Celebrating 10 Years

european energyinnovation

AUTUMN 2020

Connecting Europe's Stakeholders in Energy and Transport

THE ROAD TO DECARBONISING TRANSPORT

HYDROGEN STRATEGY

CLEANER AND MORE EFFICIENT MARITIME SHIPPING

STRIVING FOR A COMPETITIVE EU OFFSHORE RENEWABLE ENERGY STRATEGY

ENCOURAGING CITIZENS' PARTICIPATION IN THE ENERGY TRANSITION

Includes editorial contributions from:

Paula Abreu Marques
Head of Unit, Renewables and CCS policy, European Commission, DG ENER

Miriam Dalli
MEP, S&D Vice-President for the European Green Deal

Jutta Paulus
MEP

Formerly

European Utility Week | POWERGEN EUROPE

Enlit Europe

Bringing the stories of our industry to your screen and helping you solve the most pressing issues in energy!

SAVE THE **DATE**

30 NOV
2 DEC
2021

Milan, Italy

The journey continues – 365

The Enlit Europe Digital Platform hosts energy-rich content in the form of Sessions and Episodes. It is also your platform to source EU projects, Initiate startups and solutions from the online Expo.

Check it out!

www.enlit.world/europe

Brought to you by CLARION ENERGY

Contents

International Conference

World Sustainable Energy Days 2021

24 - 26 February 2021
WELS, AUSTRIA

CONFERENCES:

- European Energy Efficiency Conference
- European Pellet Conference
- Smart E-Mobility Conference
- Industrial Energy Efficiency Conference
- Innovation Workshops
- Young Energy Researchers Conference

NEW in 2021

- Update Green Deal
- Energy transition & green recovery
- Innovation Hubs
- Climate neutrality
- Meet2Talk

LAND OBERÖSTERREICH

OÖENERGIESPARVERBAND

www.wsed.at

OÖ Energiesparverband, Linz/Austria, Tel. +43 732-7720-14386, office@esv.or.at, www.wsed.at

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

European Energy Innovation is published by:
Prologue Media Ltd
1a Shire Lane
Chorleywood
Hertfordshire WD3 5NQ
United Kingdom

Tel: +44 1923 286238
www.europeanenergyinnovation.eu

To obtain additional copies please email info@europeanenergyinnovation.eu

Editor
Michael Edmund
editor@europeanenergyinnovation.eu

Business Development Director
Philip Beausire
philip@europeanenergyinnovation.eu

Director of Communications
Sophia Silvert
Mob: +32 4737 30322
sophia@europeanenergyinnovation.eu

Design & Production
RayHeathDesign.com

Website design
pulseart.co.uk

Print
The Magazine Printing Company, Enfield, Middlesex, United Kingdom

Foreword

About a year ago, Emily Holden wrote 'Climate Change Is Making Us Sicker, And We Need to Talk About It". Wildfire smoke affects hearts and lungs; changes in temperature and rainfall patterns help the spread of malaria, while waterborne diseases increase with every drought and flood. From allergies and pregnancy, to paediatrics, gastroenterology, mental health, neurology, renal, and trauma medicine, alarm bells were being sounded about global health.

And then Covid hit us.

This magazine has long been calling for new ways of thinking, new technologies, and new ways of applying them to combat climate change. We believe that mankind simply cannot afford the luxury of being distracted by a mere global pandemic - irrespective of Joshua Lederberg's prescient observation that "The single biggest threat to man's continued dominance on the planet is the virus."

Our point?

Atmospheric CO_2 levels continue remorselessly and unerringly upward. New research by the National Center for Atmospheric Research has found that..." the Arctic has already entered a new climate". Meanwhile, at the other pole, researchers from the International Thwaites Glacier Collaboration have found a series of 25-mile-wide channels in the seafloor. They bring warm water to the base of two glaciers, accelerating melting and lubricating the flow of ice into the ocean. This glacier system effectively holds the whole of the West Antarctic Ice Sheet back from the Southern Ocean. Sea level rise of more than eight feet becomes possible if it collapses.

What's being done?

In this issue, Thomas Telsnig and a team from the Commission's Joint Research Centre explore the potential for Offshore Energy in the Green Deal. Investment of 660-770 B€ is required for an offshore wind capacity between 400 and 450GW. But the potential is Terawatts – an order of magnitude greater. Boldness, they observe, will establish the sector as a key provider of clean electricity, with a further payoff of 1.2-2.8 million job person-years by 2050. Elsewhere, Paula Abreu Marques discusses the Commission's hydrogen strategy. Although infrastructure issues remain, she says that clean hydrogen repurposed from natural could simultaneously reduce emissions and contribute to climate-neutrality.

MEP Miriam Dalli calls for "policies that can actually deliver change", arguing that Governments and industries should use Covid as the catalyst. Foreseeing price parity with ICE vehicles, she maintains that zero emission alternatives will be a more popular choice within a decade. Not a moment too soon.

Reviewing the toolkit of the European Green Capital Network (EGCN), Priscila Jordão and Lucy Russell explore the role of people in the switch to 100% Renewable. Their message is clear: energy transitions can take all shapes and sizes but they must all be inclusive; and leave no-one behind.

Isabelle Ryckbost tells us of the critical importance of Europe's ports. Her first message is that, notwithstanding lockdown, European ports have remained fully operational. But she also emphasises that resilient supply chains are needed to keep economies going. This also applies to energy and to hydrogen, in this respect echoing the themes of the previous articles.

Socrates observed that the secret of change is to focus all of your energy, not on fighting the old, but on building the new. So, more from the EGCN: when Ålidhem, a neighbourhood in Umeå in northern Sweden, was burned to the ground in 2008, it was rebuilt with the goal of reducing energy consumption by more than 50%: insulation, PV and district heating were key elements, but it was the participation of the people that made the project so successful.

People rebuilding out of the ashes. Socrates would have approved.

And there's much more for you to read inside....

Michael Edmund, Editor

On the road to decarbonising transport

By MEP Miriam Dalli (pictured), S&D Vice-President for the European Green Deal

Climate change is not a myth. Neither is decarbonising transport.

For centuries, human beings have sought to improve their lives by investing in machines that do more and produce more in many different areas. This however many times came to the detriment of the envrionment, our planet and our climate.

Post COVID-19 is the right time for governments and industries to take the path towards a new economic model that is rooted in sustainibility and that is resilient, where research is incentivised, technologies are developed and where innovation takes centre stage. All with the ultimate aim of reaching a net-zero economy by 2050.

I acknowledge that addressing climate change is a major challenge but this brings with it opportunities. Opportunities for countries to stay ahead of the curve, remain competitive, attract the right investments and create quality jobs through which consumers can receive the best deals possible.

The outbreak of the COVID pandemic should not derail these plans, on the other hand it should serve as a catalyst for positive change. COVID-19 has clearly shown how much we need to take care of our planet, how an unhealthy environment can prove to have devastating effects and how short-term planning and stop-gap measures do not make bigger problems go away.

Greening our economy must be our priority. Transport has been identified over and over again as the largest source of Europe's climate problems due to its steady emissions increase.

This is the time for smart mobility with car sharing, charging infrastructures, smart city planning, smart sensing and autonomous vehicles amongst others. Sufficient emission reductions through the deployment of zero and low emission technologies need to happen in the next years if we want to reach our climate targets.

Over the next decade, zero and low emission vehicles are expected to reach price parity with Internal Combustion Engine vehicles.

Such a transition requires a coherent policy framework that covers vehicles, infrastructures – including alternative fuels infrastructure – electricity grids, employment and economic incentives.

There will always be some resistance to change, because it is in our nature to feel safer doing what we have always been accustomed to do. But we need to challenge the status quo if we want to see positive change. As the European Parliament's negotiator on the new EU CO_2 emission targets for cars and vans for the post period 2020, I can confirm that the result we achieved followed months of objections and fierce lobbying from industry players. After a series of meetings with stakeholders and after intense negotiations with the European Council, we managed to agree that new cars will have to emit 37.5% less CO_2 and new vans will have to emit 31% less CO_2 from 2030 onwards. Between 2025 and 2029, both cars and vans will be required to emit 15% less CO_2.

Over the next decade, zero and low emission vehicles are expected to reach price parity with Internal Combustion Engine vehicles. Given the terms of the European Green Deal and the Climate Law it is far to say that we have to create the right environment so that zero emission vehicles will be a more popular choice within the next 10 years. The EU needs to invest in different technologies that can help us reduce pollution from transport.

To get there, more work needs to be done. The current rate of Zero emission vehicles adoption is still very slow. Charging infrastructure in many of our Member States is still very scarce. Car manufacturers say that consumer demand is not high. Consumers on the other hand speak about major obstacles they face when trying to buy Zero Emission Vehicles, amongst which are limited options, and waiting times that spread over whole months from the day they order a Zero Emission Vehicle until they actually receive it.

This means that the EU must create a strong home market for these vehicles and invest in the necessary infrastructure to support this market. Price reduction is also heavily reliant on mass manufacturing which in turn requires strict policy measures.

The EU needs to also address the current situation on European roads. As the S&D shadow rapporteur on Real Driving Emissions, I worked hard to ensure a progressive alliance that pushed for measures that can help us stop the exploitation of loopholes that allow vehicles to emit more on our roads than what they actually should.

Successive Euro emission standards have led to very significant drops in emissions of exhaust particles both in terms of mass (PM) and in terms of numbers (PN) and other pollutants such as hydrocarbons (HC) and carbon monoxide (CO). However, NOx emissions from road emissions – and in particular nitrogen dioxide (NO_2) emissions – did not drop to the levels expected when compared to the introduction of Euro standards in 1991. This is due to the fact that emissions during "real-world" driving conditions are often higher than those measured during the type approval test.

An RDE test procedure would better reflect the actual emissions on the road and reduces the discrepancy between emissions measured in real driving to those measured in a laboratory.

I want real change and that change has to be positive. I believe in empowering the European Commission to annually review downwards the Conformity Factors, in order to reflect improvements in the accuracy of portable measuring equipment. This would enable a further gradual reduction of the emissions of nitrogen oxides (NOx) under real driving conditions.

I believe in policy-making that pushes change. We need to decide what world we want to live in and how to get there. If we want to future proof our societies and if we believe in a resilient future for the next generations, then we need policies that can actually deliver change and encourage and stimulate the much needed shift.

Decarbonising mobility in Turku: Pilot projects and electric buses leading the way

By Annika Kunnasvirta, Local Evaluation Manager, CIVITAS ECCENTRIC, Turku University of Applied Sciences

Decarbonizing mobility lies at the heart of efforts to mitigate climate change in urban areas. This looms in the vicinity for the city of Turku in Finland, aiming to become carbon neutral by year 2029. To reach this goal, a broad range of measures to decarbonize transport is naturally needed. Various policies are already at place in the city to promote the fulfillment of the goal, as well as concrete actions and strategies.

The CIVITAS ECCENTRIC project approached mobility decarbonization from various angles. In Turku, the focus ranged from stakeholder integration on regional and local level to practical measures such as improved winter maintenance of bicycle routes, the launch of electric buses and implementing a bike share system. The project also addressed

Mobility as a Service development on local and international level and created a tool for monitoring this process, the MaaS Readiness Level Index, which has already been applied by cities worldwide.

Decarbonization of public transport took huge steps in Turku when as part of CIVITAS ECCENTRIC, a pilot project was started with the goal of having six electric buses operating between the Turku airport and the ferry terminal, becoming the first Finnish city to use electric vehicles on an entire line of public transport. Despite some technical issues experienced, the Turku e-buses have already proven competitive compared to traditional diesel buses from an energy efficiency point of view, even the more energy efficient EURO VI models.

Now when talking about project success, one often thinks about concrete results – modal share changes, infrastructure improvements, methods developed. These are of course important. What is often left for lesser attention, however, are the process learnings brought about by projects that are immensely valuable for planning future mobility interventions. Therefore, beyond the concrete measure results, it is important to highlight the importance of the process towards system level change facilitated by projects, and their subsequent impacts on decarbonization. This is often overlooked, most likely due to the fact that it is difficult to showcase.

In Turku, the process level learnings from each individual measure were thoroughly analyzed, focusing particularly on the specific barriers and drivers of mobility decarbonization measures. It was found, for instance, that the political driver of the commitment of key actors to promote electrification of public transport was a major driver for the pilot project in Turku. The goal to electrify bus line no.1 was largely supported politically and larger scale electrification of public transport is part of the city's climate objectives. This kind of support is crucial when implementing a system based on a novel technology as in such endeavors there are bound to be some setbacks and failures – technological barriers – possibly leading to apparent inefficiency of the system at times and higher upfront costs. In Turku, the political commitment of key actors to promote electrification of public transport was of essence for attaining trust in the longer-term functioning of the system despite initial these setbacks.

In essence, this is what decarbonizing mobility really requires: goals, strategies, concrete actions and a thorough evaluation of these actions to assess not only direct impacts but also process learnings. The carbon-free mobility system of the future relies on these both.

One more step further to cleaner and more efficient maritime shipping

By Jutta Paulus, MEP (pictured)

The challenges of the climate crisis are urging us to take fast, far reached and comprehensive action in order to reach the Paris Agreement's goals and limit the temperature increase to 1.5 degrees above pre-industrial levels. With the United States leaving the Paris Climate Agreement and countries continuing to block much needed climate targets, the EU's responsibility as a global role model has further grown. After setting global environmental and climate standards in the past, Europe goes one step further with the adoption of its European Green Deal. However, we will only meet our goals, if we take comprehensive action in all policy fields and all sectors.

International shipping accounts for two to three percent of global greenhouse gas emissions, which is more than any single EU member state emits. If the shipping sector were a country, it would be the country with the sixth highest greenhouse gas emissions worldwide. According to the International Maritime Organization (IMO), the emissions caused by ships worldwide will increase by 50-250% between 2012 and 2050. The European Commission expects an increase of 86% within the EU compared to 1990. Hardly any other industrial or transport sector shows emission increases as high as the shipping sector. Nevertheless, maritime transport is still the only sector in the European Union that is neither subject to any emission reduction target nor to specific climate protection measures.

As a first step in addressing emissions from maritime shipping, the European Commission established the EU Regulation on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport ("Shipping MRV Regulation"). Since it came into effect on the 1st of January 2018, large ships of 5000 gross tonnage and above need to monitor and report their CO_2 emissions, fuel consumption, distance travelled, time spent at sea and other factors. The first available data shows that the 10,800 ships covered emitted more than 130 million tonnes of CO_2 in 2018,

which is more than the annual CO_2 emissions of the Kingdom of Belgium.

Since 2019, ship operators have also to report to the Data Collection System of the IMO. To reduce the administrative burden, it is important that EU and IMO reporting obligations are being aligned. At the same time, collecting data alone does not reduce greenhouse gas emissions. For that reason I, as the European Parliament's rapporteur for the amending of the MRV Shipping Regulation, aim for both: The reduction of the administrative burden for companies and the introduction of concrete measures for reducing greenhouse gas emissions from the shipping industry.

With this new legislature, we see strong political will in all institutions and on all levels. I was especially glad to learn that the European Commission committed to broaden the scope of the EU Emissions Trading scheme (ETS) to shipping, which is one of the steps needed for a cleaner maritime transport sector. In July, the European Parliament's Environmental Committee by huge majority adopted my report on MRV Shipping. Our position goes far beyond the initial European Commission's proposal, as our aim was to deliver on the objectives of the European Green Deal. After European Parliament's plenary vote next September, negotiations with Council and Commission will start.

CO_2 reduction is crucial, but not enough. One additional measure proposed by us parliamentarians is the broadening of the new regulation to further greenhouse gases. Especially methane must be added to a new reporting and reduction scheme. Its impact on our climate is 25 times greater than that of CO_2 over a 100-year period and even 87 times greater on a 20-year timeframe.

Moreover, our proposal calls for including the shipping sector into the EU ETS by January 2022 and for establishing an Ocean Fund, financed by 50% of the additional revenues resulting from the auctioning of ETS certificates. Such fund could support innovation in sustainable solutions for decarbonizing the shipping sector and, as climate crisis and biodiversity loss are closely interlinked, help protect marine biodiversity.

The greatest effect will probably be achieved by the introduction of an ambitious efficiency target calling for less greenhouse gas emission per ton of freight and nautical mile. Shipping companies would be required to linearly reduce carbon intensity by at least 40% by 2030 as an average across all ships under their responsibility. As the baseline is compiled from the average of all companies, early movers have a head start here. This target incentivises building and acquiring more efficient ships or retrofitting older ones.

By greening ports and improving their communication with ship operators, shipping emissions could also be reduced. Investments into shore-side electricity or batteries will enable zero emission ships lying at berth. A positive by-product would be cleaner air, and ultimately better health, for workers and citizens living in port areas.

After ten years of waiting, the time has come for the EU to deliver its promise and implement measures for the reduction of greenhouse gas emissions caused by maritime shipping. Only with ambitious and broad policy action, we can make the 2020s a decade of climate and environmental protection.

InnoDC
INNOVATIVE TOOLS FOR OFFSHORE WIND AND DC GRIDS

By Stephen Hardy, Anubhav Jain, Motaz Ayiad, Jovana Dakic, Davide Pinzan & Gayan Abeynayake

Europe's power system is undergoing significant change as it strives to meet its ambitious climate targets and mitigate the effects of global warming – moving from high carbon to low carbon renewable energy. This is a monumental task requiring, not just new technology, but a new generation of highly skilled specialists to boot! InnoDC is a collection of 16 organisations from academia and industry located throughout Europe and China.

