

REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

N° 33 | Fall 2019

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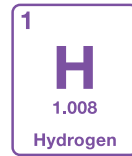
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Cover image: Biker in Chicago, USA.
Photo: Max Bender



Full Speed Ahead for Hydrogen

Harnessing a versatile solution to accelerate the global energy transition

We might be at the biggest turning point in human history since the industrial revolution. The climate change conversation, which has been bubbling away for years, has escalated beyond conjecture to a clear call for action. Citizens are demanding that their governments take bold initiative and that industries harness ambitious innovation to halt the dangerous effects of global warming.

It goes without saying that the energy sector is at the heart of this debate. It is the vital source that powers our modern lives and lifts nations into prosperity, yet it is also the largest source of global greenhouse-gas emissions, according to the International Energy Agency. So at this critical turning point, it is time for a paradigm shift – one that allows for a major structural transition and a new energy mix, as well as the large-scale financial investments that will be needed to make this happen.

One element that must be a part of this new energy paradigm shift is hydrogen. Hydrogen – the most abundant element in the universe – has enormous potential to move us towards a clean energy future and the technology to harness it is here, ready to deploy at scale. Hydrogen is incredibly versatile, able to be used as a fuel for power or in industry; and can help us decarbonize major sectors such as transport, steel, aviation and building heat. Most importantly, **hydrogen generates zero emissions at the point of use, can be produced from renewable electricity and allows for long-term energy storage.** In fact, by 2050, hydrogen could meet 18% of the world's final energy demands, preventing 6 Gt of CO₂ emissions compared to today's technologies.

The hydrogen industry has been developing for around 60 years and is now gaining unprecedented momentum. Governments all over the world, recognizing hydrogen as critical to reaching their energy and climate targets, are rolling out long-term hydrogen strategies to accelerate its deployment. From Germany to Australia to Korea, in 2019 there are more than 50 strategies and targets now set in place to support hydrogen development.

This year's G20 Summit in Japan had a strong focus on hydrogen, it was there that a new International Energy Agency report, "*The Future of Hydrogen*" (2019)¹, was launched, concluding that the time is right to tap into hydrogen's potential. In addition, recent analyses by Bloomberg New Energy Finance and The Rocky Mountain Institute predict that the cost of producing hydrogen gas with renewables is likely to drop dramatically in the coming decades, contributing to the growth of the hydrogen market and making the technology even more accessible.

The different pieces of the hydrogen puzzle have never been more closely aligned: the technology is ready to deploy at scale, industry is poised to deliver, political will is strong, and commercial opportunities are waiting to be seized. So, what is needed now to realize the benefits of a clean hydrogen energy economy for the global energy transition? Collaboration and action on a global scale. ●



Turn to page 24
for more on how hydrogen is
"Gaining Global Momentum".

PIERRE-ETIENNE FRANC

Vice-President of Hydrogen Energy at Air Liquide Group
and Co-Secretary of the Hydrogen Council



1. www.iea.org/hydrogen2019

Mobility as a Service: Moving Towards multimodality

WRITER: COORDINATED AND EDITED BY RICHARD ADAMS

Multimodality sits at the heart of the vision set out by European policy-makers for safe, connected, clean and inclusive mobility. But, how can people be convinced to leave their cars at home and switch between different modes as needs dictate? The answer lies in convenience, viable alternatives to car travel, and creating mobility systems where the user is in control. That is where Mobility as a Service (MaaS) comes in.

Multimodality is set to play a crucial role in the future of many European cities. By encouraging users to combine different travel modes and reducing reliance on cars, it can relieve congestion, reduce noise and air pollution, and generally improve quality of life.

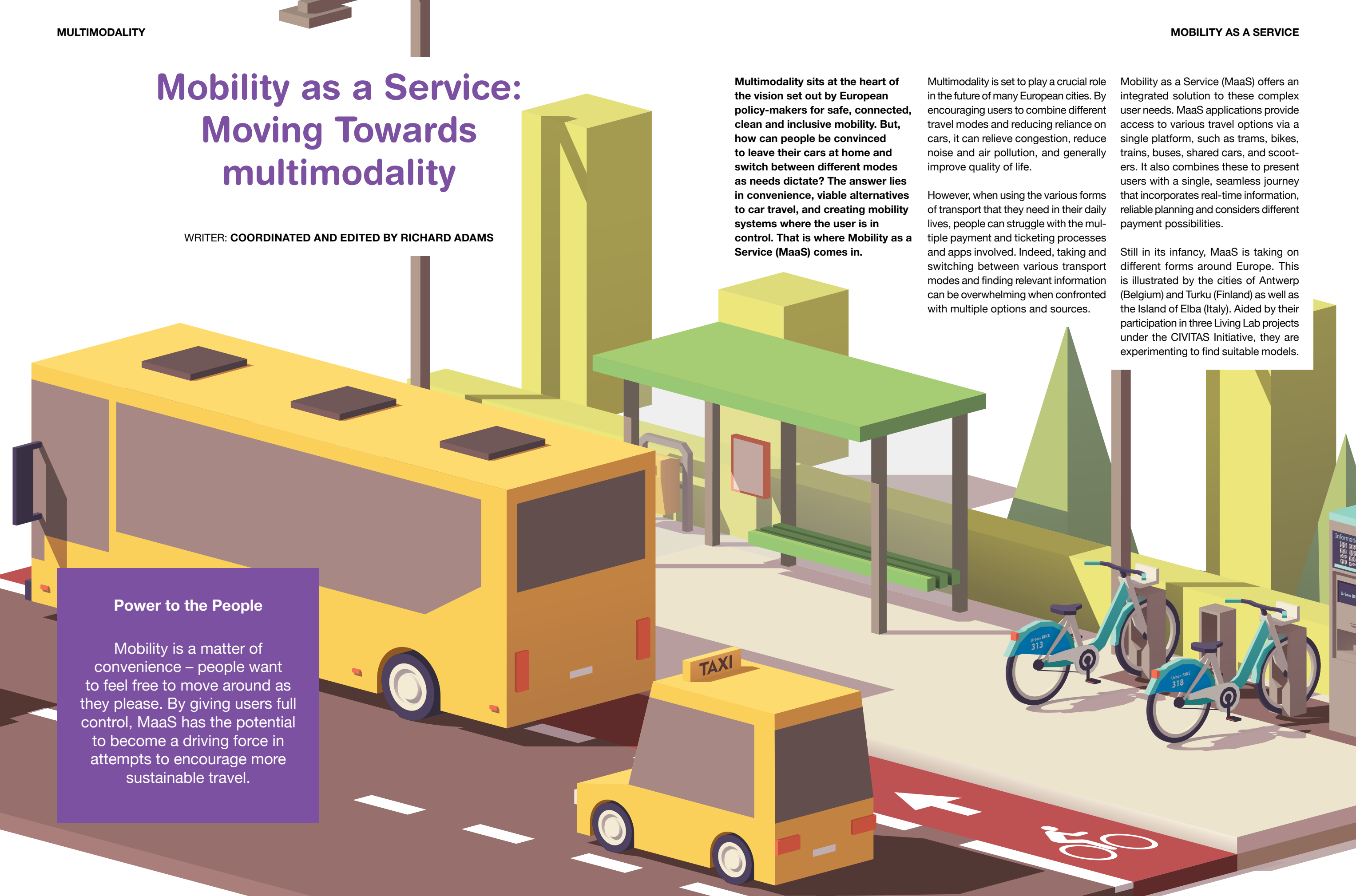
However, when using the various forms of transport that they need in their daily lives, people can struggle with the multiple payment and ticketing processes and apps involved. Indeed, taking and switching between various transport modes and finding relevant information can be overwhelming when confronted with multiple options and sources.

Mobility as a Service (MaaS) offers an integrated solution to these complex user needs. MaaS applications provide access to various travel options via a single platform, such as trams, bikes, trains, buses, shared cars, and scooters. It also combines these to present users with a single, seamless journey that incorporates real-time information, reliable planning and considers different payment possibilities.

Still in its infancy, MaaS is taking on different forms around Europe. This is illustrated by the cities of Antwerp (Belgium) and Turku (Finland) as well as the Island of Elba (Italy). Aided by their participation in three Living Lab projects under the CIVITAS Initiative, they are experimenting to find suitable models.

Power to the People

Mobility is a matter of convenience – people want to feel free to move around as they please. By giving users full control, MaaS has the potential to become a driving force in attempts to encourage more sustainable travel.



Antwerp, Belgium:
Creating a MaaS marketplace

WRITER: KATIA KISHCHENKO

In Antwerp, MaaS has the potential to help alleviate major pressure on the city’s (road) infrastructure. This is causing a challenging mobility situation that is impacting negatively on the city’s liveability and appeal to tourists and businesses.

With the support of the **CIVITAS PORTIS project**, Antwerp is creating the building blocks for the successful establishment of a MaaS marketplace in the city. This falls under the “Smart Ways to Antwerp” (SWtA) project – the development of which is a major part of Antwerp’s CIVITAS PORTIS work.

SWtA is developing various measures and tools to instigate a shift towards sustainable modes, change user mobility patterns, and improve travel times for passenger transport and urban freight. Through this, it enables and inspires people to choose alternative mobility

solutions where possible and facilitates multimodality.

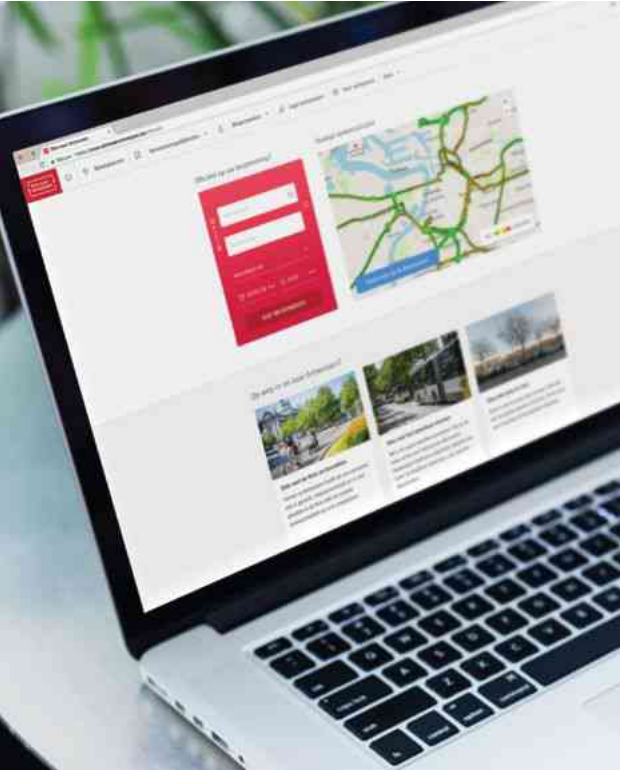
Soon after SWtA began, it became clear that people are not always aware of the range of mobility solutions available or cannot find the information to make use of them. The need for a multimodal travel planner was obvious.

1. Display of multimodal mobility in Antwerp.
Photo: Frederik Beyens

2-3. The “Smart Ways to Antwerp” travel planner.
Photo: SWtA



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After several market consultations, it turned out that no truly multimodal travel planner was available that supported Antwerp’s goals. A new travel planner was developed together with Be-Mobile, a market leader in smart mobility. This brings together the different transport modes offered within Antwerp based on various user scenarios.

Possible journeys combining cars, public transport, park and rides, shared bikes and walking are identified and presented to the end user through the website and dedicated app. Roadworks and traffic diversions are also shown.

The next step in the app’s development will be to allow users to set preferences. For example, people will be able to filter journey options according to mode. Through this, the planner will offer more personalized route planning.

While sound travel advice is crucial to changing users’ mobility habits, the proper and appropriate mobility

Mobility as
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solutions must also be in place. To ensure this, SWtA has set up its **Marketplace for Mobility**.

The Marketplace brings together a wide selection of providers who each support the city to reach its mobility goals. Through project calls and active communication and cooperation with employers, employees and entrepreneurs,

the Marketplace is encouraging the development of innovative solutions, such as MaaS.

In combination with existing mobility players and MaaS experts, the City of Antwerp is building up its knowledge related to standardization, reporting, technical requirements, and the user experience. Together, this information is creating a picture of what the end-user really requires and how to best address their needs.

It has become clear that for MaaS services in Antwerp to be efficient and successful, further collaboration between the city and different players is necessary. In January 2019, the city of Antwerp launched a MaaS-specific project call, while it will continue to nurture the MaaS ecosystem within the city.

Turku, Finland:
Achieving smart
multimodal mobility

WRITERS: ANA DRĂGUȚESCU
& ROOPE VIRTÄ

MaaS has undoubtedly had a head start in Finland with recent investments by the Finnish Transport Agency in two MaaS start-ups, **Whim** in Helsinki and **Tuup** in Turku.

Against this backdrop, the City of Turku aims to create a MaaS ecosystem incorporating several transport operators: its participation in the **CIVITAS ECCENTRIC project** is fostering this process.

Like many small- and medium-sized cities with limited budgets, MaaS appeals to Turku as it facilitates the integration of diverse mobility measures, including first and last mile solutions, mobility services in low demand areas, and parking space optimization. This helps increase the efficiency of the overall transport system without too much financial outlay.

MaaS will also help Turku develop new solutions to raise the service level of public transport and establish shared mobility as a real alternative to car ownership. The combined impact of these should make the city a better place to live and work.

Yet there remains the crucial question: how should MaaS be implemented?

Up to four MaaS business models are deployed at the moment: 1) commercial car-sharing, 2) peer-to-peer car-sharing, 3) taxi/ride-sharing, and 4) subscription services combining local bus, taxi and car sharing services. The latter two are in place in Turku.

Turku Region Public Transport (also known as Föli) covers an area with 285,000 inhabitants. Together with numerous operators, Föli provides both individuals and companies with a range of applications and packages that make travelling easier.

Föli for businesses sees employers subsidising tickets as a way of encouraging more people to take public transport. This enhances occupational well-being and health and reduces the costs arising



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from commuting. Businesses participating in the scheme also have screens in their offices displaying departure timetables for nearby bus stops.

The virtual reality (VR) online service allows users to purchase a train and bus ticket at the same time. Single tickets for use on Föli services are also available via VR if the train or bus is departing from or heading to a station in the Turku area.

Fölix (Föli + Taxi) combines the flexibility of a taxi with Föli's affordable rates. Users can call taxis to take them from home to a Föli bus stop or vice versa. The Fölix service is available throughout the Turku region.

Tuup is a smart application that allows for route planning and comparing the various mobility options. At a later stage, it should serve as an integrated platform for payments.

The Föli mobile app can be used to buy single tickets, travel cards, and TurkuCards, all of which are valid in the entire Föli region. The app offers combination tickets, which include the entrance to events and bus tickets, while it can also renew season tickets.

The aim is for residents to be aware of these new MaaS services and to provide convenient, sustainable and affordable alternatives to car ownership.

