SUMMER 2021

european energyinnovation

Connecting Europe's Stakeholders in Energy and Transport

EMOBILITY

SUSTAINABLE AVIATION

DIGITALISATION

ENERGY FINANCING

Includes editorial contributions from:

Adina Valean
EU Commissioner for Transport

Marian-Jean Marinescu
Speaker of the EPP Group in TRAN Committee, Chair of Sky and Space Intergroup

Cecilia Bonefeld-Dahl
Director-General, DIGITALEUROPE

International Conference

World Sustainable Energy Days 2021

21 - 25 June 2021
WELS, AUSTRIA

Hybrid Event (Online and Presence)

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

- Green recovery
- Update Green Deal
- Energy transition
- Climate neutrality

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European Commission
25-29 OCTOBER 2021
EU SUSTAINABLE ENERGY WEEK
TOWARDS 2030: RESHAPING THE EUROPEAN ENERGY SYSTEM
#EUSEW2021
REGISTRATION WILL OPEN
ON 7 SEPTEMBER!
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Energy

EUSEW 2021

Organised by the European Commission, **EU Sustainable Energy Week (EUSEW)** is the biggest annual event dedicated to renewables and efficient energy use in Europe. On 25-29 October 2021, the 16th edition of EUSEW will take place online, featuring a policy conference on key topics ahead of COP26, awards to sustainable energy best-in-class, networking activities and more.

POLICY CONFERENCE

Choose from several online sessions, gathering industry experts and policy makers to discuss green recovery and growth.

EUSEW AWARDS

Find out who takes home the prizes, with awards for Engagement, Innovation, Woman in Energy and Young Energy Trailblazer.

NETWORKING VILLAGE

Through the EUSEW online event platform, participants can visit the online fair and connect with other participants via 1:1 video meetings to network and discuss potential project collaborations.

SUSTAINABLE ENERGY DAYS

Looking to take part in a sustainable energy event in your area? Or why not organise one yourself? Check out the EUSEW website for more information on the Sustainable Energy Days taking place in September and October.

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SUSTAINABLE ENERGY WEEK

Citizens Energy Congress
24-26 May 2022 Madrid, Spain

#CEC2022
#citizensenergycongress

Securing a sustainable future energy system through strategy, collaboration and innovation

The Citizens Energy Congress, taking place in-person 24 – 26 May 2022, will bring together a broad spectrum of energy industry professionals, policy makers, investors, and civil society. Together, these groups will challenge the concepts and constraints of the existing energy models and foster consensus-driven foundations for a low carbon energy system.

Join us as we help reset the energy system.

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Foreword

"Climate is what on an average we may expect; weather is what we actually get."

Last year's Siberian heatwave fuelled fears that melting permafrost could "supercharge" climate change, while Arctic temperatures this Spring were... "Truly exceptional for any time of the year but mind-boggling for May." Meanwhile, recent research suggests that the permafrost does not need to thaw completely: even a slight rise in temperature can create the conditions for significant and potentially very damaging emissions.

Climate change and the pandemic cast their long shadows over the glorious setting of Carbis Bay in Cornwall, UK: might the G7 meeting become a springboard to even greater efforts to combat them?

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.

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European Energy Innovation is published by:
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Design & Production
RayHeathDesign.com

Website design
pulseart.co.uk

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

In this issue, we are delighted that Commissioner for Transport Adina Vălean explores the changing European Transport scene. Quoting Einstein, she reminds us of progress over the last century, and of opportunities now presented by two revolutions: one green, one digital. Their promise – greater comfort, lower cost, better safety and cleaner mobility – is not without obstacles, but she suggests that the Smart Mobility Strategy will help cut transport emissions by 90% by the middle of the century. In the air, the ReFuelEU Aviation initiative will help achieve 60% renewable fuel use, while on the ground, there will be 1 million more charging points by 2025, all benefiting from the Connecting Europe Facility.

Noting that the EU is successfully reducing its GHG emissions, Peter Georgiev singles out electrification of car fleets as "the most efficient approach to accelerating the electrification of transport." Pointing out numerous additional benefits, including the flow of EVs on to the second hand market, as well as the more obvious effects upon emissions, Georgiev charts four steps in a process that could see the European EV fleet grow to at least 10 million by the end of the decade.

Echoing the theme, Johan Söderbom reviews the role of charging infrastructure in accelerating the adoption of electric heavy-duty vehicles. More particularly, he explores the lessons that can be drawn from the "surprisingly fast" growth in popularity of electric cars. Charging infrastructure may have expanded, costs may have dropped, and home charging may have become the norm, but Söderbom maintains that the biggest obstacle to electric heavy-duty and long-haul transport remains charging.

Rafael Mayo-García informs us that EERA has reinforced its interest in the digitalisation of the energy sector, outlining the pivotal role of digital technologies here. A key element is a permanent EERA programme to foster pan-European R&D&I collaboration on joint strategic research and innovation in clean energy.

As the world's first world's first electric-powered aircraft is unveiled, Marian-Jean Marinescu explores the role of sustainable aviation. He cautions that the Green Deal, which puts the Transport sector under great pressure, should not be allowed to jeopardise mobility and connectivity, even as Aviation in particular is reeling from the effects of the pandemic. Achieving environmental and digitalisation goals while maintaining competitiveness and jobs requires careful assessment of the impact of measures proposed, he says, while reminding us that Europeans need to realise how important this sector is.

Starting with the assertion that the world's buildings might be able to achieve 80% lower energy use, Peter Sweatman asks where energy efficiency and building renovation are in the public imagination. And in a fascinating and well-written article, he provides a sardonic answer: "lagging". The Commission's "Renovation Wave" strategy is designed to improve the energy performance of buildings: 35 million buildings by 2030, to be more accurate, requiring €275 billion invested annually. Sweatman suggests that if 40% of the value of all European buildings and one third of all nonfinancial bank lending is backed by property, then mortgage lenders might be the "Sleeping Giants" able to finance this through the stick of EBPD type legislation and the carrot of healthier, happier occupants.

In the century or so since geographer Andrew Herbertson coined the quote, "what on an average we may expect" is changing; and the more extreme episodes of "what we actually get" are becoming more common. With the policies, strategies and initiatives we feature in Europe Energy Innovation, we can hope to prevent words like "supercharge", "exceptional" and "mind-boggling" also becoming more common - whether we are talking about the weather or the climate.

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

Michael Edmund, Editor

Rebuilding a sustainable and smart transport network

By Adina Valean, EU Commissioner for Transport

"The measure of intelligence is the ability to change," according to Albert Einstein. And change we have. 100 years ago, the car was just starting to become a common sight in Europe, and scheduled passenger flights were still rare. A lot has changed since then, making transport a huge European success story. I like to think that Einstein would be impressed by our intelligence – but also our European transport system!

The wheels of change have never actually stopped – we have continued to adapt alongside a changing world and new technologies. But now it is time to step up a gear, to accelerate change, and to unleash the dual green and digital revolutions in mobility.

Traditionally, revolutions have winners and losers. In this revolution, there will be many winners.

Investing in innovation will secure European leadership in clean transport technologies, and boost our competitiveness, supporting our recovery from the coronavirus crisis.

And accelerating the digitalisation of transport will save money, increase comfort and safety, and open up a whole new range of mobility services for individuals and businesses alike. Imagine your vehicle knowing where to find free parking spaces. This would be equally interesting for shoppers and long-distance lorry drivers.

To guide the transport sector through these transitions, and to show the rest of the world that we are serious about our transport ambitions, we have devised a 'Sustainable and Smart Mobility Strategy', complete with action points and milestones.

Challenges... and solutions

The challenges are clear. To cut transport emissions by 90% by 2050, we need to shift more freight to trains and barges – our greenest transport modes. We need nearly all cars to be low or zero-emission by 2050; today, electric vehicles account for around 10% of all vehicles sold. We need to see renewable and low-carbon fuels accounting for 60% of aviation and 80% of maritime fuels by 2050.

The technologies needed are today in their infancy. We need to make combining transport modes easy, and a natural reflex. This requires new

tools (so that we can buy electronic, multi-mode tickets) and new infrastructure (so that we can easily jump off a ferry and onto a metro – for example).

These challenges are not insurmountable

Aviation faces challenges in cutting its emissions – that is clear. But we have a plan, and we are acting on it. The role of fuels cannot be overestimated; only they promise significant emission reductions without the need for a new generation of aircraft technology, which would take time to roll out. For the EU to hit its emissions goals, sustainable fuels must account for around 5% of aviation's fuel mix by 2030, and more than 60% by 2050.

Unfortunately, production is still at a very early stage. I am however confident that our upcoming ReFuelEU Aviation initiative will take us to the next level. It will significantly boost both the production and uptake of sustainable aviation fuels, and establish a long-term regulatory framework at EU level, avoiding reliance on national initiatives.

The fuel industry needs time to ramp up capacity and production. Targets must be realistic – initially modest but becoming more ambitious beyond 2030 – and should include a prominent role for synthetic fuels in aviation. Manufacturers are already working on engines that can function on these fuels, and their production poses no threat to land use or water reserves. With the right economic and regulatory environment, our analysis suggests that synthetic fuels will become one of the main routes to decarbonising aviation.

Of course, the regulatory framework for SAF will also need flanking measures to promote the development of the market, including targeted financial support, and certification for fuels – all while preserving fair competition. We will therefore work with public authorities, the industry, producers, suppliers, airlines, and civil society to establish a Renewable and Low-Carbon Fuels Value Chain Alliance, to boost the supply and deployment of the most promising fuels.

Road transport also has work to do – it currently accounts for the highest proportion of overall transport emissions at around 71% in 2018. The sector is however expected to decarbonise faster than others. While sales of electric vehicles are still low, they trebled in 2020 to reach 10.5%.

To push that figure higher still, we need more charging points. Drivers need to be reassured that when they head out on a long journey, including across borders, they will be able to charge their car when they need to. Today, what we have serves the existing vehicle fleet, but deployment is uneven across the EU. We currently have more than 200,000 publicly accessible recharging points, serving more than 1.6 million electric vehicles.

Moving forward, we have targets. By 2025, we will install 1 million of the 3 million charging points needed. By 2030, we will also install 500 of the 1,000 hydrogen refuelling points needed. With the infrastructure in place, meeting our additional goal of having at least 30 million zero-emission vehicles on EU roads by 2030 should happen naturally.

Transitioning to a new power base is an enormous undertaking, and comes with a significant price tag. So we are in discussion with the Member States on extending our successful finance blending approach to alternative fuels infrastructure under the Connecting Europe Facility.

Rebuilding after COVID

We cannot ignore the fact that our strategy comes as many in the transport sector are struggling from one day to the next. COVID-19 brought cross-border travel close to a standstill, and even annihilated demand for domestic travel. For some, talk of investment for the future may seem inappropriate.

But the areas in which we are proposing investment – in decarbonisation and digitalisation – are also the same areas that will strengthen the sector, protecting it from future shocks. It is an opportunity to build back better.

And I have reason for to be optimistic as we rebuild, refocus and redouble our efforts to step up decarbonisation. We have a wealth of talent to draw upon, we are leading the way in key technologies, we have the drive and – most of important of all – in Europe we are working together to make change happen. Einstein would be proud.

Transport decarbonisation and sustainable aviation

By Marian-Jean Marinescu, Speaker of the EPP Group in TRAN Committee, Chair of Sky and Space Intergroup

Green Deal puts the field of transport under great pressure. Of course, this does not surprise anyone in this field, as transport has a fairly large contribution to CO_2 emissions. The EU's ambition to become the first carbon-neutral continent is to be praised, as it would mean no other thing than a continent whose citizens breathe the cleanest air on the planet, with positive consequences for their health and life expectancy. However, at the same time, we must be careful that the measures implementing the Green Deal do not jeopardise mobility and connectivity in Europe. Ideas such as the one that I have heard, proposing that on less that 500 km distance not air transport should be available, but only road and rail, are, from my point of view, a trap. Short distances are actually, in my opinion, the perfect opportunity to use electric planes, which could be extremely useful between regional airports.

That is why, during the recent meetings I had with transport officials in the European Commission, I emphasised that the regulations proposed by the Commission must relate to the environment, but also to transport so that competence can be shared in Parliament between the Environment Committee (ENVI) and the TRAN Committee. While ENVI focuses on environmental issues, TRAN takes into account the consequences of environmental measures on industry.

2021 means for the EP many of debates and votes on regulations related to fuels, the revision of transport networks, the new emission levels generated by cars, the trade in certificates in aviation and maritime transport etc. On those very important files TRAN must be able to have a big say.

On the other hand, there is a tendency of putting the aviation into a shadow corner, due to the level of emissions compared to the railway, for instance. We should not allow this. We need to make all modes of transport more environmentally friendly in a sustainable way. The sustainability of the European aviation industry can contribute to the post-pandemic economic recovery of the European Union. The field of aviation is under immense pressure, at a time when the health crisis, the achievement of environmental and digitalization objectives, and a fierce international competition are overlapping.

We already have strong competition, especially with airlines from the Arab countries. Certainly, this competition will increase for European companies as a result of the requirements of the Green Deal, digitalisation and the effects of the crisis caused by the Covid pandemic.

As sustainability is the key word, we need research and a proper budget for the Clean Sky 2 Joint Undertaking, which aims to find technologies that reduce emissions generated by the aviation sector.

In order to maintain the competitiveness of the European aviation industry, each proposed measure to achieve environmental goals and the objectives of digitization must be taken on the basis of impact assesments. And these impact assesments must pursue both environmental and digitalisation goals, as well as maintaining competitiveness and jobs alike.

Clearly, in order to maintain the competitiveness of the European aviation industry, the Union must act simultaneously in two directions: internally, it is about increasing funding for research and innovation – new technologies are essential in the transition to zero emissions and digitalisation – and globally, where the Union needs to have a stronger voice in promoting CORSIA (Carbon Aviation Compensation and Reduction Scheme) and introducing common rules for competitiveness.

But in order to be successful, the EU and the Member States must speak and act with one voice. Unfortunately, there is a tendency to support national interests to the detriment of the European one. The experience I have had during the SES2 + negotiations and the result, embodied in the text of the regulation adopted by the Council, is the best example of this trend. Council voted a SES2 minus instead of SES2 plus !

During the negotiations in the Parliament, many of the tabled amendments related to air traffic management, were in the sense of returning to national approaches, which is, in my opinion, a regress. These nationalist positions have nothing to do with nationalism in the classical sense, but only with the preservation of privileges and money at the national level and the increase of these sums as much as possible. But let's not forget that the money comes from the passengers, from the citizens. Do we offer them something better if we increase the prices? Will they be able to withstand these price increases?

I would conclude by once again supporting the idea of declaring 2022 as the European Year of Aviation. The Sky and Space Intergroup, whose chair I have the honour of being, has already sent a proposal to the European Commission, and I hope that the proposal also has the support of the Commissioner for Transport, Ms Adina Vălean.

EU has to clearly state that European economies cannot survive without aviation, and citizens need to become aware of how important this sector for each of us is.

Eco-friendly planes to fly by 2035 to reach climate-neutrality by 2050

Axel Krein (pictured), Executive Director, Clean Sky

Bold, rapid investment in research and innovation is needed to steer aviation firmly on a course towards climate neutrality by 2050.

The aviation sector has suffered immensely as a result of the Covid-19 pandemic, but in times of crisis opportunity can arise. This is our chance to leverage innovative clean technology to spur a competitive Green Recovery for aviation, in line with the ambitions of the European Green Deal.

We are not starting from zero – the industry has shown its commitment and started its green journey long ago. At Clean Sky we have already identified and delivered promising technologies and routes to zero-carbon aviation. Our European Partnership has been fuelling innovative developments in clean aviation technology since 2008, and since then we have made crucial strides towards climate-neutral flight.

We are exploring radical new aircraft configurations, eco-friendly engines, new systems technologies and airframes, innovations for large passenger aircraft and fast rotorcraft as well as regional aircraft and small air transport such as business jets. We leverage cutting-edge technologies like artificial intelligence and machine learning to ensure that our innovations are developed to the highest possible standard. I highly recommend that you visit our online stand to get a taste of what Clean Sky is currently working on, or read our Highlights report to find out about our key achievements in 2020.

Some particularly interesting innovations include the TechTP, a sustainable low-fuel low-noise engine demonstrator for small aircraft and the UltraFan, a technology demonstrator for the next generation of environmentally-friendly gas turbines for large commercial aircraft. Two new projects have recently been added to our online stand: the electrical Environmental Control System processes external air from outside the aircraft for better cabin pressurisation and air conditioning, while the MultiFunctional Fuselage Demonstrator utilises the full potential of thermoplastic composites to help future European airliner production become faster, greener and more competitive!

The technologies being developed by Clean Sky are just the beginning of the story. Once the concepts are proven and tested on our demonstrators, they must undergo a series of further steps before they can enter the market. The timeframes for the development and subsequent adoption of new aviation technology by global fleets is long – and we do not have much time.

It is important to understand that if we want to have a climate-neutral aircraft fleet by 2050, we need to start phasing carbon-neutral aircraft into the current fleet no later than 2035. The time between now and the end of this decade is therefore vital to identify, develop, mature and demonstrate the necessary technologies. We envisage that major flight and ground tests need to be carried out by 2027/2028 to secure climate-neutral aviation by 2050. Time is of the essence!