This creates an ideal environment of knowledge and experience to support 14 researchers pursuing PhDs in renewable energy. They are looking at how to integrate the latest technology into offshore wind and HVDC grids; their work is divided into the following three areas, illustrated by their initials in the graphic below centre.

1. Components of DC grids and wind farms

The focus is on modelling, control and design of the various DC grid and wind farm components. This includes DC transformers, HVDC insulation, electronic converters, cabling and energy management.

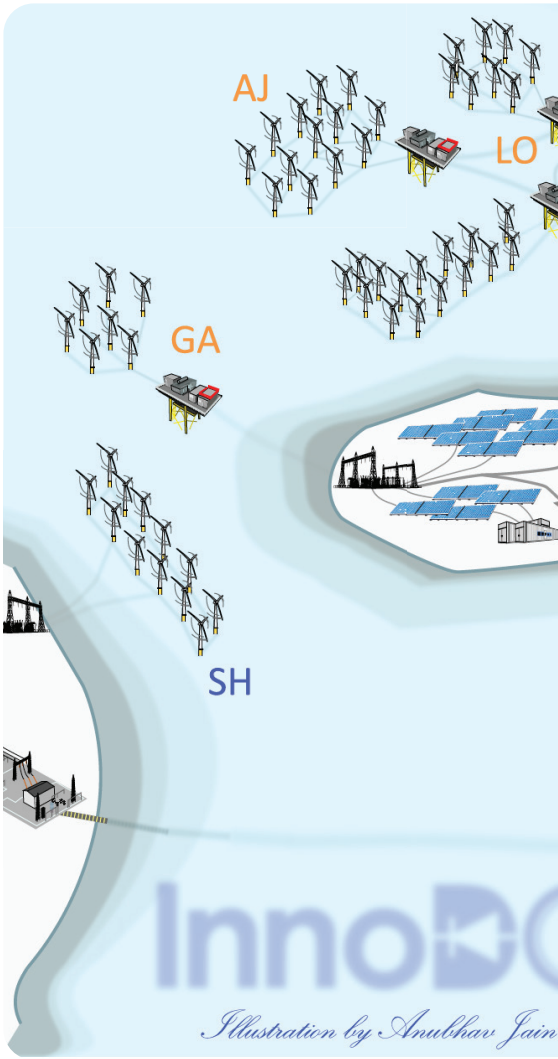
Peng Yang, Cardiff University, works on design and control of DC transformers.

Daniel Westerman Spier, Cinergia, researches control and design of modular multilevel converters.

Motaz Ayiad, Efacec, implements SCADA power applications for Hybrid AC/DC networks.

Davide Pinzan, Cardiff University, investigates the conversion of existing overhead lines to HVDC, focusing on outdoor insulators.

Stephen Hardy, KU Leuven, develops optimisation strategies for offshore windfarm topology design.



2. Connection of offshore wind farms

The researchers work on developing different tools for offshorewind farm analysis. These tools cover reliability, stability, optimisation and black start analyses.

Gayan Abeynayake, Cardiff University, is designing a tool to analyse component and system reliability of DC wind collection systems.

Luis Orellana, UPC, is designing a tool for stability analysis of offshore AC grids rich in power converters.

Jovana Dakic, UPC, is developing a tool for the techno-economic analysis of AC and DC offshore systems.

Anubhav Jain, DTU, is developing a tool for black start and islanding operation in HVDC-connected offshore wind plants.

InnoDC is an investment in technology, it's an investment in the environment and it's an investment in the next generation of scientists and engineers. **Stephen Hardy**

3. Hybrid AC/DC grids

The integration of HVDC systems into the existing grid is leading to faster dynamics and increasing the ability to control the overall system. The researchers' objective is to analyse the interactions between AC and DC grids, and enhance reliability, stability and operation.

Wei Liu, Cardiff University, is developing fast and discriminate protection for HVDC systems.

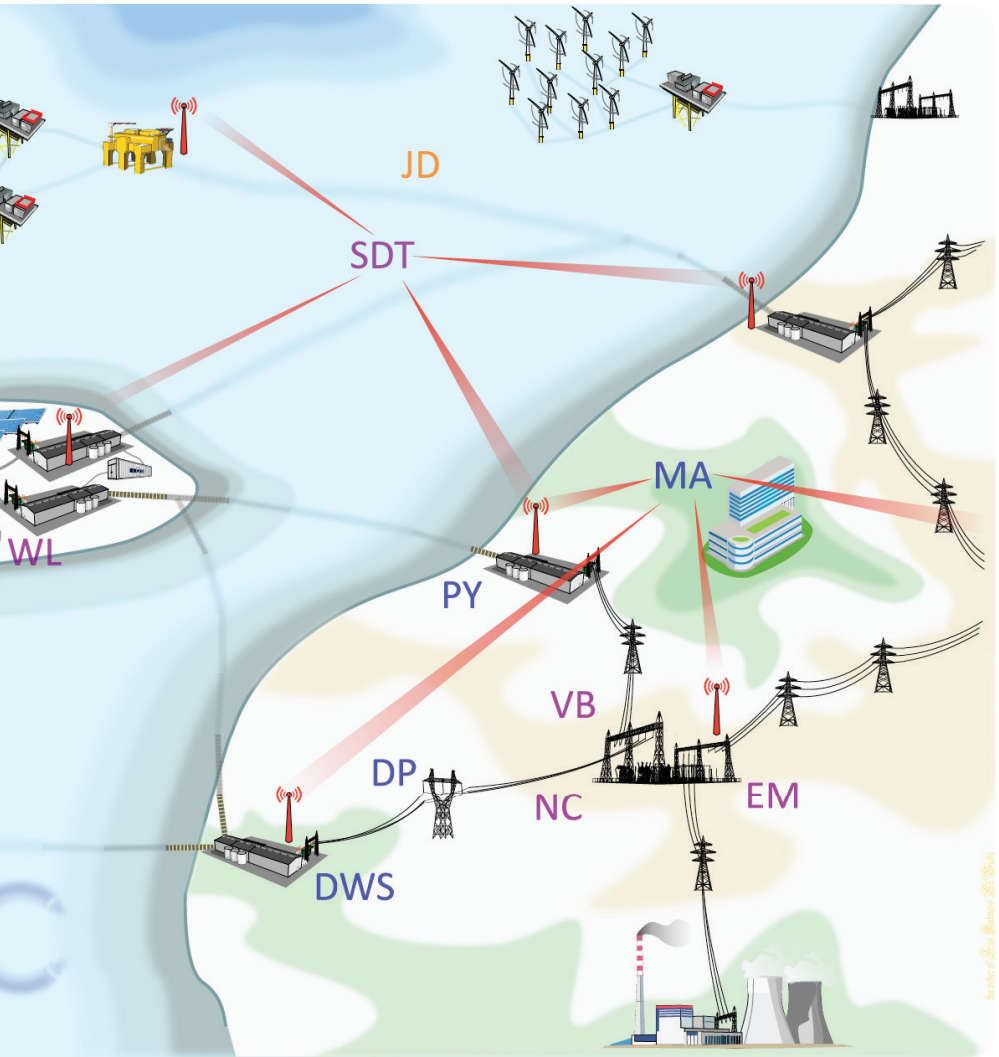
Saman Dadjo Tavakoli, UPC, is designing advanced control systems for modular multilevel converters.

Vaishally Bhardwaj, KU Leuven, researches reliable operation of hybrid AC/DC power systems in different time frames.

Nathalia Campos, Elia, focuses on dynamic stability of power systems with high penetration of power electronics.

Emily Maggioli, U.Porto, is analysing the impact of HVDC connected wind farms on AC network protection.

Click on the person to find out more about them!



InnoDC has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement no. 765585

Details at: InnoDC.org

Contact information:

Project Manager: Manon Davies
Email: DaviesM75@cardiff.ac.uk
Tel: +44 (0)29 2087 0890

Striving for a competitive EU Offshore Renewable Energy strategy delivering on the Green Deal

By Thomas Telsnig with contributions of Davide Magagna, Wouter Nijs, Maria Rühringer, Efstathios Peteves, Evangelos Tzimas and Jose Moya, European Commission, Joint Research Centre (JRC), Petten, The Netherlands.

The EU Green Deal puts strong emphasis on the development of Offshore Renewable Energy, as a key source of electricity in a climate-neutral Europe. This article presents the JRC analysis on the status of offshore renewable energy technologies and their markets and identifies cooperation and sustainable management of the maritime space as key to increase deployment.

Technology readiness and current deployment of the offshore renewable energy technologies differ strongly.

Offshore wind technology dominates the renewable offshore sector. The technology is already commercially available, using foundations and horizontal axis wind turbines (6.2 MW average turbine capacity in 2019), operating predominantly in shallow waters (<60m depth). The European offshore wind market (EU27) represents 42% (12.2 GW) of the global market in terms of cumulative installed capacity followed by the United Kingdom (9.7 GW) and China (6.8 GW).

Notably, most of the operational capacity as well as the foreseeable project pipeline for the EU is located in the North and Baltic Sea basins were the market is already established.

Although still nascent, there are notable projects of floating wind (operating in deeper waters) such as Hywind Scotland (UK), Floatgen (FR) and WindFloat Atlantic (PT), and another 320 MW are expected to be commissioned by 2024. Developers pursue different floating designs, varying the buoyancy concept of the substructure (Spar-buoy, Semi-Submersible, Tension-Leg Platform, Barge or Multi-Platforms). So far, no concept has prevailed over the others[1].

Ocean energy technologies start becoming more competitive. European R&I is still the main driver making Europe the leader in wave and tidal technologies. Ongoing demonstration projects are showing significant progress in terms of technology validation and prove that cost-reduction is possible[2].

Floating offshore photovoltaics (PV) are still at the early stage development with first demonstrators being tested offshore in the Netherlands (Oceans of Energy; TNO/Crosswind), France (HelioRec) and Italy (Saipem).

The commercialisation of offshore renewables will depend on several interacting factors: overcoming existing technological challenges, cost competitiveness, system integration value, policy support schemes and national deployment targets[3]. The European Strategic Energy Technology Plan (SET-Plan) is implementing concrete actions to achieve cost reduction targets by 2030. Costs of floating offshore wind are still at the higher end (200-250 EUR/MWh) given the technology's infancy. However, developers of floating offshore wind projects estimate significant cost reduction to about 50 EUR/MWh by 2030, if installed capacities reach ambitious values between 12-15 GW.

Significant cost reduction is still vital for tidal and wave energy technologies to meet the SET-Plan targets of 100 EUR/MWh by 2030 and 2035 respectively. Ongoing demos have proved that these targets are within the reach, yet more demonstration projects are needed for further cost reduction.

The EC long-term vision towards carbon neutrality[4] notes that an offshore wind capacity between 396 GW and 451 GW can be expected by 2050. This would require significant investments ranging between 660-770 BEUR from 2030 onwards.[5] Against this backdrop, offshore renewable energies offer an opportunity for sustained growth to EU Member States. Analysing the JRC ENSPRESO dataset[6] per sea basin shows that

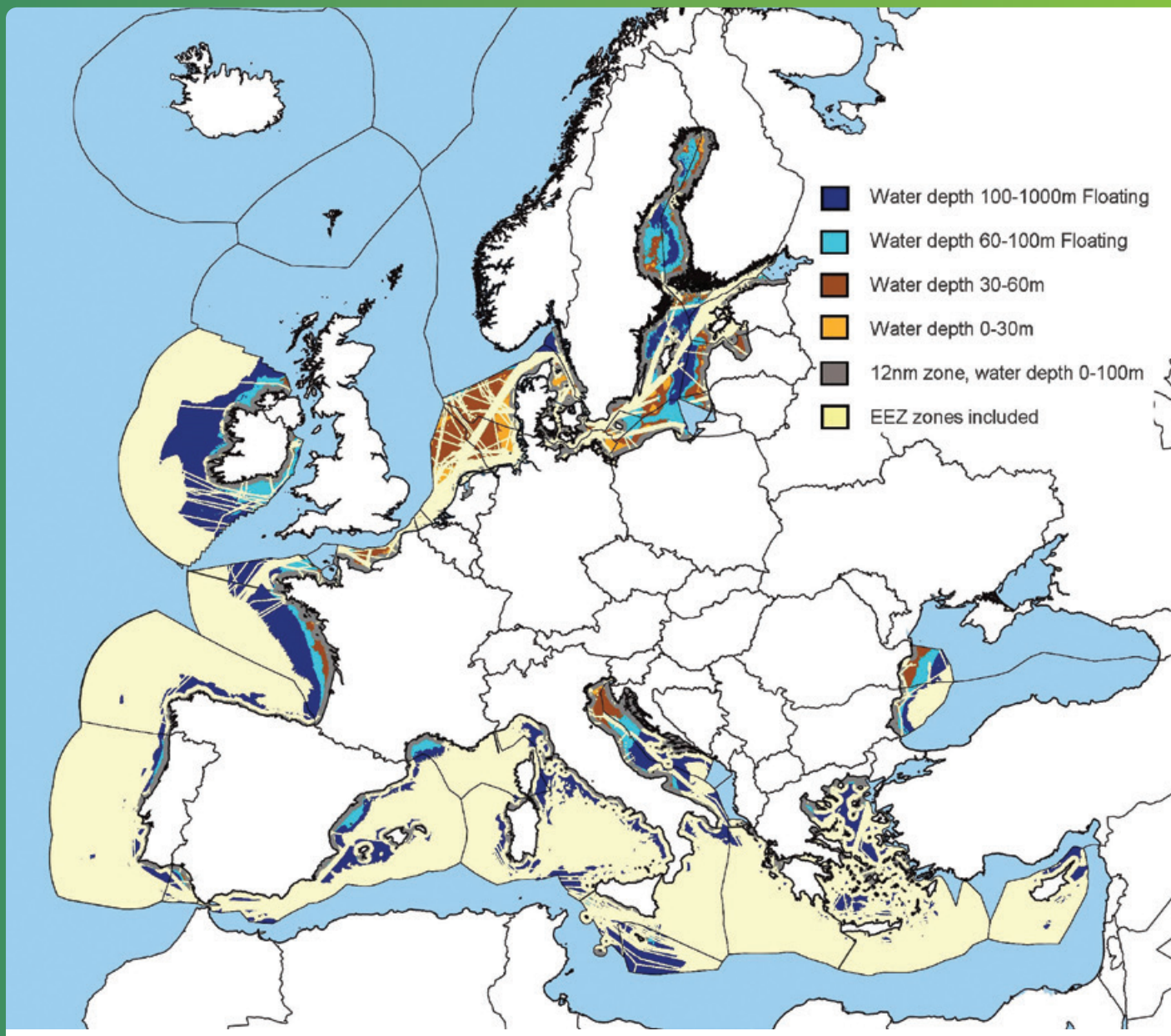


Figure 1 JRC ENSPRESO technical potentials for offshore wind in sea basins accessible to EU27 countries

technical potentials for offshore wind in EU27 EEZ[7] zones are highest in the Atlantic Ocean (1447 GW) followed by the Mediterranean Sea (1445 GW), Baltic Sea (1183 GW), North Sea (437 GW) and the Black Sea (160 GW) (see Figure 1). Areas with sea depths necessitating the deployment of floating offshore wind are vast (2468 GW) and promising for countries with steeper coastlines (Atlantic Ocean (1066 GW) and Mediterranean Sea (819 GW)). The floating offshore potential of the EU27 in the North Sea is limited to 30 GW. Still the North Sea (284 GW) and the Baltic Sea (225 GW) offer most of the technical potential for projects in shallower waters (up to 60m depth and outside the 12nm-zone).

The EU Offshore strategy is expected to frame the opportunity to expand the success of offshore wind to new European markets and develop technological leadership in new emerging technologies. However, this might need long-term indicative capacity targets for each European sea basin upfront to develop future supply chains.

