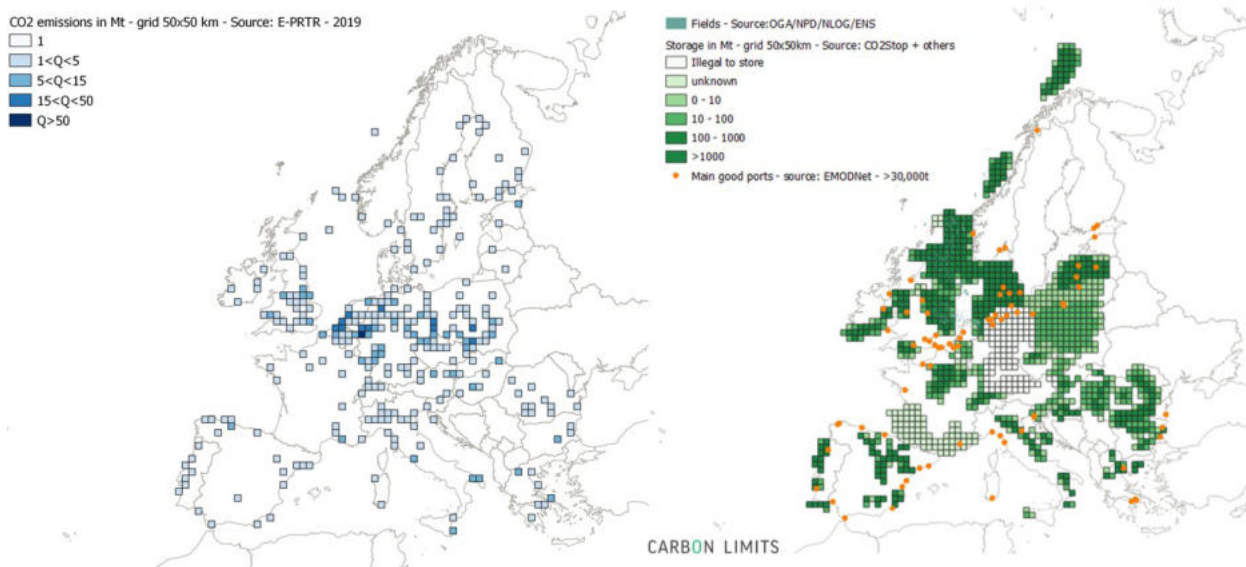
## FOR H<sub>2</sub>

- A SMR/ATR production scenario gives

a higher degree of obvious business opportunities compared to an electrolysis production one as SMR/ATR production locations are linked to the current gas infrastructure.

- Depending on the demand/production locational assumptions, the minimum reusable offshore pipeline length for hydrogen is between 2% and 25%.

Figure 2: Example of location identification – Estimated CO<sub>2</sub> sources and sinks in 2030



- With regards to onshore, based on the demand/production locational assumptions taken in this study, the minimum reusable pipeline length for hydrogen is 20% to 30%. As for CO<sub>2</sub>, it is very likely that this proportion would grow significantly if the automatic approach undertaken in the study would have allowed for only part of the pipelines to be reused or if pipeline connections, the security of supply and the benefits of an interconnected market had been considered. According to the operators, the EU network is so well meshed that current infrastructures are likely to be enough to connect production with demand with only the last miles that would need to be added.

#### Case study results

For six selected cases representing various scenarios of reuse (H<sub>2</sub> / CO<sub>2</sub> gas / CO<sub>2</sub> dense - onshore / offshore pipelines), no technical showstoppers were found at this stage. The economic assessment of those cases confirmed the strong potential for cost reduction involving reuse of pipelines compared to their new build options. For both CO<sub>2</sub> and H<sub>2</sub> transport, 53% to 82% of cost reduction can be achieved with around 2 MEUR/km cost reduction for offshore cases and 1 MEUR/km for onshore cases. Those cost reductions are of particular importance in the initial phases of development of CCS and hydrogen infrastructure.

#### What's next?

A list of technical challenges for pipeline reuse, including some criteria

that cannot be covered at screening stages, are listed, and discussed as part of the Re-stream study. Those challenges are classified in 4 main categories: Regulatory, Integrity, Safety, Operability. Mitigation actions are identified for each of the challenges.

The objective of this assessment was to estimate an overall reuse potential at EU level of the existing infrastructure and, as such, this assessment does not replace a full requalification process of pipelines by operators before reuse. The estimated potential within this project is likely to change as the knowledge basis for transport of both H<sub>2</sub> and CO<sub>2</sub> increases and as standards evolve depending on ongoing research activities, testing and studies. ●

Would you like to find out more? The full study is available at <https://www.carbonlimits.no/project/re-stream-reuse-of-oil-and-gas-infrastructure-to-transport-hydrogen-and-co2-in-europe/>

1 [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_1828](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1828)

2 Several operators have been / are assessing internally the reusability of their pipelines for H2 and CO2. Results from the Re-stream study should not prevail on operators' results considering the operators have access to more detailed data than the Re-stream team.

3 28,800 km of onshore gas pipelines / 12,900 km of crude/product onshore pipelines / 16,300 km offshore pipelines of which 13,000 km of gas pipelines

# SMOOTH PORTS – Reducing CO<sub>2</sub> Emissions in Ports

## An interregional cooperation project improving low-carbon economy policies

Ports are a consistent and important economic factor for the regions they are in, while their activities can cause significant negative environmental impacts – e.g., inefficient road traffic in port areas causing CO<sub>2</sub> emissions.

The Interreg Europe project SMOOTH PORTS, led by the City of Hamburg, with a budget of €1,139,601.00 (€951,310.85 European Regional Development Fund [ERDF]), aims to develop solutions to reduce CO<sub>2</sub> emissions in ports. To achieve this, SMOOTH PORTS focuses on developing efficient procedures and for the clearance of goods in ports, information-communications-technology solutions for different port activities, and alternative fuels for road traffic.

## From Good Practices to Action Plans

Ten different good practices on how CO<sub>2</sub> emissions in ports can be reduced were identified. As a result, Concrete Action Plans for the participating ports were formulated.

SMOOTH PORTS has helped to foster discussion on how to reduce these emissions. Each port follows a different approach, according to the local situation as well as the different port activities. The Hamburg Action Plan aims to incorporate the project into the new operational programme for the ERDF funding period 2021-2027, within the funding area 'sustainable logistics'.

When adopting Hamburg's ERDF operational programme and linking it to the project, a funding basis for logistics projects reducing CO<sub>2</sub> emissions in ports will be established. Like some of its project partners,

one-stop-shop solutions for the Port of Hamburg have also been discussed.

The Action Plan of Livorno will pave the way to a cross border IT-tool for efficient, competitive, and sustainable management of freight flows, within the framework of the Italy-France Maritime programme.

In addition, the Nantes Saint-Nazaire Action Plan will focus mainly on promoting alternative fuels in the port area in the public Natural Gas Vehicle station of Montoir de Bretagne. Furthermore, the Action Plan foresees the establishment of a working group to analyse operational- and regulatory processes of the Service d'inspection vétérinaire et phytosanitaire aux frontières (SIVEP). The aim is to improve and optimise operational processes and facilitate the transit of goods.

A monitoring detector truck to assess the pollution level will be installed

in Monfalcone. The priority is to ensure greater services for citizens, based on better environmental conditions by introducing innovative sustainable mobility technologies and creating the infrastructure networks for recharging electric vehicles. Furthermore, Monfalcone will obtain the installation of On-Shore-Power-Supply in the port. It will provide an electric ship to shore connection to provide for a passenger ship and/or a merchant ship.

Varna's Action Plan will include a feasibility study for the development of an automated "integrated information processing system" between the port operator and the Customs Agency. Moreover, the agenda includes the development and implementation of a system for electronic information exchange; the "Port Community System".

SMOOTH PORTS is now entering phase 2, which involves the implementation of the Action Plans. ●

For more information, please visit our website:  
<https://www.interregeurope.eu/smoothports/>



# EIRIE is innovating in European Energy Ecosystem

Discover EIRIE (European Interconnection for Research Innovation & Entrepreneurship), developed within the Horizon 2020 PANTERA project, and find out the richness of this interactive multi-functional platform, simply by using your EU credentials.

The key objective of the EIRIE platform is to connect and bring together the European Union's Research & Innovation community in one place, to enable collaboration, increase wider interest and give access to all the resources needed to play an active role within the European research community. With PANTERA and especially the EIRIE platform, we will help bridge the gaps that currently exist in the energy field in Europe between Member States, by bringing in a single point of access, the attractiveness of successful partnerships and knowledge being national, regional or European.