The European Partnership for Clean Aviation

To reach the ambitious climate objectives, and in close collaboration with the European Commission, the European aeronautics sector has worked out a Strategic Research and Innovation Agenda for Clean Aviation, spanning 2021-2031.

The new European Partnership for Clean Aviation will launch later this year, and three main thrusts will be pursued as part of the its programme: hybrid electric and full electric concepts, ultra-efficient aircraft architectures, and disruptive technologies to enable hydrogen-powered aircraft.

The three thrusts will culminate in a new breed of regional, short haul and

Photo: ©DLR

short/medium haul airliners which we anticipate will reach the market by 2030 for an entry into service by 2035. These new aircraft are likely to constitute 75% of the world's commercial airline fleet by 2050 and thus will have a major impact on aviation emissions and climate impact.

On 22 April 2020, Clean Sky's Spring Event: *Clean Aviation for a Competitive Green Recovery in Europe: Innovative Ideas Take Flight* took place. I was delighted to welcome politicians, CEOs and aviation experts from across Europe to discuss how to best prepare for a competitive and sustainable recovery for the aviation sector.

Two key themes emerged from the event: that the challenge ahead is tremendous and should not be underestimated, but that nevertheless, we have the capacity and competence to succeed if sufficient investment and support is provided now.

The European Commissioner for Transport, Adina Vălean, brought a hopeful message with her as she addressed the audience. She recognised that "we are faced with a formidable challenge" but said that "recovery is a primary focus; and this recovery is an opportunity to shape the future of the aviation sector."

Clean Aviation could lead us out of the economic recession caused by Covid-19. Europe is currently a world leader in sustainable aviation technology, and by strengthening our commitment in this sector, there is the potential to significantly revive the European economy while simultaneously achieving our ambitious environmental objectives.

"Leading on sustainable aircraft will give a competitive advantage to the European aviation industry," said the European Commissioner for the Internal Market, Thierry Breton, while speaking at the Spring Event.

Clean Sky's ethos of bringing together industry, academia, research centres and SMEs is a recipe for success. Our projects benefit from the innovative edge of SMEs, the cutting-edge knowledge of academics and the research centres, as well as the market-driven expertise of the European aviation industry.

Jean-Eric Paquet, the Director-General of the European Commission's Directorate of Research and Innovation, focused on this aspect as he addressed the audience at the Spring Event:

"I'm impressed by how the EU aviation industry is now coming together, including the research organisations and knowledge networks across our SME and innovation ecosystems to bring Europe's industry into a clean future. I think Europe now has a head start and my expectation is very much that the proposed Clean Aviation Partnership really allows us to ensure that we keep this head start. You can count on DG Research and Innovation to help you... to set up the new Partnership!"

The future of sustainable aviation looks bright, but we should not underestimate the magnitude of the challenge ahead of us. We do not have much time. Ambitious, fearless investment in research and innovation is needed NOW to make our climate neutrality aspirations a reality by 2050.

At Clean Sky, we are ready to take on this challenge. Clean Sky has so far yielded very encouraging results and I look forward to seeing the contribution of Clean Aviation to achieving the European Green Deal.

EERA reinforces its interest in the digitalisation of the energy sector

Rafael Mayo-García, (CIEMAT and EERA DfE Coordinator)

The European Energy Research Alliance (EERA), the largest energy research community in Europe, has a strong ambition to be at the forefront of the clean energy research advancement. For this reason, and recognizing the cross-sectoral effort that is needed to eventually drive the profound societal transformation required to achieve climate neutrality, where information technologies and the digitalisation of energy play a critical and transformative role, EERA has officially launched a transversal Joint Programme (tJP) on Digitalisation for Energy (DfE). Digital technologies will absolutely have a pivotal role to play in the energy sector as they are needed for improving the efficiency of either a research or business's process, consistency, and quality, so EERA has reinforced its strategic agenda by having this specific programme in EERA.

An EERA Joint Programme (JP) is a permanent structure that allows EERA to foster pan-European R&D&I collaboration on a joint Strategic Research and Innovation Agenda, with the objective of building leading-edge expertise in the various fields of clean energy. On this occasion, the structure of the new JP has been designed as a cross-cutting entity with the aim of leveraging pre-existing expertise, and of complementing it with high-level scientific knowledge on the latest digital concepts and technologies with a special focus on high performance computing (HPC), data science, and artificial intelligence.

Digitalisation for Energy has its roots in the expertise of numerous researchers involved in EERA activities, many of whom have already been active in recent years in projects related to information technologies and digital challenges in the clean energy field. Examples of this focus can be found in the projects EERAdata, which aims to discuss and advance the state of the art of FAIR and open energy data, and the Energy-oriented Centre of Excellence (EoCoE), offering an ever-expanding network of experts in HPC and in sustainable energies, from academia, industry, and the public sector.

The Joint Programme in Digitalisation for Energy integrates on a modular basis all the existing sub-programmes that, although belonging to other established Joint Programmes, had already developed a particular expertise in digitalisation topics. This innovative approach in the implementation of the new programme allows for an easy integration with current and future sub-programmes on digitalisation (i.e., cybersecurity, blockchain, etc.).

Currently, Digitalisation for Energy is structured as it follows: two new sub-programmes launched jointly with the Joint Programme, namely: High Performance Computing and Data Science and

"An EERA Joint Programme is a permanent structure that allows EERA to foster pan-European R&D&I collaboration on a joint Strategic Research and Innovation Agenda, with the objective of building leading-edge expertise in the various fields of clean energy."

Artificial Intelligence; as well as four transversal sub-programmes already set up and belonging to other Joint Programmes, namely: Technology in JP Energy Systems Integration, Multiscale modelling of materials, processes and devices in JP AMPEA, Digitalisation in JP Hydropower, and Physical modelling, materials health monitoring and non-destructive microstructure examination in JP Nuclear Materials.

Since its official launch in mid-October 2020, the new EERA transversal Joint Programme has developed several activities aimed at raising awareness of the programme itself, with the purpose of creating synergies and fostering cross-cutting collaboration. A dissemination effort has been carried out to promote the programme with the energy and ICT communities through participation in well-recognised events such as the HPC summit week 2021, the upcoming European Sustainable Energy Week 2021, ISC HPC 2021, and the 11th ETIP SNET Regional Workshop just to mention a few.

In parallel, efforts of this initial stage are being focused on consolidating synergies within EERA, not only on strategic initiatives that concern the whole EERA community, but also on joint research efforts with specific Joint Programmes, such as a project on Energy Materials for Innovation with JP AMPEA and Nuclear Materials. Some of these endeavors have already materialized in a community paper, Advancing FAIR metadata standards for low carbon energy research' ,under the leadership of the EERAdata project, and in a position paper about energy and supercomputing that is being drafted with the EoCoE project. Moreover, the transversal Joint Programme in Digitalisation is working on collecting a map of numerical codes, repositories, and digital methodologies being exploited in the energy sector that will eventually be made public at the EERA website.

In summary, the transversal Joint Programme in Digitalisation for Energy is a materialization of EERA's acknowledgement of the crucial role that information technologies and digitalisation have in advancing the clean energy transition towards climate neutrality by 2050. Through the transversal Joint Programme, the Alliance aims at fostering research that will be trans-disciplinary to all EERA activities and to the whole energy research community. The experience derived from this process, as first-of-a-kind cross-cutting structure, is expected to help identify best practices and lead the way to possible additional transversal Joint Programmes within EERA in the future.

About the European Energy Research Alliance (EERA)

The European Energy Research Alliance (EERA) is an association of European public research centres and universities active in low-carbon energy research. EERA pursues the mission of catalysing European energy research for a climate-neutral society by 2050. Bringing together more than 250 organisations from 30 countries, EERA is Europe's largest energy research community. EERA coordinates its research activities through 18 Joint Programmes and is a key player in the European Union's Strategic Energy Technology (SET) Plan. For further information, see https://www.eera-set.eu/.

domOS

“Enabler for digital energy services in existing buildings”

Insight

Digitalisation is progressing at a fast speed in nearly all application domains. In this respect, buildings – and especially energy in buildings – are behind the times. Consequently, facility managers and occupants have generally a limited understanding of their building as an energy system, and buildings are not acting as active nodes of the energy grid they are connected to.

Admittedly, increasing number of smart appliances and devices, ranging from smart coffee machines to online heat pumps, are available on the market. However, such silo solutions, whose individual relevance is not questioned, do not come up with the expectations of digital energy in buildings for several reasons:

- Energy appliances for heating and cooling, which are by far the highest energy consumers in buildings – have a long lifespan. Many of them are from the pre-digital area and feature no data interface.
- Deployment of services based on several smart appliances (e.g., energy management for photovoltaic inverter, electric vehicle charger, heat pump, and smart meter) is cumbersome, because of the heterogeneity of the digital interfaces.
- Higher-order energy systems (local energy communities, distribution grids, energy markets) cannot activate the energy flexibility of buildings due to lack of shared digital interfaces.
- The multiplicity of independent smart solutions degrades the user experience (multiple user interfaces and access control procedures).

domOS project aims at defining and prototyping an “operating system for buildings” acting as an intermediary between applications and field devices and appliances. The domOS operating system will offer two basic services: let applications access the building infrastructure independently of the type or brand of appliances and enable building occupants to manage their privacy centrally. The vision is to apply the same recipe that boosted the development of applications for smartphones for buildings.

Unlike the smartphone ecosystem, the smart building ecosystem is not dominated by a few big players. To trigger adoption by many stakeholders in a fragmented scene, domOS leverages both existing and emerging standards from recognised bodies. The aim is for domOS to be compliant with existing and new devices and appliances and allow their integration with low development effort.

About domOS

domOS is a collaborative research project supported by the European Commission under the Horizon 2020 Programme for Research and Innovation (Call LC-SC3-EE-4-2019-2020), with a duration of 36 months.

The project consortium is made up of 11 partners from four European countries. Each partner develops activities in smart energy services for buildings, either as a technology provider or as a service operator. This mix, together with the five demonstration sites, ensures that the developed solutions will be applicable in a large range of use cases.

“domOS is at the crossroads of smart buildings and of the Internet of Things (IoT). The consortium wants to bring new IoT developments for interoperability, privacy management, and provisioning to the smart building world. This will provide European buildings with a doable path for coordinated stepwise deployment of smart services” says Dominique Gabioud, the Project Coordinator from the University of Applied Sciences Western Switzerland.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 894240.

Objectives

1. **Design an open, secure, multi-service Internet of Things (IoT) ecosystem for smart buildings:** Any application for visualisation, energy optimization, or home automation can monitor and command any field parameter, if authorisation is granted, independently of the local communication network technology.

Features of the IoT ecosystem for buildings:

- Open & multi-service: Multiple applications from different vendors can access building sensor data and control building set points.

- Secure: Applications, users, and gateways dispose of integrated authentication and access control mechanisms. Facility managers (commercial buildings) or households (residential buildings) can control privacy: they decide which application has access to which data.

2. **Enable interoperability of data and services for smart buildings through a standard nomenclature:** Applications and local communication systems share a common nomenclature (ontology) for field data and building metadata. Existing nomenclatures will be evaluated and completed according to demonstrators' requirements.

3. **Increase energy performance through smart services:** Smart services make buildings more energy-efficient, flexible, and empower occupants and facility operators.

- Increased energy efficiency: Closed-loop control services, energy dashboards for occupants and facility managers.

- Increased flexibility: The intrinsic flexibility of consuming processes (e.g., heating) is controlled for techno-economic optimization: increased self-consumption at vertically nested systems (buildings, microgrids, local energy communities, distribution grids).

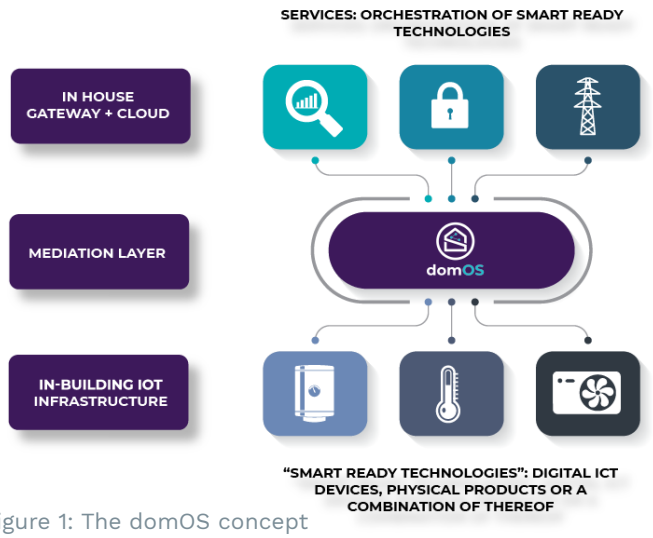

Figure 1: The domOS concept

4. **Demonstrate and evaluate smart services deployed on compliant frameworks:** Various smart services for existing buildings are deployed, using different frameworks compatible with the domOS IoT ecosystem specification. Their performance regarding technology, energy, user experience, and business is assessed.

Concept

Interoperability of a smart service and of building infrastructure is ensured if both share common technology building blocks and vocabulary.

The common technology building blocks are adapted from the Web of Things (WoT) project of W3C (World Wide Web Consortium). The WoT approach is interesting as it does not require upgrade of the building infrastructure but only to formally describe it, thus simplifying the integration of existing in-building digital systems.

The common vocabulary is provided by existing ontologies like SAREF4ENER that will be complemented when required. The following figure illustrates the mediation role played by domOS.

Demonstration sites

On five sites, domOS will prototype and demonstrate a wide range of smart energy services that:

- relate to electricity and district heating,
- have their intelligence either hosted on a building local gateway, in the cloud or mix,
- address different types of buildings (tertiary/residential buildings, single-family / multiple families),
- feature dynamics ranging from seconds to hours,
- integrate existing buildings in larger information systems, as those in use for energy grid operation and energy markets, and
- implement either closed-loop (e.g., need-based heat generation control) or open-loop (dashboards, performance reports) control strategies.

Project ID: 894240
Duration: 36 months
Website: https://www.domos-project.eu/
Project coordinator: Dominique Gabioud
Start date: September 2020
Contact email: info@domos-project.eu
Project partners: HAUTE ECOLE SPECIALISEE DE SUISSE OCCIDENTALE, Switzerland
AALBORG UNIVERSITET, Denmark
CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA – RECHERCHE ET DEVELOPPEMENT, Switzerland
ELECTRICITE DE FRANCE, France
ALIUNID AG, Switzerland
NEOGRID TECHNOLOGIES APS, Denmark
SUNTHERM APS, Denmark
OIKEN SA, Switzerland
INEA INFORMATIZACIJA ENERGETIKA AVTOMATIZACIJA DOO, Slovenia
FENIX TNT SRO, Czechia
AALBORG ENERGI HOLDING AS, Denmark

How social entrepreneurs catalyse transformation of the energy system

By Valeria Duflot (pictured) Co-founder Venezia Autentica and Tourism Allies, Co-chair of the Europe Chapter and board member of Catalyst 2030

Involving consumers, adopting a holistic approach to transformation, and facilitating new behaviours and mindsets are critical to ensuring the transition to equitable sustainable energy systems. Change is needed at all levels and all stakeholders have their part to play.

Systems change as a compass

As President of the European Commission, Ms. Ursula von der Leyen, stressed when discussing the Green Deal in her State of the Union address last year, "systemic change across our society, economy and industry is required to reach our global and European targets for 2030 and 2050."

Focusing on any one aspect of the energy transition increases the risk of widening global inequality and falling short on climate goals. Achieving a balanced transition requires managing sustainability, energy access and security, and economic development at the same time.

As leaders working directly with communities, and focused on creating long-term systemic change, social entrepreneurs are important allies in ensuring a just and inclusive energy transition. There are already several examples of projects involving social innovation that have successfully advanced sustainable energy and also had knock-on effects in areas such as energy security, community empowerment, rural area development and the introduction of new sustainability frameworks.

Partnering for local renewable energy production in Spain and Portugal

Although renewable energies accounted for the highest share in primary energy production in the EU in 2019, member states still import 60% of their energy. Addressing energy security by facilitating new production models is therefore crucial for a successful European energy transition.

With its "Clean Energy for all Europeans" package, the European Union opened the way for new initiatives aiming to empower smaller actors in the energy market and foster decentralised renewable energy production and consumption. In particular, the directive described in Article 21 of the Renewable Energy Directive (REDII) is a great stepping-stone for collective self-consumption at the community level.

While this is a significant opportunity for local governments, it also brings challenges surrounding implementation.

This was the case for 200 municipalities in Spain and Portugal until they collectively joined forces with social entrepreneurs in an innovative and highly collaborative project. Their goal: To put REDII into practice by democratising energy through clean tech and generating renewable energy locally.

But the ambition of the partners went beyond access to clean energy. It tackled the abandonment of rural areas by creating an associated ecosystem of community and livelihoods while working alongside mayors of towns and villages in rural areas. Collective solar photovoltaic installations were crowdfunded in the village and pay for themselves through savings on energy bills. All savings are then reinvested in building a shared circular ecosystem through e-mobility, permaculture hubs and innovation labs. The first pilot projects have been built in Spain and will be replicated at local, regional and national levels. This model is scalable and will be made available to other countries via partnerships.

Green ambitions create a sustainability blueprint through collaboration

Today in the EU, fossil fuels still dominate. Household energy use and transportation represent two of the top three end-uses of energy. Households in particular use energy for space and water heating, cooling, cooking, lighting and running electrical appliances, making the case for designing living spaces and lifestyles that are optimised for energy efficiency.