If the targeted capacities in the EU27 follow the distribution of the technical potentials, 36% would be deployed in the Atlantic Ocean, 28% in the Mediterranean Sea, 22% in the Baltic Sea, 10% in the North Sea, and 4% in the Black Sea.[8]

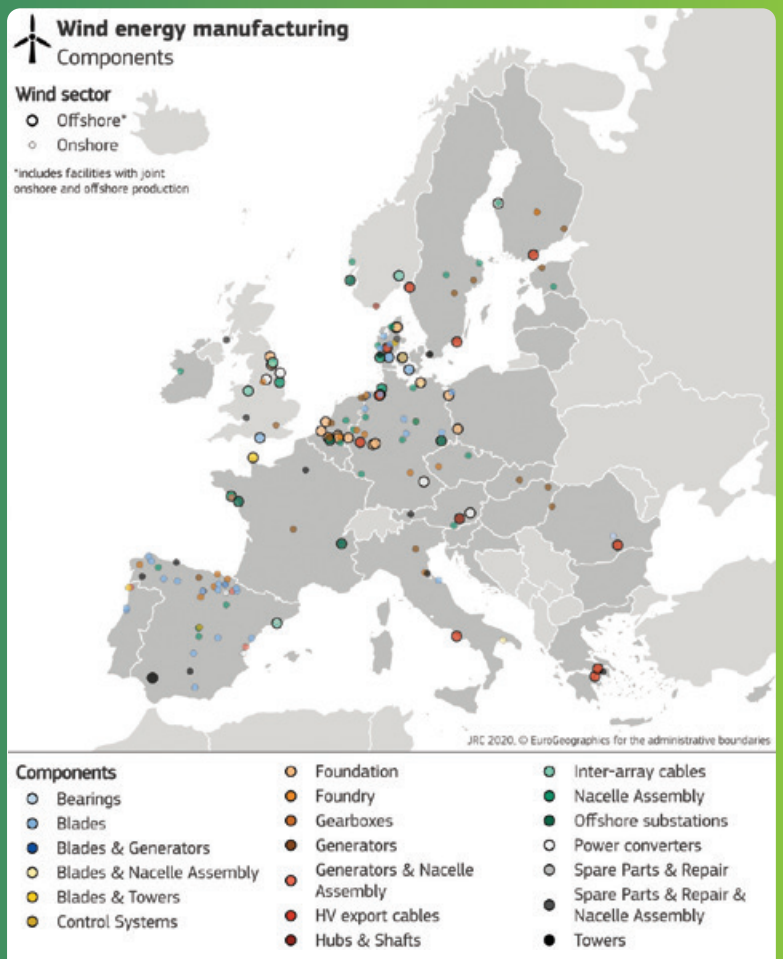


Figure 2 Manufacturing facilities of onshore and offshore wind energy components in Europe (July 2020 update based on Ref[12])

The industry's vision for offshore wind in 2050 orientates itself along the 450 GW target of the long-term strategy towards climate neutrality by 2050 for the Union. In this case, the European countries would deploy 47% of the capacity in the North Sea followed by the Atlantic Ocean[9] (19%), the Baltic Sea (18%) and the Southern European waters (16%)[10]. Moreover, the ocean energy industry targets 100 GW of capacity by 2050.

The European supply chain for wind energy components is located in countries that can be considered first movers or innovators (Denmark) and in those developing a strong home market for onshore wind (Germany, Spain).

So far offshore wind OEMs located their factories mainly around the North Sea and Baltic Sea; however, suppliers of subcomponents can be found all over Europe, even in landlocked countries (see Figure 2).

A bold offshore renewable energy strategy will establish the relevance of the Offshore Wind and Ocean Energy sector, not only as key provider of clean electricity, but also as strategic industrial asset that could leverage EU technological leadership, drive trade and generate an estimated 1.2-2.8 million job person-years by 2050.[11]

European Commission
Joint Research Centre
P.O. Box 2
1755 ZG Petten,
The Netherlands

Tel: +31 (224) 56-5222
Email: thomas.telsnig@ec.europa.eu
EU Science Hub:
https://ec.europa.eu/jrc

1 JRC 2020, Technology Development Report Wind Energy, JRC120709
2 JRC 2020, Technology Development Report Ocean Energy, 2020 Update, JRC210872
3 Based on a JRC review of National Energy and Climate Plans (NECPs) performed at the beginning of July 2020 eight countries reported a cumulated offshore capacity target of about 55GW
4 In-depth analysis in support on the COM(2018) 773
5 Capros et al. 2019, https://doi.org/10.1016/j.enpol.2019.110960
6 2019, JRC: ENSPRESO - WIND - ONSHORE and OFFSHORE. European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/6d0774ec-4fe5-4ca3-8564-626f4927744e
7 Exclusive Economic Zone. Technical potentials include the territorial waters (12nm-zone) and areas with a water depth down to 1000m. For detailed restrictions on the technical potentials please refer to the JRC ENSPRESO dataset
8 These figures exclude the territorial waters (12 nautical mile zone) of the exclusive economic zone (EEZ)
9 Excludes the Atlantic coast of Spain and Portugal, which are ascribed by BVG Associates/WindEurope (2019) to the Southern European waters
10 BVG Associates/WindEurope 2019, Our energy, our future – How offshore wind will help Europe go carbon-neutral
11 Assuming country-level employment factors (direct and indirect) ranging from of 2.1 to 5.1FTE/MWinstalled by 2050. Based on results of econometric models (Ortega et al. (2020) and WindEurope/Deloitte (2019))
12 JRC 2019, Wind Energy Technology Market Report, doi:10.2760/223306, JRC118314

District heating leads the way to a climate-neutral Europe

By Steen Schelle Jensen, Head of Business Development, Kamstrup

Ambitious energy legislation and initiatives are right now lighting up the steps towards a decarbonised Europe. More district heating and digitalisation are key elements of the conversation. And so they should be. But it will require a joint effort to turn ambition into reality.

The European Green Deal was recently presented as a roadmap towards a climate-neutral Europe by 2050, and key initiatives like the Renovation Wave are set to stimulate faster and deeper renovation of inefficient building stock to deliver on the EU's climate and energy efficiency targets. Combined with, for example, the continued discussions on increased sector coupling, this means that the energy system of the future is becoming less and less futuristic. In fact, in the face of the devastating effects of the global COVID-19 pandemic, many consider the Green Deal ambitions a necessary part of Europe's road to economic recovery.

DISTRICT HEATING AT THE CORE

In a truly integrated energy system, district heating is the glue that binds everything together by providing the necessary flexibility to balance supply and demand. Local district heating networks create the links between different parts of the system to enable improved energy utilisation. And they provide the required infrastructure to integrate, store and distribute fluctuating energy from local renewable energy sources and waste heat.

Thanks to ambitious cities and utilities, some of the most developed and innovative district heating systems in e.g. Denmark already work this way today. However, research by Heat Roadmap Europe shows that as much as 21,500 additional district heating systems are needed in Europe. In other words, the question is no longer whether more district heating is required. It is how to scale up what we have already seen works – and digitalisation is part of the answer.

DIGITALISATION A KEY ENABLER

Digitalisation is the precondition for empowering consumers and managing the increasing complexity of district heating centred around renewables and waste heat. Smart meter data and digital solutions provide the very basis for utilities making the right decisions when it comes to lowering temperatures, increasing energy efficiency and optimising the entire district heating value chain. And with the Energy Efficiency Directive (EED) becoming effective later this year, consumers now also play a central role in the decarbonisation of Europe.

The overall ambition of the EED is to generate energy efficiency through a change in consumption behaviour motivated by improved insight for consumers. It states that energy meters installed after October 25th 2020 must be remotely readable and read monthly as of January 1st 2022. And by January 1st 2027, remotely read meters must be installed in all households. A key element of the EED is that meter data – in addition to being utilised by the utility – must be pushed to consumers. In this way, it combines digitalisation and sustainability by enabling them to also make informed decisions.

TOWARDS 2030 AND BEYOND

At Kamstrup, we welcome the new demands and recognise the opportunities they represent not only for European consumers but also for the green agenda and not least the district heating utilities determined to utilise the full value from their data. Together with our customers, we are already in the process of embracing and translating them into the innovative solutions that are needed to help utilities as well as consumers reach our common goal. But the path forward has never been more clear.

kamstrup.com

Hydrogen Strategy for a climate-neutral Europe

By Paula Abreu Marques (pictured), Head of Unit, Renewables and CCS policy, European Commission, DG ENER

On 8 July 2020, the European Commission presented its Hydrogen Strategy for a climate-neutral Europe. The hydrogen strategy complements the Strategy for Energy System Integration, presented on the same day, to foster a climate neutral integrated energy system with renewable electricity, circularity and renewable and low-carbon fuels.

So why did the European Commission decide to publish a separate strategy for hydrogen, and why now?

First, the **time for a hydrogen strategy is right**. Europe is currently producing hydrogen from natural gas emitting between 70-100 Mt of carbon dioxide emissions per year. This hydrogen is primarily used as a feedstock in a number of chemical processes. With the increased ambitions to reduce greenhouse gas emissions by 2030 and prepare Europe's industry for a climate-neutral economy, clean hydrogen can address both concerns simultaneously. Investments in clean hydrogen are future proof, can replace fossil fuels in some carbon intensive industrial processes, lowers greenhouse gas emissions and gives the European industry a head start in an increasingly globally competitive market.

In parallel, the costs of renewable electricity decline and its share in electricity grows rapidly. This is why the **priority for the EU is to develop renewable hydrogen**, as the most compatible option with the EU's climate neutrality and zero pollution goal in the long term and the most coherent with an integrated energy system. It has a strong potential to support our future renewables-based electricity system, is a vector for renewable energy storage alongside batteries, ensuring back up for seasonal variations and connecting production locations to more distant demand centres. By 2030, renewable hydrogen should be cost-competitive and progressively be deployed at large scale alongside the roll-out of new renewable power generation. This process must be initiated now if we want to achieve our 2050 objectives of climate-neutrality.

The choice for renewable hydrogen also builds on **European industrial strength in electrolyser** production, will create new jobs and economic growth within the EU and support a cost-effective integrated energy system, which will be critical in the context of recovery from the COVID-19 crisis. The Commission's recovery plan highlights the need to unlock investment in key clean technologies and value chains. It stresses clean hydrogen as one of the essential areas to address in the context of the energy transition, and mentions a number of possible avenues to support it.

This is why the European hydrogen strategy sets out a vision of how the EU can install at least 6 GW of renewable hydrogen electrolysers by 2024 and 40 GW by 2030.

Second, since renewable hydrogen is not cost-competitive yet, there is also a need to go beyond energy policies to support this intrinsic puzzle piece of the future integrated energy system. The hydrogen strategy **therefore brings together different strands of policy action covering the entire value chain**, as well as the industrial, market and infrastructure angles together with the R&I perspective and the international dimension, in order to create an enabling environment to scale up hydrogen supply and demand for a climate-neutral economy.

From an industrial perspective, scaling up hydrogen in Europe requires a full value chain approach where the production of hydrogen from renewable or low-carbon sources goes hand in hand with the development of infrastructure to supply hydrogen to the end-consumers, and the creation of market demand. Two main lead markets, **industrial applications and mobility**, are envisioned.

Infrastructure needs for transporting hydrogen will remain limited in the next couple of years as production is expected to be close or on site, but planning of medium range and backbone transmission infrastructure should begin. Infrastructure for carbon capture and use of CO_2 will be required to facilitate certain forms of low-carbon hydrogen. In the period to 2030, the need for an EU-wide logistical infrastructure will emerge and the back-bone of a pan-European grid will need to be planned and a network of hydrogen refuelling stations to be established. For this purpose, the existing gas grid could be partially repurposed for the transport of renewable hydrogen over longer distances and the development of larger-scale hydrogen

storage facilities would become necessary.

The energy policy focus will be on laying down the **regulatory framework for a liquid and well-functioning hydrogen market** and on incentivising both supply and demand in lead markets, including through bridging the cost gap between conventional solutions and renewable and low-carbon hydrogen and through appropriate State aid rules, and facilitate entry of new producers. It would create viable price signals for investments and operational decisions.

Furthermore, hydrogen should be **mainstreamed in the EU's international**, regional and bilateral energy and diplomacy efforts, but also on climate, research, trade and international cooperation. International trade can develop in the next decade, in particular with the EU's neighbouring countries in Eastern Europe and in the Southern and Eastern Mediterranean countries. Broad agreement with international partners will be essential to promote EU regulations, standards and technologies and establish conditions for the emergence of a global, rules-based market that contributes to a secure and competitive hydrogen supply for the EU market.

For these policy actions to be successful Member States, regions, industry, investors and innovators need to join efforts. This is why the hydrogen strategy also established the European **Clean Hydrogen Alliance** to create the necessary pipeline of projects, and the Clean Hydrogen Partnership to coordinate research, innovation and demonstration projects across the full supply chain.

Paula Abreu Marques is the Head of Unit for "Renewables and CCS policy" in the European Commission, DG ENER since August 2013. She is responsible for defining and steering the EU renewable energy policy, including the implementation of the Renewable Energy Directive and the definition of a policy framework for post-2020, and CCS policy.

POWERSKIN+

"Highly advanced modular integration of insulation, energizing and storage systems for non-residential buildings"

INSIGHT

Buildings consume around 40% of the total energy in the EU. A minimum of energy wastage will thus be crucial contributing towards the EC targets regarding saving potential, decreasing the final energy consumption and the Greenhouse gases (GHG) emissions reduction. EU is dedicated to reaching an 80-95% GHG cut by 2050, from 1990, in the framework to the low-carbon economy.

The EC objective is to realize a large deployment of Plus Energy Buildings (PEB) in the EU by 2050. Considering the age profile of buildings in the EU (35% of the EU's buildings are over 50 years old) and the slow pace of the current retrofit, the renovation potential of buildings in the EU is considerable – up to 110 million buildings potentially need renovation.

The annual rate of home and commercial building renovation is well under the 3% required to achieve EU climate and energy goals. So how can we achieve the required renovation rate? By ensuring that the retrofitting process is advanced, cost-effective and energy-efficient.

Given the facts mentioned above, there is no doubt that the EU building market is craving for the most innovative building renovation solutions. This is where POWERSKIN+ comes into the picture.

ABOUT POWERSKIN+

POWERSKIN+ is a collaborative project supported by the European Commission under the Horizon 2020 Programme for Research and Innovation (Call LC-EEB-01-2019), with a duration of 48 months.

The project consortium comprises of a value chain formed by renowned key partners across Europe, industrially focused and highly capable of generating knowledge and innovation. It is a diverse consortium consisting of 14 partners from 8 European countries. The partner's list includes material suppliers, prestigious manufacturers, installers and end-users along with acclaimed disruptive spin-offs.

"POWERSKIN+ aims to develop a truly innovative façade solution based on a smart integration of highly energy efficient components, including super-insulative elements, solar energy harvesting and active energy storage features, all in one single combined active/passive management system especially addressed for modern non-residential Curtain Wall retrofitting solutions." says Jorge Corker, the Project Coordinator from Portuguese Innovation and Technology Institute – Instituto Pedro Nunes.

POWERSKIN+ intends to be at the forefront of the first generation of off-site prefabricated, modular "ready-to-buy" and easy-to-install glazing and opaque elements, with sustainable eco-designed connecting framings, improved functional coatings, active and passive thermal energy storage (TES) solutions and integrated semi-transparent PV cells. The solar electric harvesting features will be matched and completed with a dedicated large capacity building electric storage system, in a true energy management turnkey package.

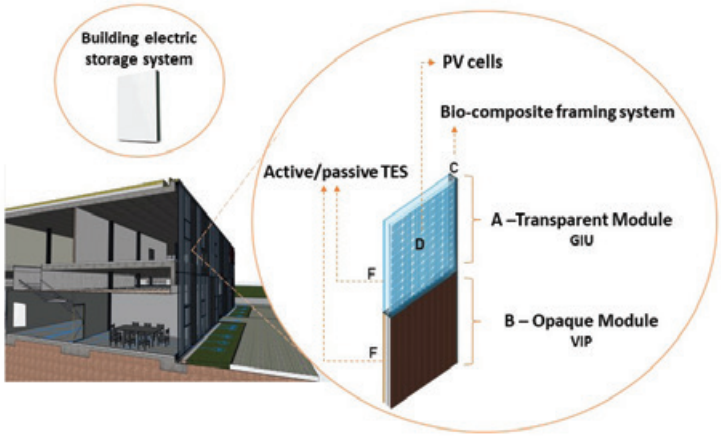
OBJECTIVES

- Insulation & climate control
- Easy module installation
- Energy harvesting
- Energy storage

CONCEPT

The concept proposed by POWERSKIN+ releases the untapped potential in the energy insulation/valorisation and energy generation of building façades by developing an integrated approach consisting of a number of innovations whose technologies, efficiencies and added

Figure 1: POWERSKIN+ Concept



value exceed the currently available alternatives on the market.

POWERSKIN+ presents a radically new vision for the energy insulation and renewable generation, combining several breakthrough developments in highly energy-efficient materials and superinsulation elements, solar energy harvesting components and active energy storage features. Among them, it includes state-of-the-art Glass Insulation Units (GUI) combined with an active heat storage fluidic capillary system, advanced Vacuum Insulation Panels (VIP), Phase Change Materials (PCM), cutting-edge flexible perovskite solar cells and multi-functional nano-enabled coatings.

At the same time, each of these sub-technologies is designed for highest compatibility with standard manufacturing lines so that rapid implementation, adaption to various use-cases (e.g., dependent on building location) and market penetration can be ensured.

The vision is materialized in the development of modern lightweight Curtain Wall and DSF retrofitting systems for non-residential buildings, comprising of the first generation of off-site prefabricated glazing and opaque elements with eco-designed framings, multi-functional coatings with self-cleaning, light-reflective or absorbing, self-healing properties, active and passive thermal energy storage and integrated semi-transparent PV cells and in the implementation of three demonstration constructions.

POWERSKIN+ will create and demonstrate pilot nearly-Zero and Plus Energy Buildings (nZEB and PEB) that can also be affordable, provide a comfortable and healthy indoor environment and be stimuli-responsive to dynamic climatic conditions, occupant comfort and energy-efficiency requirements.

Taking advantage of its modular nature, different combinations of POWERSKIN+ modules and addons can be set to match any specific need and refurbishment budget. In its full package, branded as POWERSKIN+ Upgrade, the system targets the deep renovation market and accelerates the transition to plus energy ranks, while providing a unique all-in-one envelope retrofit solution.

Figure 2: POWERSKIN+ Demonstration sites

DEMONSTRATION SITES

POWERSKIN+ will prototype and demonstrate both premium and affordable solutions, for lightweight and non-load-bearing curtain wall and DSF systems, based on highly durable system components. POWERSKIN+ façade renovation system will be demonstrated and validated in an operational environment in 3 real-size non-residential buildings located in 3 different European countries (Portugal, Slovenia and the Czech Republic). The demo cases represent 2 different climates (Hot-summer Mediterranean and Oceanic), as well as different building practices (commercial, office, etc.), characterizing and demonstrating how the overall system will work in real conditions in the future.