In more details, the EIRIE platform aims

at strengthening the participation of all Member States in support of the fifth pillar of the Energy Union (Research, Innovation and Competitiveness) and energy transition mentioned in "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy". Workshops, on a pan-European as well as regional level have been organised, interviews and research have been conducted to ensure the platform would effectively answer to the needs of the Research & Innovation community in the energy sector in Europe.

The platform users are facilitated to an easy access to information on potential funding and consortium building, projects data collection

(results and outcomes, best practices, reports and deliverables, etc.), standards and regulations, all of these searchable via an easy-to-use search tool. To ensure the success and sustainability of the platform, we are working closely with DG Energy, JRC (EC Joint Research Centre) and ETIP SNET (ETIP Smart Networks for Energy Transition), hosting EIRIE on the servers of JRC, and ensuring long-term support through a service contract financed by DG Energy.

As the EIRIE platform is still growing and does not offer yet all planned services and tools, it is pivotal for us to gather valuable insights and feedback from an early stage to build on and apply to the platform.

Did you visit the EIRIE platform and/or look for specific information or use a functionality for your needs? Drop us a message and let us know your opinion →

[www.eirie.eu](http://www.eirie.eu)

Or scan the QR code below:

**ERISGrid 2.0: Get free access to leading smart grid and energy systems labs and services**

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**Horizon Impact Award 2022 is open for applications**

The Horizon Impact Award 2022 edition was successfully launched on 6 January 2022.

**Have your say on the EIRIE**

WIRE INTERACTION: The platform is a good example for all the stakeholders in research in energy and innovation.

**The voice of Stakeholders**

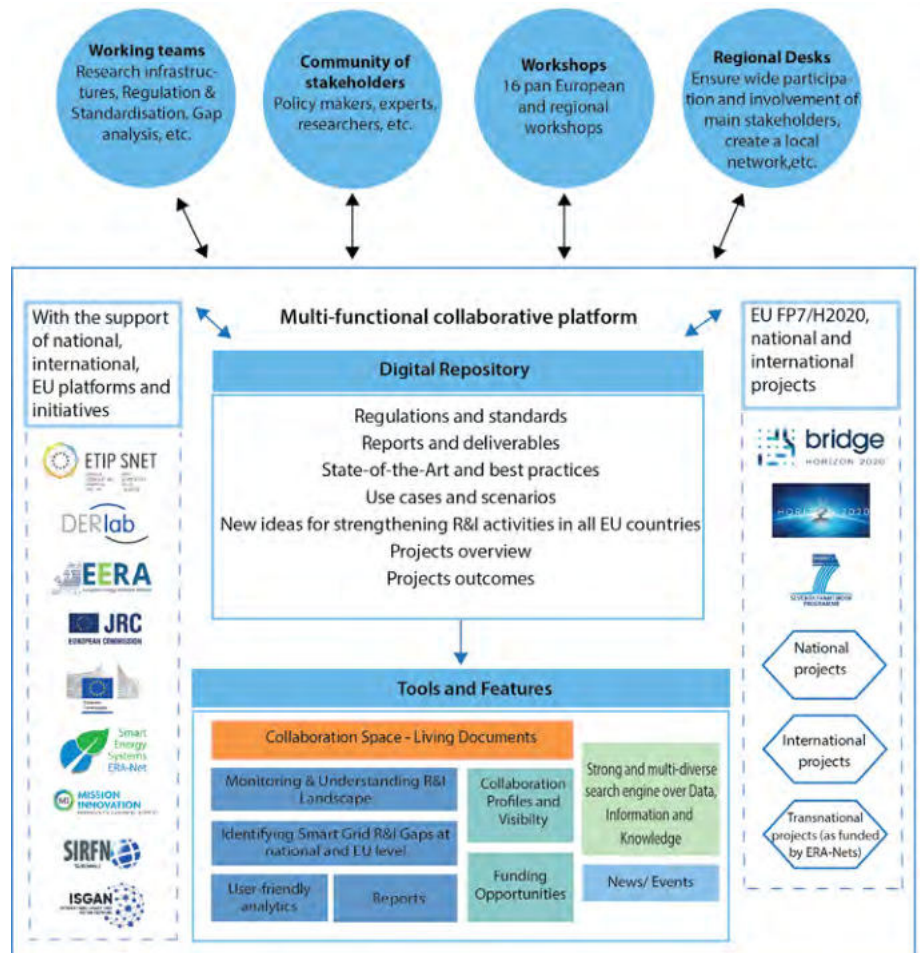
“The platform offers a good possibility for all the stakeholders to interact on a regular basis and exchange information on the smart grid implementation in various MS. It is also well integrated with other platforms in the area of smart energy systems.” (Henry Donchev, Energy Expert Ministry of Energy of Bulgaria, Expert in International Cooperation Directorate, PANTERA Advisory Board member).

**About PANTERA**

PAN European Technology Energy Research Approach (PANTERA) is an EU H2020 project aimed at setting up a European forum composed of Research & Innovation stakeholders active in the fields of smart grids, storage and local energy systems, including policy makers, standardisation bodies and experts in both research and academia, representing the EU energy system.

It is PANTERA’s vision to create, through the planned multi-functional collaborative platform, a reference operational point to:

- Unify and harmonize European activity
- Incentive further investments in smart grids
- Support access to exploitable results that can spark further work and cooperation. ●



**Get in touch with us!**

<https://pantera-platform.eu/>  
[contact@pantera-platform.eu](mailto:contact@pantera-platform.eu)

Find us as “PANTERA EIRIE Platform” on LinkedIn, Facebook, Twitter and YouTube.

# Smart Cities are a stepping stone to

By Ruud Schuthof, Deputy Regional Director, ICLEI – Local Governments for Sustainability

The European Commission called for 100 cities to commit to climate neutrality by 2030 with the EU Mission ‘Climate-Neutral and Smart Cities’, with over 377 answering the call. It is clear that cities in Europe are willing to lead the energy transition and

make necessary changes to address climate change.

Local governments are supported in their mission by policy-initiatives from the EU Green Deal, such as the ‘Renovation Wave’ and ‘Fit for 55’, as well as through funding

opportunities for large-scale urban experiments supporting climate neutrality. One of these experiments is the ‘Smart Cities Lighthouse Projects’ consisting of 120 cities, numerous academic institutions, private businesses, nonprofits and other partners dedicated to changing urban landscapes one district, city and region at a time. In 18 large projects — totalling almost half a billion Euros combined — the cities have fostered innovations that will help guide the first 100 Cities chosen by the European Commission, and other ambitious local leaders aiming for climate neutrality.

The outcomes of these projects vary as much as the cities involved, and include proven successful technical solutions implemented in cities, sophisticated data platforms increasing the use of renewable energy, low – or even positive – energy buildings and numerous use cases lowering emissions from urban mobility. Individually, all of these solutions matter for local communities, and as a greater whole they form a library of solutions that can lower energy consumption in cities.

## What is a smart city?

There is no firm definition of what a ‘smart city’ is, but the last decade has brought changes to what this means in practice. From a strong emphasis on digitalisation and energy, an understanding of citizens’ importance and of the value of effective cooperation is taking centre stage today.

Take Rotterdam for an example – the city is now successfully deploying solar panels at a large-scale. Some solar panels have been placed as part of an EU funded Smart

City view of Rotterdam. Photo: Illiya Vjestica, Unsplash



# wards climate-neutrality

Cities and Communities project RUGGEDISED, but it is the strength of the partnership which has been developed – in this case between the city, the energy company Eneco and the venue Rotterdam Ahoy – which has enabled more than 5,200 solar panels to be installed on the roof of a conference centre. The city is aiming to have 1 million solar panels installed within the next five years through further public-private partnerships and private installations.

Another example of how smart cities work in 2022 can be found in the Swedish city of Umeå. Like Rotterdam, the city is a part of the RUGGEDISED project and taking important and ambitious steps towards ensuring climate neutrality in its energy work. But another much simpler step also shows how cooperation is a key element for smart cities: “Green Parking pay-off”.

It’s a solution in which property developers can cut costs by adding fewer parking facilities, and instead contribute to the municipality’s offer

of urban mobility solutions. The end result of this cost-neutral solution has proven to be more active citizens and fewer emissions. In sum, providing an increased quality of life for urban dwellers.

In some ways, the complexity of successful smart city solutions has meant their deployment today is less about the technical challenges, and more about the cooperative tasks at hand and the approaches taken by the city-ecosystem. As such, ‘smart cities’ are a conceptual approach in the urban development toolbox in support of climate-neutrality, not a normative vision of an ideal city or an individual solution.

### Scaling-up ambitions

Rotterdam and Umeå only represent a tiny fraction of the solutions in the European Smart Cities Programme, all of which are being collected by the European Commission’s Initiatives the Smart Cities Marketplace and the SCALABLE Cities. Through the Smart Cities Marketplace municipalities can explore their project plans, find

support in shaping them and be matched with private investors to close a deal for financing - helping to bridge the current gap between public needs and private capital.