Bioregional's BedZED village in South London is arguably the most ambitious attempt at a truly sustainable major new housing development. It was designed to achieve considerable reductions in greenhouse gas emissions and water use, and to make a green lifestyle more attainable for its

residents. A great example of collaboration, BedZED brought developers, architects, engineers and a social enterprise together. After its completion in 2002, the community – which is comprised of 100 homes, office space, a college, and community facilities – became famous in the industry for its ambition.

Using learnings from the BedZED eco-village, the team at Bioregional went on to create and develop the "One Planet Living" sustainability framework with the WWF. It consists of ten simple principles and detailed goals that form a holistic approach to sustainability and net-zero. It addresses both the obvious improvements –such as zero-carbon energy, travel and transport– and the less straightforward optimisations to enable efficient energy use and quality living: Materials and products, zero waste, local and sustainable food, sustainable water, land and nature, culture and community, equity and local economy, health and happiness.

Since its launch, the framework has been used by cities, tourist destinations, developers, and brands worldwide. It was even behind the greenest Olympic Games to-date in the UK in 2012. There are now 595,000 people around the world living in, working at or visiting organisations and communities with a deep commitment to One Planet Living. The knowledge and experience of Bioregional also contributed to the creation of the UN's 12th Sustainable Development Goal, 'responsible production and consumption'.

Social entrepreneurs as the ideal collaborator

These are just two examples of what can be achieved when we use systems change as a compass, and collaboration and innovation as our go-to tools. With innovative approaches, social innovation tackles the root causes of issues, using sustainable models that benefit communities, the economy, and the environment. Social entrepreneurs have collaboration in their DNA. They are allies to any stakeholder looking to make an irreversible systemic impact and to set us on the path towards a resilient energy transition that leaves no one behind.

Valeria Duflot

Valeria Duflot is a social entrepreneur working to advance the SDGs by transforming tourism and advancing social entrepreneurship. She is the co-founder of Venezia Autentica and Tourism Allies, co-chair of the Europe Chapter and board member of Catalyst 2030. Valeria is also a digital ambassador of EU Sustainable Energy Week 2021 of which European Energy Innovation is a media partner. You can follow Valeria at @duflotvaleria

Digital will underpin stronger, greener, more competitive European industries

By Cecilia Bonefeld-Dahl (pictured), Director-General, DIGITALEUROPE

The digital transformation of Europe's energy-intensive sectors will bring our industry to the next level, create jobs and economic growth, and allow us to become more sustainable and competitive.

At the same time, an innovative, energy-efficient industry is a cornerstone of the EU Green Deal.

Studies show that by digitalising Europe's traditional sectors like energy, transport, construction, agriculture and manufacturing we can cut carbon emissions by a fifth by 2030. That is ten times more than what the ICT sector produces.

Building a digital-first Renovation Wave

One example is the construction sector, which accounts for 20% of emissions worldwide. Digital technologies have huge potential to cut out waste and reduce energy consumption throughout the whole construction process. Yet, construction is the least digitised sector in the EU and European construction companies are late compared to their US counterparts.

We are missing out on a huge opportunity. Digital technologies improve efficiency through the entire lifecycle (design, construction and operation). Not only do these improve the building operations, they also improve the entire supply system. You have to look at this through a holistic approach, integrating energy efficiency, smart digital technology, and re-use of materials.

One way of doing this is connecting the heating and cooling systems to renewable sources or integrating an intelligent energy system management that can monitor consumption and prevent waste. This is the case for the smart city quarter Future Living Berlin, where our member Panasonic's European R&D team has developed and currently tests an energy management solution aiming to optimise the locally produced renewable energy.

Upgrading how we manage our resources to prevent waste

Let me make another example: there's a segment which is not seen as very innovative, however, it deals

with one of the most important materials in the world. It is needed for life and for industry. I'm talking about water management.

In the EU, the average water losses are 23% of total water. Crucially, water challenges spill over into energy consumption challenges. Studies show that the net annual electricity consumption for urban water management is 5.5% of the total amount of electricity consumed by households in just one year in Europe**.** This water-energy nexus has a direct impact on Europe's CO_2 emissions.

Digital technologies offer hardware, software and equipment infrastructure to enable more connected, intelligent, efficient and responsive water systems and services. One key area is preventing water leakage: up to 38% thanks to digitally enabled monitoring and maintenance. In Denmark, the entire water cycle of Aarhus's wastewater treatment plant turned energy-neutral thanks to digitalisation investments.

Time for Europe's industry to master its digital future

So, it's clear that more sustainable and resilient supply chains – from raw materials to water – need digital transformation. Yet, despite all the talk of the 'twin' green and digital transitions, the reality is different.

Take the EU taxonomy delegated act – a tool for investors to assess the sustainability of various economic activities – where the digital sector is mentioned only briefly. This is a missed opportunity. To truly realise the potential of digital technologies, they cannot be just an afterthought – they must be mainstreamed into every aspect of the EU Green Deal.

AI-based logistics management, smart grids, smart mobility solutions as well as intelligent heating, light and appliance control are all well-established technologies. Rather than a raft of new obligations on businesses, we need targeted, digital investments to help our industry make the most of them.

At DIGITALEUROPE, we wish to see a European industry that promotes and takes advantage of digital innovation and gives smaller companies the opportunities they need to grow both here and globally. We are proud of our industrial past, but we also realise there is a need to change the way we do things if we are to be the leaders of the future.

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"We are missing out on a huge opportunity. Digital technologies improve efficiency through the entire lifecycle (design, construction and operation). Not only do these improve the building operations, they also improve the entire supply system. You have to look at this through a holistic approach, integrating energy efficiency, smart digital technology, and re-use of materials."

Energy-related challenges and opportunities of the ICT sector

Dr. Klaus Grobe, Director Global Sustainability, ADVA Optical Networking SE, Germany

Introduction

Since the global ramp-up of the Internet, its throughput and the associated bitrates have been growing exponentially. This can be extracted from the most important reference for Internet throughput, the Cisco Visual Networking Index.

Main components of the Internet or ICT sector (information and communication technology) are wired and wireless networks, data centers, and end-user equipment. The networks that connect users and data centers account for ~25% of the total resulting energy consumption and associated emissions. They split into core and access parts. The core networks consist of aggregation switches, routers and fiber-optic wavelength-domain multiplexing (WDM) transport. For these equipment classes, some 80-90% of the environmental impact are determined by the use-phase power consumption, which can be derived from lifecycle analyses. This is particularly true for the global warming potential (GWP).

Energy and emissions

The bandwidth growth leads to an increase in ICT power consumption, in particular for data centers and networks. The increasing power consumption also leads to increasing Carbon emissions.

Given the threats of global warming and also general resource depletion, the ICT environmental-impact growth must be seen critical.

ICT equipment got more power-efficient over time. However, it also had to cope with the growing bandwidths of an increasing number of bandwidth-hungry applications. For the core-network equipment (switches, routers, and WDM transponders), it has not been possible to cope with this bandwidth growth by gains in power efficiency: as a result, core-network equipment, over time, consumes more power. This is shown in Fig. 1.

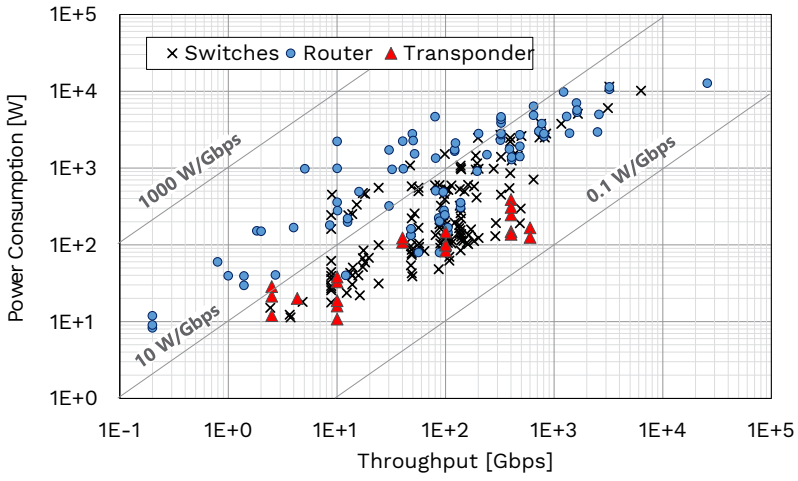

Figure 1. Power consumption of ICT network equipment over throughput [H. Mellah, B. Sansò, DOI: 10.1109/WoWMoM.2011.5986484; Vereecken et al., IEEE COMMAG, Vol. 49, No. 6, 2011; Tucker et al., ECOC 2008; ADVA research and specifications]

Power efficiency also massively grew. In Fig. 1, this can be seen because all equipment shown develops toward isolines of constant and improving power efficiencies of 1000 → 0.1 W/Gbps (Watts per Gigabit-per-second). Our latest WDM equipment, for example, can achieve an efficiency of almost 0.2 W/Gbps.

In addition to bandwidth growth, which will likely sustain over the next couple of years, we are approaching another area of challenge. The increase of energy efficiency in electronic switching and fiber-optic transport is approaching some fundamental limits in the next 20 years or so. Ultimately, for both, switching and photonic transport, this will be the so-called Shannon-von Neumann-Landauer (SNL) thermal limit, as shown in Fig. 2. The SNL limit is posed by quantum physics.

The practical consequence is the end of density scaling in semiconductors. Without new, disruptive developments, the minimum switch size will stop somewhere close to 5 nm. This will have effects on future energy efficiency.

In addition, further saturation effects already became visible. As a consequence, there has been strong increase in power consumption for the highest-ranking high-performance computing machines over the last

four decades (from ~150 kW around 1980 via ~700 kW in 2005 to 17 MW in 2014).

Storage equipment in data centers is facing saturation effects as well. The main media for mass storage – tape, hard-disk drives (HDD) and optical disks – show slowed-down increase in further areal density. The latter is relevant for resource efficiency. For HDDs, there is also an effect on energy efficiency.

Disruptive new developments are not clear right now. Theoretically, concepts like entropy-preserving switching or thermodynamically reversible computing can break the SNL limit, but they may not be acceptable in practice because the energy advantage comes at the cost of switching speed.

Other technologies like carbon nanotubes or biological-cell processors may allow to get closer to the SNL limit than today's CMOS technology. However, they do not yet present mature technology.

There is one important aspect that can relax the emissions situation that results from the ICT power consumption. This aspect is sometimes referred to as Greening-by-ICT. It refers to emissions savings in sectors other than ICT that are enabled by ICT through respective digitalization. The most relevant sectors that can be significantly improved regarding power consumption and emissions are manufacturing, energy (e.g., the power grids), buildings, mobility, and agriculture. According to GeSI Smarter 2030, the carbon-saving effect on a global scale can be almost a factor of 10 higher than the ICT emissions themselves. This is indicated in Fig.3. It shows global Carbon emissions with ICT emissions and the potential Greening-by-ICT Carbon savings.

Conclusion

ICT networks have certain environmental impact that is currently not fully avoidable despite all attempts for maximum efficiency. However, the ICT sector has very strong potential for Carbon abatement in various other sectors. These Greening-by-ICT effects are a clear opportunity on the way toward Carbon neutrality. It is therefore likely that we need even more ICT to exploit more Greening-by-ICT.

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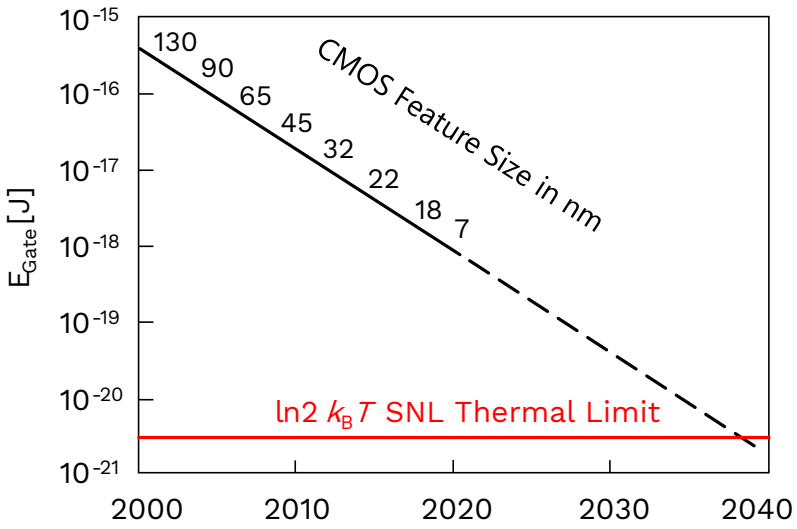

Figure 2. CMOS (Complementary Metal-Oxide Semicunductor) feature-size and related gate energy EGate approaching the SNL quantum limit [based on ITRS Roadmaps]

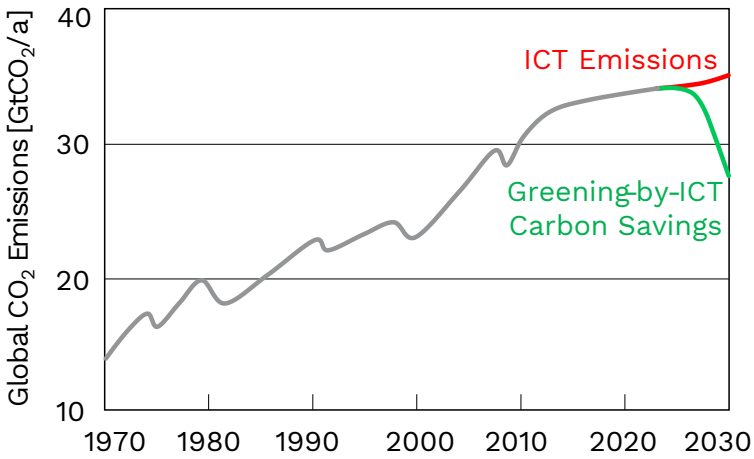

Figure 3. Global CO2 emissions and ICT emissions vs. Greening-by-ICT Carbon savings [H. Ritchie, M. Roser, 2020, retrieved from: ourworldindata.org/CO_2-and-other-greenhouse-gas-emissions; GeSI Smarter 2030; A.S.G. Andrae, Int. J. Science and Eng. Invest. Vol. 8, March 2019; and emission factors predicted until 2030]

Are mortgage lenders the sleeping giants of the Renovation Wave?

Peter Sweatman (pictured), CEO and Founder, Climate Strategy & Partners

It is believed that the world's buildings can deliver the same services with 80% lower energy use. Therefore, as the EU increases its climate and energy efficiency ambitions for 2030, and competitive renewables, lab grown meat and electric vehicles have captured the public's imagination of a net zero emissions future: where is energy efficiency and building renovation? The answer is "lagging".

Renovation is the art of converting the places where we live, learn and work into near-zero energy, or energy-positive components of a net-zero emissions world. Even without this "New Bauhaus", individual buildings are successfully transformed across the EU daily, nevertheless the rate of this activity is far below where it needs to be to enable the smooth, just and cost efficient, energy transition envisaged by most Governments.

This is indeed important, as a just climate transition relies on the new employment expected from the "jobs machine which is energy efficiency". Every €1 million invested in the transformation of European buildings creates 18 jobs in the mostly local SMEs responsible for this work.

To deliver these benefits in the EU, the Commission launched the "Renovation Wave" strategy in October 2020, designed to massively improve the energy performance of buildings. By this strategy, the EU27 will more than double buildings renovation rates over the next decade and ensure that these renovations lead to much higher energy and resource efficiency. Overall, the Commission targets the upgrade of 35 million buildings by 2030, requiring €275 billion per annum of investments to renovate these buildings.

The problem at present is that the renovation market is hard to navigate, and homeowners simply may not have the €2.75 trillion of new renovation investments envisaged in ten years. €2.75 trillion is considerably larger than the combined EU budget and the recovery fund. The only European buildings-related market of comparable size is the mortgage market worth around €7 trillion.

If European homes are estimated to be worth €17 trillion, minus €7 trillion of mortgages, then the amount of European savings in home equity is €10 trillion. In the next nine years, a quarter of that home equity needs to be reinvested to save future energy costs, deliver local jobs, improve homeowners' quality of life, reduce inequality and emissions, and address inter-generational equity.

Borrowing against the value of European property to invest to improve it seems fairer than borrowing from the whole population (via more Govt debt), or all taxpayers (via more tax) to improve buildings not always owned by those paying. Furthermore, a decade of academic research points to a correlation between a property's energy performance and its financial value (the "green premium" and/ or avoidance of a "brown discount"), and increasingly energy efficiency is being correlated with the probability of homeowners' arrears or default (ie. better home energy performance results in better credit).

To deliver all of this, we need to awaken the sleeping giants implicated by the Renovation Wave: mortgage lenders. Mortgages fund 40% of the value of all European buildings and one third of all non-financial bank lending is backed by property, as collateral. While this varies significantly between Member States, with 220 million European homeowners and banking customers there are few more appropriate allies than mortgage lenders that are so well positioned to channel trillions of euros of new investment into the

Efficiency stakeholders in EU Sustainable Energy Week (2019)

assets which house and back their clients' prosperity.

This can be achieved by a classic "carrot and stick" approach:

- The carrot comes in the form of distribution and arrangement fees, together with an enhanced, more sustainable lending book, with lower climate transition risk, more green assets, complying with the EU Taxonomy, and happier and healthier homeowner clients.
- The stick is mandatory minimum energy performance standards which the EU Commission has announced it will include in a revised Energy Performance in Buildings Directive (EBPD) by the end of 2021.