Project ID: 869898

Website: https://www.powerskinplus.eu/

Start date: October 2019

Duration: 48 months

Project coordinator: Jorge Corker

Contact email: info@powerskinplus.eu

Project partners: IPN, Fraunhofer ICT, Friedrich-Schiller-Universität Jena, Brunel University London, FENIX TNT, Flachglas Sachsen, Politecnico di Torino, Oxford Brookes University, Czech Technical University, Navodnik, Saule Technologies, Warsaw University of Technology, AMSolutions, Saule Research Institute

POWERSKIN+
walls energizing buildings

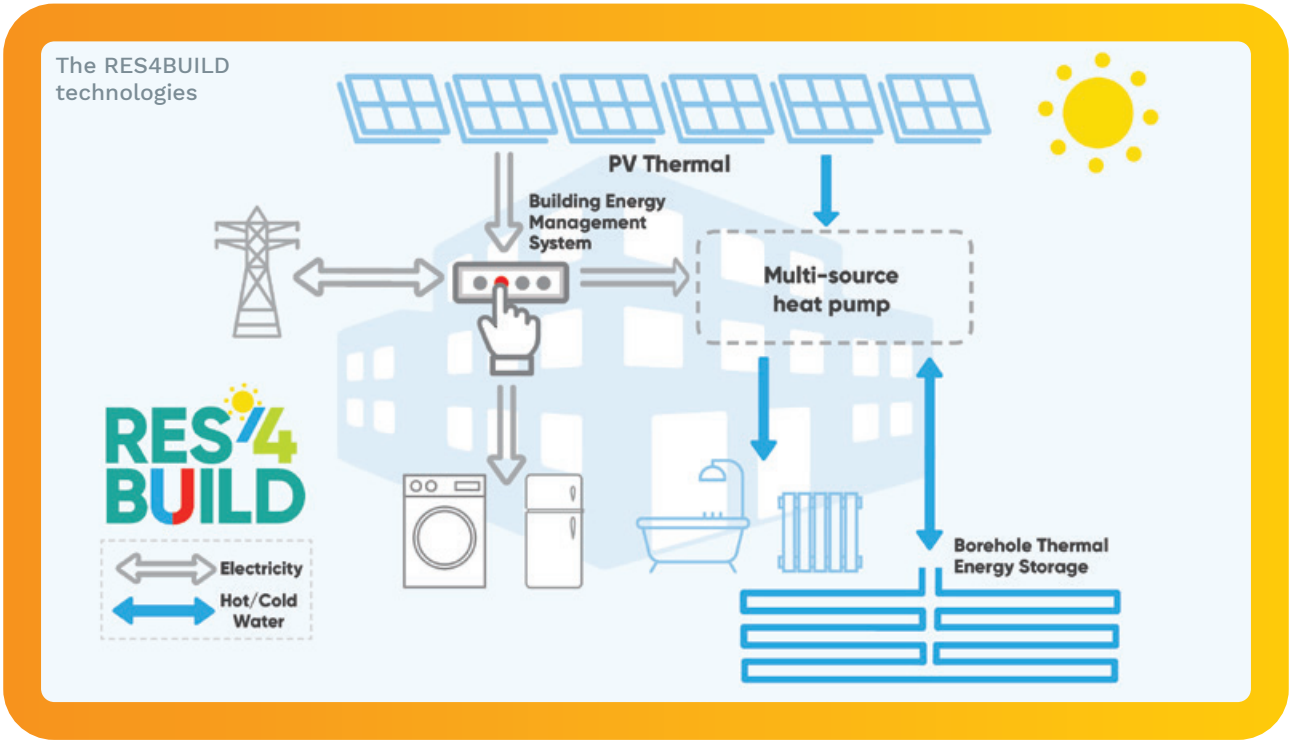
Smart Control for Buildings powered by on-site Renewable Energy

By Gowri Suryanarayana (VITO-Energyville) and Eva Greene (Intrigo)

Maintaining indoor comfort in buildings accounts for more than 30% of total energy use worldwide[1]. Hence, smart control of building energy use can contribute greatly towards energy sustainability goals. A big advantage of well-insulated buildings in this aspect is their thermal inertia; they take a long time to lose stored heat and can be used to a certain extent for heat storage, offering flexibility in heating/cooling schedules. For instance, a building equipped with solar panels and a heat pump can potentially be heated within acceptable comfort levels when electricity is generated from the solar panels, so there is no need to use the heat pump when there is no solar electricity available. Excess generation can also be stored in heat storage elements.

In order to achieve such control, it is important to understand and therefore model the behaviour of all components involved. The models can then be used to predict the system's behaviour in various scenarios and to optimally control it. This is an important element of the RES4BUILD project, which is developing integrated renewable energy-based solutions that are tailored to the needs and requirements of users and installers. The partners are working to improve the performance and reduce the cost of the most innovative components of the RES4BUILD solutions – by integrating PVT collectors, magnetocaloric and multi-source heat pumps and optimising their performance through advanced control and building energy management systems. The developed solutions will be validated in different regions, paving the route to the market and ensuring wide adoption.

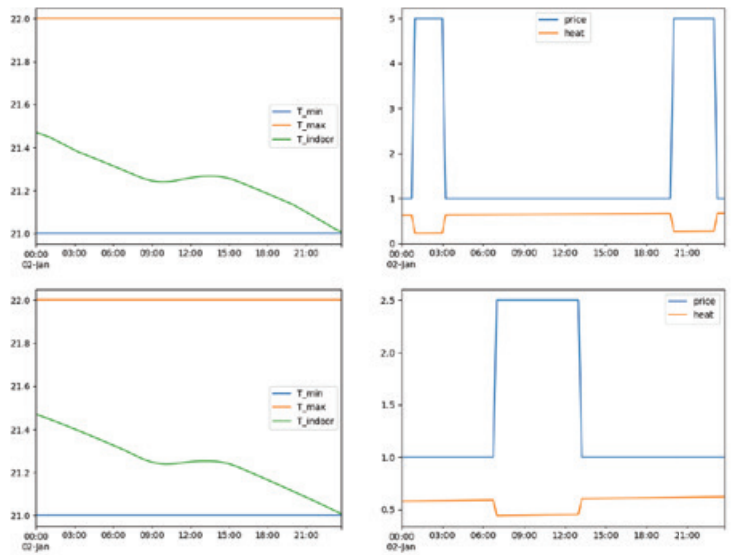
Consortium partners VITO-Energyville and Demokritos are modelling the behaviour of the various RES4BUILD system components – heat pumps, solar panel yields, long- and short-term heat storage, and the building thermal mass. One of the ways to model a building's thermal mass is to estimate the indoor temperature given the ambient conditions and the inputs i.e. outdoor temperature, solar irradiance incident, heating/



cooling. The project's approach uses grey box models[2] to approximate the building model by grouping various physical components together, and then identifying the parameters corresponding to the grouped components in a data driven way. They capture the thermodynamics to a certain extent but are also easily applied across buildings because of this data driven approach. Once ready, the models of the various components can be used in a framework for optimal control of the system to maximize self-consumption or minimize use of fossil fuels and costs.

The grey box models used in RES4BUILD, also known as RC models, group various building components into thermal resistors and capacitors. Data is collected from in-situ sensors to identify the values for the resistors and components. The data required to train/validate these models typically include time series data for indoor and outdoor temperature, as well as heat/cold input to and solar irradiation incident on the building. The identified model is then used in a simple cost minimization scheme using model predictive control. The figure shows the outcome of the optimal control of a building in response to two different price signals. In both cases, the indoor temperature is maintained between the comfort constraints of 21 and 22°C, but the power schedules are very different and follow the price i.e. consumption is higher when price is lower and vice versa. The cost minimization can be used to achieve different cases, where price can be used to shadow the behaviour of other variables – for instance, the price could be low when the renewable generation is high. Optimal control will then steer the building to consume more when renewable generation is higher.

Optimal control in response to two different price signals



The RES4BUILD project will in this manner implement a much more involved optimal control to steer a building connected to innovative heat pumps, solar-thermal generation and borehole thermal energy storage. The models will be calibrated for six case studies in three countries across Europe, and the outputs will primarily feed into stakeholder engagement work, quantifying the system performance and allowing stakeholders to make an informed decision about the elements of the system that suits their needs. The outputs of these algorithms also support the design of the integrated energy systems and the application of the building energy management system. The project's ultimate aim is to increase the uptake of renewable energy solutions for heating and cooling; decarbonising the energy consumption in buildings and contributing to EU energy and climate goals.

For more information please visit www.res4build.eu or contact Gowri Suryanarayana at gowri.suryanarayana@vito.be.

The RES4BUILD project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 814865. This output reflects only the author's view. The Innovation and Networks Executive Agency and the European Commission cannot be held responsible for any use that may be made of the information contained therein.

1. International Energy Agency and International Partnership for Energy Efficiency Cooperation (2015) Building Energy Performance Metrics. Supporting Energy Efficiency Progress in Major Economies. OECD/IEA Technical Report.

2. Prívara et al. (2013) Building modeling as a crucial part for building predictive control. Energy & Buildings, 56:8–22; De Coninck & Helsen (2016) Practical implementation and evaluation of model predictive control for an office building in Brussels. Energy and Buildings, 111:290 – 298; Arroyo et al. (2018) A Python-Based Toolbox for Model Predictive Control Applied to Buildings. Proc. of the Intelligent Building Operations Workshop in Purdue, Indiana.

Step up the electrification of ports to decarbonise on-site industries and maritime transport

By Kristian Ruby, Secretary General of Eurelectric

The power sector's decarbonisation has reached a historic speed and scale, with the share of renewables sharply rising and the fossil fuels leaving the generation mix.

In the first half of this year, renewables – wind, solar, hydro and bioenergy – generated 40% of the EU-27's electricity, whereas fossil fuels accounted for one-third, 18% less than the same period in 2019. This led to a 23% drop in the CO_2 emissions from the power sector.

With the cleanest electricity ever, the deep nexus between electrification and decarbonisation becomes undeniable. But, it should go without saying: the higher our aim to reduce the CO_2 emissions, the greater the need for electricity. So, what's next?

We need to accelerate the electrification of carbon intensive sectors of the economy: transport, buildings and industry. The potential is huge: 63% of the energy use in transport and in buildings, and 50% of that used by industries, can be electrified.

An unprecedented societal cooperation, with industries working closely together to spur the clean energy transition, is now needed to beat the clock and move towards a net-zero emissions economy.

So what are the new frontiers of electrification? One sector which urgently needs a credible decarbonisation pathway is maritime transport, which still relies on highly polluting fossil fuels. A critical element in the reimagining of the maritime industry is the ports, where ships dock their carriage and refuel.

Over the past year, Eurelectric and DNVGL worked closely together to see how ports can best contribute to the global race to cut the CO_2 emissions. The clear conclusion was that ports can play a pivotal role in Europe's decarbonisation agenda.

Port sites present ample opportunities for decarbonisation as they host numerous industries, including maritime and heavy transport, cruise tourism, manufacturing and chemical, as well as power plants. They are an intersection point for three sectors with the highest potential for electrification: transport, buildings and industry.

Ports are fundamental to decarbonise electricity generation

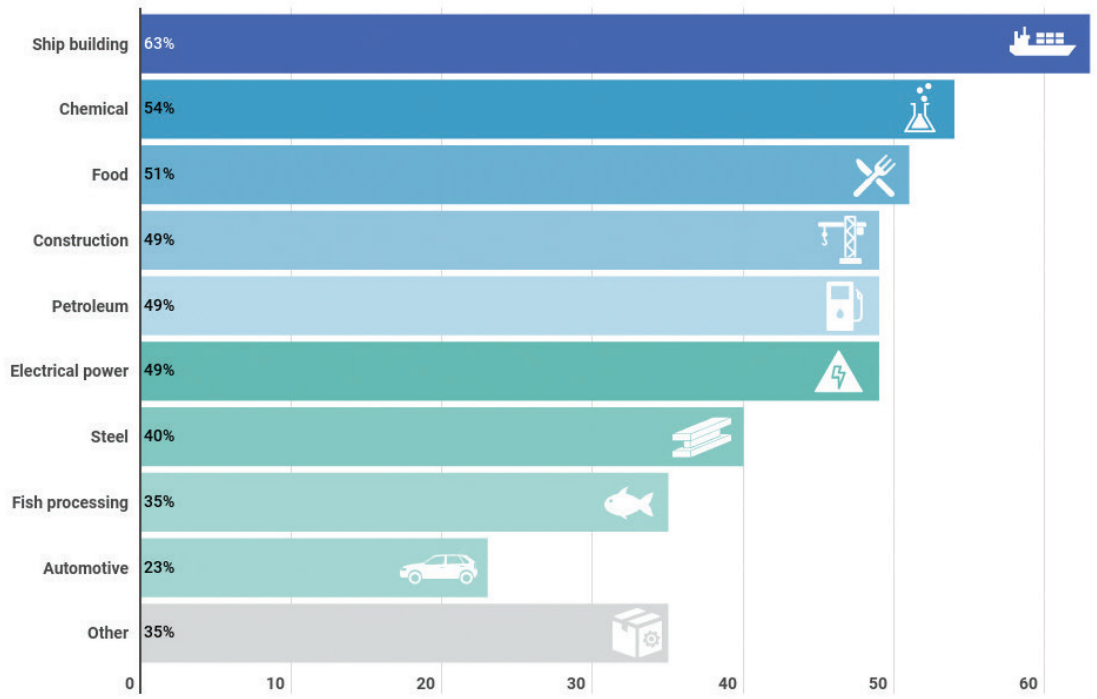
Ports can contribute to the decarbonisation of electricity generation. They are the natural landing point for the huge planned capacity of offshore wind and can play a major role in the development of offshore wind activities. In addition, they present great opportunities for the deployment of solar PV installations.

In the coming 30 years, the total electricity generating capacity for industrial ports could increase more than tenfold, with renewables covering the lion's share, if measures are taken to tap their full potential.

Amid this transformation, ports could turn into net clean electricity exporters, or even, power brokers.

Decarbonise industrial clusters & increase the energy efficiency

The analysis shows that only five percent of the electricity generated around industrial ports will be used on site. Industrial clusters, located in their vicinity, would then benefit from



*The percentages indicate the fraction of ports hosting the type of industry on a pool of 200 ports form 19 EU Member States, as well as Norway and Iceland.

the bulk of the remaining generated power.

But the opportunities do not stop here. Ports could emerge as energy hubs, offering ample opportunities for sector integration, via direct and indirect electrification. A more integrated way of working would result in a more efficient and sustainable system; in optimised energy infrastructures, able to integrate increased amounts of variable renewables and support the flexibility needs; and in decarbonising the electrified energy demand.

Stepping up the cooperation between the electricity sector, the local industries, port authorities and terminal operators, as well as regulatory and permitting agencies, is now essential to fully grasp the benefits of sector integration.

Indirect electrification leading to cleaner industrial output

While not everything can run on clean electricity – at least not immediately – hydrogen is emerging as an alternative for those sectors that benefit from indirect electrification, such as heavy industry or maritime transport.

However, the most commonly used method to produce hydrogen, by splitting natural gas molecules into their main constituent parts, carbon and hydrogen, is such an emissions-heavy process that in 2017 the amount of CO_2 stemming from this industry was as high as the one of the entire German economy.

Clean alternatives, powered by indirect electrification, do exist. Green hydrogen can be produced in and near ports, using the abundant renewable-based electricity. Extracted from water, via electrolysis, clean hydrogen could serve for the production of novel maritime fuels, such as ammonia, or be used as feedstock for other industrial processes.

Paving the way for clean maritime transports

The report also points to other areas where decarbonisation and increased efficiency could go hand in hand:

- Cold ironing, also known as shore-

to-ship, the process of powering the on-board activities while the vessels are docked. Rather than using the on-board oil-powered electricity of the vessels, this energy demand could be met with clean shore-based electricity, thus tackling the emissions from one of the most energy intensive port activities.

- Development of short-sea shipping battery vessels. In several countries, electric ferries and boats are being introduced for short distances, thanks to numerous innovations that have turned batteries into cheaper and better alternatives. The electric vessels rely on the adequate infrastructure for charging, however, which needs to be developed in parallel.