As part of CIVITAS ECCENTRIC, business models are being designed to facilitate cooperation between different existing service providers and the development of service packages. These will later be marketed through various communication channels.

- 4. Placing the Föli card on the back of the city bike unlocks it. Photo: Föli
- 5. There are 300 Föli bikes in Turku, and 39 bike stations. Two of the stations are POP-UP stations, that change location at least every third month. Photo: Föli
- 6. Föli city bus. Photo: Föli

Elba, Italy: Bringing MaaS to a touristic destination

WRITERS: **GIORGIO AMBROSINO & SAVERIO GINI**

On the Italian island of Elba, MaaS is taking a slightly different form. The island's "Shared Use Mobility Agency" (SUMA), designed as part of the **CIVITAS DESTINATIONS project**, is tailoring the concept to the needs of an island that draws many tourists with small communities.

Consisting of seven municipalities, Elba has numerous towns and small settlements spread across the island with predominantly rural areas in between them. In this way, it can be considered to be a Functional Urban Area with large peripheral zones. The island's public transport services operate mainly along its key transport arteries.

However, the summer tourist season increases transport demand by 30%, alongside an increase in trips to tourist destinations beyond the main transport network. The island's (public) transport system cannot meet these needs. This situation is exacerbated by the fragmented nature of Elba's mobility offer (including rental operators): services are uncoordinated and information spread across various sources.

To tackle these problems and create a mobility ecosystem fit for residents and tourists, the Elba municipalities of Portoferraio and Rio, along with a consultancy called MemEx, have joined forces to design SUMA that works on the basis that transport authorities should act as promoters of MaaS, and ensure that ride-sharing services are fully incorporated into the public transport and overall mobility service offer.

The role of SUMA is to integrate the various services available, make them easily accessible, and coordinate the responsible operators. To achieve this, an IT platform is being developed that will be accessible via a mobile app and

website. When released, this will be called **Elba Sharing**.

By aggregating data from various sources and systems, SUMA's Elba Sharing will provide different services to facilitate multimodal travel, such as a journey planner and in-app payment and offer a single access point to Elba's ride-sharing services and rental operators. This should make it possible for users to combine public transport with ride-sharing and rental options for journeys of different lengths and at times of varying demand.

Ride-sharing possibilities are numerous, including sharing a trip when a user is on the ferry, planning shared trips in advance, and sharing a taxi trip. These will be managed through a notice board on which passengers and drivers can publish their trip share requests and offers. Moreover, a search engine function will help identify opportunities to combine ride-sharing offers and requests with public transport. Features such as journey tracking and user evaluation of vehicle drivers will also be included to improve passenger safety.

This demand- and user-driven model should help to reduce the number of private trips made over summer and convince more people to use collective transport outside of the tourist season. A SUMA prototype was ready in April 2019 for internal testing, while its first features were expected to be operational by the end of summer 2019. ●

Find out more on SUMA's design
www.memexitaly.it

7. From June to September, the Marebus beach service provides connections with several beaches on Elba. Photo: Elbasharing

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Micro-Mobility: Challenges and Opportunities for Cities & Regions

WRITERS: LUANA BIDASCA, FLORINDA BOSCHETTI,
DAGMAR KÖHLER, KAREN VANCLUYSEN

The rise of shared dockless (e-)bikes and electric scooters alongside ride-sourcing and other demand-responsive mobility services are changing urban mobility landscapes. Micro-mobility is now a commonly used term covering shared-use fleets of small, fully or partially human-powered vehicles such as bikes, e-bikes and e-scooters.

Bike-share

Where does the success of sharing bikes, or sharing in general, come from? The demand for shared mobility has grown over the past decade, as a result of new societal trends, business models and technology developments, and bicycles have become an increasingly popular means for daily transport rather than just being used for recreational purposes.

Since the launch of Europe's first large public bikeshare scheme, **Vélib' in Paris in 2007**, an increasing number of cities and towns have procured docked bike-share services. Bike-sharing schemes are often implemented as part of a city's sustainable urban mobility strategy that addresses the adverse impacts of transport: air pollution, congestion, traffic crashes, noise. An essential change on the way to boosting the quality of life in cities is an improved modal shift in favor of walking and cycling.

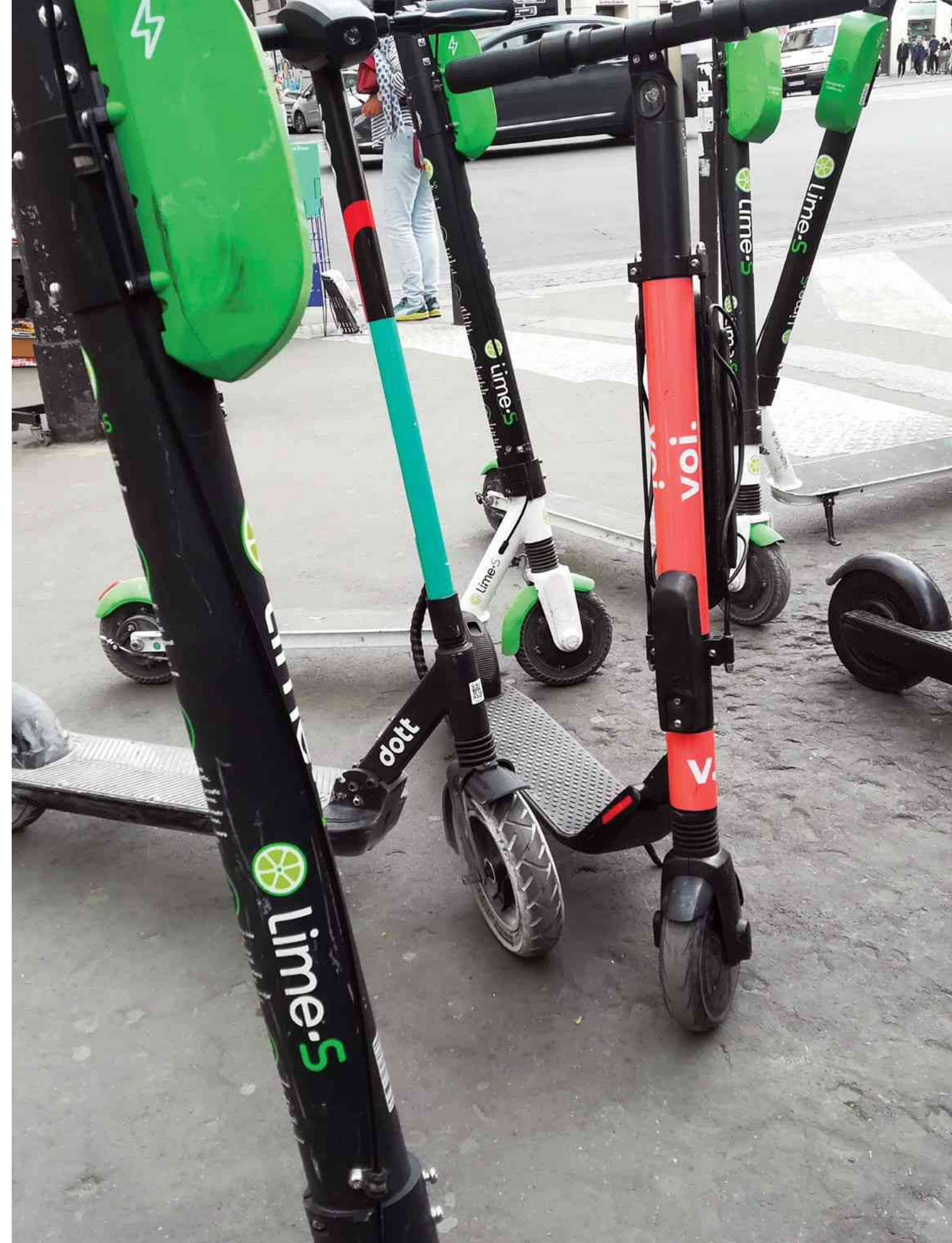
Building a local cycling culture and improving cycling conditions (infrastructure, parking, tax incentives) is the way forward to promote active transport modes for short distances and first and last mile trips. Bike-sharing schemes have the potential to help local governments deliver clean, healthy and efficient urban mobility.

Conventional bike-share (docked or dockless) has fast evolved into the 5th generation of data-driven bike-share. To

date, a variety of schemes are available across European cities, featuring traditional or electric-powered bicycles, cargo bicycles, light docking infrastructure, photovoltaic energy recharge stations, smart locks, geo-fence solutions, and GPS tracking.

Meanwhile, new private mobility providers saw opportunities to sell sustainability and eco-consciousness through new, door-to-door services, tailored to the permanently connected mobility consumer. Conventionally procured (and usually but not exclusively docked) bikeshare schemes now operate side by side to commercially operated dockless bikeshare services, and more recently free-floating electric scooters and (electric) bicycles.

1. Dockless shared scooters left on the sidewalk in Paris, France. Photo: EHFXC



MANCHESTER: First large dockless bike-sharing

The first large dockless bike-share scheme launched in a major European city was in Manchester. When testing dockless bicycles in 2017, Manchester did not have any existing bikesharing scheme. Transport for Greater Manchester (TfGM), the public transport authority, signed a Memorandum of Understanding (MoU) with a single dockless bicycle operator launching in June 2017, deploying a fleet of 1,000 bicycles for a trial period of one year. It was a trial under MoU pretences and not a traditional scheme that involves a public tender and clear long-term commitments. The operator decided to cease operations after the trial in early September 2018, allegedly due to theft and vandalism of bikes.

TfGM issued an evaluation report, looking at the data on key numbers, evaluating movements and analyzing various issues that came up. Findings included that an MoU does not necessarily provide all the tools required to manage the scheme effectively. For dockless schemes to be sustainable in the long-term, you need a larger operational team to reshuffle bicycles and scale-up. This was difficult because it was a local operation and there was a limited supply of bikes and staff. The lack of a plan about how to educate and raise awareness amongst users contributed to vandalism and misuses.

This new business model was based on introducing much larger bicycle fleets at a much quicker pace than conventional bikeshare could do, enabled by free-floating technology not requiring expensive docking stations. Some first-generation commercial fleets were literally deployed overnight, surely lacking integration with the city's sustainable transport strategy. On the other hand, this type of dockless bikeshare system has been brought to city streets at zero or small cost for the local authority, making it attractive for cities and towns which cannot afford the higher operational costs of conventional and publicly procured bikeshare schemes.

Electric scooters

A new category of portable, fun and compact shared transport devices was launched in 2018, the so-called scooters or kick-scooters, electrically-powered and with a speed up to 30-40km/h. Similar to shared bikes, shared e-scooters are made available through an app-based service, which locates the device through GPS and unlocks it with the help of a smartphone.

There's a growing and increasingly competitive market for scooters, which have popped up massively in the streets of cities such as Paris, Madrid, Lisbon, and Brussels, but also in central and Eastern Europe, in cities like Bucharest. Sharing schemes have been launched by large providers coming from the United States, but the number of European companies is growing every day.

E-scooters cater for the rising demand for quick, individual mobility solutions and door-to-door trips that can bypass congested traffic with little effort. In an ideal scenario they complement and fill the gap left by public transport and serve as first and last mile connectors, without replacing active and therefore

healthier modes of travel such as walking or cycling.

As with any new vehicle, safety concerns are important, such as maximum speed, visibility, stability, the size of the wheels and braking. On the infrastructure side, there is the issue of potholes, which are already a danger to cyclists and could be even more of a threat to fast e-scooters. UK statistics show that over the last 10 years, 400 cyclists have been seriously injured or killed due to poorly maintained roads.

The placement and parking of e-scooters raises concerns especially when sidewalks are not wide enough. These should remain the space where the pedestrian has priority over all other modes. Some companies require their customers to take a photo before completing the ride to assess how the e-scooter was parked. Geofencing the e-scooters can solve issues regarding cluttering in certain areas. What this problem reveals, however, is the lack of



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PARIS: From reacting to acting towards bikeshare and e-scooter operators

Almost 15,000 e-scooters are available today on the streets of Paris. To regulate this fleet, the municipality has put in place a fee for companies, which increases according to the number of scooters deployed.

The Paris City Council adopted a Code of Conduct in 2018 which was signed by all nine dockless bikeshare providers. The Code of Conduct included to comply with the regulatory framework of traffic laws, accessibility plan and quality of vehicles as well as commitment to communication with the city of Paris such as to participate in regular meetings that consider adaptations of service to meet the local context needs. The city has confirmed in the Code its ambition to increase bicycle parking spaces to more than 40,000 by 2020. E-scooter companies were invited to sign the code of conduct until the end of May 2019.

In April 2019, the city council of Paris adopted measures to regulate shared e-scooters and to protect pedestrians. Since 1 July 2019, e-scooters are only allowed to park on car or motor parking places. Parking on the sidewalk

or bike-parks is forbidden. Operators are asked to limit the speed to 20km/h and to 8km/h in pedestrian areas and "zones de rencontre" ("meeting areas"), and to stop any further deployment in Paris.

The city and the police will be working together to analyze the number of accidents where e-scooters are involved and the city advises e-scooter-users to wear a helmet.

Paris also announced that a tender will be launched from autumn 2019 to select up to three operators that will be allowed to operate in Paris from 2020. The number of e-scooters will be limited, and social and environmental aspects will be considered in the selection criteria. During June 2019, five or six of the city's 13 fleet operators already pulled out of Paris.

Paris region supports the integration of the different services and Ile-de-France Mobilités met all free-floating service providers and set up a charter aiming to include free-floating bikes and (e-)scooters within their mobility offering.

dedicated parking space for bikes and e-scooters in the urban environment. If you consider that one car parking spot could already accommodate several e-scooters and bikes, we should clearly be reallocating urban space away from the private car to micro-mobility modes of moving around. Lisbon, for example, addressed the problem of chaotic scooter parking by reallocating a number of car parking spaces to e-scooters.

2. Electric scooter fleets are now operating in most large European cities. Photo: Marek Rucinski, Prague, Czech Republic

Local Regulation

Cities across the European Union are looking hard at all these questions and have pursued different approaches towards e-scooters or docked and dockless bikeshare operations. These policy options vary to some extent from country to country, depending on the overarching regulatory and legislative framework and the degree to which the city administration itself has any regulatory autonomy over such issues. The Innovation Brief Regulating dockless bike-sharing schemes, developed by the CIVITAS 2020 PROSPERITY project, identified six types of policy options for cities, including the hands-off approach,

regulative ground rules, operational permits, contracts for concessions, pilots, and banning/not allowing operations.

However, the bikeshare policy options mentioned above are not as clear cut in practice, and many cities find themselves ticking more options when dealing with micro-mobility regulations. Given the new and fast-evolving nature of the services to be regulated, local authorities are unavoidably going through a stage of trial and error, where they experience that some regulatory approaches or specific rules may work better than others. This is inherent to the nature of these innovations, where cities may feel they are constantly trying to catch up

GECKO: Horizon 2020 in Action

EU-funded research supports authorities to develop new regulatory frameworks. The GECKO project, funded under Horizon 2020, assesses which actions will be required up to 2040 for policy-makers to devise regulatory approaches for disruptive innovations and new regulatory frameworks streamlining uptake.