The biggest value of these projects lie not in the smart city solutions deployed, but the crucial insights and experience their implementation brings to local governments and their partners and the financing opportunities. Local governments working jointly on innovation with a variety of stakeholders from business, industries, financiers and citizens, is what is needed to use smart city approaches to accelerate the path to climate-neutrality. This is true in all cities most successful in the transition.

Smart cities have been introducing technologies and using approaches that support climate neutrality for years, and are now willing to take the ambitious step to become climate neutral by 2030. Local governments will be lighting the way under the EU Mission for Climate-Neutrality. ●



Umeå kommun park. Photo: Fredrik Larsson

# Impact of SCORES systems on two

By Gilles Plessis, EDF, Keith O'Donovan MEng., AEE Intec, Ing. Zuzana Taťáková M.Sc., FENIX TNT

## About SCORES

SCORES is a collaborative research project supported by the European Commission under the Horizon 2020 Programme for Research and Innovation (Call H2020-EEB-2017). The project consortium is made up of 12 partners from 7 European countries. The overall concept of the project is based on a hybrid system effectively and efficiently combining solutions that harvest electricity and heat from the sun, store electricity, convert electricity into heat, store heat and manage energy flows in the building.

In the SCORES project, two demonstration sites were chosen – one in Austria and one in France.

A mixed usage building consisting of office space and two single-family homes located in Gleisdorf was chosen as a demonstration site for Austria. Its continental climate (HDD  $\approx$  2900°C.day) and the district heating make it representative to what can be seen in northern Europe. Space-heating and domestic hot water (DHW) are supplied by district heating, chemical loop combustion and heat pump. PV system is also installed to provide renewable electricity to the building.

Figure 1



The demonstration site in France is located in Agen, a warm oceanic climate (HDD  $\approx$  1800°C.day). It is a residential building composed of 115 apartments. It is a typical construction for France which was built recently and is compliant with the thermal regulation for buildings after 2012. The building is equipped with electric systems for space heating and DHW. Space heating is supplied by a VRV system and electric heater panels containing phase changing material for storing heat. For DHW, photovoltaic thermal (PVT) collectors coupled to water-to-water heat pumps and hot water storages are used.

A Building Energy Management System (BEMS) is also present on both demonstrators to orchestrate the operation of sub-systems and provide monitoring capabilities.

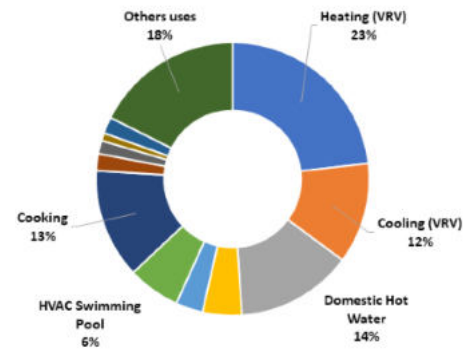
## Results

The behaviour of the SCORES technologies was monitored and performances evaluated from the monitoring data collected from both sites. Monitored variables recorded with the BEMS were crucial to quantify the performances of the demonstrators by keeping track of energy flows across the system, temperature levels in thermal storages, and the level of self-consumption of locally generated PV electricity.

Analysis was conducted in a top-down approach, assessing first energy balance at the system level, along with repartition per usages and energy carriers (Figure 2) and then assessing performances of each SCORES subsystem.

In Figure 2 one can see that, in Agen the space heating and the DHW

Figure 2: Energy usages in Agen building over 2020



consumption represent less than 40% of final energy for this building. The building energy efficiency is a consequence of high insulation levels, contributing to reducing space-heating needs and losses in the distribution system.

Figure 3 illustrates the performance of the DHW system in Agen, with a system average coefficient of performances (COP) around 2.5 on average. From time to time the backup covers part of the useful energy needed mostly due to configuration issues. As it should, demonstration activities also highlighted some practical issues one must overcome when combining multiple complex systems.

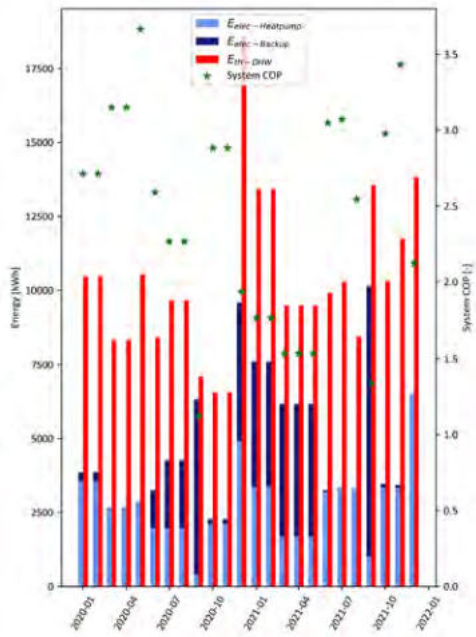
## Simulation Framework

In addition to the demonstrators, detailed system simulations were deemed an important part in not only validating the behaviour of the demonstrators but also for evaluation of the expected performance of SCORES future system setups, where components are configured to optimise the techno-economic performance of the system. The buildings and SCORES technologies were modelled using Modelica libraries (Buildings Library as well as in-house models from AEE



# demonstration buildings

Figure 3: Energy and performances of the DHW system in Agen building



Intec), with yearly simulations being carried out for a wide range of system parameters including storage capacities, PV(T) areas as well as different electricity pricing tariffs such as flat tariff or day ahead. The simulated cases were coupled with the BEMS algorithm scripts which send and receive data to/from the simulation at each timestep just like in the actual demonstrator sites. Predictions are made by the BEMS regarding PV production and building consumption based on a lookup table in a weather file whereas the actual

demonstrators rely on local weather forecasts to make the predictions.

Based on predictions for upcoming periods of PV surplus, the BEMS signals to charge one or more of the installed SCORES storage systems (electrical battery, PCM elements or the REDOX heat battery) with PV. The storages are then signalled to discharge on predictions of upcoming high demand such that the level of self-consumption in the building can be maximised. For scenarios with variable electricity price tariffs, the BEMS also charges the electrical battery from the grid at short notice during periods of cheap electricity and discharges during high tariff periods (Figure 4 ii). This enables the SCORES system to not only optimise for self-consumption but to also participate in the electricity market. The SCORES future system simulated cases assisted in the selection and sizing of all subsystems under the assumption that all technologies have reached a level of maturity to be scaled up and integrated into a larger system without any issues which may arise in the demos.

Furthermore, the simulation framework could serve as a virtual test environment for the interaction between the various subsystems and the BEMS algorithm itself before any commissioning of the demonstrator sites could be carried out.

### Outlook

The end of the test phase should focus on assessing technical, economic, and environmental KPIs such as overall self-consumption, impact on the energy distribution system, energy expenses compared to reference installations and the impact in terms of carbon emissions. ●

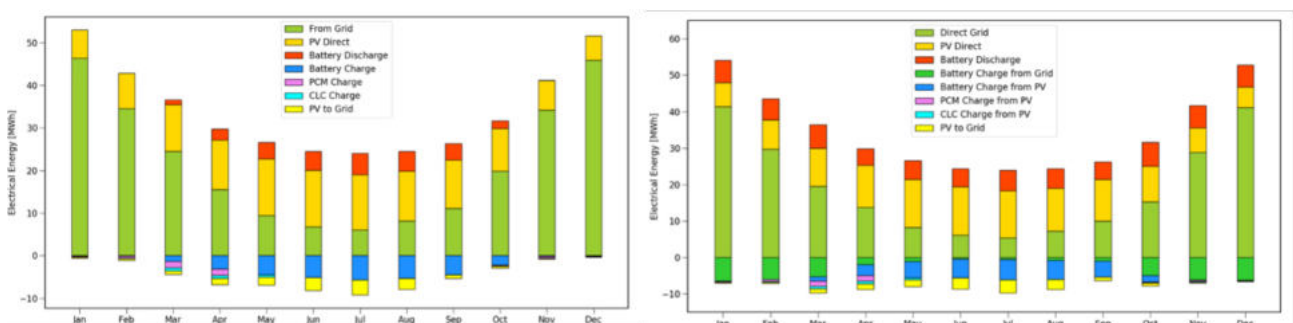


Project ID: 766464  
Funding programme: H2020  
Website: [www.scores-project.eu](http://www.scores-project.eu)  
Start date: 1 November 2017  
Duration: 48 (54 months)  
Project coordinator: Dr. Erwin Giling, TNO  
Contact email: [info@scores-project.eu](mailto:info@scores-project.eu)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 766464.

Figure 4: Monthly Breakdown of Electricity flows for the French Future System configuration. Left i) Flat Electricity Pricing Tariff ii) Day Ahead Pricing Tariff with battery charging from the grid.