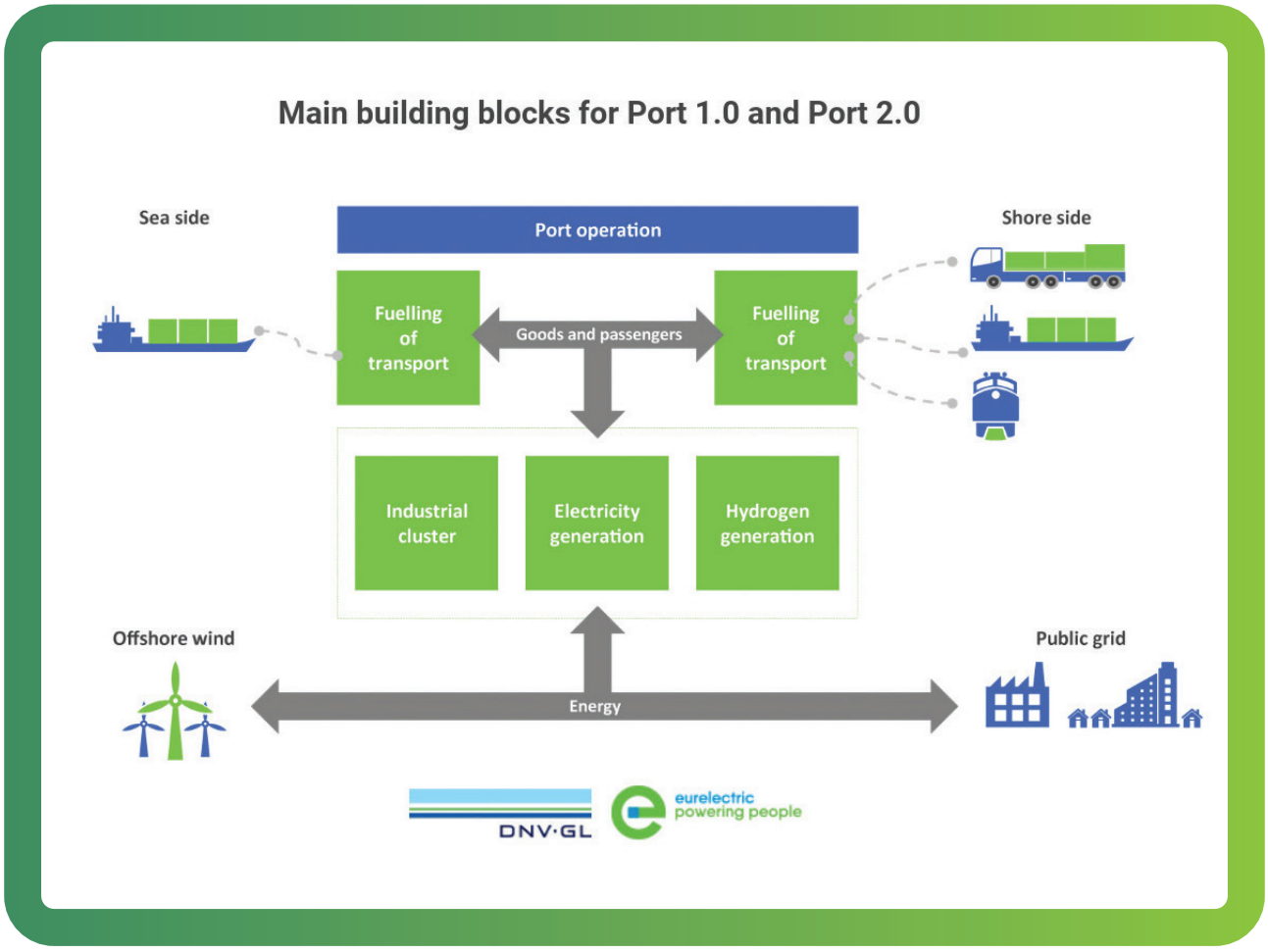
Today transport accounts for one-third of EU CO_2 emissions, with road transport being responsible for 72% of transport CO_2 emissions and water transport for 14%. However, the relative contribution of water transport is likely to increase in light of stringent targets meant to reduce the emissions from transport.

There are ample opportunities for ports to play an active role in advancing decarbonisation, but political attention is needed to remove barriers and provide the right incentives.

First, it is essential to stimulate a further electrification of port connected activities and early movers. Multiple options could be explored: support those who transition to electric solutions, although these are not yet market competitive or devise buy-back arrangements as a way to compensate first movers.

Second, to attract investments a friendly and simple financial regulatory ecosystem is needed. The fuel switch could be boosted if electricity is included in a special category of marine fuels taxation. In addition, ensuring sustainable Public Private Partnerships would accelerate the green transition.

Finally, the electricity infrastructure must be strengthened, and sometimes expanded, to unleash the ample benefits of sector integration. Through better coordination between all port stakeholders and careful assessment of transformation needs, ports can be the frontrunners of the energy transition.



Interreg Greece-Italy
European Regional Development Fund
EUROPEAN UNION
REGIONE PUGLIA


Eng. Barbara Valenzano

Long Term mission of the AI SMART Project: setting tourist routes towards a greener horizon

The maritime tourism sector is a driving force for regional development, especially in the Adriatic–Ionian regions. Tourist ports represent important attractive gates to the regions, and they are often characterized by high aesthetic, natural and historical value. Their economic benefits are based on the scenery of the surrounding coastal area, on their environmental quality and on the capacity of the ports to create green routes to satisfy a "sustainable" and "inclusive" tourism demand.

In the small port network the AI SMART Project is a strategic proposal financed by the Interreg V-A Greece–Italy Programme 2014-2020. AI SMART aims to implement a common port network in the Adriatic Ionian area that connects, through an ICT Platform, all touristic ports of the Apulia Region in Italy and those operating alongside three Greek regions: the Ionian Island region, the Region of Western Greece and the Epirus region. The ports will share in common their facilities and their services in a transnational network based on the concept of smart, green and sustainable ports, exploiting the short-sea routes as an alternative to the cruise routes, to promote sustainable tourism. The AI SMART ports, through efficient connections with rail and inland transport networks, will act as key-hubs from which, access to inland territories, can be facilitated to discover their natural and cultural heritage

The Project is led by the Department of Mobility, Urban Quality, Public Works, Ecology and Landscape of the Apulia Region. The idea behind this project – said the Head of Department, **Eng. Barbara Valenzano** - is that our territories deserve the development and setting up of short-sea routes towards a greener horizon: the Apulia Region has more than 400 km of coastline and more than 100 ports operate along the Adriatic coast. From the Gargano to the Salento, many ports and resorts have been awarded the Blue Flag certification in recognition of the beauty of their coastline, their clean water, and the large assortment of services they offer to tourists. Our idea is to develop the AI SMART network as part of an integrated and sustainable transport system that can boost some of the TEN-T Corridors ,getting through southern European territories, such as Apulia Region in southern Italy, Albania, Montenegro and Greece, as is the case in the Corridor VIII.

The project will create an ICT platform that can become the "virtual common environment" for increasing the capacity of local authorities and decision-makers to identify, manage and provide prompt solutions to day-to-day problems faced by small ports, starting from the identification of resources (human and financial) for infrastructural and non-infrastructural interventions, to the continuous monitoring of the impact of environmental stressors as required by Environmental Management System – declared the Project Manager, **Dr. Matilda Mali**.

The collection of this data will be the first step for defining a transnational governing tool and to promote a continuous and quite automatic updating of the Port Environmental Policy – said **prof. Umberto Fratino** of Polytechnic University of Bari, one of the research body involved in AI SMART Monitoring Activities.

In a similar context - **Eng. Valenzano** added - we also focus on other projects, which the Apulia Region is leading together with an international partnership financed by different Cross-border Cooperation Programs, i.e the ALMONIT project within Italy-Montenegro-Albania Program, the MARLESS Project and the CASCADE Project within the Italy-Croatia Program. ●

The current crisis brings the critical and central role of Europe's ports to the forefront

By Isabelle Ryckbost (pictured), Secretary General, European Sea Ports Organisation (ESPO)

The unprecedented health and economic crisis the world is facing today will be radically overturning current realities, assumptions and strategies. Our economy and life are affected in almost all its aspects. And let it be clear, the world will find itself in economically heavy weather for some time.

Although today this might sound strange, we should also remember that a crisis can lead to opportunities and solutions to certain challenges; or as the old saying goes: never waste a good crisis.

From a port perspective, there are three important takeways from the COVID-19 crisis. It has clearly put the critical and essential role of Europe's ports on the forefront. The crisis has also highlighted the agility and adaptability of ports and, most important, ports can play a central role in Europe's recovery strategy.

Since February this year, when the COVID-19 pandemic landed in Europe, ports have been doing everything possible to ensure the continuity of their operations. Notwithstanding the radical lockdown measures in most Member States, European ports remained open and fully operational. They have successfully activated contingency plans, demonstrating their role as essential and critical infrastructures, being crucial in the supply of necessary goods such as essentials, raw materials and medical equipment. It will therefore be essential for Europe to further recognise that ports are an essential part of an emergency supply chain and identify ports as part of the critical infrastructure of strategic importance in the framework of the InvestEU's Strategic European Investment policy window. Moreover, this recognition of ports as strategic assets should not be limited to the context of the current pandemic crisis, but should also be seen in the light of the increasingly instable geopolitical circumstances. A significant geopolitical crisis can further jeopardise the supply of good to Europe, including the much needed sources of energy. This in turn can challenge the role and resilience of ports as hubs of energy.

Secondly, the current crisis has clearly demonstrated the agility and responsiveness of port managing bodies and their ability to find quick solutions for sudden problems and changing circumstances. Ports are often seen as slow movers. They are a heavy asset, adapting plans and strategies often implies asking authorisations, wide stakeholder consultations and obtaining a sound financial plan. But during this crisis we have seen many good examples of how ports have been reorganising their operations overnight, setting up measures to ensure the continuity of critical functions and teams throughout the heat of the first wave of the COVID-19 pandemic. The way ports have been responding to the fear of a sudden shortage of warehouses illustrates the same. Because of the lockdowns in many European cities and big consumption centres and the obstructions in the hinterland because of temporary closure of borders, many goods got stuck in warehouses awaiting their final destination. Very quickly ports anticipated to the expected shortage of warehouses by facilitating agreements with temporary unused cruise terminals or by renting extra plots of lands in the wider area.

The third message I would like to convey is based on the above and is looking at the recovery strategy. We have seen how important it is to have resilient supply chains for getting through and over such a crisis and for keeping the economy going. We have also seen from the financial crisis in 2008-2009 that ports are resilient and tend to recover quickly.

Even if the current crisis cannot be compared one on one, the 2009 crisis can give an indication. From 2008 to 2009, the EU-28 GDP dropped by -4.3%, which led to a fall in total throughput for the EU-28 ports of -12.14%. In 2010, the GDP in the EU grew again by 2.1% generating a growth in throughput for European ports of almost 6%. These figures indicate that negative economic trends have a multiplied impact on cargo volumes in ports, but when the economy recovers, ports recover even faster. Ports can thus clearly be seen as a catalysator for recovery.

End of May, the Commission presented its Recovery Strategy,

which not only aims at preserving the achievements of the last seventy years, but takes a leap forward. The strategy wants to ensure that the recovery in Europe, which is being put forward under the name of Next Generation EU, is climate neutral, digital, social and ensures that Europe remains a strong global player in the future. Or as Commission Vice President Frans Timmermans said at a September virtual event: "There's no going back to business as usual. Even the strictest penny pinchers will admit that now. It's just bad economics: why spend money to keep things as they are, when you know you'll require money again to change them in the near future?".

Recovery projects that allow to progress on decarbonisation, greening and digitalisation will be prioritised. Ports are, by definition, not only worth to be supported because of their role as engines of growth and recovery but, as hubs of energy, they are also ideally placed to play a role in achieving the green ambitions.

It is true that in the short term important European oil ports might face challenging times. The demand for oil has been slowing down and is, as a consequence of the greening, not following any longer the pace of economic growth. Moreover, the current standstill of the economy has led to never seen drops in the demand of energy sources, in particular oil.

But the clear ambition of Europe to become the first climate neutral continent and the unambiguous message to go for a green recovery could be good news for many ports. It will trigger and accelerate the development of renewable energies and climate neutral technological solutions. And Europe's ports can play an important role in this development. They can be a node in the development of these new value chains and can, depending on the situation be facilitator, co-investor, catalysator or who knows even operator.

Hydrogen is a good example in that respect. Port areas can be ideal spots for the production, transport and storage of hydrogen. The use of hydrogen can be stimulated in and through ports, combining the use for transport with the use for the industry sectors active in the port.

Another interesting field is the circular economy. Many European ports are hubs of industry and/or situated in or near big urban agglomerations. The waste streams of the city can be re-used as energy for the industries active in the port, or vice versa, where the waste of the port becomes the energy for the city. In addition, the waste can be transported through ports in view of achieving the most optimal valorisation of waste flows.

The port being the unique interface between sea and land, ports will also play an increasingly important role in the development and deployment of renewable off shore energy and blue energy.

Furthermore, ports can play an important role in the transport and supply of the raw materials – often critical - that are needed for the new energies. This might imply changing the connectivity to and from the ports and adapting the infrastructure in the port.

The Commission is currently rolling out strategies for each of these areas and foresees large support for boosting the energy transition. By pumping the extra recovery money into these innovative energies and technologies, we might be reaching a tipping point for breakthrough of these solutions. It is now to the ports to cease these opportunities. It is up to the policy makers to recognize the role ports can be playing and support it not only through financing but also by updating policies. Recognising pipelines as a mode of transport and coordinating the European transport and energy networks are essential in that respect.

European Green Capital Network To go 100% renewable, cities must harness the potential of their citizens.

By Priscila Jordão and Lucy Russell

If Europe is to become the first climate-neutral continent by 2050, its cities need to think and act beyond their borders, consider the social and technological aspects in urban planning, and harness the ideas and potential of their citizens. These are the main conclusions of the new toolkit “How can your city become 100% renewable?”, launched by the European Green Capital Network.

The toolkit contains guidelines, tips and inspiring stories from renewable energy experts and urban planners from the European Green Capital Network, a select group of winners and finalists of the prestigious

Lisbon: ©flickr.com Pedro Ré

Solar panels in Nuremberg: ©Hr. Brummer

European Green Capital Award. The aim of the toolkit is to encourage other cities to take the next steps towards a carbon-neutral Europe.

Energy hungry and carbon emitting, cities are the focal point of the transition to renewable energy. They are simultaneously the sources of more than 70% of the carbon emissions from energy use, according to the IPCC, and sites of experimentation for radical decarbonisation, with great capacity for innovation and change.

The toolkit looks beyond increasing renewable energy sources; it is also about improving energy efficiency and reducing energy demand through infrastructure changes in mobility, housing and other sectors. It highlights successes, but more importantly it shows how the cities have achieved their goals and the obstacles they faced, such as opposition to wind park developments or the resistance to change consumption patterns.

One of the most emblematic case studies featured in the toolkit is the story of how Umeå, in northern Sweden, turned one of the biggest fires in its history into an opportunity to make the neighbourhood of Ålidhem more sustainable. As parts of Ålidhem were suddenly destroyed by the fires in 2008, many residents felt as if a nightmare had come true. The tragedy, however, prompted rebuilding efforts with the goal of reducing energy consumption in the area by more than 50%. Buildings in the neighbourhood received better insulation to limit energy consumption to a maximum of 65 kWh/m2/year, while district heating became almost entirely renewable. Photovoltaic cells were built on the roofs to harness solar energy, and a large solar plant was installed to provide Ålidhem with a generation capacity of 405 kWp.

But Umeå's goal was not only to equip houses and balconies with PV cells or improve energy efficiency in the 137 new homes and 405 refurbished apartments in Ålidhem. A central element of the Sustainable Ålidhem project, ran by the Umeå Municipality, Umeå Energi and Bostaden from 2010 to 2014, was

Students in Umea: ©City of Umea

the participation of residents, many of whom were students, migrants and members of underrepresented groups. Discussions with the tenant's association ensured that rents stayed affordable, with the price increase limited to 5-10%. At the same time, public engagement, a communications campaign and interactive activities contributed to keeping most of the original residents in the region, which was seen as a huge success.

Apart from telling the story of Umeå's sustainable neighbourhoods, the toolkit explores the solar energy strategy in Lisbon (Portugal), the retrofitted energy-efficient public buildings of Ljubljana (Slovenia), and regional cooperation for renewable energy in Nüremberg (Germany).

In Nüremberg, where residents from rural and urban areas led a movement opposing wind turbines and a state regulation imposed obstacles to their construction, different initiatives are trying to turn the tide. The strategy is to change Bavaria's "10-h-rule", which states that the minimum distance to houses must be ten times greater than the height of a wind turbine, and establish feasible procedures for the implementation of new turbines.

Although opposition from some citizens exists, the private sector is not alone in driving the development of renewable energy installations in Nüremberg. So-called 'Citizen Wind Parks' and 'Citizen Solar Parks', through which locals become invested in power generation projects, are helping to increase their acceptance. Of the 50,000 solar energy units in the region, more than half comes from investments by individuals.

A clear message from the European Green Capital Network in the 100% Renewable toolkit is that energy transitions can take all shapes and sizes but there is one thing they need to have in common: that the process is inclusive and leaves no-one behind. This also means that cities need to consider the impacts of gentrification when planning housing developments, or the role of gender when working on mobility. In Umeå, for instance, women are 15-20% more likely than men to choose sustainable transport for the same journey.

Throughout 2018-2020, the European Green Capital Network held expert workshops on different urban thematic development visions to share with and inspire other cities. The 100% Renewable toolkit is the second in a series of five toolkits on different themes, which summarize takeaways from the expert workshops and address the challenges that cities face in becoming more sustainable. In addition to the 100% Renewable toolkit, the EGCN Future-proof and Green Capital toolkits are already available, the last one containing tips for cities interested in applying for the European Green Capital Award. Upcoming toolkits will be based on the topics of Zero Waste and Human Scale cities. ●

The toolkit "How can your city become 100% renewable?" is available at https://ec.europa.eu/environment/europeangreencapital/applying-for-the-award/egcn-renewable-toolkit/. In addition to a 20-page downloadable brochure, you can watch video interviews with the contributing experts and access further energy-related tools and resources for cities.