GECKO collects and exchanges insights about the challenges and opportunities for new and emerging mobility solutions with EU and global stakeholders. Consultation is organized specifically on automation and emerging technology; shared mobility, public transport and Mobility as a Service (MaaS); and digitalization and data-driven models. GECKO will issue recommendations to policy-makers to enable adaptive and anticipatory regulatory schemes and governance with novel policies that contribute to sustainable mobility goals.

GECKO welcomes stakeholders working on new mobility services, Mobility as a Service (MaaS) as well as technical providers of shared mobility, policy-makers and researchers.

Visit GECKO project to learn more today:

h2020-gecko.eu



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with reality and fast-paced disruptions. Regulations should become more flexible to be able to accommodate these sometimes still unknown changes in a faster way and enable more pro-active interventions. Regulatory sandboxing to trial the impact of new solutions as well as of regulatory approaches can only be recommended.

A city needs the ability to manage, design, and understand what is happening in the public realm. Traffic and mobility data are one of the crucial sets of information needed for that purpose. Digital mobility services such as dockless bikes and e-scooters can provide the city with unique information to which they never had access. It can explain and justify modal share, thus helping to make the case for investing in more dedicated infrastructure, such as bike lanes.

Taking stock of and documenting the most recent developments and governance approaches for

commercially operated shared micro-mobility schemes, Polis is working on the regulation schemes of shared micro-mobility services in cities with the aim to support local governments and transport authorities in developing governance frameworks and regulations which are suitable to their needs and align these new mobility services with their sustainable, multimodal and integrated sustainable transport policy goals. Stay tuned! ●

Learn more about POLIS here:
www.polisnetwork.eu

Read the full feature online:
revolve.media/feature

3+4. Due to the growing market for shared scooters and bikes, the number of micro-mobility operators is growing every day. Photos: Markus Spiske

5 Insights with POLIS into Sustainable Mobility

INTERVIEW WITH KAREN VANCLUYSEN

In the June 2019 *Thinking Cities* issue, POLIS Secretary General Karen Vancluysen asks:
“Is it nothing less than a change of culture that is needed to achieve a more sustainable transport system?”
How is this change of culture being driven at the city- and regional-level?

Transport is responsible for about 1/5 of the global CO₂ emissions and nearly 1/3 of transport-related CO₂ emissions originate from urban passenger transport. City-level activities are becoming increasingly important, especially due to the multiple benefits of sustainable urban mobility action, reducing CO₂ while at the same time achieving much needed improvements in the field of air quality, congestion, quality of life, traffic safety and public health. We can expect steady increase in urban transport demand with an ever-growing urban population and it is clear that dramatically different urban mobility systems are required. Cities should be recognized as major engines for bringing about the much-needed change in the transport sector. That change will never be easy though.

A key factor for success is that we manage to reconcile the needs of the individual user with those of society as a whole.

Are policies at EU-level addressing citizen behavior change to encourage modal shifts and active mobility?

Cities stand in front of a tremendous task and need to be empowered by other levels of governance to be able to build more sustainable urban mobility ecosystems. This requires adequate

financial support, which we hope to see reflected in the next multi-annual financial framework, but also support tools for cities to make that step change. The EU plays an instrumental role in the promotion and roll-out of sustainable urban mobility plans (SUMP), which help cities to develop long-term integrated sustainable mobility strategies with clear targets, combining a wide range of measures and building in citizen consultation, involvement and co-creation from day one. The European SUMP guidelines have also just been updated to incorporate the innovation areas that have emerged over the last few years, such as electromobility, MaaS, automation, access regulations, and shared mobility.

The EU plays an instrumental role in the promotion and roll-out of Sustainable Urban Mobility Plans (SUMP).

What makes your members stand out in terms of sustainable mobility best-practices?

What our member cities and regions have in common is openness to innovation and the determination to use new solutions as enablers towards solving mobility problems. Technologies are not an end in themselves, they are a means to an end and should help to reach certain policy goals. This is a very exciting time to be working on mobility. We are going through a paradigm shift

in the transport sector, where innovative, multiple and sometimes disruptive mobility solutions and technologies are coming our way at a very fast pace. New technologies, new transport modes, new shared mobility service providers, new market players, new partnerships, and new business models, hold the potential to transform mobility in a sustainable and inclusive way, provided they are introduced within the right context and steered towards reaching policy objectives.

Could you give some examples of innovative approaches that European cities are adopting to solve mobility problems?

Addressing these problems requires multiple action. Cities are introducing measures across a wide spectrum. For example, several of our members have taken up a leading role in the deployment of electromobility. Swedish and Dutch cities are real forerunners in cleaning up their own and captive fleets, but also by providing charging

Building infrastructure for active travel, for light mobility, giving it the space it deserves will also induce the necessary behavioural change in favour of these modes.

infrastructure and incentives to users to make the transition happen. Having said that, electrifying polluting fleets may address air quality issues, but is not solving congestion. That requires interventions that favor modal shifts away from the private car, including different types of urban vehicle access regulations, new circulation plans redirecting car traffic, and smart parking management. Enhancing the user experience, improving the quality of sustainable mobility services and their combined use through intermodality are also instrumental in making that shift. Many of our members are exploring how intelligent transport solutions (ITS), including Mobility as a Service (MaaS), can help reach that goal. Engaging with the private sector is key in testing out innovations and finding common solutions.

What is one key initiative at the city or regional level you think should be replicated to contribute to more sustainable, healthier cities?

The secret lies in the right packages of measures. One extremely powerful instrument that cities and regions are in charge of is public space. Many modes are fighting for that space, which is a scarce and very valuable good. By reallocating space, by taking space away from certain modes and giving more dedicated space to other modes, cities can prioritize certain modes over others or discourage less sustainable ones which no longer have a role to play in cities that want to give streets back to the people and enhance the overall quality of life in the urban environment. Building infrastructure for active travel, for light mobility, giving it the space it deserves will also induce the necessary behavioral change in favor of these modes. ●

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5. Light mobility (bikes, scooters), shared mobility (public transport) and electrification are possible solutions to make our cities more sustainable and healthier. Photo: Alex Chernenko



5



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Gaining Global Momentum

WRITER: MICHELA BORTOLOTTI

All over the globe, leaders are looking at strongly addressing climate change. In December 2018 in Katowice, Poland, COP24 advanced a "rulebook" to bring the 2015 Paris Agreement to life which aims at keeping global warming well below 2°C compared to pre-industrial levels. Hydrogen is here to make that happen.



Europe should be at the forefront of the fight to decarbonize the energy system and, in this context, hydrogen has a key role to play. Hydrogen is multi-talented: it's an energy carrier, a fuel, and a raw material. If produced adequately, hydrogen can reduce greenhouse gas emissions, strengthen energy independence and mitigate the challenges posed by variability and intermittency of renewable energy systems. Hydrogen offers a clean, sustainable, and flexible option to convert renewable electricity into a chemical energy carrier for use in mobility, heat and industrial applications. As the "gaseous form of electricity", it is an enabler for sectoral integration. Hydrogen is indeed a key component of the future energy systems that will accelerate the transition to deeply decarbonized energy and mobility sectors, also presenting opportunities in terms of job creation, technological

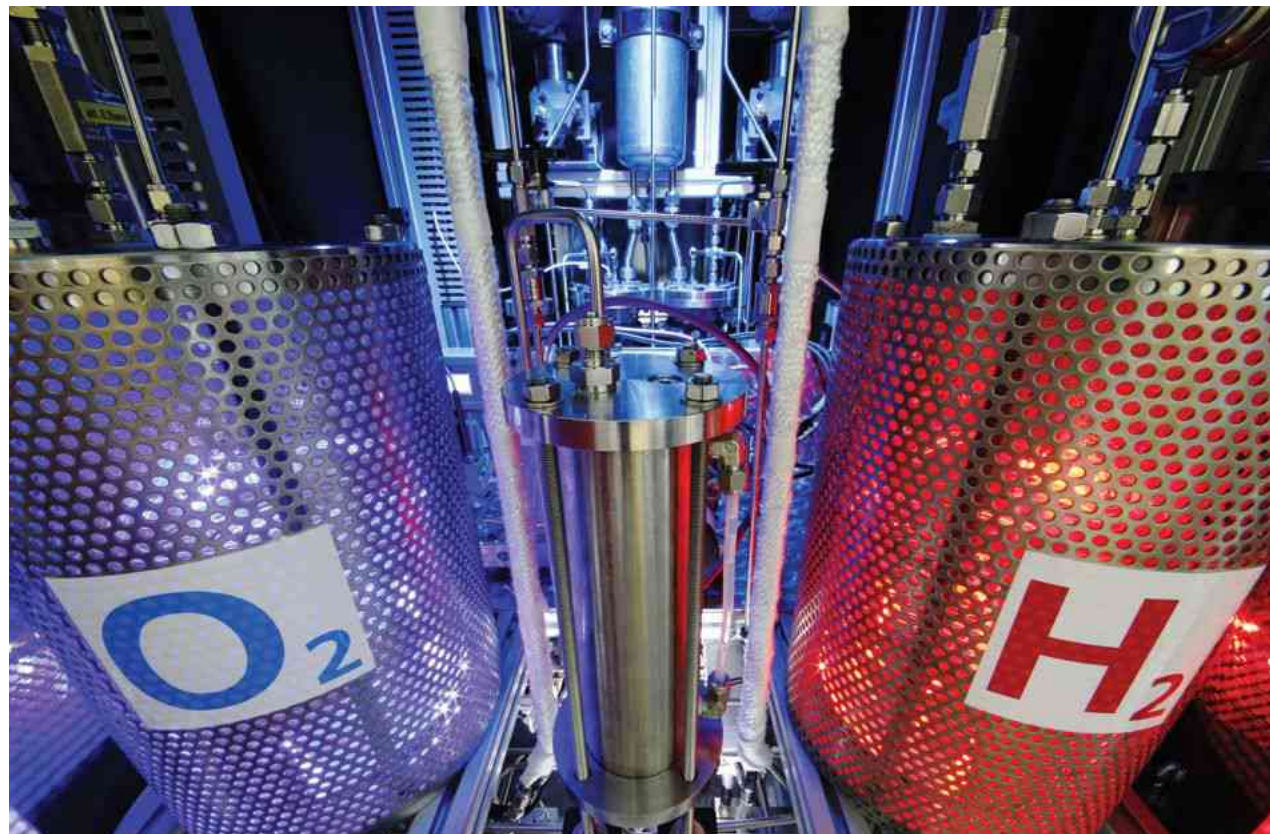
leadership, and environmental protection for Europe.

The ability of hydrogen to access and integrate each sector of the energy system opens opportunities for deploying and relying on renewables to a much greater extent. Hydrogen technologies in a power system that integrate Renewable Energy Sources (RES) can operate throughout long periods of non-consumption-oriented production of renewable energy by feeding hydrogen into one or more energy sinks (for example the gas grid, the storage tanks of hydrogen refuelling stations, and salt caverns). Stored hydrogen can be used on various timescales for meeting demand for heat, transport and power. Whereas electricity derived from renewables provides the power sector with a profound decarbonization pathway, the heat and mobility sectors

as well as industry do not yet have decarbonization pathways of equivalent significance. The versatility of hydrogen enables these sectors to be integrated and to contribute to Europe's energy transition.

1. Nikola Motor Company has created a hydrogen-electric truck for European markets, testing is projected to begin in Norway in 2020. Photo: Nikola Motor Company

2. An electrolyser splits water into hydrogen and oxygen. Hydrogen production via electrolysis offers opportunities for synergy with variable power generation, which is characteristic of some renewable energy technologies. Photo: Thomas Emsting



2

Today, some 200 hydrogen refuelling stations are operational across Europe, while new stations continue to open almost every month.

The largest share of CO₂ emissions (27 percent)³ comes from the transport sector in Europe, so decarbonizing transport and mobility is really an imperative now. In parallel, there is growing pressure to improve air quality for human health and well-being, with the European Commission opening infringement procedures towards some Member States for breaching EU rules on air pollution limits.

It is urgent to act now. Fuel cell electric vehicles (FCEV) provide a solution to tackle the big challenges Europe is facing in the transport sector: decarbonization and air pollution. FCEVs offer zero tail-pipe emission and allow for a driving experience very similar to conventional engines, with large distance range and quick refuelling time (less than five minutes), thus no need to change drivers' habits. How does this work? Simple: a fuel cell is used to convert hydrogen in electricity to power the electric engine.

Several examples are already present in the transport sector throughout Europe showcasing the maturity of this technology.



6

Concerning cars, given the remaining high upfront cost of the infrastructure and of the vehicles, we see first fuel cell electric cars in captive fleets such as taxis. An example is the taxi scheme in Paris: over 100 taxis drive long hours without refuelling needs, no loss in productivity and the hydrogen refuelling station, located at the Paris Orly airport, is used optimally at full capacity creating a business case for

the infrastructure. The vehicles are also an excellent answer to growing new mobility types, such as private hire or car-pooling (for example CleverShuttle), thus contributing to reduce the environmental footprint of private cars.

Hydrogen offers an attractive rail passenger service solution like the Alstom Coralia iLint hydrogen trains that are today in commercial service in Lower



7



8

Saxony, Germany. Hydrogen-powered trains are a clean alternative to the costly electrification of lines. This is particularly appealing in European countries with a low electrification rate. France, the United Kingdom, other German regions to name a few, intend to follow the path of Lower Saxony and invest in zero emission silent hydrogen trains.

Buses, coaches and trucks, represent one fifth of all road transport emissions⁴ and are, so far, not regulated at a pan-European level. This will very likely change in the near future: regulating

CO₂ emissions from heavy-duty vehicles will help drive zero emission vehicles forward. Hydrogen makes sense today in heavy duty applications: hydrogen trucks offer longer range and heavier payload, as they have a high energy density per weight. Fuel cell buses have a daily range of up to 400 kms and are being deployed across Europe. Co-funded by the Fuel Cell Hydrogen Joint Undertaking (FCH JU) under Horizon 2020, the JIVE initiatives⁵ will deploy 300 buses in the early 2020s in 22 cities across Europe, the largest deployment to date.