Seeing this opportunity, several European banks have already established a voluntary mortgage portfolio standard. This means assessing the energy performance of the buildings which back their mortgages and establishing a science-based trajectory for their average portfolio standard. For instance, ABN Amro recently pledged a portfolio standard of an average energy efficiency label 'A' by 2030 for its €150 billion mortgage book.

Portfolio standards have already proved their worth in reducing energy and transport emissions. In fact, banks are to financing buildings what utilities are to funding renewables, and what vehicle manufacturers are to buying new cars. In the European context, where banks have an outsized role in financing our future, we need them onboard to deliver the trillions of new investment in 10,600 home-renovations-per-day.

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Peter Sweatman (@ClimateSt) is Chief Executive of Climate Strategy & Partners and working for 18 years in climate finance. This article is based upon an upcoming report, for more details see website: www.climatestrategy.com

The EIRIE platform

The Horizon 2020 PANTERA project consortium is delighted to announce the launch of the EIRIE platform, an interactive multi-functional platform that stands for European Interconnection for Research Innovation & Entrepreneurship.

The key objective of the EIRIE platform is to connect and bring together the European Union's Research & Innovation community in one place, to enable collaboration, increase wider interest and give access to all the resources needed to play an active role within the European research community.

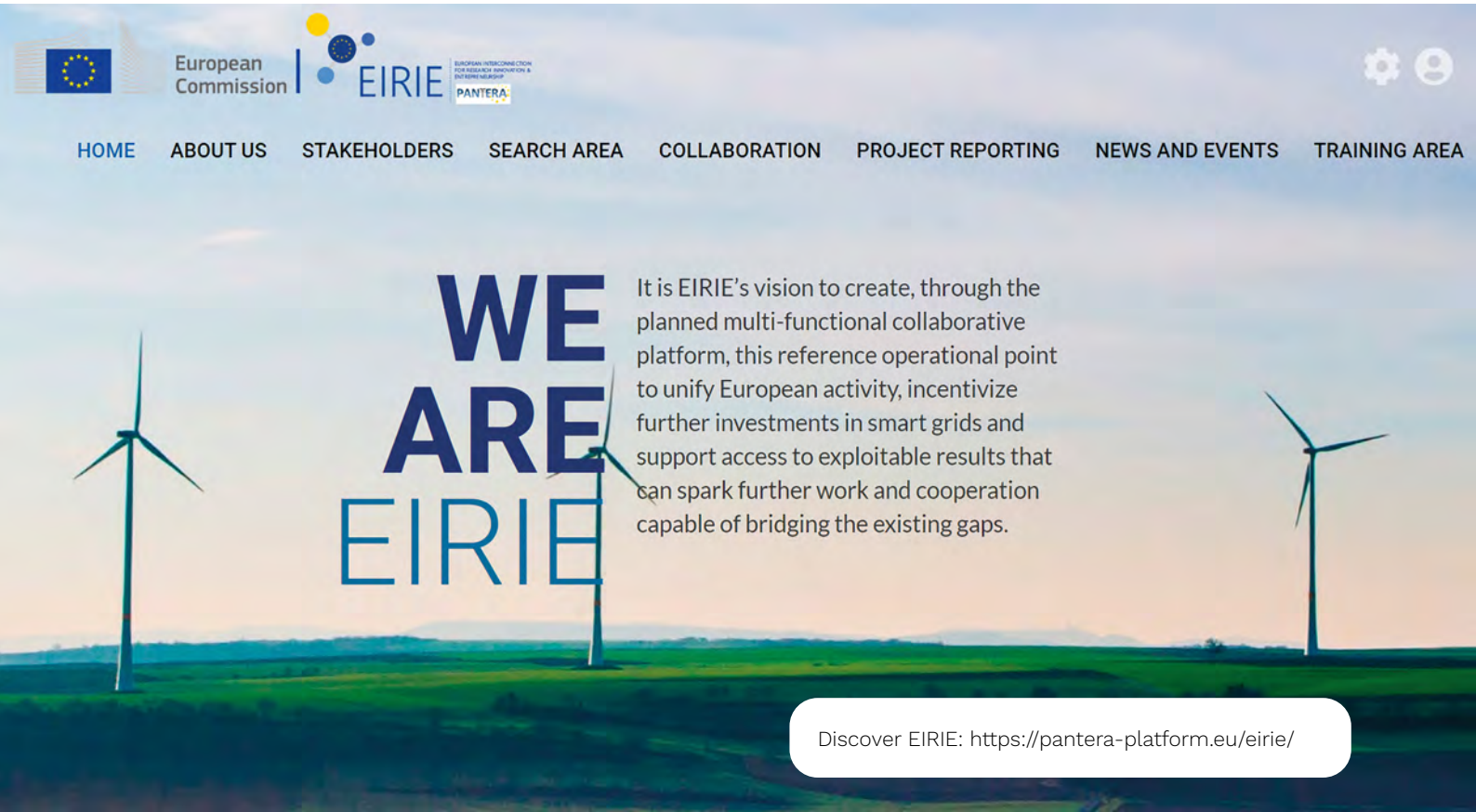
The EIRIE platform aims at strengthening the participation of all Member States in support of the fifth pillar of the Energy Union (Research, Innovation and Competitiveness) and energy transition mentioned in *"A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy"*.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

Through the EIRIE platform, we are bridging the gaps that currently exist in the energy field in Europe between Member States, by bringing together data, information, knowledge and the lessons learned from successful partnerships being national, regional or European. The platform users will get an easy access to information on potential funding and consortium building, projects data collection (results and outcomes, best practices, reports and deliverables, etc.), references to standards and regulations, all of these searchable via an easy-to-use search tool.

Alignment and collaborative work are key for creating the pan-European modus operandi envisioned in the design and operation of EIRIE. It is with the feedback and continuous support of relevant stakeholders and their active participation, along with national, international and EU platforms and initiatives, H2020, Horizon Europe, national and international projects that the EIRIE platform aims to become a reference access point.

Furthermore, to ensure the success and sustainability of the platform, we are working closely with JRC (EC Joint Research Centre), under the guidance of DG Energy of the European Commission, to develop EIRIE as a linked extension of their Smart Energy Systems platform. The platform will also be serving the needs of ETIP SNET (ETIP Smart Networks for Energy Transition) and be in close collaboration with well-known platforms in Europe such as the ERA-Net SES (ERA-Net Smart Energy Systems), DERlab and Mission Innovation.

EIRIE smart grids
EUROPEAN INTERCONNECTION FOR RESEARCH INNOVATION & ENTREPRENEURSHIP
PANTERA



Discover EIRIE: https://pantera-platform.eu/eirie/

The PANTERA project

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

It is PANTERA's vision to create, through the EIRIE multi-functional collaborative platform, a reference operational point to unify European activity, incentivize further investments in smart grids and support access to exploitable results that can spark further cooperation and bridge the existing gaps.

Developing an effective and functional platform is a true collaborative effort. Within PANTERA, several initiatives have been put in place to ensure the participation and collaboration of all project stakeholders.

Indeed, working teams each tackling specific research areas have been created and Regional Desks have been established to create a local network and ensure regional issues and aspects are taken into consideration.

Get in touch with us!

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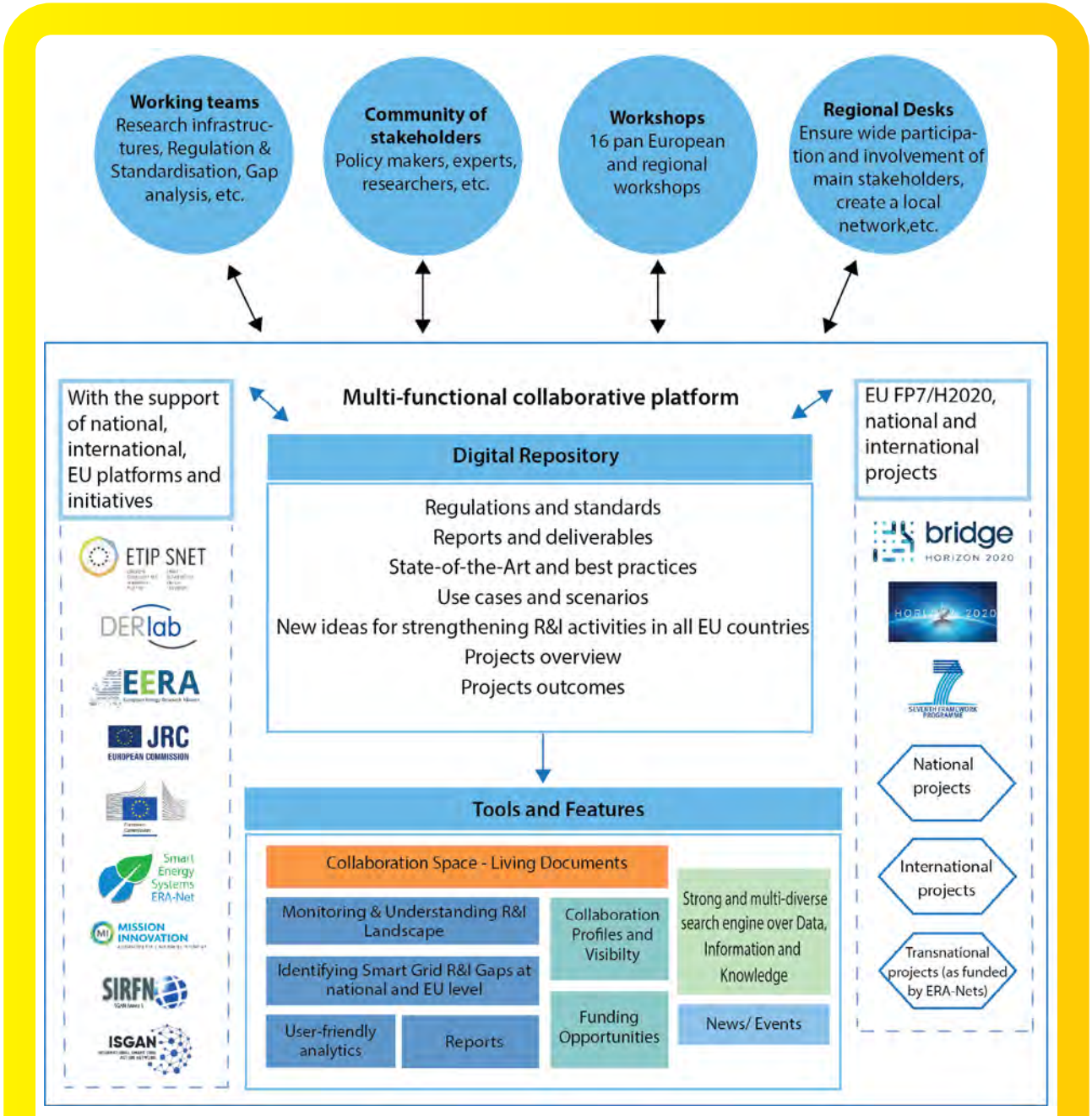
Find us as "PANTERA EIRIE Platform" on LinkedIn, Facebook, Twitter and YouTube.



Boosting economic recovery with the energy transition!

By Christiane Egger, Conference Director of the World Sustainable Energy Days

This is the focus of the next World Sustainable Energy Days (WSED), a leading conference on achieving global climate neutrality, taking place from 21-25 June 2021 in Wels/Austria. After more than a year, it is one of the first international conferences offering on-site as well as online participation – an opportunity many of us have been eagerly waiting for!

Organised by the OÖ Energiesparverband (ESV), the regional energy agency of Upper Austria, this special edition of the WSED offers a hybrid format. It brings the worldwide energy transition community together by allowing participants to connect digitally from anywhere in the world or follow the main sessions on-location in Wels (in full compliance with COVID regulations).

The Green Deal – our green recovery

Europe is aiming for a 55% reduction of CO_2 emissions by 2030 as a milestone on its way to climate neutrality by 2050. It is crucial that the investment decisions made in the next few years put us on the path of being «fit for 55» by the end of this decade. The current economic challenges and the related investment programmes present a unique opportunity to accelerate decarbonisation and create a fairer society and more competitive economy.

Energy efficiency and renewable energy are key to boosting the economic competitiveness of the EU, its member states, regions and individual businesses. Resulting economic growth provides jobs and the ability to invest in the further progress of the clean energy transition to the benefit of all citizens. The pandemic and resulting societal changes make way for new narratives for energy efficiency and the energy transition.

The WSED show how we can make a green recovery happen in practice, how renewable energy and energy efficiency can contribute as an investment engine, and how effective narratives can help make energy efficiency the new normal.

A high quality, comprehensive package

Over the course of just a few days, the WSED offer a series

of specialised, stand-alone but complementary conferences covering key topics for the energy transition. Each year, over 600 participants from more than 60 countries attend! The large community of returning delegates speaks for the event's reputation. In 2021, the WSED's comprehensive package presents policies, technologies, markets and financing models for the energy transition.

Bioenergy for a green recovery!

There are still 17 million oil heating systems in the EU emitting over 150 million tonnes of CO_2 every year. Bioenergy can play a key role in phasing out fossil fuels. The **European Pellet Conference** (22 June) is an opportunity to learn about innovative technologies, projects and concrete solutions for pellets across the bioenergy value chain!

Industrial competitiveness through the energy transition

As Europe moves towards becoming the first climate-neutral continent, a new paradigm is emerging from policy, finance and global supply chains: the industrial energy transition and independence from fossil fuels as a crucial factor for competitiveness. The **Industrial Energy Efficiency Conference** (23 June) presents the new policy framework and key innovations for the industrial energy transition, and showcases real-life examples of how it can be implemented in the daily reality of industrial companies.

Solutions for mainstreaming e-mobility

While automotive markets around the world were heavily disrupted by the Corona pandemic, sales of electric vehicles rose sharply, and e-mobility achieved a market breakthrough in many countries. Nevertheless, mainstreaming e-mobility requires up-scaling across the value chain. Learn about the status, trends and global prospects for e-mobility at the **Smart E-Mobility Conference** (24 June), as well as the technology solutions, business models and best practice examples that can act as game changers.

Current research and future researchers

Six **Innovation Workshops** (25 June) introduce latest results from EU funded projects in the fields of green finance, sustainable buildings, renewable energy in industry and innovative technologies. In addition, the **Young Energy Researchers Conference** (21 June) offers bright young minds and budding scientists an opportunity to present their work and achievements to an international audience. The best contributions are honoured with the "Best Young Energy Researcher" awards.

Upper Austria – a leader in the clean energy transition

The conference is organised by the OÖ Energiesparverband (ESV), the regional energy agency of Upper Austria and a main driver of the energy transition in the region. Upper Austria, the country's most industrial region, is a leader in the clean energy transition. This makes it an ideal location for this conference. Through significant increases in energy efficiency and renewable energy, greenhouse gas emissions from buildings were reduced by 39% in 10 years. 60% of all space heating and 31% of the primary energy in Upper Austria already come from renewables. Over €2 billion are invested annually in the energy transition and the dynamics created by regional programmes and initiatives are showing how the energy transition can be a cornerstone in competitiveness.


Christiane Egger

The energy transition can help boost economic recovery. The WSED 2021 focus on how to make this happen. Mark your calendar and register today!

www.europeanenergyinnovation.eu

OÖENERGIESPARVERBAND

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Reducing the environmental impact of the cold chain

Turboalgor is an innovative Italian SME startup, participated by Angelantoni Group, which brings an automotive-derived solution to the refrigeration sector, that guarantees **energy savings up to +23%** and an **increase in cooling capacity up to +56%,** at low temperatures.

Turboalgor has a clear goal: **to reduce the environmental impact of the cold chain**, which is now responsible for almost the 20% of world electricity consumption. This number will grow significantly over the next 30 years due to increasing global temperatures, economic development and urbanization. Nature remains the greatest resource for each of us, which is why it is fundamental that technologies evolve to impact the environment less and less. Turboalgor takes an active part in this ambitious project, allowing to reduce the electricity consumptions related to refrigeration systems and CO_2 emissions.

By applying long-established technology in the automotive sector, **the turbocharger**, Turboalgor has patented and created a system capable of making the compression cycle of refrigerant fluids more efficient, while **improving the cooling capacity** of refrigeration systems and their **energy efficiency**, extending their service life, instead of replacing them.

In the refrigeration sector there have been no significant innovations in the last 20 years, excluding the inverter. Turboalgor's innovation represents a radical change from any other existing energy saving solution. Furthermore, it is also applicable in the presence of the energy saving technologies currently available in the refrigeration sector.

Conventional vapor compression refrigeration systems have an important point of inefficiency, **the expansion valve**. This takes the coolant from a high pressure to a low pressure and dissipates energy. By inserting a turbocharger and two heat exchangers, it is possible to recover part of this energy, as well as increase the cooling capacity of the system.

"Turboalgor is the result of an intuition, not of a logical process. I made parallelisms between automotive and refrigeration sectors and I noticed that there was a common problem, the waste of energy", explains Maurizio Ascani (left), Turboalgor Innovation Technology Manager.

The product range is developed in different combinations of absorbed electrical power (**20 kW – 300 kW**) and evaporation temperature in order to meet the needs of those who work along the entire cold chain, a sector currently responsible for the **20% of the world electricity consumption**.