HIGH PERFORMANCE GREEN PORT GIURGIU

A NEW LOGISTICS HOTSPOT IS EMERGING

The global main objective of "High Performance Green Port Giurgiu" is to transform the port of Giurgiu into the first efficient green port on the Danube. This project is funded with 85 % by the European Union.

The construction of the first tri-modal logistics center on the Lower Danube with a fully covered ship berth built by ILR Logistica Romania is in progress. In this building it will be possible to load and unload trucks, wagons and ships independent of any weather conditions.

The connection of the tri-modal logistics center to the public railway (about 740 meters newly built railway track) and the rehabilitation of the access roads inside the port area (about 1.3 km) are nearly completed.

For the foundation of this new logistics center thousand tons of filling material were necessary and more than 920 concrete piles had to be drilled to protect the logistics center from high water of the Danube. The highlight of this logistics center will be a ship berth inside the hall.

The logistics center will be equipped with 2 bridge cranes and a modern computer-based supply chain management system. An increase of the annual capacity of the port from current 140,000 tons to 300,000 tons in the next years is the objective. Furthermore it will create new jobs in the Giurgiu region.

At the beginning of 2021 operation in this most modern logistics center in Southeastern Europe will start. It ensures a quality-assured transshipment of high-class industrial goods like steel or automotive components and offers companies a perfect logistical infrastructure.

The effects of this logistics project will positively influence the macro-economic, environmental and social aspects in the Giurgiu-Bucharest-Russe region in the next years.

High Performance Green Port Giurgiu

PGPG iurgiu

STAGE II CONSTRUCTION

FACTS & FIGURES

Size of the logistics center: 230 m length, 40 m width

Size of ship berth inside the hall: 100 m length, 15 m width

Equipment: 2 bridge cranes with a lifting capacity of 42 tons

Co-financed by the European Union
Connecting Europe Facility

www.ilr.com.ro/projects/high-performance-green-port-giurgiu.html

Encouraging citizens' participation in the energy transition

Energy communities have a big role to play

By Sara Giovannini, Communication Officer – Covenant of Mayors Europe

In the 2019 Clean Energy for Europeans package, the EU officially acknowledges the key role played by citizens and energy communities in the energy transition. The EU defined a set of rights and obligations and called for EU Member States to make sure they offer an "enabling framework" to support their development. Currently, energy communities are not only contributing to reaching the EU climate and energy objectives, but could also speed up the recovery from the crisis triggered by COVID-19, by fostering the creation of local jobs and supporting small businesses. That is why more local authorities should get involved in such projects.

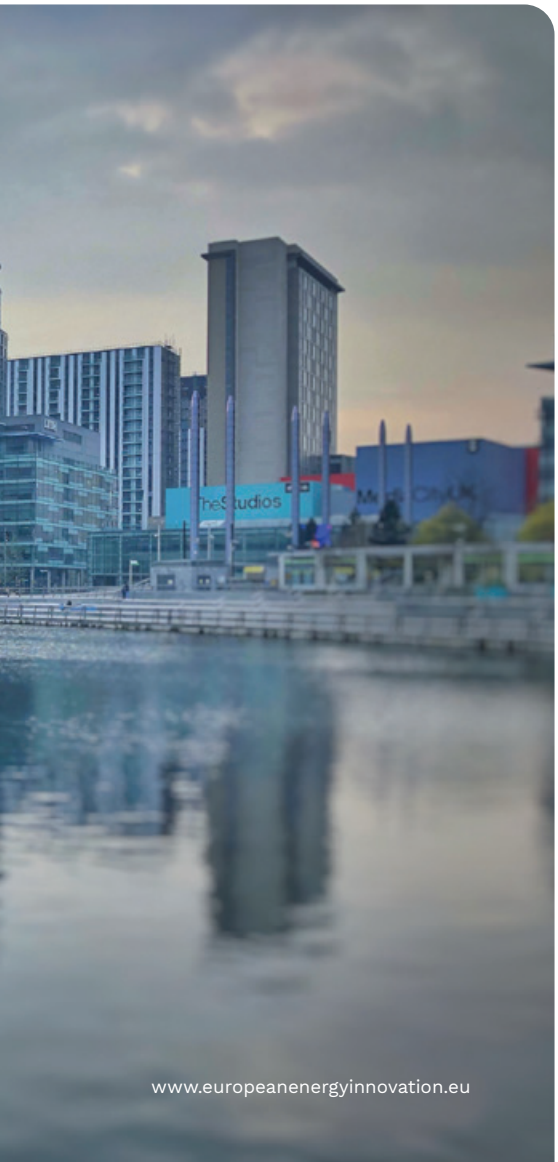
Within over 10,000 (and counting) European Covenant of Mayors signatories, we have already some successful examples of this city-citizens cooperation, allowing cities and towns to drive the implementation of their Sustainable Energy and Climate Action Plans forward. The Belgian City of Mouscron set up their local renewable energy cooperative COOPEM in 2017 to finance renewable energy production in their area. The city owns stakes of the cooperative, together with citizens and other local actors. Under the cooperative's impulse, there have already been 100 installations in private homes: 1,145 solar panels expected to produce around 292 MWh each year.

Energy efficiency communities for buildings' renovation

While the concept of energy communities producing renewable energy is well known, energy efficiency communities can also be set up to foster cooperation in another priority area for Europe: residential building renovation. In Manchester (UK), the local cooperative Carbon Coop developed a retrofit programme called "Community Green Deal", in collaboration with the European Covenant of Mayors' signatory Greater Manchester Authority.

The project enabled households to receive a free assessment, to access zero interest loans, to benefit from a professional design package and contractors procured and managed by Carbon Co-op. Nine out of the 12 completed retrofits were included in a single contract, with Carbon Co-op as the client, managing the project on behalf of the household/members. Retrofit works ranged from external wall insulation to the installation of efficient boilers and solar panels. As a result, gas use decreased by 47% and each household saved from €200 to €700 a year.

Zelo Buon Persico (Italy) also shows an exemplary case of collective energy efficiency intervention, amongst the first of its kind in the country. At the end of 2017, they launched a call for tender to replace old thermal plants in public buildings and upgrade the public lightening system with LED lamps, but received no offer. The Italian cooperative Energia Positiva decided to enter the competition and won the contract. The cooperative raised around €500,000 from its members (some of them are also residents of Zelo Buon Persico) and subcontracted the job to two companies that are also part of the cooperative. In exchange, the municipality agreed to a 20-year contract in order to amortize the interventions and allow the cooperative to get return on investment.



The EU Climate Pact needs local communities

The soon–to-be-released EU Climate Pact is supposed to "bring together people and organisations to share ideas and experience, and to work together" for climate and the environment. For this initiative to be successful, local authorities, the body of government closest to people, have a big role to play, and energy communities are (one of) the most successful form of cooperation for the local energy transition.

Furthermore, if there is anything we have learnt from the COVID-19 crisis, it is that in difficult times, people are more likely to look beyond their front door and take action for the common good. There is no better moment than now to make sure energy (efficiency) communities can find a fertile ground and prosper in cities all over Europe.

Covenant of Mayors for Climate & Energy EUROPE

For more information about cities' energy and climate actions, please visit www.eumayors.eu/support/library

Do you work for a local or regional authority in Europe? Help us shape the future of the Covenant of Mayors! www.bit.ly/EUCoMSurvey

Turku being turned into a Climate Positive City

In Turku Student Village, there is a housing complex the size of a city block that produces emission-free energy even for the needs of neighbouring buildings. In a European Union Horizon 2020 Lighthouse project, the cleantech area will be expanded into an entire city district. A climate positive water system is also being developed in Turku.

A flower-shaped building the size of a city block, called Aitiopaikka, was completed in Turku Student Village last year. The building has 255 apartments and over 300 inhabitants.

Five hundred solar panels have been installed on the roof of Aitiopaikka. At times, they produce even more energy than needed in the building.

“In this case, the excess electricity is transmitted to neighbouring buildings through the power grid of the area”, says Real Estate Engineer *Joonas Rantala* from the Student Village Foundation of Turku.

District heat is used for the heating of Aitiopaikka. In the Turku region, already 80 per cent of district heat is produced using renewable fuel and modes of production. The percentage is constantly increasing.

“Underneath Aitiopaikka, there is also a wide gathering area of ground heat. It produces half of the heating power needed for the large neighbouring building Ikituuri.”

Coming next – a climate positive city district

Another European Union Horizon 2020 Lighthouse project called Response is also now implemented in Turku Student Village. In this project, the area of climate-friendly technology is significantly expanded.

The idea is to build an entire climate positive city district.

“For instance, heat pumps connected in series with high efficiency and efficient heat exchangers will be used in the area. A solar plant will be placed on the roof of a new building called Tyyssija. In addition, older buildings will be renovated to make them more energy efficient; examples of helpful measures include windows with quadruple glazing and heat recovery from air conditioning. Through the power grid of the area, energy will be transmitted from one place to another when needed”, Rantala lists concrete examples.

Piling of Tyyssija is already underway. Extensive negotiation work and planning work is also currently undergoing.

Experts in the field across Europe

Development Manager at the City of Turku *Björn Grönholm* says that several businesses, expert organisations, research institutes and universities from both Finland and across Europe take part in the project. Currently, there are as many as 57 partners.

“For instance, there are top experts in solar energy, heat pumps, battery technology, automation and 5 G connections. One of our important sparring partners is the city of Dijon in France where a slightly similar Lighthouse project is currently ongoing.”

Grönholm states that the idea is to find new innovative solutions that could also be easily utilised elsewhere.

The water system was harnessed for energy production

A climate positive city is being built in Turku Student Village one house and one city district at a time. There is also much happening elsewhere, as the entire city is an experimentation platform for cleantech.


Joonas Rantala


Björn Grönholm

The excess electricity produced by solar panels at Aitiopaikka can be transmitted to neighbouring buildings. Photo: ©Turku Energia, Esko Keski-Oja

For instance, a climate positive water system has been under development in Turku.

"There is top level water expertise in the Turku region. The efficient treatment of wastewater has already had a positive impact on the state of nearby sea areas. What is even better is that loads of environmentally friendly energy is also generated in the process", Grönholm says.

At the wastewater treatment plant in Kakola, district heat is made with heat pumps out of waste heat in wastewater. The waste heat would otherwise be left unutilised. At the same time, district cooling is produced for cooling purposes.

District heat from Kakola is used for heating approximately 15,000 apartments.

"While wastewater treatment plants are usually the worst energy guzzlers in municipalities, in Turku we have a wastewater treatment plant that is one of the biggest producers of district heat."

Approximately 10 per cent of all district heat needed in Turku is produced in Kakola.

An underground experimental laboratory of new energy

Björn Grönholm describes the underground wastewater treatment plant in Kakola as an experimental laboratory of new energy.

"Energy is also produced for example by using a turbine placed in a wastewater effluent pipe", he states.

Naturally, also sludge generated in Kakola is utilised. Liquidised biogas for road traffic use is made out of it.

"We produce clean energy locally. In addition, local production is very good from the point of view of security of supply", Grönholm states.

Text: Matti Välimäki
Translation: Aino Koivisto

The best climate city in Europe

The objective of Turku is to be carbon neutral in 2029. However, this is merely a milestone. Afterwards, the journey continues towards climate positivity and the city will eventually sequestrate more carbon than it releases into the atmosphere.

The ambitious goals of Turku and the climate measures that have already been taken have also been internationally acknowledged.

Turku has been selected the winner of European Covenant of Mayors Climate Award 2020 as the best mid-sized Climate city. The best climate cities are selected among the ten thousand cities that are part of the EU Covenant of Mayors for Climate and Energy.

Contact information:

Björn Grönholm
Development Manager
Project Development Unit,
City of Turku
bjorn.gronholm@turku.fi

Joonas Rantala
Real Estate Engineer at the Turku Student Village Foundation
joonas.rantala@tys.fi

Further information:
www.turku.fi/en/carbonneutralturku

Today's Zero Emissions technology for tomorrow's Zero Emissions fleet

By Madadh MacLaine, Secretary General, Zero Emissions Ship Technology Association


Madadh MacLaine

Zero Emissions Ships (ZES) are possible today, however zero-emissions shipping is not. Why? Because although we have the technology; policy, economics, and a lack of green hydrogen stand in the way. Fortunately, the regulatory and financial landscapes are rapidly changing, putting zero emissions (ZE) vessels and green hydrogen infrastructure on the near horizon.

To be in line with IPCC recommendations of 1.5, shipping will need to be zero emissions by 2034.

To achieve this shipping requires; a zero GHG fuel that can be used in existing vessels, Zero Emissions Ship Technologies (ZEST) that can be retrofitted to existing vessels, and, most importantly, given that vessels designed today, under normal circumstances, will be in service after 2050, all vessels designed from today should be zero emissions, or at the very minimum, must be zero ready.

The good news is, we have the technology, however, much of the tech is pre-market and therefore requires a shift in the regulatory environment as well as increases in development and seed funding, to become widely available.

A holistic approach

A fully Zero Emissions Ship (ZES) necessitates a holistic systems approach, incorporating many technologies that are available on the market but not currently being used in commercial shipping. In this article, I look at some of the design features and technologies required for a ZE self-fuelling water carrier that could compete in the current market with minimum negative impacts on both human and environmental factors, considering; pollution, stability, vibration, and noise.

The keys to achieving zero emissions in the current environment are 1.) a zero-emissions fuel, 2.) efficiency measures that reduce the fuel required to propel the ship. 3.) assured ZE fuel supply 4.) operational measures; speed reduction, weather, and current routing.

Fuel reducing energy efficiency features

An aero and aqua dynamic hull design will reduce drag. An air cavity in the bottom of the hull reduces friction with the added benefit of creating buoyancy when the vessel is laden. The air is released when she is in ballast reducing the need for ballast water.

Using the energy of the environment to reduce fuel

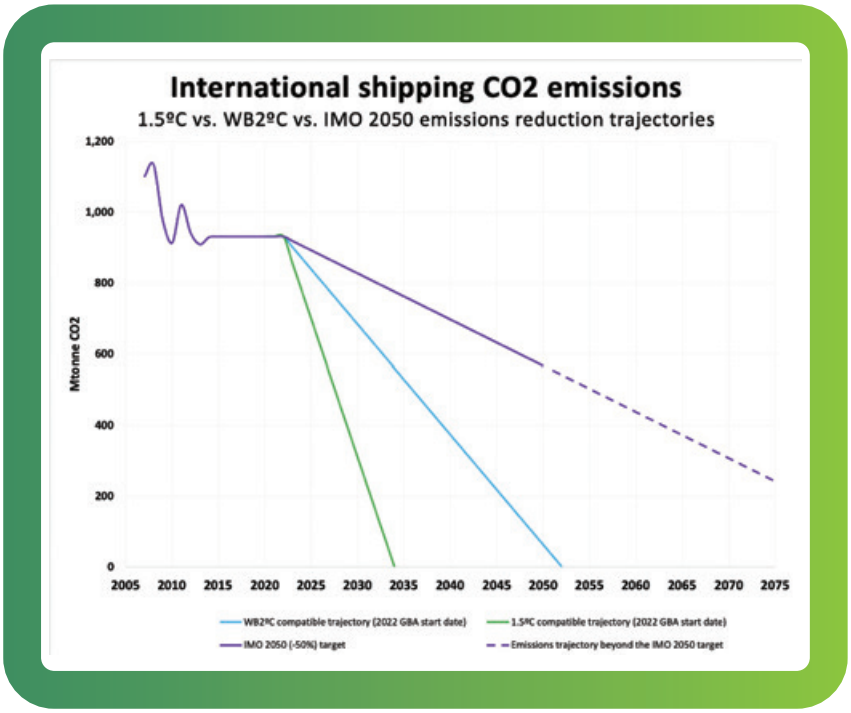
Wind, only being pre-dated by oars, is the oldest form of ZE propulsion in shipping, however, modern wind propulsion technology (WPT) has more in common with The Americas Cup, airplanes, and baseball, the market-proven Flettner rotor using the same spinning Magness effect as the proverbial curveball.

Other WPTs entering the market are Airbus spin out, Airseas Seawing, pictured here on a K-Line vessel, and the suction wind, conceived in 1980 by Jacques Cousteau. Here we see the Econowind collapsible Ventifoil installed on the 3638 DWT general cargo carrier, Ankie.

An essential design feature of the self-fuelling ZES is that, whatever the wind propulsion system used, it must be oversized to ensure excess power for onboard hydrogen production.

The ship will also use the commercially proven wave propulsion system installed in her bows. This system absorbs the energy of the wave into a rocking motion which propels the ship forward. A passive foil propulsion system will be mounted in her stern, converting the energy of the wake into forward thrust. This has the added advantage of reducing wash water impact on Coastal ecosystems.

The GEPS role damping power take-in system has the double advantage



of both stabilizing the ship in heavy weather and bringing the energy of the sea into the ship's system.

The ship will trail a water turbine when she is under wind power to bring power into the energy system. The captured renewable energy will go first to the battery bank followed by water electrolysis when the battery bank is full.

By reusing the water generated by the hydrogen fuel cells we have calculated an efficiency of ~40%

The onboard hydrogen generation system has been proven on the Energy Observer with registered hydrogen production system efficiencies of 42%.