- 3-4. Source: National Emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism provided by the European Environmental agency
5. More on www.fuelcellbuses.eu
6. Taxi from the Parisian company Hype, the first hydrogen taxi fleet in the world, at the hydrogen refueling station of Place de l'Alma. Photo: ENMIX
7. CleverShuttle CEO Bruno Ginnuth. CleverShuttle (Germany) is a ridepooling app that provides affordable and eco-friendly door-to-door transportation, and its fleet consists of eco-friendly electric and hydrogen vehicles. Photo: CleverShuttle
9. Alstom's Cordalia iLint hydrogen train which provides passenger service in Lower Saxony, Germany. Photo: René Frampe
10. Fuel cell bus currently in service in Groningen, the Netherlands. Photo: PitPoint



9

HYDROGEN

Hydrogen is the most promising zero emission alternative for long haul trucks. To name some of the latest developments: truck-maker Nikola has announced very ambitious targets in term of vehicle mileage, number of vehicles and associated hydrogen infrastructure coverage and has secured over \$13 billion in pre-order reservations for its vehicles. Additionally, Nikola is now moving into the European market with pre-orders from several EU countries in the Benelux and Norway. Switzerland has just ordered 1,000 fuel cell trucks for the retailer company Coop. More and more manufacturers are joining the club and working on long haul hydrogen trucks and end-users are recognizing hydrogen as a key alternative to diesel for long haul transport.¹¹

And it is not only road and rail transport that can be decarbonized with zero emission fuel cell vehicles. Considering that maritime transport accounts today

for 2.5% of global CO₂ emissions and that these emissions are predicted to raise tremendously by 2050, there is also a need to develop solutions powered with alternative fuels. While the Energy Observer – the first hydrogen-powered vessel is touring the world to demonstrate the readiness of the technology – maritime key players are looking at hydrogen powered vessels from catamarans to large ships.

All of this cannot happen without the appropriate infrastructure. Today, some 200 hydrogen refuelling stations are operational across Europe, while new stations continue to open almost every month. The support from the Fuel Cell and Hydrogen Joint Undertaking and the Connecting Europe Facility (CEF) has proved to be essential, while some stations are becoming commercially viable with a growing utilization rate. This shows that the European Union is committed to enhance decarbonizing

solutions like hydrogen. This is even truer as hydrogen helps move towards zero emissions in transport and in other sectors: hydrogen is a bridge between sectors, a fundamental part of sectoral integration. The latest book by Thierry Lepercq – a pioneer in the solar industry – is called “Hydrogen is the New Oil”. He uses plenty of examples to showcase his point of view. And the International Energy Agency calls hydrogen a factor which is here to stay¹². Indeed, the number of qualified analysts grows who say: Hydrogen is the next big thing! ●

11. See for example the “IRU vision for decarbonising commercial road transport leading up to 2050” published by the International Road Transport Union in November 2018.

12. The Future of Hydrogen Seizing today's opportunities, IEA, June 2019

13. Launched in April 2017, the Energy Observer is the first vessel in the world to both generate and be powered by hydrogen. Photo: Amélie Conty



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Laszlo Domokos,
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www.biofuels-news.com/conference



This Is Not Business As Usual

AN INTERVIEW WITH ANDREEA STRACHINESCU

How are maritime affairs and energy intertwined?

The seas and oceans are essential for our future on planet Earth. They regulate its carbon and heat cycles and deliver resources such as food that contribute to our diets and provide livelihoods for coastal communities. The OECD estimates that the ocean economy will double by 2030.

This is partly because the seas and oceans will play a vital role in the reduction of greenhouse gas emissions and limiting global catastrophes. Looking at the level of ambition expressed in the European Commission's 2050 Clean Planet Strategy (COM (2018) 773 - A Clean Planet for all - A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy), it is quite clear that reaching the climate neutrality goal will require a quarter of all Europe's electricity to be generated offshore with twenty times more offshore wind turbines in our seas than there are today. Energy from tides and waves will complement this with an energy supply that is more regular and more predictable than that provided from wind or sun.

This will totally transform Europe's seas with significant proportion of national waters – up to 20 percent for some countries – dedicated to renewable energy production. This is not business as usual. A new vision is needed



to accommodate this massive expansion of renewable energy while taking into account other ocean users and maintaining or recovering biodiverse ecosystems. This will be a major challenge for the maritime spatial plans that EU countries are preparing for 2021.

What main applications of renewable energy is the EU promoting?

Europe has been a world leader in offshore renewable energy in terms of patents granted. EU guidelines stipulate that energy tenders should be technologically neutral although exceptions can be made for small-scale

and demonstration projects. Offshore wind farms, at least those with turbines fixed to the seafloor, have moved well beyond the small-scale but wave and tidal projects as well as floating wind farms have benefitted from considerable public support.

This includes the EU. Support is provided for all levels of technological readiness. The EU research programme Horizon 2020 has financed ocean energy projects since 2014, not only through grants but also loans, guarantees and equity-type funding for higher levels of technological readiness through the Innovfin programme. Revenues obtained from the sale of emission allowances from the new entrants' reserve (NER) of the EU Emissions Trading System have been spent on ocean energy.

Horizon Europe, the successor to Horizon 2020, will continue this support in line with the objectives of the UN decade of ocean science for sustainable development. Investment will be handled by the Invest EU Programme which will bring together under one roof the multitude of EU financial instruments currently available to support investment in the EU, making EU funding for investment projects in Europe simpler, more efficient and more flexible. The European Commission's proposal envisages openings for smaller companies providing services and products for offshore renewable energy as well as larger infrastructure projects, including transmission lines to bring the energy ashore and port upgrades.

What are the challenges and solutions for maritime transport in the EU and worldwide?

According to the International Maritime Organisation (IMO), shipping is responsible for 2.5 percent of global GHG emissions. In 2018, the organization resolved to reduce emissions by

50 percent by 2050 compared to 2008 while "pursuing efforts to achieve full decarbonization as soon as possible in this century". This will be extremely challenging given that the scenarios presented in Clean Planet suggest a 115 percent growth in tons-kilometers between 2015 and 2050.

Electrification of short sea shipping and inland waterways is feasible and

battery-driven ferries carrying 30 vehicles and 200 passengers are already in operation. There could be a hundred or so such vessels by 2030. But batteries have a low energy density, and for now their high weight makes the technology ill-suited for long-distance shipping. Hydrogen-based technologies (such as fuel cells) may become competitive in vessels in the medium- to long-term and the fuel would need to be produced by water electrolysis using carbon-free electricity or from natural gas steam using carbon capture and storage. But biofuel consumption will also inevitably

Shipping is responsible for 2.5 percent of global GHG emissions.

Source: IMO

grow. Indeed, reaching zero carbon by 2050 will mean less land for food as land is set aside for biofuel. This can be compensated by aquaculture which can produce protein with a lower carbon footprint than that grown or raised in soil. The extra space needed for offshore food and energy production will create new landscapes for maritime transport and careful planning will be needed to ensure minimum disturbance. ●

Read the full article on:
revolve.media/interview

1. Andreea Strachinescu, Head of Unit for Maritime Innovation, Marine Knowledge and Investment in the Directorate General for Maritime Affairs and Fisheries at the European Commission.

2. Container ship in Rostock Port, Germany. Photo: Markus Spiske

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VIEWS

Transport Today

You need to get from A to B.

How do you get there? One foot in front of the other,
look down and touch the screen of your phone to use an app?
And when you get there? Disembark or unlock the screen again.

Most cities plan things in a way as to connect residents to their destinations; some planned for situations relevant to 2000 years ago and some have only been created in the last 200, 100 or 50 years. Future scapes for urban as well as rural spaces are taken into consideration as well as issues the past may have left behind. Daily needs of their communities are usually the drivers behind change or a long worn out road.

According to the European Environment Agency, transport consumes one third of all final energy in the EU. The bulk of this energy comes from oil. This means that transport is responsible for a large share of the EU's greenhouse gas emissions and a major contributor to human-induced climate change. Reducing the adverse effects of transport is an important EU policy goal.



Germany

On 1 August 2019, Deutsche Bahn made public transport on metro free for children.
Photo: Ansgar Scheffold

Arthur D. Little assessed the mobility maturity, innovativeness and performance of 100 cities worldwide, using 27 indicators split into three even groups.

MATURITY

The first group of indicators measures maturity of urban mobility systems, taking into account the share of sustainable modes of transport in the modal split.

INNOVATION

The second group of indicators reflects innovativeness of mobility systems.

PERFORMANCE

The third group of indicators deals with performance of mobility systems. Here we measure, among other things, air quality, motorization and fatality levels, and the mean travel time to work.

1.

Singapore 59.3%
2.

Stockholm 57.1%
3.

Amsterdam 56.7%
4.

Copenhagen 54.6%
5.

Hong Kong 54.2%
6.

Vienna 54.0%
7.

London 53.9%
8.

Paris 53.7%
9.

Zurich 53.2%
10.

Helsinki 52.8%
11.

Tokyo 50.0%
12.

Berlin 49.9%
13.

Madrid 49.0%
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Munich 48.8%
15.

Shanghai 48.5%
16.

Barcelona 48.0%
17.

Prague 47.6%
18.

Shenzhen 47.5%
19.

Warsaw 47.3%
20.

Tallinn 47.1%
21.

Brussels 47.1%
22.

Guangzhou 46.9%
23.

Frankfurt 46.9%
24.

Milan 46.9%
25.

Lausanne 46.8%
26.

Stuttgart 46.3%
27.

Nantes 46.1%
28.

San Francisco (CA) 45.9%

29.

Seoul 45.8%
30.

Beijing 45.4%
31.

Toronto 44.7%
32.

Moscow 44.7%
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Istanbul 44.7%
34.

Dubai 44.6%
35.

Hanover 44.4%
36.

Wuhan 44.2%
37.

Manila 44.0%
38.

New York 43.9%
39.

Montreal 43.8%
40.

Melbourne 43.2%
41.

Osaka 43.2%
42.

Hyderabad 43.0%
43.

Santiago de Chile 42.9%
44.

Boston 42.9%
45.

Turin 42.7%
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Chicago 42.5%
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Washington, D.C. 42.3%
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Sydney 42.2%
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Mumbai 42.1%
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Nanjing 41.9%
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Lima 40.1%
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Rome 39.8%
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São Paulo 39.8%
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Xi'an 39.6%
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Athens 39.6%
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Kolkata 39.2%
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Ankara 39.2%
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Cairo 39.0%
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Saint Petersburg 38.9%
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Rio de Janeiro 38.8%
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Los Angeles 38.6%
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Bangkok 38.6%
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Chengdu 38.4%
74.

Jakarta 38.4%

75.

Tianjin 38.34%
76.

Kinshasa 38.3%
77.

Miami 38.2%
78.

Addis Ababa 37.6%
79.

Johannesburg 37.6%
80.

Philadelphia 37.5%
81.

Ho Chi Minh City 37.0%

82.

Riyadh 36.9%
83.

Lahore 36.7%
84.

Kuala Lumpur 36.6%
85.

Karachi 36.5%
86.

Salvador 36.4%
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Shenyang 36.2%
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Lagos 36.0%
89.

Dallas 35.9%

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Caracas 35.2%
91.

Dhaka 35.2%
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Tehran 35.1%
93.

Houston 34.6%
94.

Amman 33.8%
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Jaipur 31.9%
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Delhi 31.5%
97.

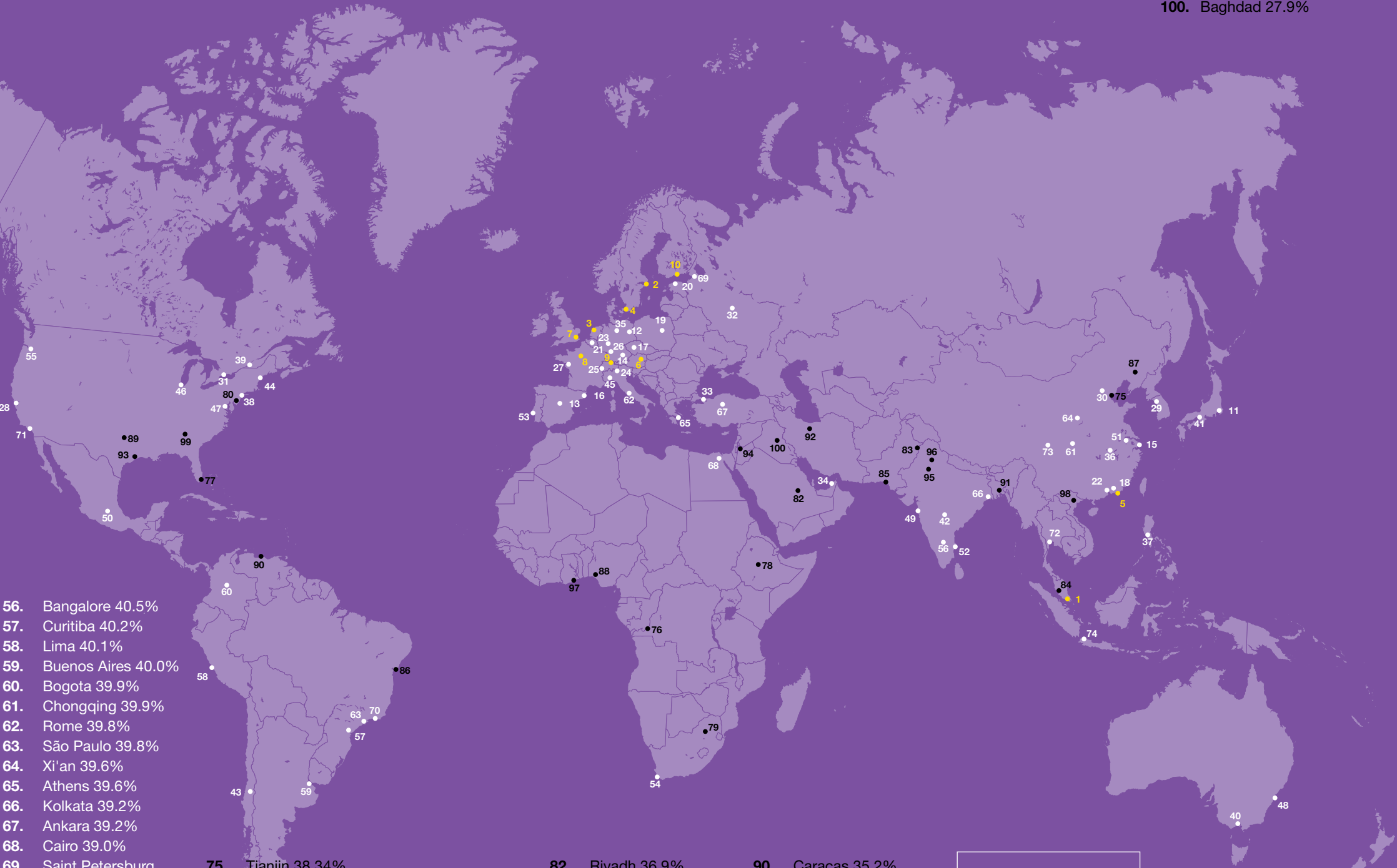
Accra 31.4%

98.

Hanoi 29.1%
99.

Atlanta 27.9%
100.