To date, solutions for **Low and Medium Temperature are available on the market** and Turboalgor technology will soon be compatible even with higher temperatures, typical of industrial air conditioning and process cooling. Turboalgor technology can be applied both to

existing systems, with the **Stand Alone Kit Solution**, and to newly manufactured systems, with **Integrated Solutions**, where the heart of Turboalgor technology (right), is included directly into the refrigeration system during its construction.

Turboalgor technology is compatible with **HFC (freon) organic refrigerant fluids** such as R404a or similar type, including the latest generation ones such as R448a, R449a, R452a whose GWP (Global Warming Potential) is less than 2.500, and in the future with natural refrigerants such as CO_2 and NH_3.

Turboalgor has already some important references in the Food and Refrigerated Logistic sectors, such as Cesare Fiorucci S.p.A, Di Battista Food Srl, and STEF Italia S.p.A with **the Stand Alone Kit** and it turns to all the companies working along the cold chain, belonging also to different market sectors such as GDO&Retail, Chemical and Pharma.

"Working with Turboalgor has been a great experience since they are trained and professional people who have shown maximum availability, also collaborating with our refrigeration technicians. I would absolutely recommend to evaluate the product, because with the saving that could be obtained, the return on investment is really interesting." Says Matteo Bruzzano, STEF Italia Energy Manager.

It has already been developed the first **Integrated Solution** with Di Battista Food which is bringing **-9% of energy costs** and **+15% of cooling power** on average.

With integrated solutions there is an optimization of both layout and costs: the more the level of integration increases the more the payback time for end-users is reduced.

"We chose Turboalgor because it has a significant impact on both environmental and economic terms. Furthermore, there was the possibility to reduce the compressors size and to reduce the power consumed for the same performance." says Rocco Di Battista, Di Battista Food owner.

Despite the difficult period that the world is experiencing, Turboalgor is encountering strong interest from the market and it's looking for companies that share the same values and that are interested in preserving the environment.

As a result of directives aimed to reduce and to eliminate refrigeration fluids that contribute to global warming, refrigerating plants using natural refrigerants are becoming more and more widespread.

Among these **CO_2**, being neither flammable nor toxic, is assuming a relevant importance, but it is characterized by a higher consumption of electricity.

Energy efficiency, which is important in all applications, takes more relevance in this specific case.

Unfortunately, turbocharger cannot be used in this type of system due to the high pressures and low volumetric flow rates of the refrigerant fluid.

For this reason Turboalgor has developed a device completely different from the turbocharger, but with the same purpose: to compress refrigerant fluid without using primary energy but by reusing the energy of the refrigeration circuit that would otherwise be lost; this device is the "free piston expander" that is a piston-cylinder system with no electric motor and whose movement is guaranteed by the "waste energy" which in a normal refrigerator would not be usable.

Theoretical analyses foresee that, through the free piston expander and related auxiliary devices, it will be possible to save between 10-20% of electricity.

The experimentation on the test bench of the first free piston expander prototype will have to quantify the extent of the benefit obtainable in terms of energy efficiency.

Turboalgor is also working on the "heart" of refrigeration system, that is the compressor; successfully completed the research activities on an innovative reciprocating compressor characterized by efficiency increases more than 10%, the activities aimed at industrializing and placing on the market this type of compressor have begun.

turboalgor
COLD ENERGY SAVING

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EU industrial heat pump demonstrations have huge potential for emissions and primary energy savings

Waste heat is heat that is produced by a machine, or other process that uses energy that is not put into use and is lost into the environment. There is enough waste heat available in Europe to meet the demands of much of industry and the entire building stock. The ultimate goal of DryFiciency, a five year Horizon2020 project, is to develop technically and economically viable solutions for upgrading this unexploited waste heat streams and process these at higher temperature levels up to 160˚C which can then be economically used in many industrial processes.

The DryFiciency novel heat pump technologies developed and put to test at several demonstration sites aim to achieve heat supply temperatures of up to 160˚C which is of relevance for industrial drying in several industrial sectors such as e.g. paper, chemical industry, textile, or food processing industry.

In line with the EU 2030 Climate and Energy Targets and the Energy Efficiency Directive (2012/27/EU), DryFiciency aims to reduce CO_2 emissions by up to 80% and increase energy efficiency in energy-intensive industrial processes. Furthermore, DryFiciency aims to support the industry in complying with the new F-Gas Regulation limiting the total amount of fluorinated gases sold (e.g. for heating & cooling systems) and phasing them out to 2030.

In a nutshell, DryFiciency´s Key Performance Targets are:

1. To improve energy efficiency by up to 80%,
2. To reduce production costs by up to 20per cent/kg,
3. To reduce CO_2 emissions up to 75%.

By offering replicable and adaptable technology for both newly constructed plants and existing plants, DryFiciency paves the way for high temperature heat pumps in energy intensive European industries. To advance research for this effort, the heat pumps have been demonstrated under real production conditions at TRL 7 in industrial drying processes in three leading European industrial companies: Wienerberger, Agrana, and Scanship.

As drying accounts for some 10-25% of the total industrial use in the EU (amounting to between 320TWh – 800 TWh of energy consumption, the significance of making these processes more energy efficient is evident. If the DryFiciency heat pump would be rolled out to 50% of all drying process in the EU, thereby replacing natural gas burners, the impact would amount to 7-18% savings in end energy and a stunning 3-7% of total CO_2 emissions. The impact is vast in the fields of industrial drying application and enormous if extended to other fields where heat pump technology can be utilised. Here DryFiciency is leading the way by utilising high temperature heat pump technology in the most efficient way towards a greener European industry.

Learn more about DryFiciency, partners and results, **register for the final conference on the 6th July 2021**, or participate in one of our designated **training modules** set for July & August 2021.

impressive project develops ground-breaking transparent photovoltaic cells to be used as windows

IMPRESSIVE project aims at developing the first fully transparent photovoltaic (PV) device with 14% efficiency that will enable to save 15% of energy consumption in European south-oriented façade buildings.

In order to maximise the renewable share of energy supply in the building sector, the use of photovoltaics (PV) must be further deployed. Current PV technologies are opaque or semi-transparent and can thus only be installed on roofs or in non- or semi-transparent facades. The international consortium of IMPRESSIVE addresses the specific challenge of developing efficient transparent PV cells that can be integrated on a wide scale as windows in buildings.

The solution benefits from the latest development in perovskite solar cells (PSC) and dye-sensitized solar cells (DSSC) with their junction in tandem devices. The device will convert selectively ultraviolet (UV) and near-infrared (NIR) part of the solar spectrum, while excluding the visible range, to reach colourless and fully transparent cells. Since the NIR part of the spectrum is responsible for heating behind glass, its absorption could save up to 15% of the energy used for air conditioning.

The device is expected to reach an Average Visible Transmittance (AVT) > 55% (full transparency) and 14% Power Conversion Efficiency with a lifetime over 25 years.

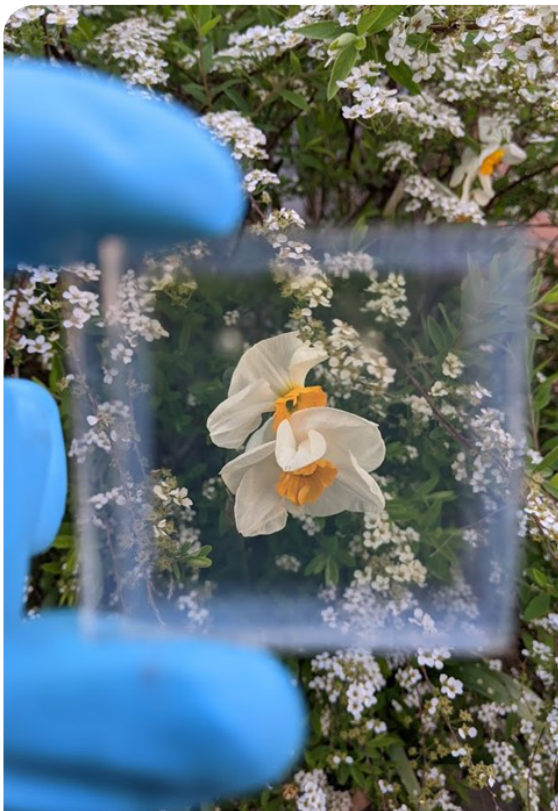
European research centres with world leading experience and expertise are conducting these activities: the Laboratory of Reactivity and Solid State Chemistry of CNRS and the University of Torino developed materials for the first transparent DSSC; the Swiss Federal Institute of Technology of Lausanne (EPFL) is leading the PSC revolution; the Tor Vergata University of Rome realised the first PSC module and developed a pilot line production for Building Integrated DSSC; G-LYTE owns a worlwide patent on improved DSSC stability and lifetime; SMART has a deep experience in Life Cycle Assessment (LCA) for third generation photovoltaics; and Euroquality has large experience in dissemination and exploitation of EU projects results for strong market uptake.

As explained by Frédéric SAUVAGE, research director at CNRS and project coordinator: “the approach led in IMPRESSIVE is totally disruptive from current streams in PV aiming at integrating black absorbers. Around 55 % of the solar spectrum lies outside the visible range and is actually not considered for electricity production. Transparent PV is not an irrational concept and may rapidly revolution the way PV is integrated into our environment.”

Since 2019, the consortium has been working on developing the UV-PSC and NIR-DSSC before integrating them into a transparent tandem cell. In the first 2 years and despite the pandemic, the consortium has already achieved world-record efficiencies and unprecedented level of transparency!

Currently, the transparent tandem cell designed and assembled in 2020 is being characterised with regard to its stability and performance. The most relevant materials will then be upscaled to obtain prototypes for the Building Integration Photovoltaics (BIPV) industry. You can check the progress of the project on www.impressive-h2020.eu and follow IMPRESSIVE H2020 on LinkedIn.

IMPRESSIVE has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 826013.



Strengthening the EU aerospace industry by Optimizing design for inspection

Dr Petar Dimitrov, COST Action Science Communication Manager

The aerospace industry has been impacted like any other sector by the COVID-19. Aerospace engineering means that aerospace organisations/universities are planning, designing, manufacturing, operating, and maintaining aircraft and spacecrafts.

Air transportation is being increasingly monitored with the focus in creating resource-efficient transport that respects the environment.

The aerospace industry is aiming for a cleaner means of transport. One way to achieve this goal is making transportation lighter, thus directly improving fuel efficiency, and reducing environmental impact. A further industry aim is to reduce maintenance time in order to cut down operating costs, which can be beneficial for both passenger and freight services.

Ultrasound based nondestructive evaluation techniques (NDE), energy harvesting and wireless sensor networks are being increasingly effective in monitoring damage in aerospace. These components include critical elements such as air frame, engines, landing gears and control surfaces. However, there is an urgent need to integrate these approaches and techniques at the inception of an aircraft.

To integrate these approaches and meet future challenges, the COST Action: Optimizing Design for Inspection (ODIN) launched in 2019, has set a network of top European experts across several key areas to develop an integrated framework for optimized self-sensing structures capable of diagnosis and prognosis.

In this context, the Action has effectively established an interdisciplinary network of mechanical and electrical engineering, computer science, mathematics, materials science from 29 countries. They aim at connecting researchers from academia including early career investigators and the industry who share the vision of delivering safer and greener aerospace travel.

"The ODIN COST Network has allowed me to realize my ambition of creating a truly interdisciplinary network of researchers across Europe and the globe who are aiming to tackle one of the major problems in engineering. The power of networking, is already delivering great benefits through publications, grant applications and shared facilities that would not have been realized without the support of the EU COST network." Says the COST Action Chair, Dr. Rhys Pullin.

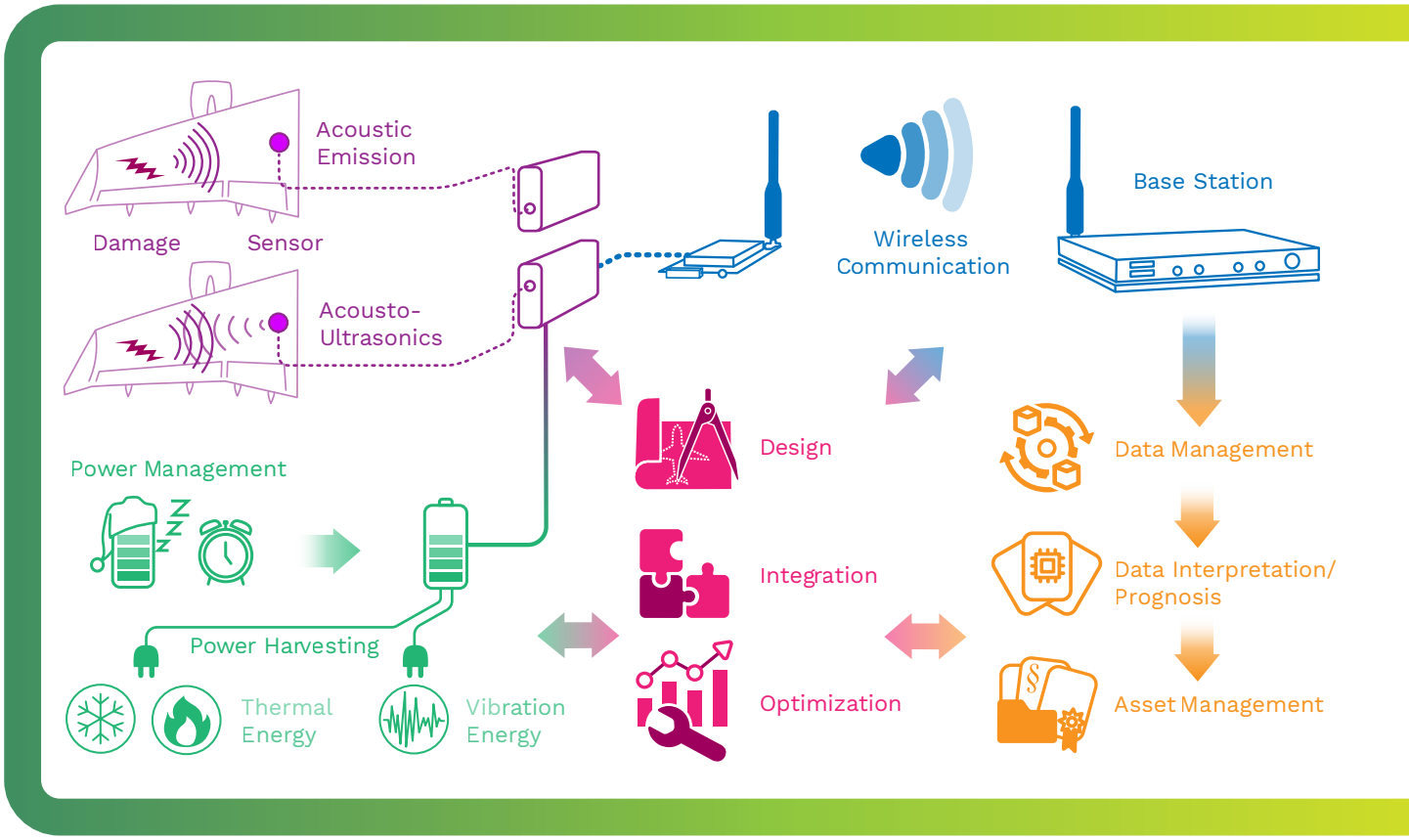
One way to overcome some of the issues this Action is dealing with is the adoption of a Structural Health Monitoring (SHM) inspection system that uses energy harvesting and a wireless sensor network. Currently, no standard methodologies or frameworks exist for the assessment of the modular components of aerospace SHM system.

Such systems obtain information about the status of a structure in real-time which can feed back into an asset management framework. This will determine maintenance schedules and allow for lighter structures to be designed whilst increasing safety. Current developments include using advanced materials, with the current generation of aerospace structures being 50% composite materials. These materials offer a weight reduction whilst maintaining adequate stiffness; however, their damage mechanics are very complex and less deterministic than that of metals.

To meet their objectives the network has set several working groups with specific goals.

The first group focusing on **Design, Optimization, and Integration**, will encompass industrial aerospace design engineers and experts, mathematicians, computer scientists. The objective is to analyze the requirements for integrating SHM systems at the start of an aerospace design. The challenge is to ensure that specific aerospace requirements are communicated effectively and efficiently to the SHM system designers.

The Damage Detection group



will focus on the analysis of existing strategies including sensor technologies. They will quantify the capability of systems to identify damage in new structures, power level requirements and compare state of the art signal processing approaches to damage location and characterization.

The third working group is focusing on **Power management and energy harvesting**. They aim at developing a detailed understanding of current vibration levels and temperature differences and the location or position. This could be found on an aircraft and standard testing procedures to allow a comparison across European research groups.

The Wireless Communications group has the challenge that lies in aerospace where there is a restriction in allowable wireless protocols and the complex geometry that signals have to propagate through and around.

The last working group called **Data management and signal processing**, will focus on human interface, data interpretation, data presentation, data mining, data efficiency/reduction and hardware integration.

Collaboration between the working groups working in these areas (as well as other groups co-related), will ensure an innovative solution to this global challenge and a new concept in the design and management of aerospace structures.

Any challenging and ambitious project, like this one, will always entail some sort of risks. Nevertheless, this project can have a huge benefit to the economy of Europe and has a high potential to overcome all risks.

This ODIN Network aims to generate evidence, based on industrial requirements, and engage designers to ensure maximum acceptance and adoption. The COST Action focuses on aerospace structures and there are other industries, which would benefit from all or individual aspects of the proposed technologies and developed evidence.