Both hydrogen fuel cells (HFC) and water electrolyzers, that produce hydrogen, have been used by the military in marine applications for over fifty years. Nedstack first installed an HFC in a civilian vessel in the 1980s. HFC manufacturers Nedstack, Powercell, and Ballard are all in advanced stages of designs for marinized >3 megawatts (MW) systems. ABB and HDF have plans to build 3MW power plants for ocean-going vessels based on the fuel cell power plant which was jointly developed between ABB and Ballard. Powercell is installing a ~3MW system in the 102-meter yacht.

HFCs, being solid-state, can be serialized

By the time the >80,000 DWT self-fuelling water carrier has gone through designs and is ready to build, serializable 3MW hydrogen fuel cells will be market-ready and able to provide the 21MW of required power.

Fuel is the highest cost in the bottom line of vessel operations. By virtually eliminating the cost of fuel from the bottom line, a ship can afford to operate at the reduced speeds, current and weather routing required to be self-fuelling. Although the CAPAX will be much higher than for a conventional vessel, this ship will be “bomb proof” in the coming regulatory market, holding its value past 2050.

For more detailed information visit the Zero Emissions Ship Technology website at zestas.org, contact admin@zestas.org, or Madadh MacLaine on Linkedin.

EconoWind Ventifoil installed on general cargo carrier

Why scrubbers matter

Ian Adams (pictured), Executive Director of the Clean Shipping Alliance 2020, explains why the continued use of heavy fuel oil and scrubbers is vital to human health and the environment

There should be no doubt about the importance of the marine exhaust gas cleaning system in helping to improve the health of those living and working around the world's ports and harbours. There is currently no better solution.

Sulphur emissions, particularly Sulphur Dioxide (SO_2), a by-product of burning fossil fuels in an internal combustion engine, is the major contributor to a raft of respiratory health problems. Yet while we now have the technology to improve the health of millions, especially those living and working around the world's ports and harbours, there is a corner calling for these systems to be banished.

The presence of high levels of SO_2 and PM, especially, has such a negative effect on human health and society in general, that we as an industry, should be embracing this technology and looking at ways of improving it rather than removing it. It is counterintuitive and I think the media frenzy surrounding the washwater debate has created something of a panic devil, with us forgetting the primary reason why more than 4,000 ships have the system installed.

Inhaled, sulphur dioxide quickly dissolves with moisture on the lining of the lungs and nose, burning the mucous membranes. This is clear to anyone who accidently inhales the smoke from a match being struck. Chronic, or long-term, exposure to high levels of SO_2 leads to breathing problems and respiratory illnesses such as asthma, bronchitis as well as heart disease. Children tend to be more susceptible due to their less developed lungs.

Indeed, World Health Organisation (WHO) statistics show that 92% of the world's population lives in places where air quality levels exceed WHO Ambient Air Quality Guidelines. These guidelines stipulate a 'safe limit' for fine particulate matter (PM 2.5) at 10µg/m^3, but only 24 countries meet this requirement meaning that billions of people around the world are breathing in unsafe air. On average there are 1-in-8 premature deaths linked to air pollution each year – that's 7 million deaths a year! The use of HFO with a scrubber can reduce this.

It is the Particulate Matter (PM) that is so dangerous to human health. And when inhaled, particles of less than 10µm penetrate the lining of the

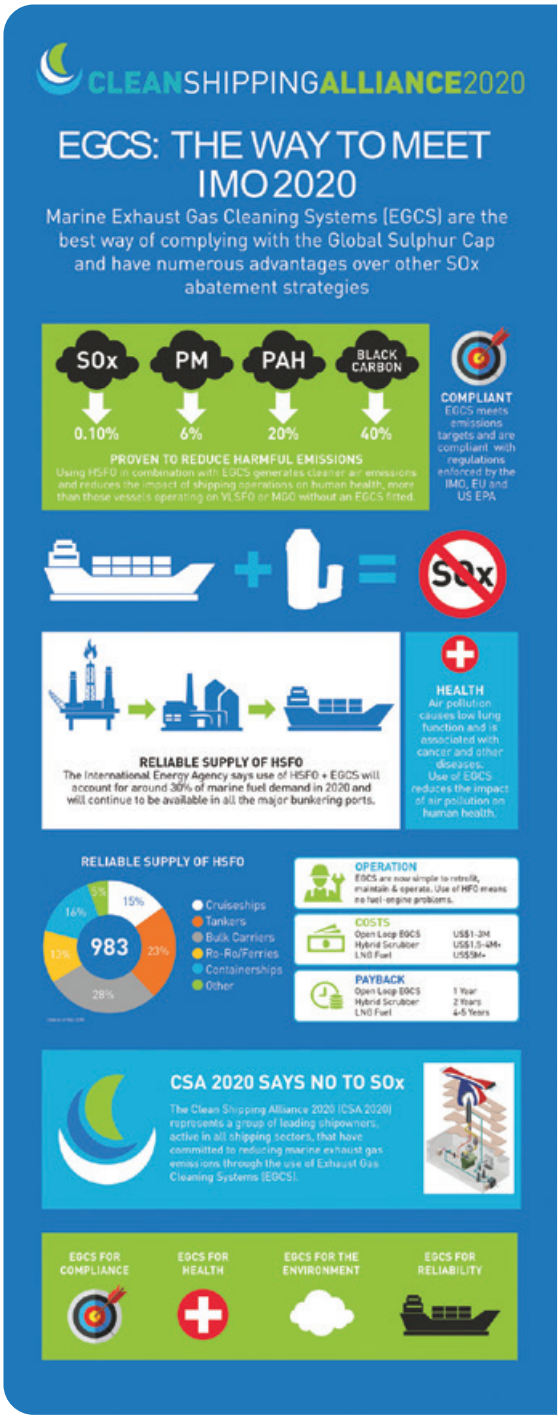
lungs, seeping into the bloodstream, contributing to respiratory diseases, such as asthma, bronchitis, and flu; increased risk of lung diseases, such as emphysema, chronic bronchitis, and lung cancer; increased risk of cardiovascular conditions, such as heart attacks and strokes; and increased risk of dermatological diseases and other cancers.

Aside from the poor respiratory health of those living around ports and harbours, areas where shipborne air emissions are documented to have a major negative impact on human health, these pollutants also, of course, contribute significantly to climate change.

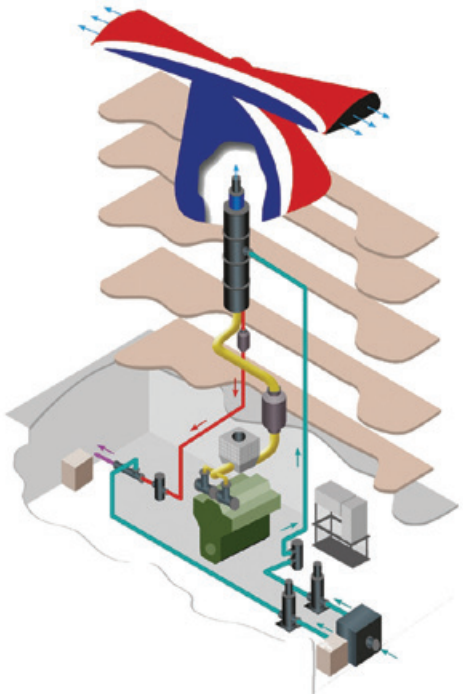
Fossil fuels contain sulphur compounds and their combustion generates SO_2. Further oxidation of SO_2, usually in the presence of a catalyst such as Nitrogen Dioxide (NO_2), forms H_2SO_4 (Sulphuric Acid), which returns to Earth in the form of acid rain. So, removing the sulphur compounds from the exhaust gas, reducing the potential of the formation of acid rain and the impact on humans and other living organisms, must remain the primary reason for adopting the most effective solution – the scrubber, a proven technology commonplace in land-based power plants and refineries around the world without undue concern.

Exhaust Gas Treatment Systems treat the gases from the combustion process by spraying alkaline water into the exhaust. In a seawater scrubber system, the sea's natural alkalinity largely neutralizes the results of SO_2 removal before discharge back to the sea. In a freshwater system, the washwater used for scrubbing and neutralization is treated with an alkaline solution such as sodium hydroxide (caustic soda) or magnesium hydroxide. In both cases the sulphates resulting from the SO_2 removal will be discharged with the washwater to the sea, a major constituent of which is sulphate, anyway.

Of course, low sulphur fuels are being used, but the continued use of HFO with a scrubber provides a higher quality of air emissions than any 0.1% compliant fuel, and higher quality in all respects than 0.5% compliant fuel.



It is anathema to me that given the evidence and acknowledged fact that scrubbers do a far better job in removing SOx (99%), PM (94%) black carbon (60%), mitigating the risks to human health and the corresponding burden on public health services, that



we are still having a debate about the efficacy of these systems.

Removal of black carbon, especially, slows down ice melt, which would ultimately contribute to rising sea levels. And, from an air quality point of view, operating a ship on HSFO in combination with a scrubber produces cleaner air emissions than operating on LSFO or MGO. Less refining also means less GHG emissions associated with HSFO vs MGO.

This was pretty much confirmed in a study published last year by Norway's SINTEF, one of Europe's largest independent research organisations. Chief Scientist Dr Elizabeth Lindstad concluded that from well-to-wake the continued use of HSFO or HFO with an EGCS is the most environmentally beneficial means of meeting global Greenhouse gas (GHG) emissions targets.

She stated that based on the energy consumed during the global production of distillate fuels, the continued use of residual fuel will have a positive impact on global GHG emissions, given the energy required to produce distillates would result in higher levels of CO_2 being released into the atmosphere.

Yet, here we are, and despite the clear benefits to our planet and those that live on it, we find ourselves in something reminiscent of a Franz Kafka novel, with some ports and harbours banning a solution adopted for their benefit based only on blind authority, hearsay and supposition.

Due to the unfounded view by several port and maritime authorities that scrubber washwater could be hazardous to the marine environment, bans or restrictions have been imposed because they think that scrubbers pose a risk to public health and increase the rate of corrosion of their port infrastructure. 'Could' and 'think' being the operative words here.

Despite the fact that for decades shore-based industries have been operating scrubbers and discharging washwaters into rivers and waterways without much ado, then surely what is good for the goose is good for the gander. If such discharges contravened any water quality requirements in any way, then it is logical to conclude that they too would be banned from operating them.

None of the studies on scrubber washwater to date have shown that the use of exhaust gas cleaning systems poses any significant risk to the marine environment or to public health. To the contrary in fact.

If the sulphur in the sea were spread out as an even layer, the total ocean area of the world would be covered by a 5-foot (1.5m) thick layer of sulphur. And if all the sulphur in all the known oil and coal reserves were added to this layer, then, as Nyman and Tokerud stated in 1991, the thickness would only increase by the thickness of a sheet of paper. What is more, vessels fitted with scrubbers spend most of their time in international waters, where they normally produce much less SOx than compliant fuel with a sulphur content of <0.5%.

Nevertheless, there is no doubt in my mind that use of an EGCS in port would improve the lives of those living and working around them.

"None of the studies on scrubber washwater to date have shown that the use of exhaust gas cleaning systems poses any significant risk to the marine environment or to public health. To the contrary in fact."

DRIVE unlocks DR potential and de-risks implementation

Uncontrolled overproduction from distributed renewables can cause grid issues at all levels. This is one of the key challenges of the energy transition, and unlocking flexibility via demand response (DR) is critical to this. In particular, unlocking the distributed flexibility potential in medium and low-voltage grids will be important, which has little precedent in the market to date.

To address this, the H2020 DRIvE project has developed a full-fledged platform for seamlessly connecting distributed assets within a single environment. Validation is performed through pilot demonstrations ranging in all stages of the energy-value chain, from large-scale generation plants to residential community and tertiary buildings. A key piece of this validation is digital-twin and control hardware in the loop (C-HIL) testing, which accelerates implementation by directly addressing integration issues and providing early validation before beginning costly physical tests. As the project closes its final stage of validation, the first results already show significant potential to unlock flexibility from generation assets.

The Giessenwind demonstration site, featuring transmission lines, a transformer station and battery storage for excess energy from wind generation, has provided an excellent opportunity to benchmark and validate the potential flexibility available from voltage control, frequency control testing and congestion management actions via this single platform approach. Results from frequency containment reserve and Congestion Management tests show that current equipment can utilize these algorithms, significantly reducing the need for new CAPEX installations for grid reinforcement by as high as 20%.

This approach has also simplified the integration stages of these algorithms. During the model validation process with the digital twins, bugs in MODBUS maps and other communication issues can and have been identified quickly and repaired; issues that could significantly harm physical equipment if deployed directly to the devices. This improves scaling capacity in a low-risk setting, minimizing the risks that real devices may face due to human errors.

In addition to the direct energy savings results, easy and reliable virtual testing procedures allow for extreme scenario and future capability testing that would otherwise not be cost-effective in physical testing.

In the Giessenwind site, this included analyzing the effects of islanding and highly irregular frequency scenarios. C-HIL Digital twins have already proved important in applications at other demonstration sites as well, with the results of full algorithm validation tests on Time of Use Energy Bill optimization and Max Power Consumption, serving as a critical step in assuring building managers and owners that new control actions perform as intended and won't negatively impact existing systems.

The tests at Giessenwind have shown that by using digital-twin C-HIL validation, novel DR capabilities can be tested in a low-risk setting earlier in the production process, saving time and potentially dangerous risks associated with physical piloting. Scenario validation with digital twins is an excellent means to safely gather information on system performance for new applications with little precedent in the existing market. Such tests are currently also being performed for residential and tertiary building applications. ●

More info at:
https://www.h2020-drive.eu/

Follow us at
Twitter and LinkedIn.

This project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement n° 774431

A career takes off – with drones adding lift

How do you map invasive plants in inaccessible terrain? Two years ago, a Serbian student got involved in a COST Action training school to learn about unmanned aerial systems (UAS) as a way to advance his work. Now, he is lead author of a guide for their use in environmental monitoring.

By Mr Goran Tmušić, PhD (pictured) student and MSc Biology of the University of Novi Sad (Faculty of Sciences, Department of Biology and Ecology), Serbia.

When a COST Action on the harmonisation of UAS techniques for agricultural and natural ecosystems monitoring (HARMONIOUS) started in October 2017, Goran Tmušić of the University of Novi Sad's Department of Biology and Ecology decided to seize the opportunity.

From an initial e-mail to the Action Chair, his involvement quickly developed into a role at the heart of the Action. Participation in a training school in September 2018 was a first milestone in this journey, Tmušić notes.

The course, held in Reykjavik, brought together 18 trainees and 8 experts from around Europe for a full week of activities dedicated to UAS techniques for the acquisition and pre-processing of data. Along with a theoretical introduction to the monitoring of vegetation and soil, it provided opportunities to gain practical experience through field experiments.

"The training school showed me how much there was to learn," he says. "To use this tool correctly, you need to be familiar with many things I knew nothing about. I am a botanist, and I found myself dealing with drones using different types of sensors, different global navigation systems, etc."


Mr Goran Tmušić

"I can't emphasise enough how important COST and its networking tools are for younger researchers, particularly from Inclusiveness Target Countries."

How to use your UAS

His curiosity piqued, Tmušić set out to address the gaps in his understanding. During a short-term scientific mission to Italy in February 2019, he conducted a review of literature on the technology's use in vegetation surveys to produce an initial protocol. On the strength of this, he was invited to contribute to developing a first HARMONIOUS guideline on UAS in environmental monitoring.

As of December 2019, the paper – listing him as first author – is nearing completion. It will provide a framework for subsequent guidelines to be produced by HARMONIOUS, which will adapt the general recommendations to specific fields of study.

Dizzying heights

Harmonisation is needed to show how UAS technology can be used to best effect and unlock its full potential in environmental monitoring, Tmušić points out. "We are hoping to produce comprehensive guidance for all areas covered by the Action, so that other researchers won't find themselves in a fog the way I did."

Being encouraged to play a central role in this process is an unexpected privilege for a beginner, says Tmušić, who is due to complete his PhD in 2021. It is also placing him in a better position to transfer UAS know-how to his home country, where it is currently in short supply.

"I would advise all young researchers to participate in COST," Tmušić concludes. "It's a great opportunity to connect with scientists at all levels of expertise, from Europe and beyond, and build a strong network of people with a well-established tradition of working together."

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

View the Action:
https://www.cost.eu/actions/CA16219

View the Network website:
https://www.costharmonious.eu

The iBRoad concept for Building Renovation Passports after COVID-19

By Alexander Deliyannis, Sympraxis Team, iBRoad project coordinator

How is the iBRoad project, a finalist for the EU Sustainable Energy Awards in the Innovation category, and its vision for stepwise deep renovation of European buildings relevant in the current context?

The COVID-19 pandemic and related lockdowns saw European homes transformed – literally in a matter of days – into hubs for a multitude of concurrent activities extending way beyond the dwellings' original intended purposes, such as work, education, physical training and cultural creation. This instant change made even more evident the need for buildings to be safe, comfortable, climate-proof and resilient, while making efficient use of resources to cater for all EU citizens' needs.

While the context of this transformation may have been perceived as temporary, we can be certain that it will continue beyond the pandemic framework, at least to a significant degree. Indicatively, according to recent research by Gartner, 74% of CFOs intend to permanently shift some employees to remote work. Other professionals, including many currently unemployed, may choose to develop new careers from their homes.

Overall, it is reasonable to expect that people will be spending more time in their homes than before the pandemic; they will thus want to improve conditions such as thermal comfort, ventilation, noise insulation, lighting and room flexibility for new activities. Research has shown that people are happier and more productive in settings which they themselves have shaped and can control.