Baghdad 27.9%



- Above average
- Average bucket
- Below average



▼ The Netherlands

While less frequent, public transport in city centers is often available throughout the night. Photo: Michael Fousert



▲ **Switzerland** Post delivery by light electric vehicle, in Erlach, Switzerland. Photo: W. Bulach



▲ **France** Ferry connecting Corsica with France and Italy, Bastia Harbor, Corsica (France). Photo: Vidar Nordli Mathisen

▼ **Portugal** While unpopular with the locals, electric tuk-tuks are a growing presence on the streets of Lisbon, carrying tourists through the narrow streets of the historic Alfama district. Photo: Ajay Suresh

▼ **Russia** Massive bike parade in Moscow city center, organized by Critical Mass, to promote the bike movement. Photo: DesignYourUniverse





▲ Denmark

Man riding a cargo bicycle with his daughter in Viborg, Denmark.
Photo: Vadim Ungureanu

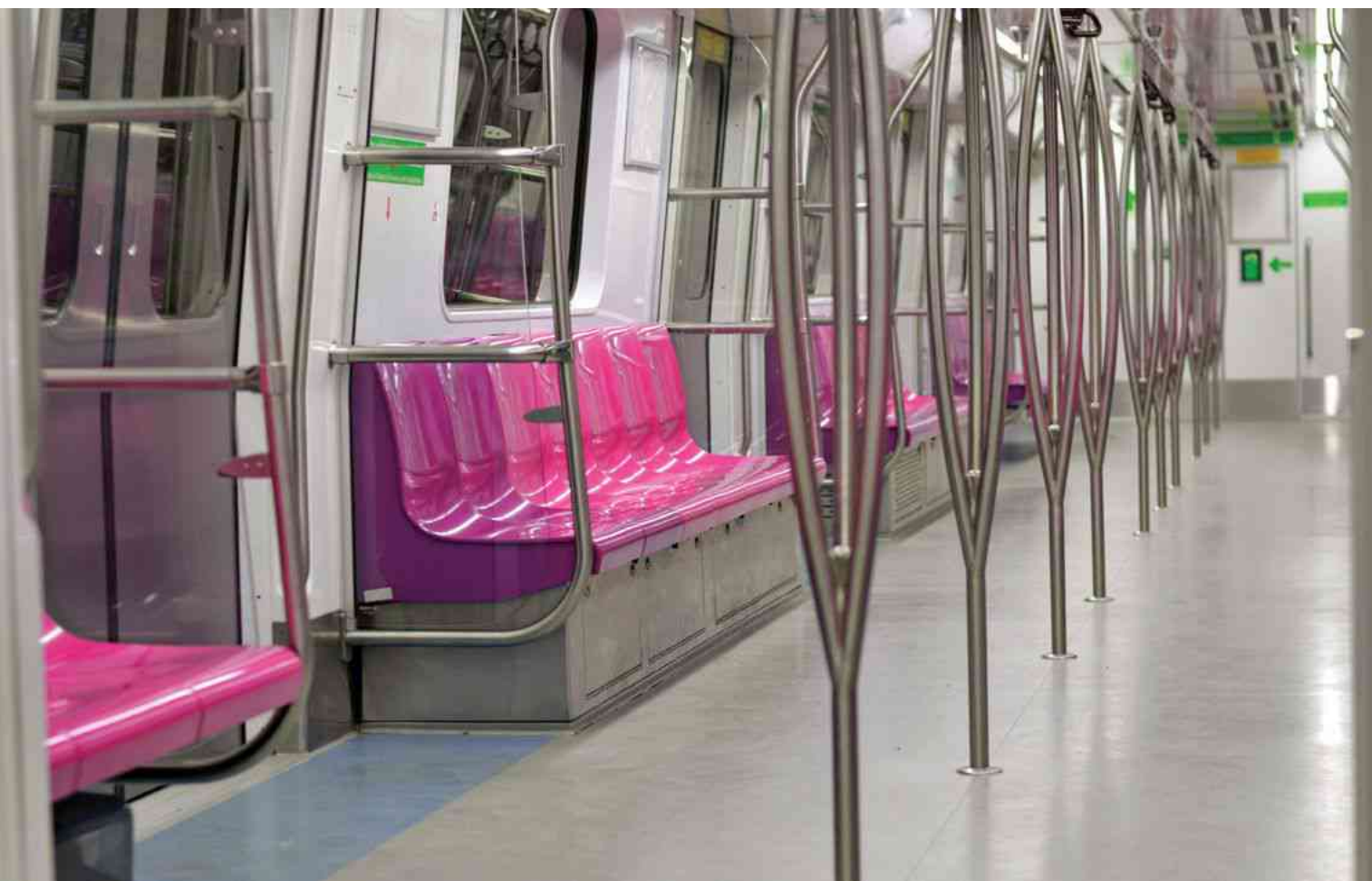


▲ **Digital** From electric cars to shared bikes and scooters, public transport and taxi services: mobility now comes in apps. Photo: Luca Bravo



▲ **China** The Shanghai Maglev train is the world's fastest commercially operating train, with a top speed of 431km/hr. Photo: Lars Plougmann

▼ **United Kingdom** London was the first city in the world to inaugurate an electrified underground railroad. The Baker Street Station opened in 1863 and is still in operation today. Photo: Stephen Dawson



New York Highline: old rail tracks on the west side of Manhattan have become a walkway and green space for residents and visitors to enjoy.
Photo: Robin Stevens



▼ Oceans

The Sail Cargo Alliance unites organizations who share a passion for sail-shipped cargo, and aims to create a healthy transport culture that promotes the preservation of the environment for future generations. Photo: Alfvanbeem



▼ Indonesia

People enjoy outdoor activities during the car-free day held every Sunday morning in the business district of Jakarta. Photo: Asia Travel





▼ The Netherlands

Huge bicycle parking in the center of Amsterdam, near the Central Station.
Photo: S-F



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Maritime sector looks at reducing emissions

DANAOS Shipping outlines the future

INTERVIEW WITH PROFESSOR TAKIS VARELAS, DIRECTOR, DANAOS RESEARCH CENTER (DRC)

Will innovation in shipping reduce carbon emissions by 2050?

Emissions reduction and environmental sustainability is on everyone's lips these days in shipping. International Maritime Organization (IMO) has adopted regulations to address the emission of air pollutants from ships and has adopted mandatory energy-efficiency measures to reduce emissions of greenhouse gases from international shipping. A target of at least 50 percent reduction in total annual GHG emission from ships is pursued for 2050 compared to 2008 figures while at the same time there will be efforts to even achieve a zero-emission shipping operation. Under this scope, it seems that the only path to follow to reach the destination is to start thinking differently and invest in innovation. Retrofit solutions and emission control technologies would be one way to reduce emissions. Change to low emission fuel types (biofuels, Low Sulphur oil, etc.) or alternative energy sources (batteries, fuel cells, nuclear power etc.) could lead to greener shipping operation. All these abatement measures have pros and cons and at the same time benefits brought forward looks quite controversial in reference to

environmental impact. Industry needs time to consider options, experiment with different solutions and assess effectiveness of each innovation in terms of cost and reliability.

How would you describe the EU's efforts in reducing emissions in the sector?

European Union embraces the global initiative for environmental sustainability. Strategic framework of EC policy consists of three consecutive steps. **1.** Monitoring, reporting and verification of CO₂ emissions from large ships using EU ports (MRV regulation) **2.** Greenhouse gas reduction targets for the maritime transport sector and **3.** Further measures, including market-based measures, in the medium to long term. Within this framework we should highlight the strong motivation of Research community to foster policies against pollution in EU waters. European Union funds conglomerations from distinct disciplines which are working together with the maritime industry to better understand the different environmental processes, the impacts of

human activities and of climate change on marine environments, and the socio-economic impacts of the protection of the marine environment.

What are some of the challenges facing shipping today?

Fuel emission reduction is one topic that the industry is encountering today. On the other hand, challenges still remain the same throughout the years and have to do with safety, security and operational efficiency in terms of energy, cost and quality in shipping service. What is changing are the means to handle those challenges.

How has the shipping industry changed in the lifespan of Danaos?

DANAOS established in 1972 and all these years it is called to address challenges and meet changes and trends in shipping management. DANAOS is rather considered a leader rather than

a follower to this principal and natural need of constant change and progress. At the forefront of innovation for environmental sustainability our Research and Development department studies a great number of energy efficiency improvement measures and innovative vessel retrofit solutions that improve fuel efficiency while working on emerging technologies for energy saving and emissions' reduction, including LNG for propulsion, SCR for NOx reduction, SOx scrubbers, etc.

We are participating in a number of EU research programmes with a strong motivation to apply innovation and creative thinking across all aspects of maritime operation. In fact, we are currently engaged in twelve EU Research and innovation projects including initiatives for more energy efficient and less polluting European waterborne transport. Among those stands AIRCOAT project which invests in biotechnology by developing a game-changing hull coating technology that reduces the frictional resistance of ships leading to energy efficiency and FIBRESHIP project which designs large-length ships built entirely with composites (FRP materials) implying a significant weight reduction thus saving fuel consumption and resulting in reducing greenhouse gas emissions and underwater noise.

Is the skill set necessary for green shipping there?

Down that road of constant change workforce in shipping needs to adapt. Maritime is digitalized, turning to more autonomous operation and new skill sets becoming a necessity. Data analysts, software engineers, Research engineers employed in maritime companies to apply creativity and innovative thinking in traditional shipping operations. Youth is playing a massive role to this open



call for innovation and bundled with the experience and knowledge of the oldest they are moving industry into the next era of modern shipping service.

Moving the world's goods is a massive task, how do we see future innovations changing in another 50 years?

In this era of modern shipping, digitalization and de-carbonization are watch words for the coming years. So the question is what does the future hold for shipping in the field of innovation and technology? If we could name a few trends those are: Application of advanced materials in shipbuilding or coating focusing on nanotechnology, autonomous application onboard with less human interaction in decision

making, robotics and drones remotely interfered in critical operations (search n rescue, inspection, etc), enhanced ship connectivity (5G) to allow real-time decision making in ship management and autonomous operation from ashore and new technologies applied in power and propulsion with alternative fuels, energy-saving devices, renewable energy and hybrid power generation all potentially playing their part in the vision for zero-emission shipping. Needless to say that all these challenges are in the center of DANAOS research attention. ●

1. A target of at least 50 percent reduction in total annual GHG emission from ships is pursued for 2050 compared to 2008 figures. Photo: Avigator Fortuner

Renewable Fuels

Advancing European Market Uptake

WRITER: VANESSA VIVIAN WABITSCH

CONTRIBUTORS: AYLÄ USLU, ECN PART OF TNO, THOMAS CHRISTENSEN, IMPERIAL COLLEGE, COSETTE KHAWAJA, RAINER JANSSEN, WIP RENEWABLE ENERGIES; RITA CLANCY, EURIDA RESEARCH

Discovering the world, working with people across the globe, commuting to work everyday or consuming exotic fruits imported to Europe – nearly every European is used to at least one of these habits producing a significant amount of carbon emissions. On the road to decarbonizing transport and reaching climate targets, the market uptake of renewable fuels is essential.

1. By 2050 global aviation emissions should be at least 41 percent lower than in 2005. Photo: Jasper

The European transport sector is the only major sector where greenhouse gas (GHG) emissions are continuously increasing. According to the European Environment Agency, in 2016 the transport sector contributed 27 percent of total EU greenhouse gas emissions and they were 26.1 percent higher compared to 1990. While road transport has contributed the most to the transport sector’s GHG emissions, the largest increase in final energy consumption has occurred in the aviation sector between 1990 and 2016, and this sector is expected to continue growing rapidly. International shipping activity is also expected to increase as it is driven by increasing globalization and trade.

In response to increasing emissions, the EU has set several targets to mitigate and limit GHG emissions from transport. An overall target of a 60 percent reduction in GHG emission within the transport sector by 2050 was set in 2011 (compared to 1990) – still too low to reach the 2015 Paris Agreement aspiring to limit global warming to less than 1.5°C. In 2015, the study “Emission reduction targets for international aviation and shipping” conducted for the European Parliament suggests that by 2050 global aviation emissions should be at least 41 percent lower than in 2005, and the global emissions of the shipping sector to be at least 63 percent lower.

Renewable fuels are among the most viable options to reduce GHG emissions in the transport sector. While electrification becomes more significant, (mainly in road and rail transport), advanced biofuels are expected to maintain a significant role for the shipping and aviation sectors – especially in the short- and mid-term. A number of scenarios conducted for the European Commission and by the International Energy Agency (IEA) indicate the need for large quantities of renewable fuel demanded by 2050. With the aim of contributing to the Paris Agreement goals, the PRIMES scenarios foresee a major increase in current biofuel use. If demand in 2050 is to be met completely by advanced biofuels, this implies a more than 10-fold increase of their uptake in the time frame between 2017-2050. For the successful and sufficient market uptake of biofuels, feedstock has to be produced sustainably in sufficient quantities.

Ensuring sustainable feedstock

There has been a great deal of skepticism followed by strong debates about the overall sustainability of biofuels especially their impact on land use patterns and food prices, and their carbon emissions across the production value chain. In response, a new generation of renewable transport fuels is emerging produced from non-food biomass called advanced biofuels.

Europe has significant potential to produce advanced biofuels from lignocellulosic feedstock (such as waste and residues from agriculture and forestry). There are many initiatives that provide evidence to that. The EU H2020 projects FORBIO and SEEMLA demonstrated that biomass can be produced for bioenergy in a sustainable way on underused



land, a process which is in line with the objectives of the EU Renewable Energy Directive (RED II), showing a high potential in promoting the production of advanced biofuels. The latest findings of the ADVANCEFUEL project show that many biomass sources are potential candidates that require sustainability efforts before they are readily available

2. Biogas plant. Photo: Vitaliy Kyrychuk

3. The overall sustainability of biofuels is often debated, especially their impact on land use patterns and food prices, and their carbon emissions across the production value chain. Photo: Kletr

4. Lignocellulosic feedstock, such as waste and residues from agriculture can be used produce advanced biofuels. Photo: Ivaylo Velikov



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The European transport sector is the only major sector where greenhouse gas (GHG) emissions are continuously increasing.

to produce advanced biofuels at a commercial scale (e.g. infrastructure, farmers experience, regulatory compliance and support, suitable for conversion).

Water scarcity, low fertility and marginality are major challenges concerning biomass productivity and profitability on underused land. The web geographic information system (GIS) developed by the BIOPLAT-EU project helps identify suitable marginal, underutilized and contaminated (MUC) lands around Europe, assessing environmental, social and economical sustainability indicators of bioenergy value chains. Another option to tackle limited available fresh water and marginal land is to use seaweed as novel biomass for alternative transport fuels. The MacroFuels project developed several routes for the conversion of seaweed to biofuels which, once upscaled, will be economically viable. MacroFuels further achieved urgent technological breakthroughs towards large-scale seaweed cultivation such as deployment and cultivation at sea, automated harvesting or efficient storage and pre-treatment methods.

Although RED II is an important step forward in recognizing the need to



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cover all bioenergy uses and supporting renewable fuels in the transport sector, lack of internationally recognized and harmonized criteria between different bioenergy sectors remains a major barrier to the commercialization of advanced biofuels that will increasingly be produced in multi-output biorefineries and supplied to international markets such as shipping and aviation. Harmonization of national and voluntary sustainability certification schemes at EU level is key for the market uptake of advanced biofuels. The ADVANCEFUEL project provides a set of sustainability criteria and indicators along the whole supply chain and recommendations to enhance the sustainability performance of biofuels.