# Renovating multi-apartment buildings essential to address the cost-of-living

By Peter Werner and Dan Storey

Housing sits at the centre of many of the most pressing challenges facing our societies today. The Covid-19 pandemic exposed the connection between access to secure, decent housing and the people’s mental and physical health. Now as the price of energy rockets, governments and their citizens are facing a cost of living crisis exacerbated by poorly insulated buildings.

Buildings account for around 40% of energy consumption and 36% of greenhouse gas emissions in the EU. Improving their energy performance can address the cost-of-living and climate crises by lowering energy bills, reducing import dependency and cutting greenhouse gas emissions. Building renovation also enhances people’s health, improves indoor comfort and increases property values and can create significant amounts of

jobs as economies recover from the pandemic.

Relative to their size and population, countries in Central and Eastern Europe have huge potential for energy-efficiency in buildings, an important tool to reduce the high share of energy poverty among households.

Much of this potential is in the large number of poorly insulated apartment blocks in the region. While retrofitting rates for all building types need to rise, the barriers to retrofitting multi-apartment buildings mean they deserve particular focus from international financial institutions, the donor community, and governments.

Enabling legal and regulatory frameworks are a prerequisite for investments. Through the Western Balkans Regional Energy Efficiency

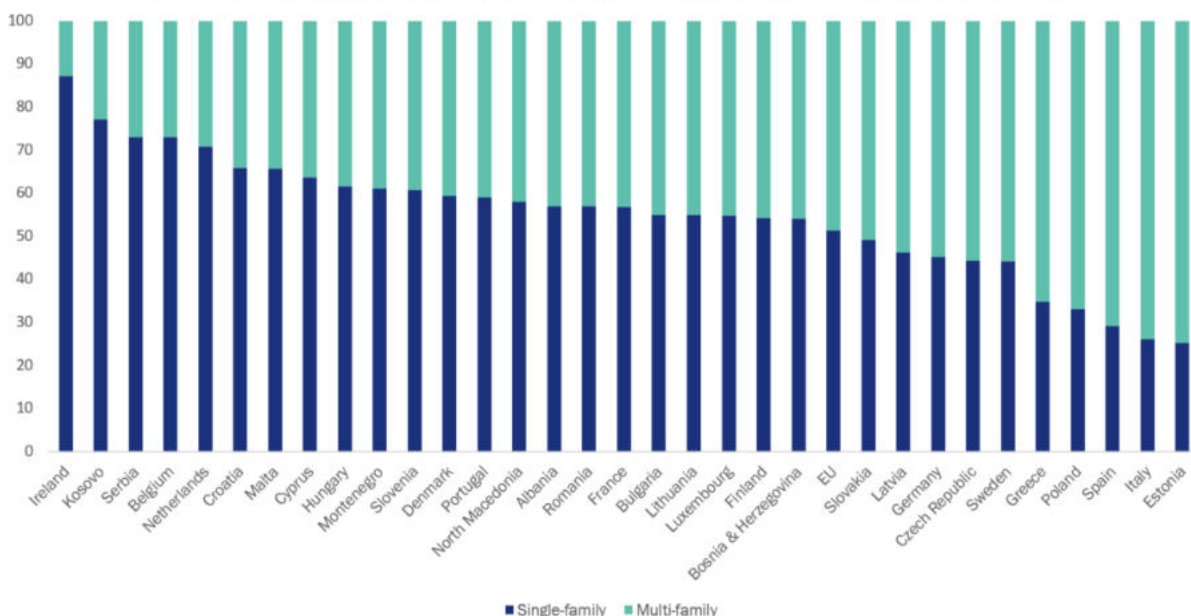
Programme (REEP) the EBRD has worked with the Energy Community and KfW to support governments and cities to create an enabling framework for investment and to provide finance. By the end of 2021, this had resulted in 75 completed policy deliverables — including primary laws and regulations — and contributed to energy efficiency investments benefitting SMEs, cities, governments and over 9500 households.

Below are further lessons the EBRD has learned from the deployment of particular financing structures in these markets. Together with partners, it hopes to expand and replicate these approaches to unlock further investment in the region.

**Cities and governments are key to accelerating renovation rates in multi-apartment buildings.**

Lithuania has achieved a deep

Distribution of single family and multi family buildings in the EU and Western Balkans



# Buildings in central and eastern Europe is facing energy and climate crises



renovation rate six times the overall EU average in apartment buildings thanks in part to cities' support for homeowner associations (HOA). In Central and Eastern Europe, privatisation during the 1990s resulted in high owner-occupation rates,

ranging from 80 to over 90%. The HOAs that manage these buildings often lack the capacity to prepare projects or to reach consensus among residents on renovating an apartment building. This is the case in Lithuania and it seriously

slowed take up of finance from the state-owned Public Investment Development Agency (VIPA) – a recipient of EBRD loans. When cities appointed renovation administrators to identify the worst performing buildings and support their residents to secure finance and manage works, the number of VIPA-funded retrofits accelerated notably.

The following steps were key to unlocking investment in multi-apartment building retrofits across all financing structures.

- Enabling legal and regulatory frameworks
- Long-tenor finance combined with incentives for higher energy performance to make interventions more affordable
- Dedicated support to assist homeowner associations with project preparation, decision-making processes and implementation
- Support for vulnerable and poor residents to enable high participation rate
- Strong government support and financial contribution to kick-start programmes.

### **Cities can also act as intermediaries.**

Supported by an EBRD loan, the district heating company owned by the city of Sabac is financing the energy efficient renovation in around 40 private multi-apartment buildings, and recouping the investment through by on-bill financing. Energy savings of around 45% offset the fixed payments for the renovation in most cases.

### **Target support and incentives**



**to help the most vulnerable and reduce government expenditure on energy allowances.**

VIPA-financed projects are supported by incentives to encourage higher energy performance and have support schemes for vulnerable and poor households. Eligible households can receive state support for 100% of the costs of an apartment retrofit, encouraging residents to join residents' meetings and endorse renovation projects.

**Finding and financing the right organisation can drive investment**

The EBRD also drives energy efficient retrofits of single and multi-family homes through its [Green Economy Financing Facilities \(GEFFs\)](#). They provide credit and technical support to enable local financial institutions to lend to homeowners looking to improve the comfort of their homes.

Tools such as the [Green Technology Selector](#) support investments by enabling financial institutions and homeowners to identify the best performing green technologies.

**in hundreds of individual projects.**

For instance, an EBRD loan of PLN 80.5 million (€18.3 million) extended to the City of Walbrzych through the [EBRD Green Cities](#) programme is financing the deep renovation of around 330 apartments in 52 multi-apartment buildings. This will not only achieve outstanding energy savings of 75%, but also eliminate coal heating and improve living conditions for around 1,100 residents.

Elsewhere, the EBRD is engaging with real estate investors in the private rental sector, a small but growing

segment in the region, to develop large-scale renovation programmes for existing multi-apartment buildings.

Financing companies that have the ability to carry out renovations on thousands of buildings creates much needed economies of scale and can aggregate energy efficiency investments supporting decarbonisation of the residential sector.

All of the models described above can contribute to the EU's Renovation Wave target of doubling the renovation rate by 2030. Now is the time to grasp these opportunities. National governments can prepare regulatory frameworks to allow for such models to be rolled out more broadly and provide finance. International Financial Institutions (IFI) like the EBRD play a key role to support the set-up of these models, support regulatory reforms and provide financing. ●

# CIRCUSOL

## Towards circular solar PV

The solar power market is globally growing at a record pace. Last year, according to Solar Power Europe's Market Outlook report (2021), the EU's solar power generation capacity increased by another 19% to almost 165 GW. Modelling scenarios predict also for the coming years continuous two-digit annual growth towards an estimated total EU solar capacity of 672 GW in 2030.

The flip side of the coin is that eventually, as the installed capacity grows, so will the volume of discarded PV modules entering the waste stream. If we aim for a truly sustainable transition towards a low carbon renewable energy future, we will need a systemic shift towards circular business solutions, also in the solar PV market.

CIRCUSOL is a European project in which 15 partners have united, precisely around this challenge. The goal was to explore potential solutions for the solar power industry to achieve higher resource efficiency by lengthening and closing product and material loops. Through experiments in real-life demonstrators and co-creation workshops with key-stakeholders, opportunities and barriers for future circular business models in the PV sector were identified. The focus was on reuse and product-as-a-service models, to support lifetime extension, repair and remanufacturing, in addition to recycling.

Reality proved to be a lot more complicated and more nuanced than expected. Yet, as the end of the project is approaching, some interesting conclusions can be drawn.