It is also reasonable to expect that many of those improvements will be done gradually due to

cash shortages. This is not a new phenomenon. We know that most home building renovations in Europe are already implemented step-by-step; they are also mostly funded by homeowners themselves. A key element of these renovations is that they may not always be named or perceived as such; they may be called 'interventions', 'improvements', 'redecorations', 'works', 'maintenance', 'upgrades' or otherwise. Notwithstanding, they represent substantial investments in European dwellings, gradually changing the residential building stock, in and out.

Before COVID-19, a major incentive for such investments, particularly in Southern Europe, was their exploitation in the sharing economy. This is now not the case, with other trends taking precedence, such as those mentioned above. An eminent danger here are 'quick fixes' that reduce future options or make them much more expensive.

At the same time, the urgent and cross-cutting nature of the pandemic in no way reduces the urgency and importance of climate change; the EC's recent announcement of the recovery plan and the role of the European Green Deal sets the full context. The climate-related requirements for European buildings are more important than ever, in respect to both climate change mitigation (reducing buildings' direct and indirect greenhouse gas emissions) and adaptation (providing climate-resilient shelter).

What if all these investments in a home could be put into a greater context and be part of a consistent while flexible long-term plan, leading to a building which is better in all respects, including climate resilience, indoor environment, energy performance, economic viability and aesthetics?

It is here that the joint concept of building renovation roadmap and digital building logbook proposed by the iBRoad project, as a model for Building Renovation Passports, comes into play: the roadmap can be used to transform the homeowner's desires into a concrete long-term plan, while the digital logbook can help them organise all building-related information and record their progress along the plan as snapshots of real building states.

The iBRoad project began before Building Renovation Passports were mentioned in the Energy Performance of Buildings Directive (EPBD), but its approach fully supports the EPBD context: the iBRoad concept is aimed as a catalyst for deep renovation of residential buildings, providing realistic roadmaps which take into account homeowners' needs, desires and financial means. If use is made of loans or grants supporting building renovation, these too become part of the plan.

The iBRoad approach includes several other elements and methodologies in support of stepwise deep renovation, such as an energy audit methodology and training leading to the development of the roadmap; a flexible hybrid data structure for building information (common and country-specific); a cost calculation methodology; public opinion and stakeholder feedback analysis; and policy proposals including guidance for implementation and suggestions for informational, economic and regulatory instruments surrounding Building Renovation Passports. These outcomes are publicly available and form part of a modular framework: authorities and agencies can choose the elements which are relevant to their own specific conditions.

Critically in the current context, the iBRoad roadmap-logbook approach could also support non-energy related home transformations. Home renovation 'triggers', such as children moving out, providing working space, or undertaking major maintenance works represent opportunities to reflect on the big picture of our home's mid-term and long-term future. A key aspect is avoiding lock-ins, whereby present choices limit the renovation potential in the future. Conversely, known ambitions for the future can be more efficiently and effectively implemented if already foreseen in planning. A building renovation roadmap can ensure that the best measures are taken in an optimal order.

iBRoad's end-user survey showed that, while most homeowners are willing to undertake the cost of renovation themselves, they may be reluctant to invest in expert guidance, such as that provided by a Building Renovation Passport. Yet such guidance may be critical for the long-term success of renovations, both for homeowners needs and policy targets. This is therefore the opportunity for the public sector in EU Member States to invest in Building Renovation Passports, thus supporting citizens in doing their part for social, economic and climate resilience. It is also the opportunity for the public sector to take advantage of such instruments for its own 'homes' – public buildings are ideal candidates for stepwise deep renovation.

The iBRoad project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement No 754045.

The sole responsibility for the content of this article lies with the author. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.

Is past prologue? A review of the first half of 2020 and what it means for EU energy and climate policy

By Philippe Dumas (EGEC Secretary General) & Sanjeev Kumar (EGEC Head of Policy)

Crisis, what crisis?
It feels like a decade was wrapped up in the first half of the 2020.

The first semester has seen a haltering of the global economy. The COVID-19 pandemic combined with melting Siberian permafrost and heatwaves in the Arctic Circle continue to reshape our lives. They are both part of the same systemic problem - the inability for our energy systems and economic models to operate within finite planetary boundaries. This has to change immediately. There are only two optimal actions to address this – the first is to stop putting CO2e into the atmosphere from the energy system, which still accounts for 75% of the EU's climate pollution. The second is to accelerate the energy transition to renewable heating, cooling and electricity with local jobs creation and economic development. This is a long way from the policy noise surrounding the EU Green Deal.

Covid-19 highlighted the importance of a resilient energy system and that conventional definitions of infrastructure are no longer relevant. Confinement to homes meant that households became part of the EU's energy infrastructure. The Commission's inability to include the changed paradigms during its consultation on energy systems and Trans-European Networks for Energy indicates that it is still shackled to

solving the past than preparing for the future.

In the last mandate, there was clear recognition that the energy system needed transformative change to solve the climate crisis. The Junker mandate championed the Energy Union. The narrative was transparent and appropriate. The Energy Union was a very powerful concept bringing together all the different streams of the EU energy and climate policy. Legislation did not live up to this mantra. In fact, both renewables and energy efficiency targets firstly proposed by the Commission were replaced by much higher targets by governments, EC and MEPs.

The Climate and Energy package for 2030, adopted in 2019, was supposed to have set in stone targets to address the climate crisis. With each passing moment, it becomes clear that these targets were insufficient to deliver zero-carbon by or before 2050. The 2019 UN Emission Gap report stated that at least 7.6% emission reductions per year are required from now on to give humanity a reasonable chance to avoiding the worse of the coming climatic, social, economic and environmental catastrophes. It was and is vital that all policy initiatives issued by the Commission undergo a climate 'scrutiny' to see if they fit into a Paris Agreement-compliant world.

Running with your eyes closed

The Commission launched its Climate Law proposal with much fanfare but the decision to delay the increased 2030 targets was the first indication that something was brewing. Whilst it is important to fix the EU's 2050 zero-carbon target, it is essential to prepare the EU to attain this target which meant an early change to the 2030 framework. After all, time is important. We don't have much time so every second really does count.

This may be due to the fact that this mandate is less about meeting the climate target and more about protecting some interests. Executive Vice-President Franz Timmermans constantly stresses that there is a role for fossil gas. Instead it should ensure that the remaining investment cycle introduces clean technologies that are already available yet locked out by direct and indirect fossil-fuel subsidies. Even at the launch of the Energy System Integration Communication he talked about the need to transition from coal to gas rather than coal to renewable heating and electricity. The former locks these countries into a high-cost high-carbon pathway, impacting EU citizens' health, the environment and clean air, whilst the latter is not only the most cost-effective solution it is best at addressing the socio-economic aspects of energy transition through targeted investments in local communities and regions.

The European Parliament has also had a difficult time. Its Own Initiative Reports on Energy Storage and Energy Efficiency in buildings are a sign that the new cohort of MEPs really have grasped the scale of the challenge and the need for radical interventions to make up for lost time.

The EU Green Deal has to deliver better than the Energy Union. Instead of an informed conversation about the required renewable and energy efficiency targets, the airways were gobbled up by simplified silver bullet solutions which sought to postpone and divert attention from the urgent need to decarbonise heating, electricity and cooling.

Built to win

Energy efficiency and renewable energy continue to face institutional discrimination. The EU's Long Term Strategy needs to be urgently reassessed to finally be able to forecast the whole energy sector. This includes recognising that 50% of the EU's final energy demand comes from heating & cooling.

The PRIMES model's obvious limitations need to be acknowledged to avoid the false impression that this is the perfect model to draw out decarbonisation pathways. It isn't. Distortions in heat appliances, discount rates, technology learning, costs reductions, non-energy benefits have dogged it for over a decade. It has also led to many policy blind alleys.

Solutions that decarbonise, provide additional revenue streams and tackle key socio-economic solutions must be prioritised. Renewables facilitate "made in Europe" manufacturing and local production of electricity, heating and cooling. Even more, in the case of geothermal energy, they also provide thermal storage and lithium! Geothermal technologies accelerate the pace of decarbonisation, but they need a dedicated strategy, which we hope to see in this mandate.

New rules on cleaner and safer cars now apply across Europe

By Nina Kajander, Press Officer at the Joint Research Centre

Two new state-of-the-art laboratories are being finalised at the Joint Research Centre (JRC) – the European Commission's science and knowledge service – in Ispra, Italy. The new laboratories will carry out the compliance checks of cars already on the market under the new European Type Approval framework.

The new EU Regulation on the approval and market surveillance of motor vehicles is applicable across the EU since 1 September 2020.

Proposed by the Commission in the wake of the Dieselgate scandal, the new type approval rules are part of the Commission's wider work package to ensure cleaner and safer cars on the European market.

From now on, the European Commission will be able to carry out checks on cars that are already on the EU market, trigger EU-wide recalls, and impose fines of up to €30,000 per car when the law is broken.

The EU's market surveillance function

One of the novelties of the new regulation is that the EU now has an oversight on the cars that are already on the market.

EU Member States are required to regularly test a minimum number of cars, and conformity checks will also be carried out by the Commission's Joint Research Centre (JRC) in Ispra, Italy.

In the past, the JRC conducted mostly pre-normative research, meaning that the results from its vehicle emissions tests contributed to the development of new emissions standards in the EU.

Under the new Regulation, the JRC is also tasked to verify whether vehicles that are being sold on the EU market or are already in circulation continue to respect the emissions and safety rules.

The tests will also ascertain that the vehicles do not have defeat devices, which disable emissions control systems under real driving conditions.

The JRC will also provide technical support for the market surveillance activities of the EU Member States and carry out the audit of the national type approval procedures.

New state-of-art-laboratories

The new function is a substantial expansion to the activities of the JRC.

The Commission has provided additional resources for the JRC for funding additional staff, new operational costs as well as the construction of a brand new laboratory with two test cells.

The new laboratory will be 100% dedicated to the market surveillance activities. It is equipped with innovative technology and designed so that a high number of vehicles

The JRC's new Vehicle Emissions Laboratory (VELA 10-11) is expected to be ready in the first half of 2021. ©European Union

can be tested in a relatively short time. One of the two test cells of the laboratory is designed to replicate the real driving conditions on the road, including potential temperature and altitude changes.

This laboratory can be used all year round to check the exhaust emissions in very high or very low temperatures.

The completion of the new laboratory was delayed because of the COVID-19 containment measures in Italy.

However, the works at the construction site are in their final stages and the research team expects to be able to start working in the laboratory in the first half of 2021.

In the meantime, the JRC has already conducted a pilot market surveillance study and kicked off the new activities – temporarily in its existing vehicle emissions laboratories.

Jacopo Franzetti and Lisa Bigozzi are among the new recruits for the JRC market surveillance activity. Pilot testing has already been started at this VELA laboratory. ©European Union

The JRC's existing Vehicle Emissions Laboratories (VELA 1 – 9) include nine major testing facilities tests on a variety of vehicles. These laboratories are dedicated to pre-normative research in support of EU emissions standards. ©EC – Audiovisual Service

European Commission | Eltis | 2020 CiViTAS | European Platform on Sustainable Urban Mobility Plans | #UrbanMobility

Urban Mobility Days 2020 is coming! Originally intended to take place as a three-day conference in Brussels, the event's new online format will enable participants to join debates and exchange expertise on the most important urban mobility topics safely from their own desks.

The conference combines two leading events from Europe's transport calendar: the CIVITAS Forum Conference and the European Conference on Sustainable Urban Mobility Plans (SUMPs). It will allow policymakers, local authorities, academics, NGOs, urban transport practitioners, urban planners and all those putting the SUMP concept into practice to share their experiences using a virtual forum. Over the course of the digital conference, delegates will hear sustainable urban mobility success stories from the CIVITAS Living Labs projects and other examples of pioneering excellence from Europe and further afield. Over 30 plenary and parallel sessions will equip attendees with inspiration, tools, and know-how to further advance clean and sustainable transport in line with the European Green Deal.

With such a wealth of expertise and knowledge-sharing, Urban Mobility Days provides the ideal opportunity to digitally network, debate key issues, and exchange ideas on emerging transport trends and technologies and the latest developments in sustainable urban mobility planning.

The conference will also go beyond transport by connecting zero-emission mobility initiatives with broader EU efforts to tackle climate change and make Europe a carbon-neutral continent by 2050. Conference activities will also address the resilience of urban mobility in unforeseen circumstances, and take stock of lessons learned to date during the COVID-19 pandemic.

For further information and to register for the online event, visit www.eumd.org.

ETU initiative

Encouraging local energy communities in island and rural areas

By Cynthia Echave and Danilo Ceh

What is the ETU initiative?
The Interreg Med Renewable Energy Community Project is a transnational cooperation project that proposes and launches the ETU (Ecosystemic Transition Units) initiative as a capitalisation strategy for **transferring** the outcomes from Interreg MED Projects dedicated to renewable energies and also for **promoting** an energy transition model based on a holistic approach to the territorial, economic and social needs of rural areas. The MED Renewable Energy Community consists more than 110 institutions within 57 regions in 10 EU Member states and 3 neighboring countries, all located in the MED territory.

The ETU initiative aims to encourage local authorities and civil society to use the ETU toolbox and ETU model in their energy transition plans. The ETU toolbox gathers the main technical outcomes and tools developed from the MED Renewable Energy Community and is open to gather other tools that complement the support to energy planning, the creation of energy communities, energy policies and smart solutions for energy facilities.

The ETU model offers a roadmap for rural **areas** addressing 5 main concerns: 1) apply an **ecological approach** to climate emergency; 2) promote a **territorial equity** between the urban and the rural, 3) boost **social innovation** through technology and warranty clean energy for vulnerable groups, 4) encourage the **green economy** by attracting green businesses into local energy communities, and 5) advocate for the **cooperation & commitment** between key actors and key policy frameworks.

The contribution of Interreg Med Renewable Energy Community Project will be the integration of energy transition strategies from a holistic perspective that allows guiding decision-making to enhance a better territorial, social and economic development of the territories.

The Interreg Med Renewable Energy Projects' main targets are the island and rural areas of the Mediterranean Regions, precisely because of their high vulnerability to climate change, and the emergency actions that small villages/island should take with the scarcity of resources.

The main contribution of the project to increasing local RES production and consumption in island and rural areas will be to support the application and use of ETU toolbox and ETU model in energy planning, through sectoral plans; energy communities through citizens' awareness of energy transition; energy governance through the implementation of green fiscal policies; and energy facilities through the design and implementation of microgrids, storage systems, PV Solar, etc.

Energy transition can be a catalyst of revitalization into a greener and more resilient pathway. The project wants to highlight the gaps and opportunities that exist, in order to focus efforts into bringing solutions for rural needs.

How to support the ETU initiative?
The project calls on local authorities to join the ETU initiative in order to integrate its toolbox and model into their energy transition plans. We are looking into small villages and rural areas located either inland or on islands in the Mediterranean region.

We invite you to support the ETU initiative by signing our Manifesto and to contact us in case you are interested in receiving further information about our activities. More: https://renewable-energies.interreg-med.eu

20 TO 22 OCT 2021 | Piraeus Greece

Piraeus 2021 GREENPORT Cruise & Congress

NEW DATES ANNOUNCED!

The world's leading conference on balancing environmental challenges with economic demands comes to Greece in October 2021.

The 2021 conference topics include:

- Financial and technical challenges to onshore power supply
- Getting ahead for new fuels
- Collaborative community projects
- Sustainable transport and logistics in the hinterland connections
- Eco-Cruise ships and sustainable cruise initiatives in Europe

Get involved today!

- A range of sponsorship packages is available to suit any budget
- Benefit from over 12 months exposure to our network of 13,000 port, terminal, equipment and logistics professionals

Meet and network with over 200 attendees representing port authorities, terminal operators and shipping lines.

For more information on attending, sponsoring or speaking, contact the events team

visit: **greenport.com/congress**
contact: **+44 1329 825335**
or email: **congress@greenport.com**

#GPCongress

mercatormedia
magazines|events|online

Sponsored by:

SIEMENS
Ingenuity for life

HYSTER

Media Partners:

PORTSTRATEGY
INSIGHT FOR PORT EXECUTIVES

GREENPORT
BALANCING ENVIRONMENTAL CHALLENGES WITH ECONOMIC DEMANDS

EU PVSEC 2020 *online*

37th European Photovoltaic Solar Energy Conference and Exhibition

You've missed the EU PVSEC 2020 online?

Don't worry, you can still watch all presentations of Europe's biggest PV Solar Energy Conference. All presentations are available for streaming on demand for one full month after the event.
Check out www.photovoltaic-conference.com

Photo by Eugene Zaycev on Unsplash

Watch all presentations now!

The Innovation Platform for the Global PV Solar Sector

www.photovoltaic-conference.com
www.photovoltaic-exhibition.com

Image: Wirtschaftsförderung / Ben van Skyhawk

#Mannheim2020
www.**mannheim2020**.eu

9th European Conference on Sustainable Cities & Towns

Join us for the
9th European Conference on Sustainable Cities & Towns
to take transformation forward!

- 30 September - 2 October
- No participation fees
- Interactive online format

Register now

@sustain_cities
european.sustainable.cities
sustainable-cities-and-towns-4ab0a8110

9TH EUROPEAN CONFERENCE ON SUSTAINABLE CITIES & TOWNS
MANNHEIM | GERMANY | 30 SEPT - 2 OCT 2020

ICLEI Local Governments for Sustainability

STADTMANNHEIM