End use of advanced biofuels

In addition to incremental sustainability governance and availability of biomass for the production of advanced biofuels, a secure and stable policy framework and significant cost reductions are essential for a successful market uptake. According to the progress review by the European Commission conducted by Navigant, the EU is on track for reaching renewable energy and biofuel targets 2020. However, the IEA World Energy Outlook, flags that the biofuel production in EU member states is not on track to meet the IEA Sustainable Development Scenario (SDS) demand



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in 2030 as most biofuel consumption is at low percentage blend levels with fossil fuels. It forecasts annual production growth of 0.5 percent in Europe, falling short of the 8 percent of growth to meet the SDS. Higher biofuel blend rates or greater use of drop-in biofuels are essential to increase the consumption of biofuels. To tackle the high costs of advanced biofuel investment and production, the IEA recommends to introduce supportive policies to facilitate the technology learning and production scale-up necessary to reduce costs.

European renewable fuels market analysis by the ADVANCEFUEL project indicates that Europe started off well with the advanced fuels sub-obligation of 3.5 percent (including double counting) introduced in RED II. However, this may not be yet sufficient to meet the Paris Agreement targets. For road and rail transport, the EU introduced a mandatory renewable energy target. In contrary to road and rail, the aviation and shipping sectors are regulated at an international level. As of 2021, a global market-based measure, Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), will be operational addressing CO₂ emissions in the aviation sector allowing airlines



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to buy emission reduction offsets from other sectors to compensate emissions or use eligible fuels with lower carbon use.

In spring 2018, the International Maritime Organisation (IMO) adopted a strategy to reduce total GHG emissions from shipping by 50 percent in 2050, and to reduce the average carbon intensity by 40 percent in 2030 and 70 percent in 2050, compared to 2008 by focusing efforts on enhancing the energy efficiency

5. Another option to tackle limited available fresh water and marginal land is to use seaweed as novel biomass for alternative transport fuels. Photo: Andrew Buchanan

6, 9. The aviation and shipping sectors are regulated at an international level. Photos: Jaromir Chalabala (6), Avigator Fortuner(9)

7, 8. The EU introduced a mandatory renewable energy target for road and rail transport. Photos: Jacek Rużyczka (7), Artur Braun (8)

performance of shipping, encouraging the development of national action plans to develop policies addressing GHG emissions from international shipping, and provide technical cooperation and capacity-building activities.

Production costs of advanced biofuels are more than twice the price of conventional fossil fuels.

Scaling up advanced biofuels

Production costs of advanced biofuels from lignocellulosic feedstocks are typically more than twice the price of conventional fossil fuels and the current low fossil fuel prices have been a considerable obstacle to their development

and deployment as shown by latest ADVANCEFUEL results. The shipping sector can use a large range of advanced biofuels. The future ability of advanced biofuels to compete in the market will depend on cost reductions such as technological learning, economies of scale, efficiency improvements, more affordable and more sustainable feedstocks as well as the evolution of fossil fuel prices. Making them competitive can be difficult, especially in the aviation sector due to their high production costs and energy intensity. In shipping, biofuels can be a viable option due to lower production costs and the large demand from the industry.

To reach climate goals and decarbonize road, maritime and air transport, upscaling biofuels is crucial and an indispensable way forward in the energy transition. In addition to using all possible renewable fuel options, maximizing energy efficiency and energy saving is necessary. There are still some roadblocks to remove in the strategy to ensure a smooth market uptake of renewable fuels. Concerted stakeholder action is essential to put transport biofuels on track with the Paris Agreement. Policy is therefore an important tool to steer future market uptake towards value chains that source sustainable feedstock and employ resource efficient conversion pathways generating rural

and global economic development and a more decarbonized mobility around the world. ●

Join us at the Press Briefing “The role of renewable fuels in decarbonizing transport” on 21 November 2019, Press Club Brussels.
For more details contact:
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Watch the ADVANCEFUEL video on **Removing Barriers to Advanced Biofuels**



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10. The shipping sector can use a large range of advanced biofuels. Photo: ID-VIDEO



Removing barriers to renewable transport fuels

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Walking: a Personal Journey

WRITER: **STUART REIGELUTH**

Mammals were born to move. The foal and deer stagger around within minutes on long shaky legs. The human squawks and screams, jolting its little limbs into motion. We are a mother-dependent species that would hardly survive in the wild (if that still exists), unable to walk before a year. But it's all movement from the beginning, and then walking is the easiest, most natural way of getting around. People make walking a habit, a daily routine, to get exercise; others turn it into the intense hobby of hiking or running long distances. Some have turned walking into a fashion, others make moving around mandatory. The following meanders are personal glimpses into why we walk.

“The act of journeying contributes towards a sense of physical and mental well-being, while the monotony of prolonged settlement or regular work weaves patterns in the brain that engender fatigue and sense of personal inadequacy. Much of what the ethnologists have designated ‘aggression’ is simply an angered response to the frustration of confinement.

– Bruce Chatwin, *What Am I Doing Here*, London: Vintage Books, 2005, p.221-222.

Walking is the most fantastic thing in the world. The bipedal movement of putting one foot in front of the other, “like a pair of scissors”¹ opening and closing, as we stride along a sidewalk or shuffle along a corridor in short snippets with our arms straight down or holding a cup of coffee or flopping around, depending on your style and speed. “The bipedal walk made possible the development of the manufactory hand, and this led to the enlarged brain of our species.”² Homo sapiens erectus – the human being, standing on two feet, losing its tail and cropping its hair, gesticulating its arms, grasping with its hands, molding things, making things, moving things, the “innate restlessness” of wanting to walk is within us all.

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★ ★

1. Rebecca Solnit, *Savage Dreams, A Journey into the Landscape Wars of the American West*, New York: Vintage Books, 1995, p.61.

2. Bruce Chatwin, *What Am I Doing Here*, London: Vintage Books, 2005, p.222, p.63.

3. Pedestrian traffic on the Millenium bridge, London. Photo: EHFXC



The English writer Bruce Chatwin went to Australia – the land of origin of song-birds⁴ – to investigate the parallel human version known as the ‘songlines’ of the Aboriginal Australians. ‘Songlines’ or ‘Dreaming Tracks’ is the European denomination for what the Aboriginals call the ‘Footprints of the Ancestors’ or ‘The Way of the Law’. Songlines comprise an intricate, seemingly impossible labyrinth, a trans-generational inter-connection of invisible pathways that trace our trajectories on territories. Chatwin aspired “to use this astonishing concept as a springboard from which to explore the innate restlessness of man.” On the origin of these superb threads and constellations of songlines, Chatwin says:

Aboriginals believe that the totemic ancestor of each species creates himself from the mud of his primordial waterhole. He takes a step forward and sings his name, which is the opening line of a song. He takes a second step which is a gloss on the first lines and completes the linked couplet. He then sets off on a journey across the land, footfall after footfall, singing the world into existence [...]⁵

While travelling across the “incessant red country” of Australia, the Aboriginal ancestors scattered their songs and word so their descendants can pick them up and find their way, add to them and create a chain of generational pathways. The songlines are recognized by different generations in their time and space, and “these Dreaming-tracks lay over the land as ‘ways’ of communication between the most far-flung tribes.” Songlines transcend tribal dialects and colonial territorial demarcations. I would assume that the depth of authentic Aboriginal songlines has diminished with the imposition of the nation-state of Australia as defined by property-rights and privately-owned parcels of land that would make the traversing of the territory more difficult. Chatwin claims that for the Aboriginals “an unsung



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4. Tim Flannery, *Europe, A Natural History*, London: Allan Books, p.91.

5. Bruce Chatwin, *What Am I Doing Here*, p.63.

6. Uluru & Kata Tjura National Park, Australia. Photo: Ondrej Machart

7. James Price Point, Kimbolton, Australia. Photo: Chris Galbraith

8. The Pinnacles Desert, Cervantes, Australia. Photo: Tobias Keleir

land is a dead land: since, if the songs are forgotten, the land itself will die.”⁹ Songlines are defined by walking, not wandering.

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Jumping continents and stepping back to the fabled era of the *flâneurs* in the 19th century arcades of Paris, we can imagine dandies with their long canes and black top hats, their penguin coat tails and buckled shoes, smoking cigarettes and chatting about nothing and everything, walking as slowly as they can so they can be seen by everyone and see everything there is to see in a slow motion world of reflecting mirrors in the glass windows of the shops all along the new arcades sometime around 1840, supposedly. The *flâneur* and his followers are famous for tying a ribbon around the shells of their turtles, setting them down on the polished stony floors of the arcades, and taking their turtles for endless walks back and forth – the slower, the longer it takes, the better. Popularized by the German critic, Walter Benjamin, the *flâneur* represents the decadence of a certain emerging class in society that could afford the leisure of literally ‘going for a walk’ or in Benjamin’s words: “botanizing on the asphalt”.

Two centuries later, how far we have come! How many times have you said to some friends or family: let’s go for a walk! And everyone gets their dogs on the leash or their children in a carriage, and off you go for a stroll around the block or the closest park. How we all enjoy a good walk – at least the more active of us – and how we all enjoy wasting time and ‘doing nothing’. This too is inherent in the notion of the flâneur who was described as a loiterer, a slacker, a silent poet, an aloof member of society, detached but present. “*Flaner*” became a verb in French, meaning essentially to do nothing. Nothing but walk that is. And walking is a defining trait about our human species – the bipedal beast

walking, running around, doing things. (“The only problem with the flâneur is that he did not exist, except as a type, an ideal, and a character in literature.”¹⁰



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interrupted his daily walk only twice: once for the French Revolution of 1789 and when he read Rousseau’s *Social Contract*. Rousseau then wrote in his *Reveries* that his “solitary walks and the reveries that occupy them, when I give free rein to my thoughts and let my ideas follow their natural course, unrestricted and unconfined”¹². Andre Breton, the father of French Surrealism, would expand on this idea of instigating involuntary associations, streams of consciousness, to create art, literary or other. Read Joyce’s convoluted Ulysses for an endless mental meander... Someone said of Joyce in Paris: “I don’t think I ever saw him walk with his head erect. His gait had something unmistakable about it, something pen-sive and tentative [...]”.¹³

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Whether or not the prototype flâneur really existed or not, there was a newspaper called *Le Flâneur*¹¹ which advanced a patriotic purpose-driven feel to walking and observing, and the act of meandering persisted through the ages. All minds, incredibly creative and banally common, have benefited from some fresh air and movement of the limbs. Beethoven composed his great symphonies while wandering around, deaf or not later in life, it was walking that moved him and the nature around him. Kant, the boring philosopher of the impossible “perpetual peace”,

9. Bruce Chatwin, *The Songlines*, London: Vintage Books, 1998, p.5, p.13, p.52.

10. Rebecca Solnit, *Wanderlust, A History of Walking*, London: Verso, 2002, p.200.

11. Walter Benjamin, *The Arcades Project*, translated by Howard Eiland and Kevin McLaughlin, Cambridge: Harvard University Press, 2002, p.448.

12. Walter Benjamin, *The Arcades Projects*, p.453-454.

13. Rebecca Solnit, *Wanderlust*, p.198.

14. Paul Gavarni, *Le Flâneur*, 1842

An entry from the epic *Arcades Project* by Walter Benjamin:

Hegel writing from Paris to his wife, September 3, 1827: "As I go through the streets, the people look just the same as in Berlin, everyone dressed the same, about the same faces, the same appearance, yet in a populous mass."¹⁵

I have walked in the streets of Paris and Berlin, I have wandered through the cities of Beirut, Madrid, Istanbul, San Francisco, New York, Casablanca, Damascus, Stockholm, London, Copenhagen, Prague, Athens... I have walked with you in Beijing, in Melbourne, Nairobi, Moscow, Tokyo, Algiers, Rome and Johannesburg. We have walked together, marching in the streets, against apartheid, corruption, injustice, dictators and taxes. We were the solitary man standing in front of the tanks in Tiananmen and the hordes in DC protesting Vietnam and the new youth marching to combat climate change and the rough farmers waking and walking against the despotic extortionist monarchies and the workers on strike again and again for better more respectable wages. I am the baseball that drew a walk and walked on down the lane to first base. We are the couple and friends walking the fields in the dusks, when long shadows from lines of trees extend across the golden wheat. We are humanity and the act of walking is ingrained in all of us as a mnemonic device that triggers the past and future.

Walking is ingrained in our DNA. Part of our genetic code. We are born with the need to move. Look at the infant jerking its arms, trying to raise its head, pushing up to see more, sitting up, pulling itself up to stand and look out across the table/world to see what's on the other side, then taking steps towards that ephemeral goal of ever reach that other side, then turning back, falling over, starting again and again. Anyone having had children will recognize the amusement of watching

their child starting to totter around and then the fatigue of having to follow them around...

Walking instigates memory. It's ingrained in us. It's passed on to us by generational emotions and sensorial memories. Things that happened before are transferred involuntarily, without us knowing, via untreated emotions and ultimately via memory of our senses. We know how to do this motion innately because it is part of what we do – it's an automatic response – we just start walking as part of our development, but then we stop and sit and 'work' all day behind a desk, staring, blinking at

a screen. The computer is not what defines our species; it defines our contemporary society, but this is just a phase, a miniscule blip in history. Take a dive into deep time and you will see the audacity and arrogance of the Anthropocene.

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15. Walter Benjamin, *The Arcades Project*, p.451-452.

16. In the past months, we have witnessed people around the world walking together, marching for climate. Visit our photo essay on [Taking to the Streets](#) for more images about climate action. Photo: Esther Driehaus



And around
and around
they go,
caught in the
fleeting illusion
of freedom
provided by
the movement
of walking.

We were born to move, to walk, to mate.

You are sitting on the grass during lunch break on an overcast day. The sun tries to push through the clouds. A tree is having its branches trimmed. Clusters of people are having picnics together. A small group of four, supposedly co-workers, is walking around the inner path of the Urban Brothers Square in the European Quarter of Brussels. Maybe they work in the European Commission building to the right or in some lobby group nearby. They are walking in loops, chatting together, smiling, laughing, striding. We all have the nomad in us. Skirts and jackets swaying in their wake as they go past you at a brisk pace. And around and around they go, caught in the fleeting illusion of freedom provided by the movement of walking.