First, let it be clear that from

[www.europeanenergyinnovation.eu](http://www.europeanenergyinnovation.eu)

an environmental point of view, extending the use time of a PV installation yields clear environmental benefits. Life cycle analyses have shown that the environmental impact of electricity produced with an installation which was kept in use for 30 years was lower than for any other scenario, in which old modules were replaced after 10 or 20 years with newer, more powerful ones. Higher electricity yields for the same surface could not offset the additional environmental burden caused by the production of the new modules needed to repower the installation.

Does this mean that 2nd life PV will soon conquer the market? Probably not. Or at least, not in the residential or utility-scale segments. The business case for 2nd life PV modules very much depends on the targeted application and market segment. For private investors (residential/utilities), return on investment is usually the leading decisive factor. Incentives to go for (environmentally friendly) 2nd

life panels are usually non-existent. So, in those cases, the 2nd life business case doesn't make sense.

Yet, there might be other opportunities, in cases where little surface restrictions apply or in off-grid applications. In the CIRCUSOL demonstrators, second life PV was applied on the roof of a co-housing community, where ample space was available. Also, it was successfully used to assemble urban charging hubs for e-scooters and e-steps. With a little imagination, other opportunities could be explored, in off-grid power supplies for low-income countries, or in agrivoltaics, for example.

In conclusion, 2nd life PV might in several cases be a viable option, and should not just be ignored. A huge amount of PV-modules will flood our waste facilities in a not-so-far future. Will recycling be the only option, or will we also try to reap the benefits of PV reuse? ●



Waasland demonstrator



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<https://www.linkedin.com/company/circusolproject>



# EV market expansion will end “ICE”

By Kristian Ruby (pictured), Secretary General of Eurelectric

**E**lectric vehicle (EV) sales are hitting the highway in record numbers. Their market share increased from 10% in 2020 to 20% last year, while as recently as December, the sales of battery-electric models overtook diesel cars in Western Europe. We are witnessing the beginning of the end of the internal combustion engine, or ICE Age.

EVs have already come a long way but market trends point towards an imminent turbo evolution: 65 million of them are projected for Europe's roads by 2030. By 2035, that figure will have doubled to 130 million vehicles. They are beating all the odds, especially when you consider that just a few years ago, several decimal places would have been needed to show the EV percentage of overall vehicle sales.

Undeniably, the “carrot and stick” approach implemented in various ways across the continent played a key role. But the adoption of e-mobility is not just an economic or

environmental phenomenon; it is also a psychological one that hinges on customer acceptance. So, how do we get there?

#### Increasing EV affordability

The price tags of EVs must become increasingly consumer-friendly, revealed a recent customer survey by Eurelectric. The good news is that electric cars are passing the affordability tipping point and are likely to reach full cost competitiveness across Europe by the mid-2020s.

Government measures and incentives are sweetening the switch to EVs, helping to accelerate mass adoption. Twenty European countries now offer EV buyers incentives such as bonus payments, premiums, and tax reductions. Such support can cut the upfront cost by €12,000 – or approximately one-third of the price of the average electric car.

Moreover, the cost of batteries – one of the most expensive components

of the EV price tag – is decreasing dramatically. Over the past 10 years, the cost of battery packs has declined by over 98% to €122/kWh. This reduction did not lead to reduced efficiency or range. On the contrary, several car manufacturers have already announced EV models that can drive more than 800km on a single charge.

#### Offering more sustainable, energy-efficient models

The offer for electric, energy-efficient and sustainable vehicles is growing. Legacy automakers are now directing higher funds to their electric R&D departments than to the internal combustion engine component. Some have even announced an end to their ICE production line, aligning with the EU's ambition to ban the sales of fossil-fuelled vehicles in 2035.

Some bring the sustainability challenge one step further. Last October, Volvo unveiled the world's first vehicle made with “green steel”. This autonomous truck resulted



from the collaboration between the Swedish car manufacturer and the members of the Hybrit project – Vattenfall, LKAB and SSAB. Hybrit also marked a milestone, proving possible the production of fossil-free steel using electrolytic renewables-powered hydrogen.

Affordability, sustainability and design are key elements weighing in customers' choice of vehicle. Adding to those, fuel consumption is a significant component. And EVs are winning on this front too. They are five to six times more energy-efficient than the best combustion engines, enabling drivers to travel longer distances on the same budget.

#### **Getting the charging infrastructure right**

While progress is being made on the vehicle front, the deployment of charging infrastructure needs to keep the pace. Mirroring the expected EV market expansion, 34 million chargers are needed by 2030, and 65 million by 2035, shows a recent [Eurelectric-EY analysis](#).

What is more, the study reveals that 85% of charging will be done at home, 6% in the workplace, 5% at the destination (such as commercial facilities) and 4% on highway corridors. In each location, different types of chargers can be rolled out, ensuring that drivers have a seamless and simple experience.

But we should also be mindful of the impact that millions of EVs will have on the electricity network and supply. At such a high penetration rate, we will see the annual electricity demand growing by 11%. The grid will be able to cope with the foreseen 130 million EVs. Yet, an unmanaged approach to charging infrastructure risks creating major congestions on our already heavily loaded and aging grids.

So, can we prevent the grid from buckling under the pressure? The answer is yes. Electricity utilities, charge point companies, grid operators, and multiple actors across the ecosystem are already looking into solutions. Our collaboration, as well as the interactions with local

authorities, is paramount for ensuring a timely planning and optimal roll-out of charging infrastructure.

Looking into the future, we must ensure that smart charging becomes the norm when fulfilling a driver's "right to plug". Using algorithms that follow the load curve, smart charging can enable EVs to charge when green energy is plentiful and cheap. Time-of-use tariffs can further incentivise drivers to use the network when costs are low.

And as vehicle-to-grid technologies develop, smart charging will contribute to offsetting grid investment by leveraging the battery capacity of a vehicle.

With timely planning, coordination and the deployment of smart technologies for metering and charging, we will be better equipped to understand whether investments in grid modernisation are needed or can be avoided. Let's speed up the deployment of smart capabilities and finally end the ICE Age! ●

# Achieving carbon neutrality

## A commitment of the Provence-Alpes-Côte d'Azur Region in France

With 1,000 kilometres of coastline, 50% of protected natural areas throughout nine Regional Natural Parks, 10% of the world's marine biodiversity, the Provence-Alpes-Côte d'Azur region offers an exceptional setting for biodiversity.

Following the adoption of the Paris Climate Agreement in December 2015, the Region has developed an ambitious strategy to be ahead of the international objectives in the fight against climate change.

In 2017, the regional Climate Plan entitled 'Une COP d'avance' (One COP ahead) was adopted with the ambition for the Region to become a leader in environmental protection while ensuring human health, improving well-being and implementing a new model of sustainable development across its territory.

With the aim to preserve the environment in Provence-Alpes-Côte d'Azur, and make it a better place to live, the Region takes concrete actions to implement its environmental strategy: in that respect, Climate Plans constitute the backbone of its regional policies.

The first Plan, set as a first step to achieve carbon neutrality, was completed in 2021. Structured along 100 operational measures spread over five major axes – eco-mobility, carbon neutrality, economic development, environmental protection, well-being - it covered all regional competences and aimed to federate companies, local communities and associations to achieve carbon neutrality by 2050.

In these domains, the Region has

strived to generate innovations with the aim to preserve its unique territory and to respond to the needs of the citizens in Provence-Alpes-Côte d'Azur.

One of the key problems was to find an alternative to counter individual car use. With the aim to offer a credible solution, the Region deployed the first 100% electric long distance bus lines: between Aix-en-Provence and Toulon; between Aix-en-Provence and Avignon and; 100% GNV (Natural Gas for Vehicles) lines between Arles and Salon-de-Provence, as well as between Draguignan and Toulon.

For those who do not have the opportunity to use public transport, the main objective was to set-up new and better access to sustainable fuels. Today, charging stations for electric cars are accessible within a radius of 30 kilometres throughout the Provence-Alpes-Côte d'Azur territory. Furthermore, a 'bioethanol transition check' was deployed in 2020. This scheme allows the Region to fund the conversion of a thermic vehicle with €500 of regional subsidy.

Beyond the energy and environmental gain, a bioethanol converter generates a 40% save on each refuel. It is a concrete example of an immediate measure which can truly improve the life of the citizens while contributing to the goal of achieving carbon neutrality.

In the South of France, the sea and the maritime sector play a key role. In this context, cruising activities are important for the regional economy, even though they generate high levels of air pollution. Meeting the challenges of air pollution while keeping the cruising activity going is a strategic priority for the first

French maritime region, in its effort to achieve carbon neutrality. That is why the regional scheme 'smoke free stopovers in ports' was launched in September 2019, with the European Union's support.

The system allows the Region to bring cruise ships electrical connection to the dock when they moor in big ports such as Toulon, Nice, Marseille. In total, more than €30 million have been dedicated to conveying electric supply, so that all ferries could be connected in 2023, and then cruise ships in 2025.