The Action will allow the development of a breakthrough in scientific research and in the industry by focusing on the concept of Optimized Design for Inspection (ODIN). In the long run, this will certainly strengthen the EU aerospace industry that respects the environment.

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View the Action:
https://www.cost.eu/actions/CA18203/

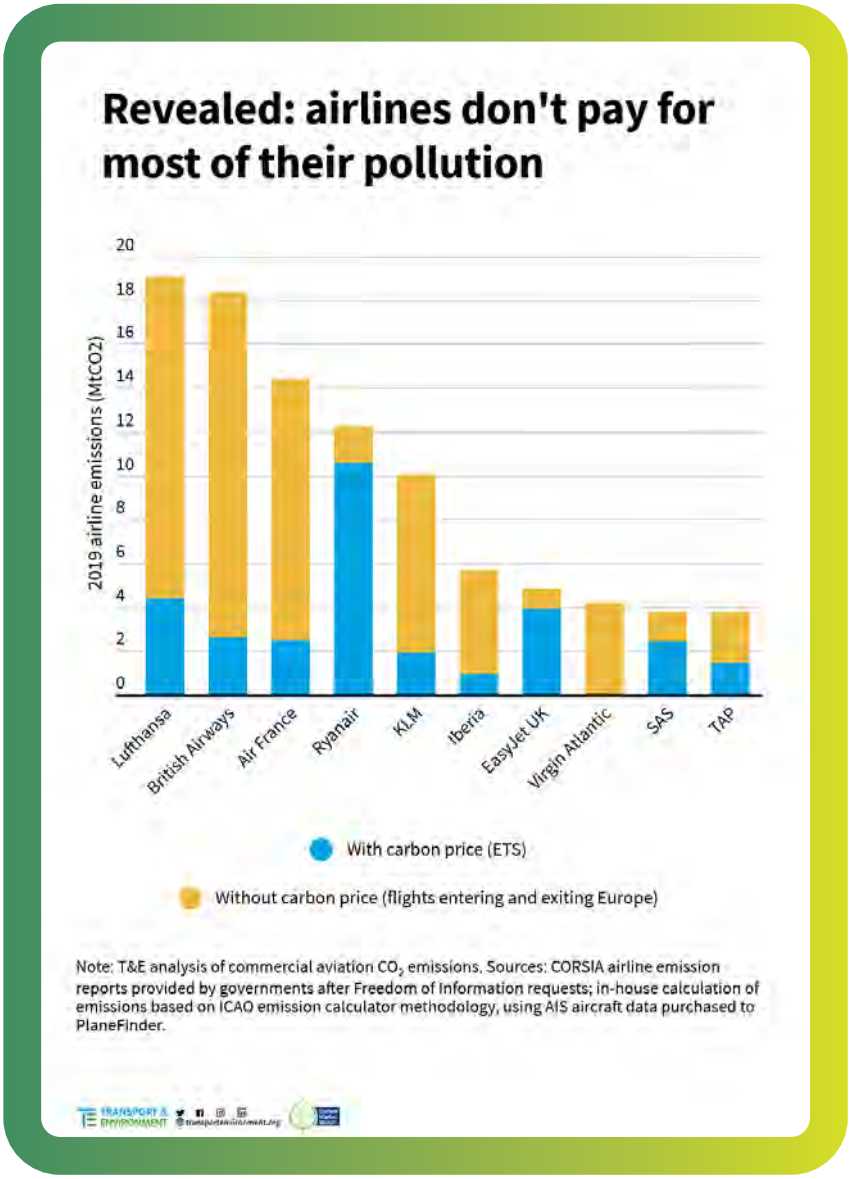
View the Network website:
http://odin-cost.com

Europe's Green Deal: we can't waste another decade

Jo Dardenne (pictured), Aviation Manager, Transport & Environment (T&E)

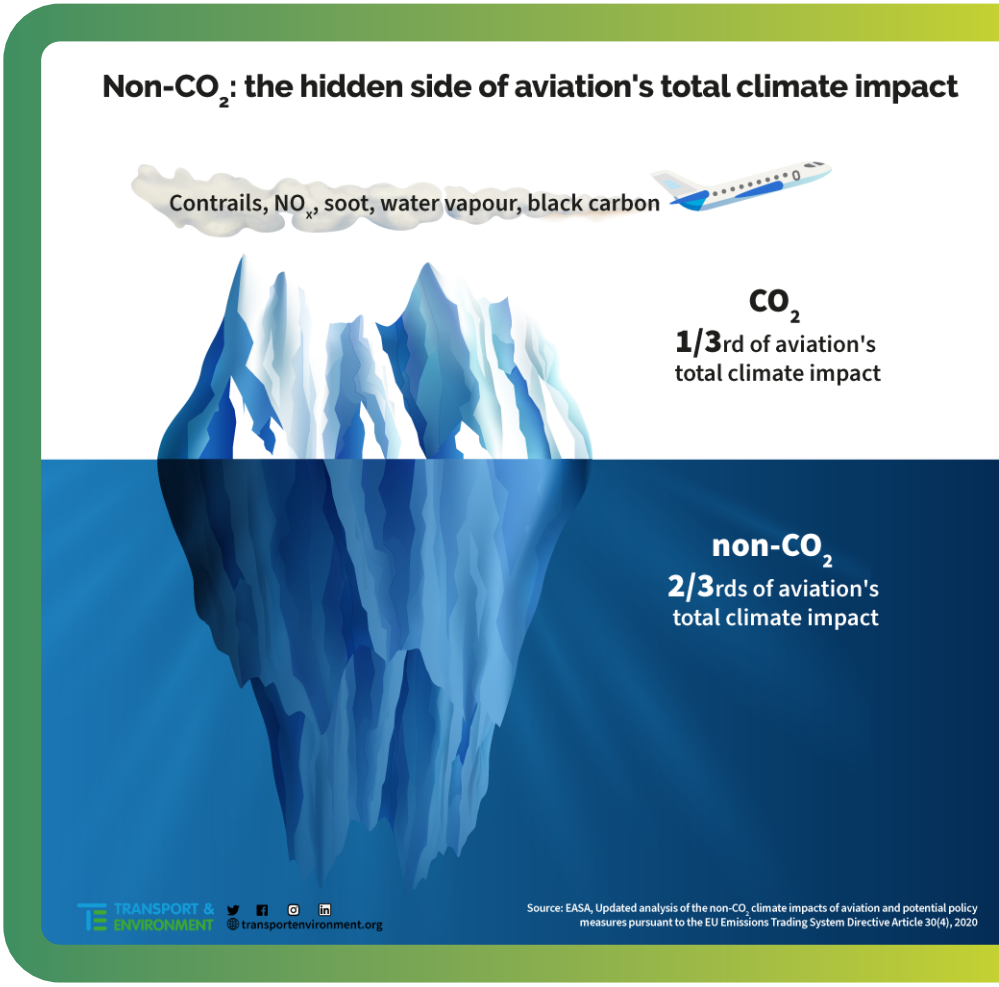
Aviation's green "make or break" moment is approaching. The EU's Green Deal or "Fit for 55" package in July is the biggest opportunity to date for Europe to effectively address aviation's climate impact. This includes the ReFuelEU initiative aimed at deploying sustainable advanced fuels for aviation as well as revisions of the EU Emission Trading System (EU ETS) and the Energy Taxation Directive, to finally apply adequate carbon pricing to the sector. Will these initiatives be enough for aviation to decarbonise? The answer is maybe, but only if adopted with sufficiently high ambition.

Aviation is said to be one of the transport modes which is the hardest to decarbonise, because zero emissions planes are in their



infancy and clean fuels are still not sufficiently available to be used widely. But the absence of available and scalable decarbonisation technologies for aviation today is intimately linked to how the sector has been regulated over the past decades.

If we had adopted effective regulation of aviation emissions 10 years ago, like the EU did for road transport with CO_2 efficiency standards for cars and fuel taxes, maybe we would be witnessing aviation's Tesla moment today and not waiting for 2035 to get hydrogen planes in the skies. Unfortunately market signals and therefore technology deployment has been lagging behind compared to other sectors, because aviation has been over subsidised and emissions under regulated for decades. But this is hopefully set to change.



Right up until the COVID-19 crisis, aviation emissions were soaring. Since 2013, aviation emissions had increased 27.6% while emissions from other sectors covered by the ETS decreased by 19.7%, mainly due to decades of unfair subsidies being handed out to the sector by governments which did not incentivise the sector to decarbonise. Airlines are exempt from paying tax on their jet fuel and get half of their pollution permits for free under the EU's ETS. Despite poorly contributing to national budgets before the pandemic, the sector has now received over €36 billion of support from tax payers to cope with the COVID-19 crisis without any effective green conditions attached to them.

Because the price to pollute is still so low for aviation, the sector has never had sufficient financial incentive to use clean technologies and financial flows were not channeled towards the development of synthetic fuels or zero emission planes. Putting an effective price on burning kerosene is now essential for clean technologies to flourish. New fuels and airplanes will only take off with the right carbon price signals. That is why, if the sector is to grow back greener after the COVID-19 pandemic, governments have to accept aviation cannot continue burning untaxed jet fuel and should start using clean fuels once the crisis recedes.

The increased involvement of EU governments in the long term viability of the sector during the pandemic has also contributed to highlighting the need to address aviation's climate impact at the national and EU level instead of relying on weak international organisations like ICAO. We often hear that aviation is an international mode of transport, so it requires international solutions. ICAO's solution to aviation's climate problem is a cheap offsetting scheme (Corsia) that allows the sector to continue to pollute by buying cheap credits (under 1€) with no guarantee that these actually reduce emissions in the long term. The aviation industry cannot continue promoting these international solutions when it wants to escape its environmental responsibilities, and then ask for national solutions when it comes to getting bailout money.

Airlines do not pay for most of their pollution as flights entering and exiting Europe are currently exempt from the EU ETS. For some EU airlines, this means over 80% of their emissions are currently exempt from any carbon pricing and EU regulation. This needs to be addressed in the EU's upcoming package by reintegrating extra-EU aviation emissions within the whelm of EU climate regulations. This also means

that any EU-wide mandate to use sustainable advanced fuels should be applied to all flights leaving Europe and not just intra-EU flights.

Especially because extra-EU emissions are largely caused by long haul flights which play a big role in aviation's overall climate impact, due to their higher non-CO_2 effects. Given these flights generally fly longer and at higher altitudes, they can cause significant warming through the formation of contrails, which are among the non-CO_2 emissions which contribute twice as much to global warming as aircraft CO_2. Using increasing amounts of sustainable fuels can help reduce the formation of these contrails and therefore address long haul's disproportionate impact on global warming.

The EU cannot afford to lose another decade. The longer we wait to regulate aviation emissions, the more we will have to cut flying after 2030. With an ambitious set of regulations this year, the EU can set the course for aviation to grow sustainably in the next decade, by pricing pollution effectively and finally promoting the right technologies to decarbonise such as hydrogen and direct air capture for synthetic fuels. Europe's next big test to address aviation's sustainability is coming, and it cannot afford to fail.

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Destination 2050: The aviation sector's contribution to the Green Deal

Laurent Donceel, Senior Policy Director, Airlines for Europe (A4E)

Europe's aviation sector just unveiled its flagship sustainability initiative, **Destination 2050 – A Route to Net Zero European Aviation**. It shows a decarbonisation pathway that combines new technologies, improved operations, sustainable aviation fuels and smart economic measures in achieving net zero CO_2 emissions by 2050.

Both policymakers and the sector must think and act outside the box to address the climate challenge. An EU Pact for Sustainable Aviation can be the vehicle for jointly formalizing and agreeingtargets for European aviation and the corresponding policy framework, guided by an industry roadmap as set out in the Climate Law.

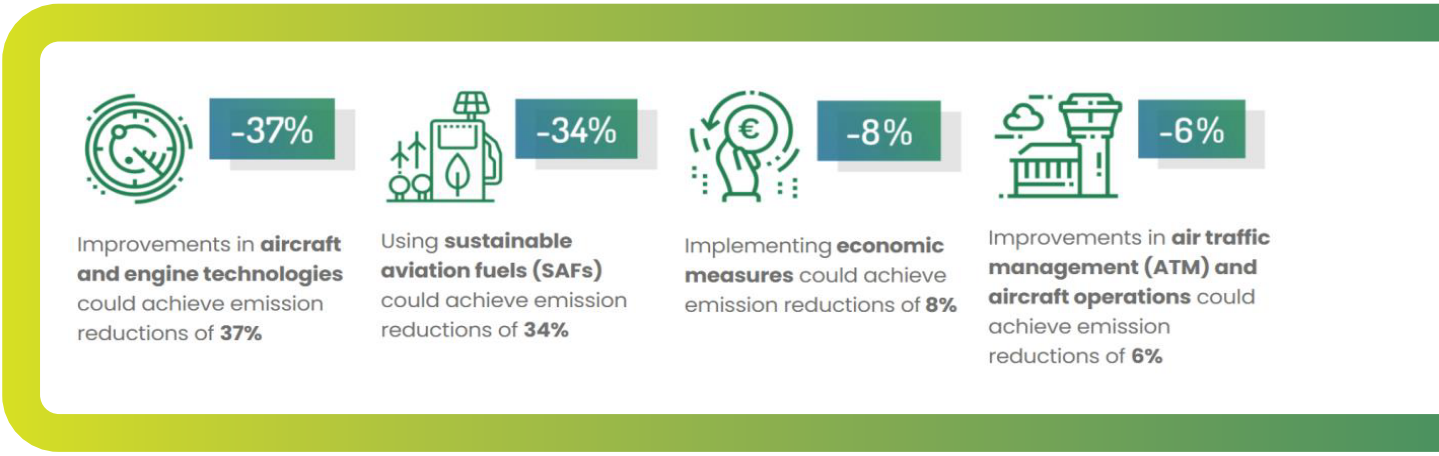
Driven by the independent work of the research consortium Royal Netherlands Aerospace Centre and SEO Amsterdam Economics, Destination 2050's roadmap empowered the European aviation sector to make the following commitments:

- Reaching **net zero CO_2 emissions by 2050 from all flights within and departing from the EU**. This means that by 2050, emissions from these flights will be reduced as much as possible, with any residual emissions being removed from the atmosphere through negative emissions achieved through natural carbon sinks or dedicated technologies. For intra-EU flights, net zero in 2050 might be achieved with close to no market-based measures.
- Reducing net CO_2 emissions from all flights within and departing from the **EU by 45% by 2030 compared** to the baseline. In 2030, net CO_2 emissions from intra-EU flights would be reduced by **55%** compared to 1990 levels.
- Assessing the feasibility of making **2019 the peak year for absolute CO_2 emissions** from flights within and departing from the EU.

The modelling of Destination 2050 sees a reduction of 293 Mt CO_2 in 2050, compared with a scenario where no sustainability measures are implemented.

1. Improvements in aircraft and engine technologies (**-37%**)
   - 30% improvement in fuel efficiency for the largest single and twin-aisle aircraft
   - 50% improvement for regional aircraft based on hybrid-electric propulsion
   - Regional hydrogen-powered aircraft (by 2035)

2. Sustainable Aviation Fuels (**-34%**)
   - Exponential scale-up of SAFs from 2030, including blending to 100%
   - 83% of total fuel consumption by 2050



3. Smart Economic measures (**-8%**)
   - Emissions trading – the EU ETS
   - Offsetting schemes – The ICAO CORSIA scheme

4. Improvements in ATM and aircraft operations (**-6%**)

In addition, the model foresees a reduction in demand due to the increased cost of these technologies, whilst maintaining a compound average annual growth rate in passenger numbers of 1.4%.

The Destination 2050 roadmap demonstrates how many different technologies are needed to chip away at emissions and across all aspects of aviation operations. **There is no panacea for reducing emissions from aviation**; the solutions will vary with geography, economics, and demand.

A comprehensive analysis of SAFs, for example, shows that even the cheapest alternative fuel will still be 4-5 times more expensive than existing jet fuel. The economics will only work with associated efficiency improvements, electrification where possible and supporting economic measures. Supplying enough SAF to meet the 2050 target from within the EU will be challenging. Europe has a limited capacity for sustainable biomass, requiring reliance on a wide range of feedstock sources.

Because of the specificities of the sector - its global nature, existing decarbonisation technologies available and the challenges linked to their adoption – there can be no similar approach from other sectors. **The route to net zero aviation will need a dedicated policy mix and the collaborative contribution of all actors from our eco-system**: airlines, airports, aerospace manufacturers, air traffic controllers, passengers, and governments.