Your wristwatch beeps. It's time to go back to work. You don't want to be late for another the very important date. The clock is ticking. The Garmin or Polar or Samsung or Apple beeps again. You have burned 827 calories. Another beep: your heart rate is 82. You have walked 1,593 steps. Your stress level is low (you've been around trees on the grass in a public park). Beep. The GPS kicks in again. The gadget will track your movement all day, all night, if you let it, charge it, it will track you all day, all night, then it will compare the data. Suggest adjustments for a more stable, sustainable, healthy life: walking is good, do more walking, get out more. We all need more nature in our lives. You have walked 5.6 kilometers today (new record, a trophy pops up the circular screen). We all need more trees in our

cities. Your heart rate is 82 thumps per minute (lower than average). Go a little faster, get going. You're late. Beep beep beep. We need more forests in our world. Beep. We are walking digitally into an artificial future. ●

18. Like many aspects of our modern lives, walking now leaves a digital trace. Photo: Tim Foster

19. Are the "to-go" cups another sign of the nomad in us? Photo: Caleb George



Athens Democracy Forum

October 9-11, 2019

IN ASSOCIATION WITH
The New York Times

Reinventing Democracy: New Models for Our Changing World

The 2019 Athens Democracy Forum will be held **October 9-11** in Athens. The Forum brings senior New York Times journalists together with international business leaders, policy makers, academics and experts to discuss the state of democracy and what action it requires in the face of mounting challenges. A Spirituality & Democracy Weekend at Costa Navarino will follow on October 11-13.

As of this year, the Forum is organized by the Democracy & Culture Foundation, an independent non-profit entity, in association with The New York Times, which continues to curate the subjects to be discussed and to publish special reports on them.

Join us and take advantage of curated networking opportunities, access to exclusive events, and interactive discussions that dive deep into the challenges facing governments and businesses alike.

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A Future Worth Inheriting

Building more sustainable, equitable and healthier lives

WRITER: DANIELLE KUTKA



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Four years ago, the Inter-sectoral Health and Environment Research for InnovaTion project (INHERIT) set out to identify ways of living, moving and consuming that challenge the 'take, make, consume and dispose' economic models of growth that have driven environmental degradation, global health inequities and – ultimately – the climate crisis.

The quest for interventions that protect the environment while promoting health and health equity – the INHERIT 'triple win' – has resulted in a body of research work and findings that propound what



is required to make a more sustainable, equitable, and healthier future a reality. From delving into the intricacies behind the collaborative work required across all sectors, at all levels of policy-making, to the very determinants and drivers that influence individual behavior and lifestyle changes, INHERIT seeks to ensure that our future is a far cry from its current course.



Drawing from the expertise of its partners and their networks, INHERIT identified 100 promising, real life initiatives around Europe that are helping people to adopt behavioral changes with the potential to improve environmental sustainability, health and wellbeing, and equity. From this database, INHERIT selected 15 interventions for evaluation as case studies in the areas of living (green space, energy efficient housing) moving (active transport), and consuming (sustainable diets) to undergo further assessment to see how these inclusive interventions can be best replicated and scaled for further impacts.

A closer look at three case studies related to sustainable mobility - Malvik Path, UrbanCyclers, and The Food Garden - offer an enlightening and inspiring look at how we can rethink our transport priorities, our lifestyle patterns, and ultimately improve our health and well-being in a holistic way for current and future generations

INHERIT Case Studies – A focus on sustainable, active mobility

Malvik Path was developed along a 3 kilometres stretch of scenic, coastal path in Norway from what used to be an abandoned railway. Strategically connecting two residential areas, the path now serves as an open, accessible public space for all, offering new opportunities to utilize green space that promotes social interaction and active lifestyles through walking, running and cycling. The path contributes to health and well-being of its users by encouraging active lifestyles while reducing air pollution and noise levels.

Malvik Path was designed in accordance with universal design so that it can be accessed and used by all people regardless of their age, size, or abilities. The trail also makes optimal use of the locale, providing areas for hiking, fishing, swimming and barbequing, and playing. Perhaps in the future some communal gardens or fruit and nut trees could offer up some sustainable diets, too. Needless to say, the community benefits in a variety of ways that paving a road could never provide.

Involving residents throughout the planning and implementation stages was key to the success of Malvik Path, along with garnering support from local policymakers and authorities. By converting an abandoned railway into a practical, recreational path with views many could only dream of, it's easy to begin imagining what spaces in our own communities could be transformed if the political and citizen willpower is there.

While creating usable spaces can encourage active lifestyles, the **UrbanCyclers** app offers insights to how trends in tech are also driving sustainable, healthier behaviors across the social gradient. The UrbanCyclers app promotes regular biking by supporting and motivating riders with a suite of intelligent applications that include planning tools, emergency notifications, and even offers riders the shared experience of cycling by hosting competitions and campaigns. The app also supports intermodal means of transport by using real-time data to suggest alternate routes in combination with local transportation options, seamlessly lessening travel time in an intuitive way.

Furthermore, the app can motivate urban residents to cycle more through its gamification of route tracking that translates into a system of points, badges, leader-boards, challenges, and real-world rewards—in essence,

building a digital riding community. The app can also be employed with existing bike to work and school initiatives that target employees and students to increase their physical activity through sustainable commuting—improving health while reducing CO₂ emissions and noise pollution.

However, the importance of policymaking to provide and maintain suitable cycling infrastructure, both for transport and leisure, is an underlying factor to determine the successful impact of such digital applications. As strides are taken by the private sector to develop more shared means of mobility, either through bikes or even e-scooters, aims to integrate better, safer cycling paths and routes should be a top priority. One great contribution of tech to driving sustainable mobility is that the real-time data generated on the UrbanCyclers app can assist cities in identifying bottlenecks in the cycling infrastructure that can be used to make improvements in city planning, fostering safer, more sustainable urban mobility.

Combining the INHERIT thematic focuses of active mobility, green space and sustainable diets, **The Food Garden** (De Voedseltuin) is an urban garden in Rotterdam that provides fresh, organic produce to people living in poor socio-economic circumstances via the Dutch Food Bank, which supports nearly 7,000 local households.

The Food Garden is a great example of a triple-win intervention, turning what was previously an industrial area into a food haven that offers local unemployed opportunities to volunteer in the garden—gaining new skills, improving their social interactions and networks, and empowering their health and wellbeing with the agency to grow food. The Food Garden pays it forward by cooking for local food shelters with the produce grown and even delivers food to people living in more deprived areas. It also hosts various educational



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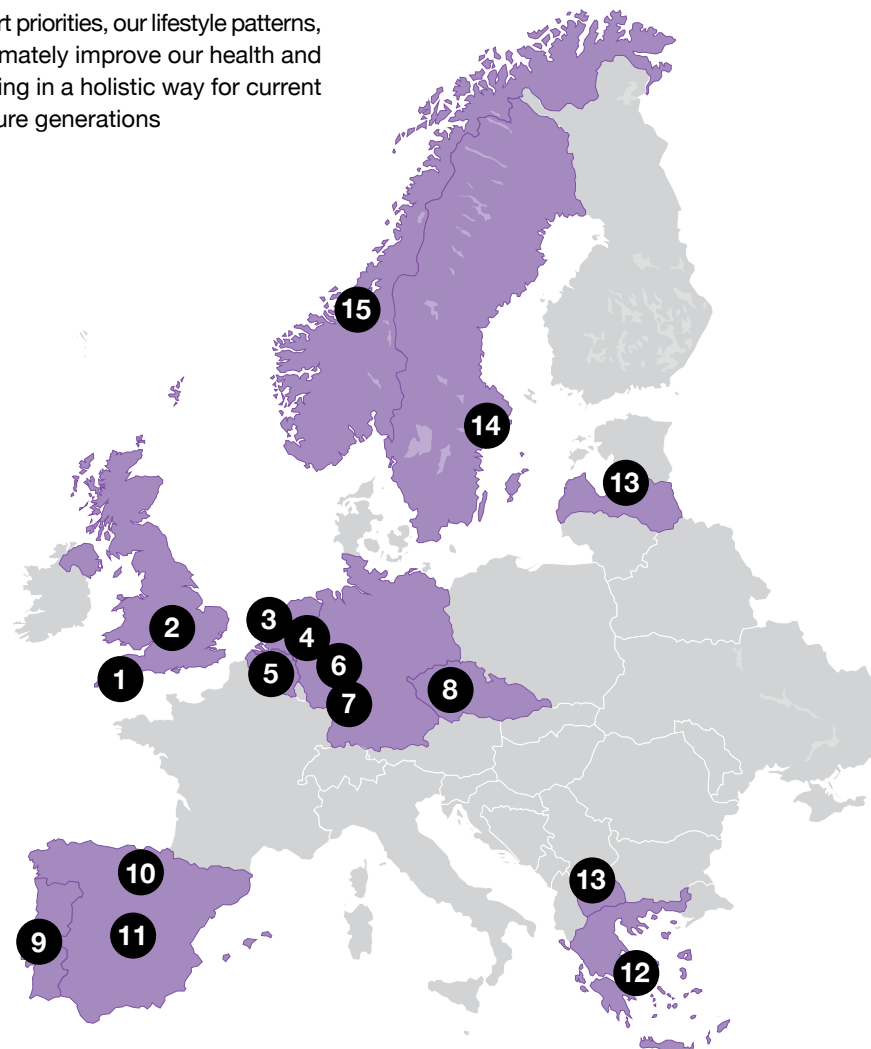
activities including workshops on permaculture and how to grow your own vegetables.

What initially began as an urban garden has grown into a proper food park as part of a wider set of initiatives in Rotterdam to create a healthier and more sustainable city. An eight km path connects The Food Garden to a cycling route and park area, further supporting healthier lifestyles with active mobility and opportunities for green leisure while advancing sustainable, equitable food systems. Merging the work of various sectors, The Food Garden exemplifies what can be achieved through intersectoral collaboration to activate socioeconomically disadvantaged citizens, promote health equity and increase environmental sustainability.

See all 15 INHERIT case studies:
www.inherit.eu/triple-win-cases

1. The UrbanCyclers app promotes regular biking by supporting and motivating riders with a suite of intelligent applications. Photo: Dylan Woods

2. What used to be an industrial area, the Food Garden now provides fresh produce to nearly 7,000 households around Rotterdam. Photo: Menno Leutscher



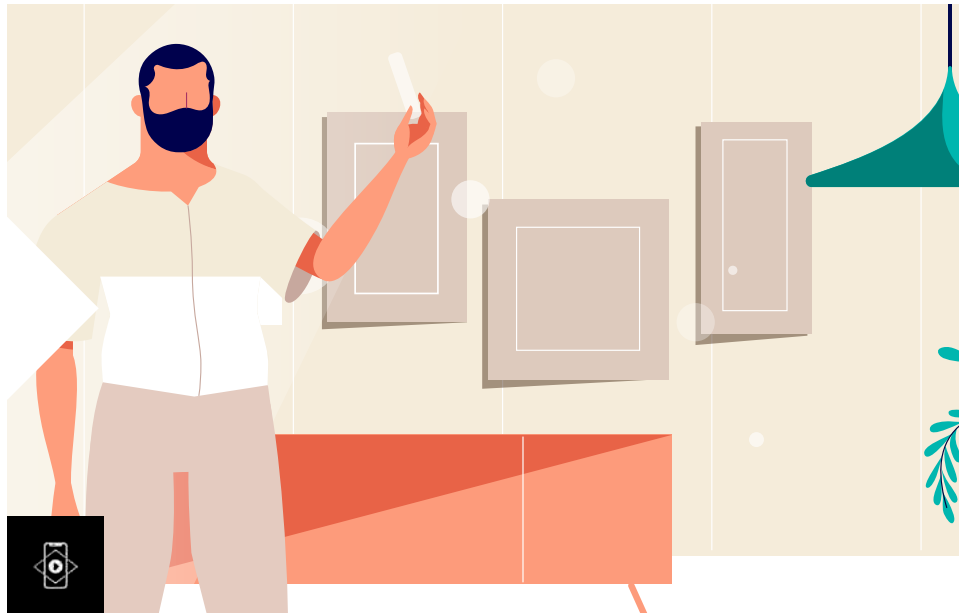
1. **Energy Efficiency Investments**
2. **Green Gym and Meat Free Monday**
3. **The Food Garden**
4. **Restructuring Green Space**
5. **Gent en Garde: The STOEMP Initiative**
6. **GemüseAckerdemie**
7. **Eco Inclusion**
8. **Urban Cyclers**
9. **PROVE**
10. **Thinking Fadura**
11. **Sustainable Food in Public Schools**
12. **Lifestyle e-coaching**
13. **Place Standard**
14. **Restructuring Residential Outdoor Areas**
15. **Malvik Path**

Looking to the future

A closer look at a few of the INHERIT triple-win case studies, one can't help but wonder what a future of better health, greater equity, and environmental sustainability could in fact look like if our society took into consideration these very intersections. By identifying key trends likely to impact our future, INHERIT forecasted possible scenarios of what European societies could look like in 2040 if measures are taken to live within the planetary limits. These scenarios aim to spark citizen discussion and policy dialogue on the necessary interventions needed to build a future worth inheriting. **Discover the scenarios with ROAR Augmented Reality App!**

Scenario 1: Meet Adam **My life between realities**

Interconnectivity is the trend that frames this scenario in which everything is digital, connected and personalized. Big data and private companies provide services, with great care for data privacy. This has led to transparent and innovative European societies, with a broad range of new personalized services improving people's lives.



Scenario 2: Meet Isabella **Less is more to me**

Characterized by a centralized system, national governments and European institutions play a strong role in the management of services and products, providing public healthcare and education with support from the private sector. Society has developed towards less material ownership and a tendency towards greater sufficiency.



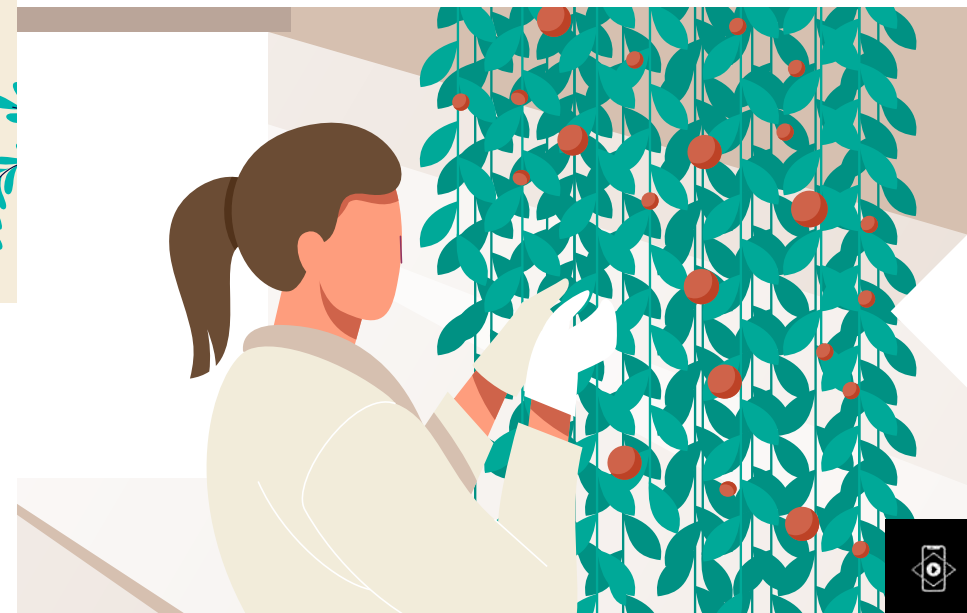
Scenario 3: Meet Milan **One for all, all for one**

Localism is the distinguishing feature of this scenario and it is reflected in community interactions, local diets, as well as work and leisure activities and living conditions. Technological innovation facilitates local development, while policy-makers provide rules and regulations to ensure healthy and sustainable living environments.