These measures brought concrete results in a short period of time. Between 2016 and 2019, the red and orange blotches demonstrated a decrease in ozone peaks and fine particulate emissions, significantly improving air quality (the results were measured by ATMOSUD, an independent air pollution control agency).

After spending more than €1.3 billion over the last years, the Region has renewed and reinforced its commitment with the adoption of a second Climate Plan entitled 'Gardons une COP d'avance' (Let's keep a COP ahead), in April 2021. This new climate plan will mobilise more than 40% of the regional annual budget. From 2021 to 2027, the Region will implement a new strategy with 141 concrete measures around five new axes such as air, sea, earth, energy, waste improving the daily lives of people living in Provence-Alpes-Côte d'Azur. ●

### Contact details:

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Secretariat: + 33 (0) 4 91 57 54 38



# OCEANERA-NET COFUND

## Celebrating five years of collaborative innovation in ocean energy

**A**fter five years of supporting the European ocean energy sector to carry out collaborative innovation, the OCEANERA-NET COFUND project comes to an end in June 2022. Led by Scottish Enterprise the project has partners from across Europe – Basque Energy Agency, Region Bretagne, Sustainable Energy Authority of Ireland, Region Pays de la Loire, FCT (Portugal), CDTI (Spain) and the Swedish Energy Agency.

OCEANERA-NET COFUND will conclude with a Final Conference and on-line events in June 2022, to include presentation of project results and roundtable discussions on key learnings and future collaboration. Look out for the Final Conference, planned to take place at the Seanergy Conference in Le Havre, 15-17<sup>th</sup> June. Details will be published on the OCEANERA-NET COFUND website when dates are confirmed.

The 9 demonstration projects under the Co-funded Joint Call 2017 have now been completed. These projects were awarded €7.8m, including €2.6m from the EU through Horizon 2020, co-funding with national and regional funds, supporting €14.5m of investment. Projects funded under the Second Joint Call, launched in January 2019, are ongoing.

The projects have allowed leading ocean energy developers in wave, tidal and ocean thermal technologies, together with supply chain companies, test centres and research institutes, to carry out key research and demonstration projects. These have both contributed to development, improved performance and reduced costs of the generation technologies and created new products and tools which can be used across the sector and beyond.



For example, Scottish tidal turbine developer Orbital Marine Power has worked on two key elements for the Orbital O2 2MW commercial demonstrator turbine, now deployed at EMEC and demonstrating great results. On TOPFLOTE, Orbital worked with global drivetrain solutions provider SKF to deliver a controller for floating tidal turbine, facilitating a significant increase in yield. On SEABLADE, Eire Composites have manufactured and evaluated new blades for a floating tidal energy converter, testing to validate a 20-year design life, now being tested on the O2.

In terms of enabling technologies, Brittany-based tidal company Sabella led the CF2T project to design and test an innovative hybrid foundation, combining steel and concrete. UMACK, led by Swedish wave energy developer CorPower

Ocean, has developed a generic anchor-foundation-mooring-connectivity system, applicable to a wide range of wave and tidal energy converters, with potential for use in floating offshore wind. Similarly, TIM, led by Geps-Techno, has worked on single point moorings systems, including developing the design process and two new mooring solutions, for floating production plants and offshore monitoring buoys.

RESOURCECODE, led by the European Marine Energy Centre, has developed an open access, high resolution, North West Europe wave energy resource dataset, software toolbox and on-line portal. This will provide designers with the information and tools needed to push forward new marine renewable energy projects, improving cost, quality and time to market. ●

**For further information, please contact:**

Details of all the projects can be found on <https://www.oceancofund.eu/>  
 Karen Fraser, OCEANERA-NET COFUND Coordinator  
[karen.fraser@scotent.co.uk](mailto:karen.fraser@scotent.co.uk)

# Security of Supply: Changing the rules

By Patrick Clerens: Secretary General, EASE

**By avoiding the curtailment of renewable energy through energy storage, dependency on imported fossil fuels**

If this article had been published just a few weeks ago, we would have discussed energy shifting in the context of the European Union’s decarbonisation target. But the ongoing situation forces us to discuss energy shifting from a more geopolitical perspective: in terms of gas imports dependency.

**What is energy shifting, and why does it matter?**

Wind and solar generation relies on weather conditions to produce energy, making it a ‘non-dispatchable resource’. This means there may be

times when not enough energy is produced on low wind or cloudy days.

As renewable penetration in Europe grows and traditional dispatchable generation assets such as coal are decommissioned and phased out, the need for flexible backup generation is becoming increasingly more critical. And we are still dependent on gas imports for that, as gas peakers are used for dispatchable generation, de facto replacing other greenhouse gas emitting assets (coal, lignite plants).

This leads Europe into fossil fuels

dependency: it hinders the success of reducing emissions in line with Europe’s climate targets and forces the reliance on non-EU energy resources.

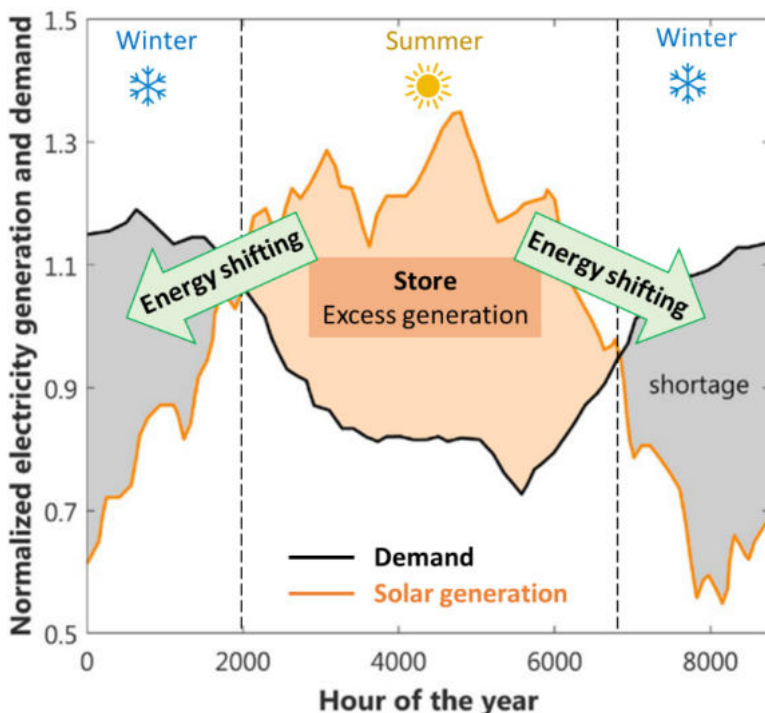
In a nutshell: the higher the penetration of renewable energy, the higher is the need for flexibility and energy shifting. If we depend on gas peakers for this, we depend on the gas price to cover our needs.

This is a big problem: with the ongoing threat to Europe’s gas supply and affordability of energy, we are possibly looking at empty gas storage and possible security of supply threats for the next winter (we had spikes with over 170% increase in gas prices on the world market in 2021, which was before the actual situation unfolded).

Yet, energy shifting through energy storage can provide a solution by shifting the excess energy produced during high winds or sunny days, for example, and storing it until it is needed. This will avoid wasting Europe’s local energy production from clean energy sources. Excess energy can be stored for days, weeks and even months and released back to the grid as electricity when it is required. As an example, Figure 1 shows that in the summer months there is more solar energy generated (orange line) than is required by demand (black line). This excess solar energy can be stored for several months and used in winter when solar generation is low and demand for electricity and heating is high.

The technologies for energy shifting are already available today. Instances of low renewables production can

Figure 1: Seasonal correlation of electricity demand (black line) and solar generation (orange line) for Europe showing the potential to store excess solar energy in summer months and use it to support winter electricity demand. Figure adapted from Gabrielli, P., Poluzzi, A., Kramer, G. J., Spiers, C., Mazzotti, M., & Gazzani, M. (2020). Seasonal energy storage for zero-emissions multi-energy systems via underground hydrogen storage. *Renewable and Sustainable Energy Reviews*, 121, 109629



# es of the game with energy shifting

s is reduced.

necessitate backup capacity of up to 8-10 hours or more. Long-duration energy storage technologies (LDES) are now available to help with this. Compressed or liquefied air energy storage (CAES, LAES), pumped hydro storage (PHS), thermal storage, electrochemical storage (e.g. flow batteries), chemical storage (including hydrogen), and innovative gravity storage methods are some of the technologies available. Depending on the technology, these systems can store enormous amounts of energy for lengthy periods of time, ranging from days to weeks to months. It is vital to emphasise that these solutions are already available on the market; what is needed are revenue streams and support to enable their widespread adoption.