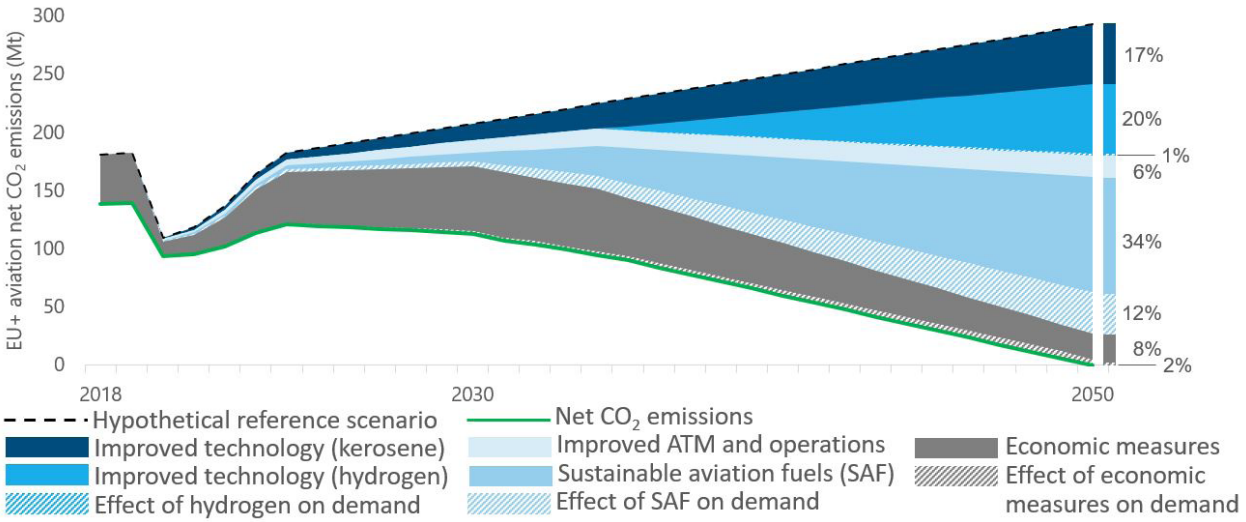
The Destination 2050 initiative maps out a possible pathway to net zero emissions. It demonstrates that the target is achievable -- but it is not a guarantee of success. It is closely dependent on the capacity of national policymakers, the EU and ICAO to back the sector's decarbonisation plans with regulatory, investment and fiscal incentives, whilst ensuring that this radical transformation does not reduce connectivity or make air travel less affordable.

The aviation industry is experiencing its worst crisis in modern history due to the COVID-19 pandemic. Yet, as led by the EU, efforts to make Europe the world's first CO_2 neutral continent by 2050 are only accelerating. This includes the decarbonisation of European aviation. Destination 2050 signals European aviation's unprecedented ambition and its determination to lead aviation globally in cutting emissions. But we cannot do this alone. Success will require joint action.

Among the key commitments put forward by Europe's aviation sector as part of Destination 2050: Industry will:
- Continue to substantially invest in decarbonisation
- Develop more energy-efficient aircraft and bring these into operation through continued fleet renewal

Decarbonisation Roadmap for European Aviation

All flights in scope



- Develop hydrogen-powered and (hybrid-)electric aircraft and supporting infrastructure and bring it to the market
- Scale up drop-in SAF production and uptake
- Implement the latest innovations in ATM and flight planning
- Compensate remaining CO_2 emissions by removing CO_2 from the atmosphere.
- For their part, governments should:
  - Support industry investments through incentives or by reducing risk through a consistent and stable policy framework
  - Support the development of the SAF industry
  - Contribute to optimising ATM, in particular by fully implementing the Single European Sky
  - Support and strengthen global carbon markets and policy to achieve cost-effective carbon pricing at ICAO
  - Stimulate further development and deployment of innovations by funding research programmes and promoting carbon removal technologies (Clean Aviation, SESAR partnerships, etc.)
  - Work with the energy sector to ensure sufficient availability of renewable energy at affordable cost.

Through these commitments, Europe's aviation sector is also making a significant contribution to a proposed **EU Pact for Sustainable Aviation**. This Pact would help formalise and enact the required partnership between industry and European & national policy makers, ensuring agreement on joint sustainability targets and alignment between the related industry contribution and roadmap on the one hand – and the enabling regulatory and financial framework on the other.

We are counting on the EU to actively embrace and drive this proposed EU Pact forward.

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E-MOBILITY

EV fleets – the panacea for decarbonising transport?

An integrative electromobility system needs an integrative legislative framework

The role of charging infrastructure in accelerating electric heavy-duty vehicles

Electric Cars and Cultural Heritage: breaking down silos at the 9th Informed Cities Forum

EV fleets – the panacea for decarbonising transport?

Peter Georgiev (pictured), Eurelectric's E-mobility Lead

The European Union is on the path to greatly reduce its greenhouse gas emissions by 2030 and all economic sectors must contribute to this goal. When it comes to the road transport sector, electric vehicles are the only way to successfully decarbonise, and in addition to their environmental benefits, they bring new business models through charging services and solutions.

Electrify vehicle fleets first! This was the main conclusion of a joint study by Eurelectric and EY, which took this starting point and examined the most efficient approach to accelerating the electrification of transport.

What are the benefits of electrifying urban and corporate fleets?

To begin with, this will substantially reduce CO_2 emissions. Commercial and public transport vehicle fleets represent more than 40% of the total vehicle kilometres travelled in Europe and are responsible for half of total emissions from road transport. Estimated at 63 million vehicles in 2020, company -owned or -leased vehicles comprise 20% of the total vehicle parc in Europe. However, they drive on average 2.25 times more than private vehicles – making a disproportionate contribution to emissions.

Secondly, electrifying corporate and urban fleets is considered the most effective way to electrify Europe's vehicle parc in the coming decade.

In 2019, six out of 10 cars sold in Europe were company cars and 96% of them were either petrol or diesel. What's interesting to consider is that corporate vehicles have a very quick refresh period. Now, imagine that instead of constantly replacing them with polluting, fossil-fuelled vehicles, operators opt for electric alternatives. This will lead to a continuous flow of zero-emission vehicles into the second-hand market.

Additional benefits? This will further extend the EV market penetration, and create an affordable second-hand market.

All this makes fleets the low-hanging fruit to target when it comes to policy making.

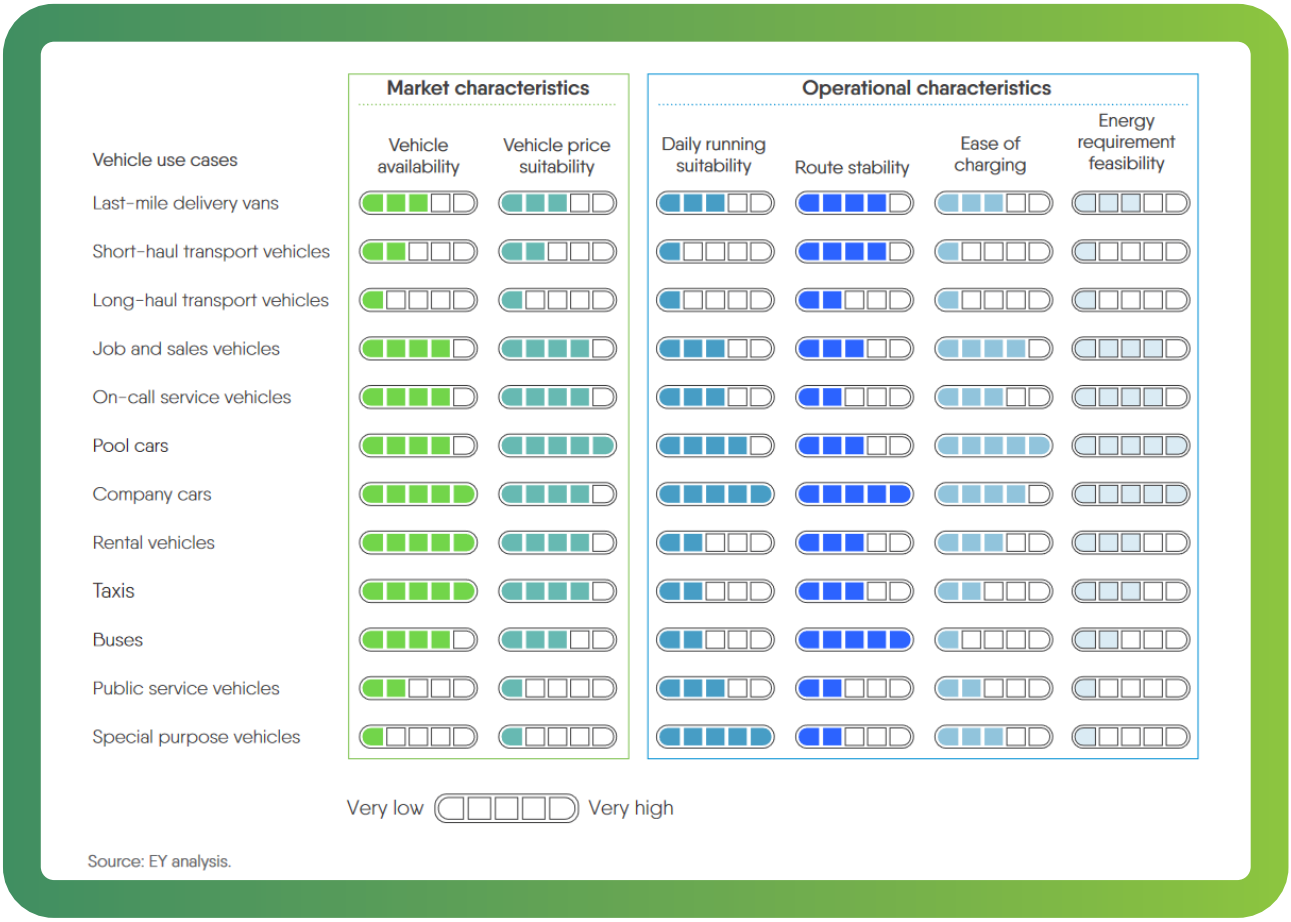
At European level, new CO_2 regulations will impose progressively more rigorous limits on emissions

for new vehicles. This makes them the single biggest accelerant of the e-mobility transition.

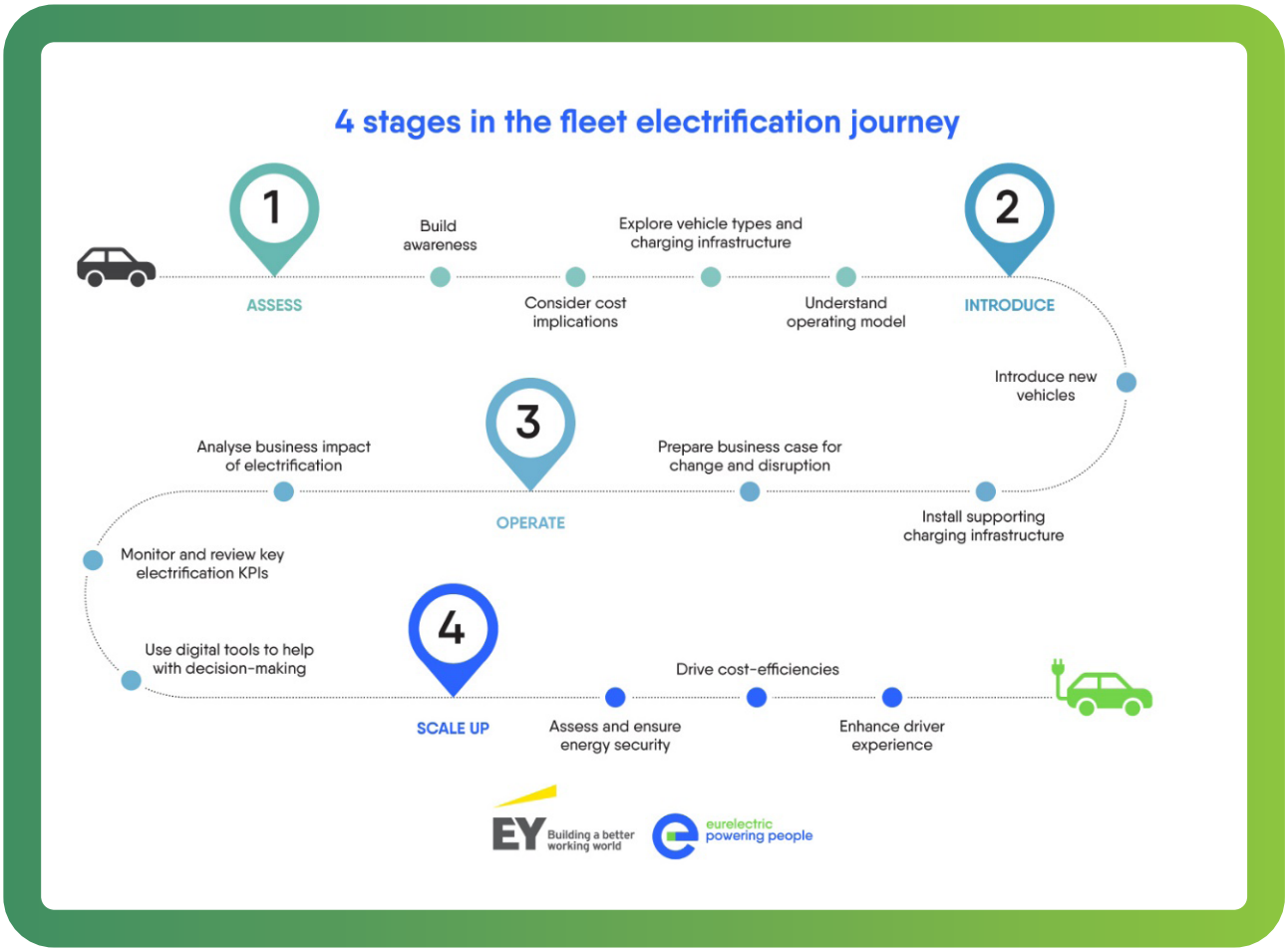
Another aspect of the equation is the need for charging infrastructure, to support the shift to zero-emission mobility. Legislation considering the specificities of fleets is essential, and needs to be looked into at national or even local level.

Major companies all around the world see value with regards to total cost of ownership and other sector specific advantages for the transition to electric. But they need clear signals. City administrations need to encourage private investment by avoiding lengthy delays for the roll-out of public and private charging points – notably with regards to site approval and permitting.

Our study examined the market and operational characteristics of various



Source: EY analysis.



types of fleets to evaluate which ones are most suitable to electrify in the 2020s. We saw that currently, about 75% of the fleet is spread across six key industries: wholesale/retail sector, public administration, manufacturing, construction, transportation services and vehicle rental. By examining factors that govern the acceleration of electrification across fleets, we also identified the scope of the opportunity.

Harnessing these opportunities could increase the European EV fleets size from about 400,000 in 2020 to at least 10 million in 2030.

This significant push to decarbonise road transport will have a spill-over effect into other sectors. EVs are not simply vehicles. An EV can charge, store and shift electricity load; it can deliver flexibility to the grid to help manage peaks, becoming itself a potential income earner.

In addition to electricity network management, we identify significant value potential in fleet management with regards to EV charging solutions, battery management, data and financing.

To better understand the journey companies ought to take in their own sphere of influence, we interviewed 20+ industry experts for the purpose of our study with the goal to create an EV fleet transition roadmap. This resulted in what we call the “4 stages in the fleet electrification journey”.

In summary, there is no doubt that fleets offer massive environmental benefits while at the same time promoting significant rewards for the first and fastest movers in the e-mobility ecosystem.

Reclaiming energy and value from domestic used water

Domestic wastewater (WW) contains thermal energy in the form of organic matter (close to 4 kWh/kg Chemical Oxygen Demand (COD) for 500 mg COD/l – or about 2 kWh/m^3), but in conventional WW treatment plants (WWTP) the organic matter is oxidised with an electricity consumption of at least 0.5 kWh/m^3, and producing sludge. In larger WWTP with capacities above 50,000 population equivalent (PE), this biomass can be converted to biogas in anaerobic digestion, but on average only up to 50% of the energy can be recovered by co-generation.

Other valuable resources in WW are nutrients, essential ingredients for plant growth in agriculture, as each European produces yearly about 4.5 kg N, close to 1 kg P and 2 kg K. However, centralised WWTP can only recover a small fraction of diluted nutrients by precipitating up to 50% of the phosphorus in sidestreams, while two thirds of the nitrogen is converted to gas and lost to the atmosphere. In the production of artificial fertilizer, this nitrogen is gained back from the atmosphere with an energy input of 10 to 15 kWh/kg.

One approach to increase recovery rates and optimizing the energy balance is by treating concentrated streams in a decentralized concept, before the waste is diluted by the freshwater use of 150 l/PE/d. The project H2020 Run4Life (Recovery and Utilization of Nutrients 4 Low Impact Fertiliser) demonstrates the options of decentralized WWTP, based on the source-separated collection of greywater (from showers, basins...), blackwater, from toilets), and kitchen waste, with each flow receiving optimal treatment for resource recovery.

As part of Run4Life, blackwater from an office building in Nigran, near Vigo in Galicia, is treated with the AnMBR process, combining Anaerobic Digestion (AD) with membrane filtration to separate biosolids and clean water. As ultrafiltration with pore sizes between 0.04-0.1 µm retains solids, bacteria and even some viruses, permeate is suitable for reuse while providing nutrients for agriculture (fertigation). This in turn reduces CO_2 emissions by recovering organic matter and avoiding the need of mineral fertilizer.

Blackwater treatment at room temperature removes above 90% of the organic matter, while biogas with >75% of methane concentration is obtained and biosolids production is cut by half compared to conventional WWTP. The higher organic concentration of blackwater allows for direct AD treatment, and incorporating the organic kitchen waste increases biogas production and nutrient recovery, while avoiding biowaste collection and transport.

This concept will also be applied by Aqualia in the new Life Zero Waste Water project, in collaboration with the University of Valencia, to exploit their joint patent (EP3225596). AnMBR has been demonstrated at different WWTPs, achieving low power requirements (0.15 kWh per m^3 of treated water in Life Memory) whilst producing a nutrient-rich, pathogen-free permeate.