Scenario 4: Meet Tereza **Our circular community**

Companies, governments and citizens work together to create a closed-loop economy with business models in place that emphasize services over product ownership. Citizens are highly connected and dependent on technology for making most of their decisions, but societies are more aware of the importance of commonly-owned and created goods and advocate for more efficient services and products.



Citizen Insights

INHERIT Focus group sessions in five countries revealed Europeans found the **'One for all, all for one scenario'** most appealing due to its focus on supportive communities.

'My life between realities' was deemed the most controversial due to the prominent role and influence of technology.

A future for all to inherit

As the INHERIT project wraps up its final year, key resources and findings will be shared that will set a precedent for the uptake of triple-win interventions and incite the political and public action required to bring these future scenarios closer to reality.

Such resources, including reports on the 15 INHERIT triple-win case studies' implementation and their elements of good practice, will compile all key findings and learning to ensure the creation of triple wins in health, equity, and environmental sustainability. These resources will serve as great reference guides for policymakers, community activists, and civil society organizations to learn the pragmatic approaches to launching similar interventions or scaling current activities.

INHERIT will also provide a top-down catalyst for change through concrete recommendations to policy-makers through a series of policy briefs and an online Policy Toolkit, to assist the decision-making processes to better integrate the triple-win in policies in the most impactful way for citizens and communities.

If everyone on Earth consumed like the average European, we would need 2.8 planets.³

Additionally, the University of Exeter will host a dedicated online course for students specific to the findings of INHERIT in November 2019. More information will be available on the INHERIT website.

Lastly, on 10 December, the project will host its final event in Brussels—**A Future for All to INHERIT: Taking Action Now**—as both a celebration of the work achieved in making strides for better health, a cleaner environment,

and greater equity, and as a call to action to continue the efforts in making a more sustainable world. This forum is open to all who want to shape a better future for all.

Of all the impressive work and research the INHERIT project has accomplished, one message remains clear: all of us need to question the part we can play in challenging traditional patterns of living, moving, and consuming, and accept that we are the agents of change. ●

inherit.eu
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3. Source: World Wildlife Fund, *EU Overshoot Day* (2019)

The INHERIT consortium comprises 18 partners from 12 countries across Europe



A Future for All to INHERIT

Taking Action Now

10 December 2019, 9:00 – 17:00
KVS, 1000 Brussels, Belgium

Koninklijke Vlaamse Schouwburg
 Arduinkaai 7

Royal Flemish Theatre
 Quai aux Pierres de Taille 7

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The INHERIT project (www.inherit.eu), coordinated by EuroHealthNet, has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 667364.



Kids Autonomy

A Step Forward in Sustainable Mobility

WRITER: FILIPA ROSA

Sustainable mobility is a pressing preoccupation for every large city - Lisbon is no exception.

A group of multi-disciplinary researchers from Portugal has decided to tackle the issue from the point of view of children.

“Many cities are searching for new ways to promote sustainable mobility in general and specifically with children. Promoting public transport, car- and bike-sharing, and free passes for children, are some of the approaches used, many of which depend on mobile device usage and location services,” says Cláudia Silva, researcher at the Interactive Technologies Institute (I-TI) at the Nova University of Lisbon.

Her research project aims to understand how technology can contribute to lessening car dependence by fostering sustainable and independent mobility among children and give caregivers the confidence to allow them to move by themselves. The ultimate goal is the design and creation of a mobile application for that purpose.

Inspired by Human Computer Interaction (HCI) research advocating for the inclusion of children in the design process and the specific methodology called ‘Participatory Design with

Children’, alongside the scientists, the children become co-designers of a mobile application for their own usage. The application will target their needs for mobility and reflect their own perspective of the urban landscape.

Approached as citizens, decision-making beings, responsible for their social context and potential drivers of change, the children are the ‘protagonists’ of the project. Throughout the process, they work and explore notions of space to understand what would be ideal to them, both in terms of technological creation but also in the creation of space (placemaking).

Cartography and Child’s Play

The representation of space, via mapping and cartography, is a communication tool that serves the specific purpose of securing and helping others in their exploration of territory unknown to them. It shows roads and landmarks, geographic features, transport systems, distances, possible dangers and obstacles, resting places... Today, the communication scope of maps in digital format combined with internet

technology is even greater. Perhaps a sign of the importance of such tools is the finding that, in the world of digital mobile technology, ‘Google Maps’ is the most used app among consumers.

Countless studies throughout history have been carried out on cartography and mapping, but almost always focused on the adult relationship with space and way-finding systems. Although, since Jean Piaget published theories, we know that children understand landmarks and the environment based on cognitive development stages, the child’s perspective in this context has seldom been explored. One of those rare examples is to be found in the 1970s, in the work of cartographer Barbara Bartz, who dedicated a part of her life to write about and design maps specifically for children.

In many ‘developed’ countries, children’s independent mobility has declined in recent generations. Although the reasons for this are many, a key to start changing this trend might be to understand and observe the child’s relationship with their urban space. Designing and creating technology, possibly even adapting and modifying the urban landscape with regards to these findings might be a step to consider in order to reach more effective mobility-centric city planning.



Towards a More Connected Technology

Most children below the age of 13 already own a mobile phone with associated internet plans. The market of mobile apps is therefore developing such as to target that consumer group, but the world of the navigational apps is still mostly an adult one. Geo-location mobile applications that exist today are mostly for, and designed by, adults. They focus on concerns, such as, the locating of children for surveillance reasons, or on educational purpose like that of geography teaching. These apps fail to take into consideration the interests of children, the particular ways in which they perceive their environment or understand its pictorial representation.

Up to now, the research team has engaged with children from two locations in Portugal in the drawing of cognitive

maps of their journeys from home to school. Accompanied questionnaires, written narratives, and personal interviews conducted with the children, completed the studies.

A first study involved 70 students, aged 9 to 12, from the city of Funchal, Madeira; and a second one, a group of 27 students, 11 to 12 years-old, from a private school in Lisbon.

Analysing this material shows how these children perceive their city, what elements in the urban landscape stand out to them (such as landmarks) and how they relate to space as a whole.

From the first field study, in Funchal, 10 types of landmarks were identified while the second, in Lisbon, revealed a set of design recommendations.

Here, we present some/or details of, the cognitive maps drawn by the children,

as well as, some of their suggestions and comments.

What They Saw...

Easy to remember striking visual marks such as a street art mural of a whale (2), a large soda advert, a new large store...³ Infrastructure elements that stand out such as roundabouts and tunnels, bus stop markers, zebra crossings and traffic lights. Along with important visual and conceptual markers such as shops and supermarkets are also churches (5, 6, 7). Other schools than theirs also have a place in their navigation memory. And so do trees (8, 9, 10), gardens, the relative position of the sun and the sea.

1. Study 1 – Landmarks of Funchal, Madeira: Replica of a building’s mural painting (the blue whale). The blue whale mural was an important landmark for the child, and powerful in conveying a sense of place. Drawing by Rita, 12 years old.

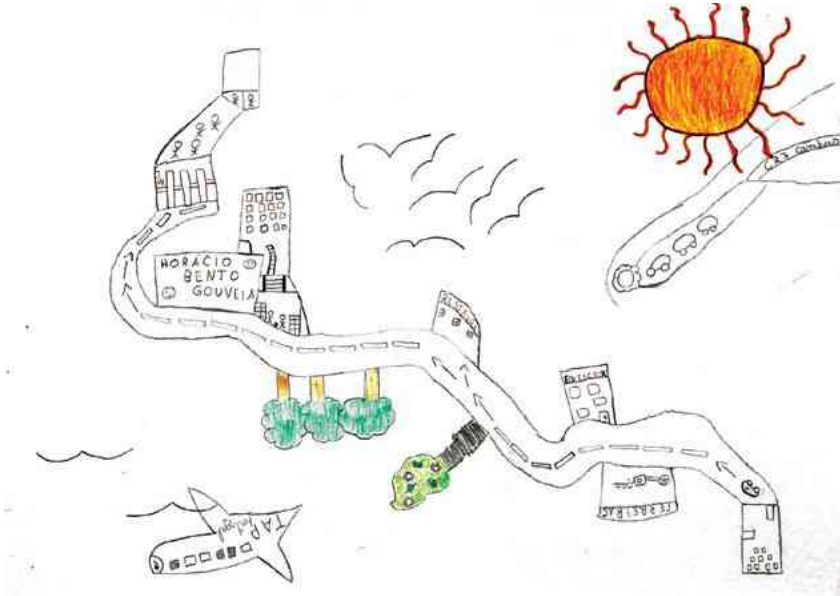
It is interesting to see that kids often remember features that stand out of the ordinary, such as the shape of a tree, for example (8, 10, 11). Personal references are also important landmarks, such as a friend's house or the work place of someone they know...

Reaping Benefits Along the Way

Like in all good journeys, every step is important.

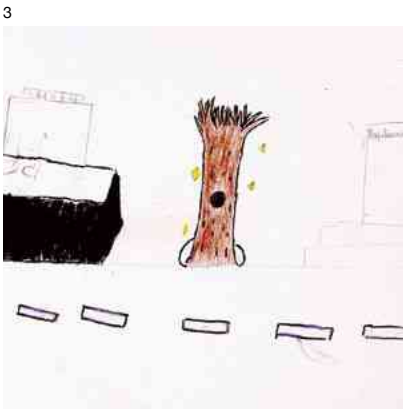
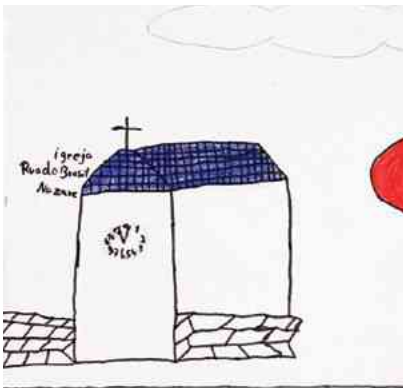
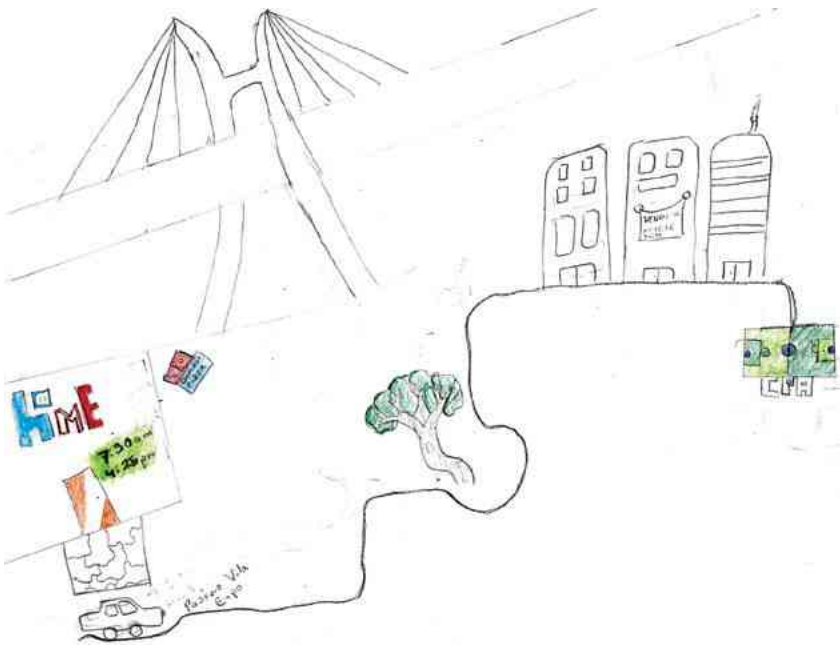
Before reaching its destination - with its participatory and multi-disciplinary nature - this project has already impacted many children and parents. The studies are done in the 'field', often in the context of an official education system, for example, in the Portuguese or Art class. Drawings, written narratives, questionnaires, story boards and other interactive experiments will be put into practice. The exchange between the children, scientists, teachers and parents provides a rich educational exercise for all, enhancing awareness in children, awakening their questioning about space, mobility and autonomy. ●

- 2. The easiest thing to remember for Pedro in the path from home to school was a tree: "I really like this tree. I find it fun because it has the shape of a pear..." Drawing by Pedro, 10 years old.
- 3, 4, 5. Churches as landmarks in some of the children's drawings. — Particularly in Catholic and Christian countries such as Portugal, churches are a culturally important landmark. When responding to the class survey, some children said that they did not know their own street names. However, some children knew the names of the local churches and wrote them down in their drawings alongside their depictions.
- 6, 7, 8. Trees and gardens as landmarks in children maps.
- 9. "If I had this application, I could go to many more places alone without my parents worrying so much." "My map represents a soccer field, where I train with my team." Drawing by Rafael.
- 10. "My map represents several palm trees. They represent nature (...) The trees may be a [visual] reference for us, so we cannot get lost." Drawing by Inês.
- 11. "The easiest thing to remember was the "Ceifeira Real" [a Café in the neighbourhood where António lives]." Drawing by António



▲ Study 1: Funchal, Madeira Identifying elements standing out in the urban landscape (landmarks).

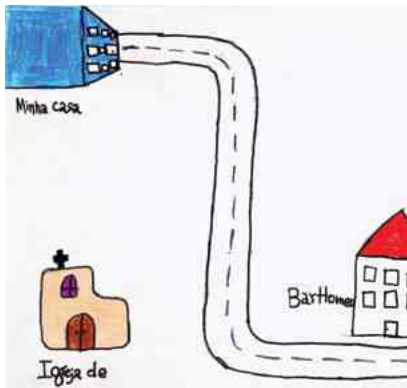
▼ Study 2: Lisbon Design recommendations.



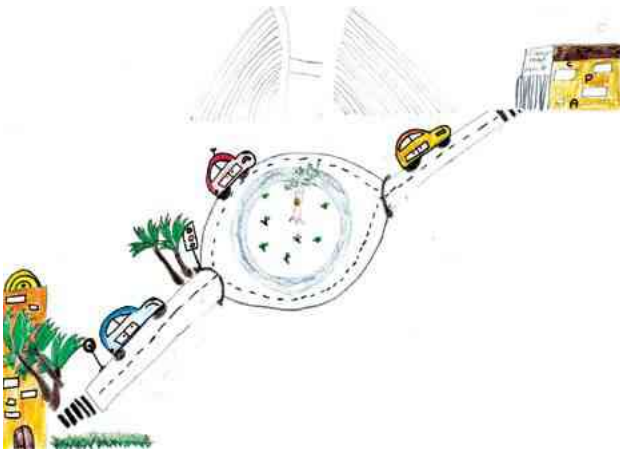
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