Some could argue that the European Union should not look into energy storage, as there is simply not enough energy to shift from one day to another or from one season to another. That is not true. The European Union has all the energy it needs within its own territory – we are simply wasting it. When the energy produced from variable renewable energy sources exceeds the energy demand – and this not a rare event – solar panels and wind turbines are turned off – the so called curtailment. This happens because there is simply more electricity generated than can be used on certain days, but also due to grid congestion as the transmission lines are unable to accommodate the electricity flow during peak production hours. It is an unnecessary waste of Europe's valuable indigenous energy resources. Shifting the excess energy to time periods with lower energy generation

Patrick Clerens



and higher demand allows the EU to create its own zero-emission, dispatchable backup energy reserve.

To conclude: right now, the EU is overly reliant on polluting gas imports; and this will continue in the

years to come, if we do not change the course. Security of supply and the maximisation of local energy production in the EU today are absolutely essential, and energy shifting solutions are crucial to accomplishing these goals. ●



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# How to boost green chemistry and t

By Senka Vidović, PhD, Associate Professor and GREENERING science communication manager. Faculty of Tec

Since the nineteen-century industry has improved every aspect of our lives, nevertheless in the second half of the 20th century questions were raised regarding the continuous industry development disregarding sustainability concerns.

The modern chemical engineering concept has evolved from the traditional definition of a process able to convert raw materials and/or chemicals into high added value products, involving now pioneer methodologies for new product developments.

However, few of these processes have been implemented at an industrial level, up to the date. In Europe, there are a large number of experts in green technologies and their applications. However, these experts work scattered and disjointed in small groups. The exploitation of scientific and technological potential of super critical technology and other green technologies has been insufficient in the EU.

The need for international

cooperation is, therefore, urgent in order to have quick access to the facilities and expertise available. In this context, launched in 2019, the COST Action [Green Chemical Engineering Network towards upscaling sustainable processes](#), (GREENERING) set up its collaborative network of scientists and industry members from 34 countries. The COST Action gathers 250 participants to promote and boost the application and the implementation of green chemistry and sustainable technologies.

*“Gathering more than 200 people with similar interests in a network is both exiting and very challenging and I am sure that great outputs will come from the collaborations being established.”* Says Dr Ana Rita Duarte chairing the Action.

This objective can only be successfully achieved through the connection of working groups in emergent areas such as: best use of raw materials; use of clean solvents; efficient use of energy and production of minimal amount of waste. The development of novel processes

and high added value products from the integration of highly innovative technologies has been pursued and it is the objective of different programs and projects.

Within these settings, GREENERING arises to provide tools and knowledge to the participants enabling them to be highly competitive in new breakthrough developments.

GREENERING is focused on the four major factors that contribute the faster growth of green chemistry and technology: Collaboration, Technology Forcing, Compromise and Enhanced Education. In spite of the fact 2020 and 2021 years were marked by the COVID-19 crisis, GREENERING has continued its efforts to achieve the project main goals.

During this period several activities have been organised for networking, increased collaboration and knowledge exchange in the project filed.

The [1st GREENERING International Conference](#), which was held online in February 2021, encountered big success since it brought together



## 1ST GREENERING BUBBLES



# Technology at the industrial level?

Technology Novi Sad - University of Novi Sad



**Dr Ana Rita Duarte: "To do great work with great people"**



more than 150 participants from 23 countries – academics, industry, and students, from the field of Alternative solvents, Bio-fuels and bio-energy, Cosmetics, Food technology, Pharmaceuticals, Raw materials, Waste treatment/valorisation, and Green policies and innovation.

Beside this, the one of highly efficient tools promoted, were the GREENERING Bubbles-3-day intensive workshops devoted to industry were organised for the first time at the Faculty of Technology Novi Sad, Serbia, and Faculty of Food Technology and Biotechnology Zagreb, Croatia.

The topic of the first GREENERING Bubbles was the application of green technologies and green solvents in the herbal material processing and herbal extracts production. Nine companies participated in the first GREENERING bubbles: Euro Prima, Vitalon, Deverra Farm, Suncokret Granum, Sapunoteka, Imortela, Nikel, Bio & Naturalis and Adena Natura.

To encourage the start-up spirit in the green chemistry field the

GREENERING set up a series of webinars on the success industry stories. One of the stories presented on this tool was the story presented by Alexandre Barros from the company Hydrumedical, in Portugal. Mr Barros spoke on how green chemistry, using supercritical carbon dioxide, is integrated in the Hydrumedical processes, and how he managed to transpose a green process from the laboratory to industrial scale.

The interdisciplinary consortium of this project will try to accelerate the development of green technologies in different areas. For this purpose, GREENERING joins the main European research groups in green chemistry to work together in finding a unified solution that can bring benefits along the entire value chain of a product.

The added value of GREENER Action stands on the consideration of the whole chain with not only the technological issues themselves but also other key points to make industrial change implementation come true, involving for these interdisciplinary experts.

Dr Ana Rita Duarte adds: *"I believe that green chemistry and sustainable processes will pave the way for future industrial developments and that Europe can become a leading area in this field."*

Dr Ana Rita Duarte is currently Associate Professor at the Chemistry Department from Nova School of Science and Technology, in Portugal. In 2016, Ana Rita Duarte was awarded an ERC consolidator grant entitled: DES.solve – When Solids Become Liquids: Natural Deep Eutectic solvents for Chemical Process Engineering, to proceed the developments on green technologies. Each year, according to Scopus Data, the list of top 1% and top 2% of scientists in the world in all fields is announced. According to Scopus Data, Dr Duarte is among the top 2% of scientists in the world. ●

# The EPBD revision is a critical opportunity to reduce energy waste in buildings and increase energy efficiency

By Oliver Rapf, Executive Director, BPIE

The Energy Performance of Buildings Directive (EPBD) is the single most important legislation targeting buildings and should reinforce the urgency to put the sector on the path to net zero carbon by 2050. Especially against the backdrop of soaring fuel prices,

market volatility and mounting geopolitical duress, the EPBD revision is critical to achieving long-term energy security and fighting energy poverty, and should be treated as such.

With the revision process now in full swing, significant work remains

to be done this year. The European Commission's December 15th recast EPBD proposal is unbalanced at best. It provides a good working basis to improve the building renovation ecosystem (planning, financing, information and advisory tools), but the energy and security policy reality in Europe changed drastically on 24 February. This must be reflected in the revision of the EPBD. It must make its contribution to increasing Europe's independence from energy imports wherever they may come from, and must do its utmost to help making Europe more resilient against energy price shocks.

The new reality mandates that the transformation of Europe's buildings is accelerated. The EPBD's long-term vision for the building stock should be rephrased as 'net zero operational energy and net zero carbon over the whole lifecycle', which would more explicitly spell out that the full decarbonization of the building stock should be based on three pillars:

1. Reducing energy demand during the operational phase and applying the energy efficiency first principle
2. Switching to full renewable energy supply during the operational phase and reducing operational greenhouse gas emissions
3. Reducing embodied greenhouse emissions, adopting a whole-life carbon perspective. The latter point would also help to reduce the fossil fuel energy dependence of the construction industry.