AnMBR has also been used to retrofit of an old septic tank of a small village (20 m^3/d WW), as OPEX was 20% less compared to conventional WWTP. A larger AnMBR to treat domestic WW from an industrial park (400 m^3/d), to generate bioenergy and reuse water in the factories and green spaces is under design as a sewer mining concept in H2020 Rewaise.

Above: AnMBR operated in Life Memory (Alcazar de San Juan, Spain). Below: AnMBR operated in H2020 Run4Life and equipment arriving to Nigran office building (Spain)

The Run4Life project receives funding from the EU Horizon 2020 Research and Innovation programme, GA no 730285. This article reflects only Aqualia's view. The European Commission is not responsible for any use that may be made of the information it contains.

An integrative electromobility system needs an integrative legislative framework

To truly decarbonize transport, new mobility must be understood as an integrated system. Legislators should not forget this while reforming European transport policy.

While the EU gave one single objective of climate neutrality for the continent by 2050, no one expected it to provide one single, magic solution. Instead, the EU will soon publish the Fit-for-55 package, its main legislative toolbox to achieve this objective.

No single solution. This is true for all economic sectors sharing the same green ambition. At the Platform for electromobility, we believe the path toward climate-neutral transport is a road made of multiple cobblestones rather than a straight, flat highway.

Electrifying transport does not only mean replacing all combustion engines by battery-powered vehicles but considering all modes and their electrification potential. Beyond the Fit-for-55 package measures, urban mobility, light mobility, waterways and even aviation will also have to be part of the puzzle. Besides, the entire energy system must be rethought beyond physical fossil-fuels

Upcoming revisions and initiatives under the Fit-for-55 package must be ambitious, but will only be efficient if all measures are coherent and work in synergies between all modes: decarbonisation of the transport

The road to electromobility is multimodal

sector must be holistic. The Platform for electromobility outlines here why, and how the different elements of the upcoming package should be designed in a comprehensive and overarching manner to be efficient and successful for the uptake of electromobility.

The demand-side: rethinking charging

Regulators must think mobility differently to ensure that the electromobility ecosystem is ready to support its roll-out: quick refueling will be replaced by recharging on the go but also at home, at work or while shopping, and by increasing the use of public transport and other soft modes.

Only a revamped Alternative Fuel Infrastructure Directive (AFID), turned into a Regulation for Road transport while addressing other transport modes, can support both the market and customers with a strong, fit-for-purpose electromobility infrastructure. It can do so by setting minimum binding targets per Member State for the number of public charging points deployed across the EU taking into account different charging technology levels, in line with the demand side.

The revision of the Energy Performance of Buildings Directive (EPBD) must follow the same level of ambition, and guarantee the right-to-plug-in for EV users to make it as simple as a subscription to other services. The revision should put in place minimum requirements for the pre-cabling of the installation of EV chargers, ensuring that all buildings will be pre-equipped by 2035. Further the EPBD should address the outstanding barriers to private charging in order to ensure the installation of chargers in all types of buildings as it is pivotal for the development of electromobility.

Increasing ambition in terms of electrification needs to be aligned with an increasing level of investment in infrastructure and networks as well as implementation of smart charging technology and ICT solutions able to give flexibility to the electricity system and reduce overall cost.

Smart charging in buildings ensures a better charging experience, reduces the electricity bill of the consumers and can create synergies with renewable energy by integrating them into the electricity mix and providing flexibility services to the electricity grid system. To that end, the EPBD must be aligned with a definition of smart charging that we urge to be introduced in the revision of the AFID.

The supply-side: more ambitions but realistic targets

Europe's world leading vehicle CO_2


Quick refueling will be replaced by recharging while parking

Europe's world leading vehicle CO_2 standards deliver genuine benefits for transport

standards deliver genuine benefits for transport, setting clear signals to car makers regarding the pace of the transition to zero-emission mobility. This regulation is the most effective way to achieve cleaner vehicles compared to the EU Emission Trading Scheme (ETS).

Firstly, for Europe to meet its goal to become carbon neutral by 2050, road transport needs to be entirely decarbonised by this date. To achieve this goal, considering the average retirement age of combustion engine vehicles in Europe (around 15 years), this means that an EU-wide phase-out date for sales of new pure internal combustion engine passenger cars and vans will take place no later than 2035. Before then, the revised regulation should set significantly higher CO_2 reduction targets for 2030.

The current design of the car CO_2 regulation targets – whereby targets kick-in in five years intervals with no emission reductions required in between – is suboptimal from the climate point of view and means CO_2 emissions can actually increase in between, as was seen between 2016 and 2019 from new car sales. Although setting binding annual targets would better serve the climate (ensuring continuous CO_2 emission reductions), it is also important for industries to have sufficient lead time (in this case a five-year vision) to prepare.

Adding binding interim CO_2 reduction targets, during the first full calendar year after the entry into force of the Euro 7 emission standard, would ensure a more linear CO_2 emission target trajectory.

Logistic: no time to waste to apply the 'polluter pays' principle

While a lot is being done to promote transportation of passengers by train – especially in this European year of Rail, trains are also key to decarbonising logistic flux across Europe.

As a way to implement the polluter pays principle, the Eurovignette Directive has the potential to contribute to an efficient transport system, where prices reflect the true external costs of logistics. It will thus pave the way for clean options, such as electric road vehicles and trains, as well as a a level playing field to compete. It will also reduce risks of switching between different polluting vehicle categories (e.g. trucks to vans).

Roughly around half of Europe's truck-making sector has already signaled a willingness to replace half of all new zero-emission truck sales by 2030 - but these pledges count on law-makers to deliver the revision of the Eurovignette legislation. Proposals for toll reform under the Eurovignette are ripe for agreement between the co-legislators. It's true that proposals for a road ETS may come, but there will be ample time and scope to ensure that the latter is fully aligned and compatible with the former.

Beyond Fit-for-55

The electrification of European transport goes beyond the suite of measures considered for charging infrastructures, vehicle production and transport of goods. ●

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FLEXIGRID

Preparing the electricity grid for the increase in renewable generation

Making the grid more flexible, reliable and cost-efficient through the development of innovative solutions. This is the objetive of FLEXIGRID European Project, led by the technology centre CIRCE from Spain and 8 million funded by the European Commission.

The project is putting into practice new tools to allow the distribution grid to operate in a secure and stable manner when a large share of variable renewable electricity sources is connected to low and medium voltage grids.

Concretely, the consortium of 16 partners that make up FLEXIGRID are working on the development of innovative hardware and software solutions to improve the power system flexibility by enhancing the grid hosting capacity of renewables; to increase the observability, controllability and automation of the network systems for the improvement of both the security and resilience of the grid; to mitigate short-term and long-term congestions in the distributed grid from an economically efficient point of view; and to ensure the interoperability and compatibility of the developed solutions with different platforms used by European DSOs.

To achieve these goals, FLEXIGRID is developing four hardware solutions, including the design of transformer substations of the future, a new generation of smart meters, new grid protection devices and a multi-function Edge-computing platform capable of controlling grid assets called Energy Box. In addition, the project is developing four additional software modules addressing fault location, selfhealing, forecasting, operation and congestion management of the grid, and optimisation of thermal energy storage. Finally, a common platform including all the necessary protocols and standards to integrate the mentioned solutions with the DSOs platforms is being developed.

In order to ensure the effectiveness of these solutions, FLEXIGRID is implementing them in eight uses cases which are being demonstrated in four demo-sites: a rural and peri-urban network in the Spanish grid, a hotel in the Greek Island of Thassos; an urban grid in the city of Zagreb accounting congested areas and an isolated valley in the South-Tyrol region of Italy with more than 50% of hydroelectric energy.

Moreover, the project will help to identify and analysing, through constant monitoring of the legislation, the obstacles to innovation under the current local and European regulatory framework. Last but not least, FLEXIGRID partners wish to raise awareness among citizens and other relevant stakeholders on the transition towards a low carbon economy, considering them as active players within the energy system.

The main impacts expected as a consecuence of the implementation of the solutions developed and tested in FLEXIGRID Project are improvements in stability and flexibility of dictribution networks; renewable energies curtailments decreasing; reduction of reinforcements required in the grids, increase in capabilities to manage future energy loads and CO_2 emission savings.

The role of charging infrastructure in accelerating electric heavy-duty vehicles

Johan Söderbom (pictured), Thematic Leader for Smart Grids and Energy Storage at EIT InnoEnergy

Today, major automotive players such as Volvo, Scania and Tesla are rapidly developing battery electric vehicle (BEV) trucks for long-haul transport. More importantly, some of these are already taking sales orders. But a lack of charging infrastructure and urgency to tackle it could stand in the way of an accelerated adoption of electric heavy-duty vehicles (HDVs). What lessons can we learn from electric passenger vehicles and what is the way forward to develop a robust charging infrastructure?

Only a few years ago, cost, charging and range anxiety were all valid arguments against electric vehicles (EVs). And yet, there has been a recent and surprisingly fast transition to electric passenger cars. Charging infrastructure has developed in tandem, thanks to market leaders such as Tesla and joint ventures like Ionity. With 370 different EV models on the market, cost has come down significantly, home charging is now the norm and infrastructure already exists throughout Europe to make longer road trips in EVs completely viable.

No way back

The tipping point for EVs has passed. The International Energy Agency

reported that despite the effects of the Covid-19 pandemic, EV sales in the first quarter of 2021 were more than 2.5 times higher than the same period last year. The business-as-usual projection sees the number of EVs on roads worldwide increasing from 11 million today to 124 million by 2030. This will be significantly larger if governments further support the uptake.

These numbers largely represent passenger vehicles but recent developments show this trend also for light-duty vehicles (LDVs), construction vehicles, long-haul transporters and HDVs. This is especially important because CO_2 emissions from the transportation sector are roughly split evenly between passenger vehicles and HDVs. Battery electric HDVs are therefore a key part in decarbonising the transportation industry in Europe.

Charging is the challenge

A few years ago, test routes for electrified highways started popping up across Europe and a lot of discussion ensued if this would be the future of long-haul heavy-duty transport. In just as much time, gains in the battery electric drivetrain have shifted the discussion almost entirely to battery electric HDVs. It is easier to equip highways with fast charging infrastructure than to build an electric road, but this comes with its own challenges.

Heavy duty, long haul and electric – is it even possible?

To develop successful charging infrastructure for HDVs, solutions need to leverage how trucks already operate. At a regional level, charging points can be easily implemented at the terminals, ports, warehouses and adjacent cities that trucks move between.

For long-haul transportation, a common set of EU rules for maximum driving times and frequency and duration of rest times for truck drivers might just be the hidden cheerleader. Drivers are required to take a break of at least 45 minutes after 4.5 hours of driving time, providing an excellent charging opportunity. Because of the relatively short driving time, heavy batteries can be avoided. First signals from automotive companies such as Volvo show that this is where they are placing their bets, with most truck manufacturers focusing largely on improving the battery drivetrain.

However, it is necessary to find a way to connect and charge the trucks and deal with the massive increased power demand on the grid. This can only be achieved through policies, subsidies and collaboration. Several parties need to be involved to make this happen – the OEMs, those delivering charging stations, the rest stop owners and the DSOs that need to provide the capacity.

Lessons learned from passenger EVs

While home charging is not considered an obstacle anymore, city dwellers face a slightly more complex reality. But solutions in this area provide a good blueprint for HDV charging. Collaborative models between the city, DSOs and charging infrastructure suppliers have proven successful in Amsterdam and Berlin, where private actors have bid on charging infrastructures through auctions, gaining exclusive rights for certain areas. The market is also responding with various solutions cropping up. The Swedish-based company CaCharge for example, offers real estate and parking companies, municipalities and


Photo: CaCharge AB

tenant-owner associations profitable and cost-effective charging stations using the entire parking time to efficiently distribute power between cars. As a result, many cars can be charged without expensive load peaks.

While charging infrastructure for heavy-duty long-haul trucks won't be solved commercially and subsidies are certainly needed to build it out, taking the lesson from passenger vehicles and encouraging collaboration between OEMs, truck stops and the utility companies is crucial.

Another complementary solution is grid connection via buffer battery, reducing the size of the connection to the grid. The buffer battery is stationed at the rest stop, charged slowly at a low power, and trucks then charge from the battery rather than a charging station.

Collectively growing the market

Will we be seeing BEV HDVs as the mainstream in the next decade? Perhaps. But that depends greatly and urgently on policies and government subsidies that promote investment in fast-charging infrastructure as well as collaboration at all levels. Regional roll-outs will happen in the very near future but to pave the way for long-haul BEV HDVs more needs to be done. If the right subsidies are in place and collaboration is happening, we could already have some routes equipped within a year that could support a limited number of trucks. However if all stakeholders do not come together and act fast enough, very soon we will see increased market demand for BEV HDVs but the inability to charge them at scale.

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Electric Cars and Cultural Heritage: breaking down silos at the 9th Informed Cities Forum

Jasmin Miah (pictured), Officer, Governance & Social Innovation, ICLEI Europe

Close your eyes and think of the average car advertisement. What do you see? A car gliding through the countryside or the mountains? A happy couple blasting songs on the radio and singing along? A family on their way to a beautiful holiday destination? Or a middle-aged man proudly washing his car on a Sunday afternoon? The images car companies use, make us feel like cars give us freedom, safety and are not just normal, but needed for a fulfilling (Western) life. In fact, you could go so far as to say that they have become a part of our culture. They have drastically shaped our cities or even nature and play an important aspect in our daily lives.

We often think in silos, too often in fact. Most of us work in the mobility sector and even when interpreted widely, this does not necessarily include cultural aspects. But cars and

culture are not two separate topics, but provide the space to talk about shared experiences and exhibit an untapped potential to learn from each other. Which is why we at ICLEI Europe will do just that: at the 9th Informed Cities Forum this autumn we will combine the topics and let both cultural heritage and electric mobility take centre stage and explore solutions together.

In fact, the Informed Cities Forum (ICF) is the perfect place to have such a collaboration as it was designed to help urban actors think outside of the box and provide a creative and unusual environment for them to find solutions to the problems of our time. The Informed Cities Fora are a series of international events on urban governance, renowned as a space for open exchange and learning, that aim to bridge the gap between research, policy-making and action in sustainable development. Each Informed Cities Forum is rooted in the reality of a specific city or problem, placing local challenges and solutions in the European context. Informed Cities events bring together people from across sectors and disciplines to address the most pressing questions facing European cities, to gather inspiration and contacts, as well as to share practical knowledge and experience. The Informed Cities series is managed by the ICLEI European Secretariat.

Normally, Informed Cities Fora are hosted by one project that ICLEI Europe is partnering in. However, these are special times and 2020 and 2021 are not like any other year, so for this special edition of the ICF we have decided to join two projects from the fields of cultural heritage and electric mobility, namely OpenHeritage and GreenCharge. We want to address how they topically align, but we also want to look at how problem solving or specific processes might be addressed differently. How do experts from the different fields respond to the same administrative hurdles, how do they interact with stakeholders and the public? Do we see similar patterns or different ones?

GreenCharge empowers cities and municipalities to make the transition to zero emission sustainable mobility with innovative business models, technologies and guidelines for cost efficient and successful deployment and operation of charging infrastructure for EVs. Pilots are carried out in Barcelona (Spain), Bremen (Germany), and Oslo (Norway) to demonstrate and evaluate the approach. Guidelines

Green charge alternatives. Photo: ICLEI Europe

Electric charging in Bremen. Photo: Reggie Tricker, ICLEI

synthesise the experience from the pilots and simulations and advice on localisation of charging points, grid investment reductions, and policy and public communication measures for accelerating uptake of electromobility, and are aligned with Sustainable Urban Mobility Plan (SUMP) processes.

While, OpenHeritage identifies and tests best practices in the field of adaptive re-use of cultural heritage in Europe: Industrial buildings, historic castles, degraded urban districts are given a new life and purpose and are providing social, cultural, educational or economic opportunities to local communities. Drawing on the observations and results, the project is developing inclusive governance and management models for marginalised, non-touristic heritage sites and tests them in selected Living Labs over Europe. It works with communities, local businesses, local and municipal administrations, tries out new forms of engagement and uses crowdfunding and crowdsourcing mechanisms to create

Røverkollen. Photo: Paal Mork, City of Oslo

Photo: ICLEI Europe

active heritage communities. The 9th Informed Cities Forum will create the perfect symbiosis to give both projects enough space to talk about their individual topics while also creating the space for joint sessions where experts from both fields will address the same challenges from different perspectives. So, no matter if you are interested in discussing electric mobility, cultural heritage, or both, the 9th Informed Cities Forum is the place for you. Be ready to join not yet another regular online conference but an interactive, collaborative event making use of innovative formats and willing to explore unconventional topics. Active participation by the audience is not just encouraged but required – and will be rewarded with lively and memorable discussions. Interested? Join us on 26-28 October 2021 for this unique experience.

For further information and updates visit: informedcities.eu

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EUSEW Special Issue – Autumn 2021

Edition Programme

Our Autumn edition will be published in September.

EU Sustainable Energy Week (EUSEW) will take place on 25-29 October 2021 and European Energy Innovation is one of the official media partners for the event.

A special edition of the magazine, focusing on energy efficiency and renewables will feature articles on a variety of issues - with informed viewpoints from EU Commission officials, Members of the European Parliament and industry experts.

To keep our readers fully informed on the Week's events, sessions and meetings, the full EUSEW programme will be published in this issue.

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