Deep energy renovation must





# Opportunity to fight climate change, stop raise Europe's energy security

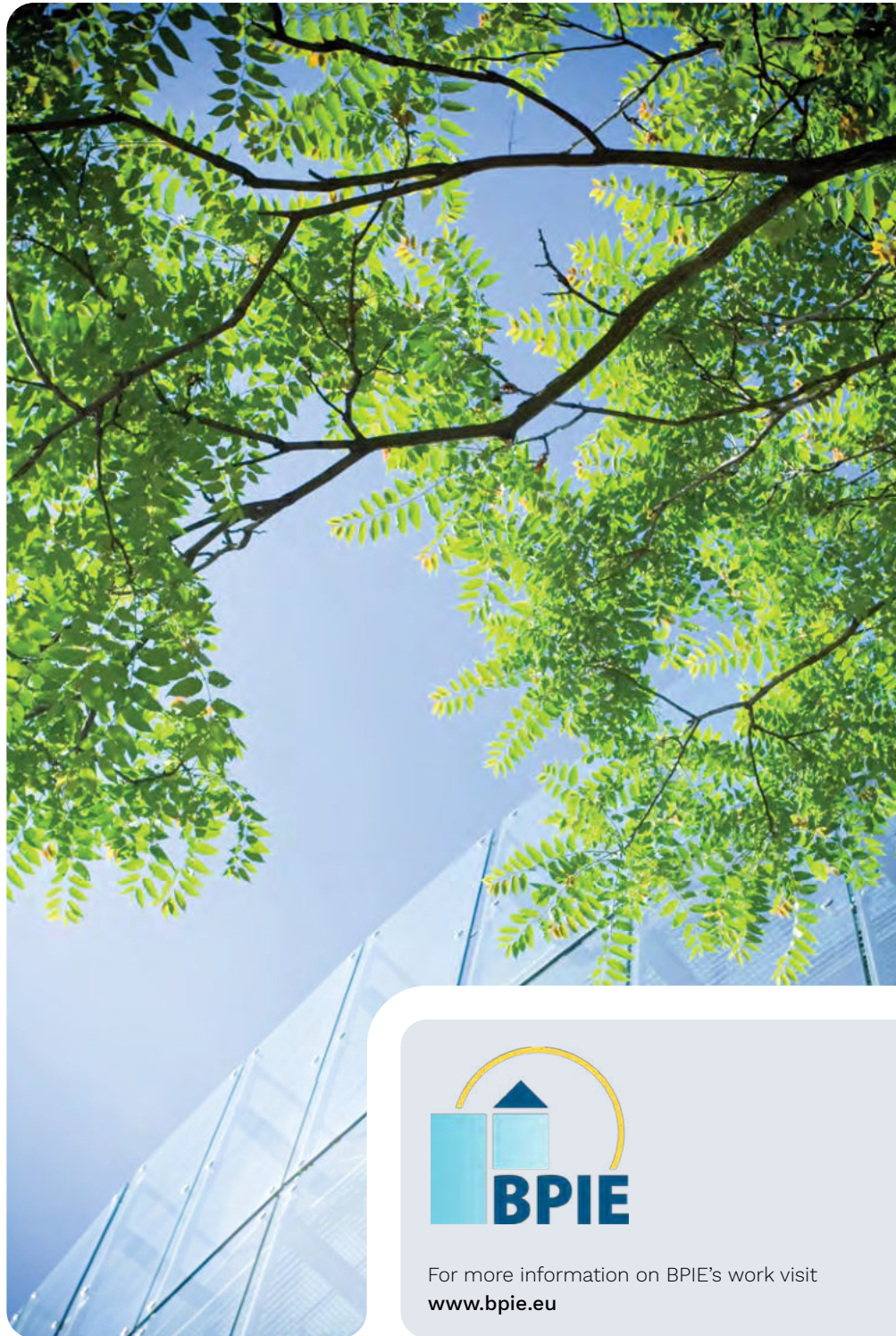
become the rule for renovation, not the exception. Changing the approach towards deep renovation in the EPBD recast holds the potential to massively increase the impact of the Directive and increase its contribution towards the 2030 climate target.

This in turn requires an innovation boost in the construction industry. The industry needs to deliver serial renovation at large scale so that our heating supply can be provided by renewable energy more easily and economically.

The introduction of Minimum Energy Performance Standards (MEPS) is a welcome new addition to the EPBD, however, the current design risks locking the worst-performing buildings into the bottom performance class. MEPS should ensure that all buildings become renewable heating & cooling ready, as soon as possible. This means that higher mandatory performance standards must be supported by stronger financial incentives and support schemes so that social hardships will be avoided.

The proposal's objective to lift citizens out of energy poverty should also be given significantly more weight, especially in the context of high energy prices and significant price fluctuations.

We have the chance to get the EPBD revision right and put the EU on the path to achieving climate, efficiency, and security objectives, but time is running. The urgency to implement comprehensive measures to transform the building stock and stop energy waste has never been higher. ●



For more information on BPiE's work visit  
[www.bpie.eu](http://www.bpie.eu)

# On the look-out for a blueprint for a fa

By Sorcha Edwards, Secretary General, Housing Europe

‘The tech Industry, the social justice and the environment industry often see themselves as quite separate’ This observation from the Solar Punk movement needs to be overcome, if we are to achieve the aims of the Green Deal in the housing sector.

## What does the Green Deal mean for housing?

The Green Deal has been described by Diederik Samson, Head of Cabinet for Commissioner Timmermans as ‘the biggest environmental project the world has ever embarked on which will set first Europe, and then the World on course to a sustainable future.’ The building sector is at the centre of this deal because it includes the European Commission’s commitment to cut 55% greenhouse gases emissions by 2030. Achieving a decarbonised building sector represents both a challenge of minimising energy demand for heating, cooling, lighting and other energy needs as well as of maximising renewable energy supply sources.

The EU plans include reducing buildings’ greenhouse gas emissions by 60%, their final energy consumption by 14% and energy consumption for heating and cooling by 18%. The European Commission proposed a “Renovation Wave” where the annual energy renovation rate of residential and non-residential buildings doubles, impacting over 35 million building units until 2030 million buildings in Europe, many badly insulated & very few having renewable energy either for heat or electricity.

The European Green Deal was born from the Climate Crisis however the new more urgent energy crisis

resulting from the war in the Ukraine is making the need to make our homes more efficient and maximise renewable energy use doubly clear.

## The challenge of leaving no one behind when housing is already a driver of inequalities

In the last 10 years for example the total housing costs have risen by 21% for low-income tenants in the EU. Inevitably, the confinement of people in their homes due to COVID-19 has highlighted failures in the housing sector, related to the quality and comfort of dwelling. A quarter of Europeans cannot afford to heat or cool their homes adequately. Poor housing quality has become more visible, including indoor air quality, increased energy costs and green amenities.

The housing crisis with a widening housing costs’ gap between poor and wealthier households. ‘This year has seen a marked acceleration in prices. In 2021 Q2, EU aggregate residential property prices grew by 7.3% year-on-year. This means that of the total increase in prices that occurred since 2013, nearly a fifth has taken place in the last 12 months alone.’ In the first half of 2021 prices reached their fastest growth rates since the global financial crisis. Various EU countries are displaying risks of overvaluation. That raises concerns particularly where household debt is high or rising fast.

How can we ensure that this new investment drive in the sector does not lead to more inequalities? That we address energy poverty but also housing inequalities. The most successful examples of scaling up of renovation in housing are those which have harnessed creativity, resources and, most of all, support from the population. They have not focussed

solely on cm of insulation or m<sup>2</sup> of solar panels but on ensuring that peoples’ homes and energy bills and the districts remain affordable and good places to live.

A social housing estate designed by architect Stefano Boeri - the 18-storey tower is 70 meters high and offers space for 125 social housing homes. Large communal interior space and roof terrace. A perfect space to meet fellow residents and organize joint activities. €620/month rent. 520 trees, 10,000 plants, 8,000 Kgs CO<sup>2</sup>, [www.trudo.nl/trudo-toren](http://www.trudo.nl/trudo-toren)



# Air energy transition? Watch this Space...

Let's take an example from – Belgium. In the northern part, Flemish social housing providers represented by VVH have invested €231 million to place 650 000 solar panels on social

dwellings, expecting to drastically lower the electricity bills of tenants in 60,000 social housing units and decrease energy poverty levels.

We will then go further north where in the Netherlands, the Federation for Social Housing Providers, AEDES is managing 1/3 of the building stock of the country and has the ambition to achieve a carbon neutral building stock by 2050, while still providing affordable housing to its tenants.

In Denmark's fourth biggest city, Aalborg, large-scale renovations of on large scale renovations in socially vulnerable living areas have literally transformed the neighbourhood into a mixed community. As a result, the average household income in the municipality has increased by 19% in the period 2011-2017 and for Aalborg Municipality as a whole the increase was over 10%.

### **On the look-out for a blueprint for a fair energy transition? Watch this Space...**

These examples show that there are pockets of a fair energy transition already happening however there is need to tap into a hive mind to enable others to learn from and expand the approaches that work. There is a need to address doubts on what are trusted technologies, to understand what have been behind the successes and the failures and to follow the path most suited in each context. There is also a need to balance the challenge of meeting both renovation and new construction targets and of course to find new financial sources to cover the costs.

To answer this need, Housing Europe has responded to a call from the European Commission

to form a 'European Affordable Housing Consortium', a partnership bringing together three groups 1) those working for social justice through the provision of social, cooperative and public housing within Housing Europe, 2) cities organised in EUROCITIES's Mayors Alliance for the Green Deal who see the consortium as a good example of how to 'cooperate with citizens, the construction sector, energy & finance providers, providers, for a common goal' according to Silvia Ganzerla, Policy Director at EUROCITIES and described by Claire Roumet, Director of Energy Cities as an initiative which will 'strengthen local authorities' workforce and capacities to tackle the issue of inadequate housing, key to alleviating energy poverty!" And 3) the construction sector, represented by the European Construction and Technology Platform, whose Secretary General Alain Zarli sees the project as 'a fundamental step to guide and show the way for renovation projects across Europe, for social housing and indeed beyond'.

This partnership aims to become a reference point for a truly innovative and fair renovation wave that reconciles the potential of tech, the environmental urgency and social justice. ●

### **Get in touch**

SHAPE-EU is looking for experts to support the process.

You can get involved and receive more details by contacting Housing Europe's Innovation and Project Manager,  
joao.goncalves@housingeurope.eu



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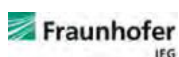
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