

REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

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Jacopo Scudellari
Research analyst on urban mobility, transport policies and automotive industry.

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Photographers

- Antony-22
Basotxerri
Alex Butterfield
Diego Delso
Florentino Velasquez
Floro
Fraselpantz
GilPe
Globetrotter19
- Davide Greco
Marc A. Hermann
Wolfgang Hummer
Jae69376
Maximilian Kafanke
Steve Kwak
Alex Liivet
Marcos
Alberto Peroli
- Jacopo Scudellari
Spsmiler
Alister Thorpe
Aron Urb
Alessandro Vargiu
Guilhem Vellut
Paola Viesi
Oran Viriyincy
Vuxi

Graphic Designers

- Émile Noël
Filipa Rosa
Christina Sanuy

Digital Managers

- Gary Leleu
Alicia Fabregas
Paula Monteiro
Luciana Abbruzzese

Project Managers

- Patricia Carbonell
Clémence Contant
Danielle Kutka
Sudhanshu Verma
Vanessa Vivian Wabitsch

Communication Officers

- Yara E. Acaf
Joshua Franklin-Mann
Rami Deeb

Senior Advisors

- Sören Bauer
Peter Easton

Scientific Advisor

- Josep Crous Duran

Founder

- Stuart Reigeluth

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Cover image: ITM Power Solar Hydrogen Station at CEME Essex, UK.
Photo: Alister Thorpe

Setting Transport Priorities in the Aftermath of a Global Pandemic

The COVID-19 pandemic is re-defining our approach to public transport. From modernizing our transport systems to highlighting sectors vital for our society - Commissioner Vălean outlines the EU's plan to build back better, and get passengers back on board.

I am often asked how my priorities have changed in light of COVID-19. It is true that the sector was hit particularly hard by the global health crisis and national measures taken to prevent the virus spreading. Obviously the sector needs a great deal of support to get back on its feet, and we stand more than ready to provide this. But it is also true that our priorities from before the pandemic struck – of making transport sustainable and embracing digitalisation – are no less important today than they were at the start of the year.

The challenges posed by climate change and international competition have not gone away and this is why, as we look ahead to rebuilding our transport sector, we need to seize this opportunity to build back better – to make our transport system more sustainable, more efficient, and more resilient. We need resilience to known threats such as climate change and pandemics, as well as to currently unknown threats.

In the short term, as we restore transport, we are following a two-pronged approach. We are focusing on the conditions needed to resume services and restore public confidence on the one hand, and ensuring that safety is never compromised on the other. Once transport is operating at full speed once again, we will be much better placed to address other economic impacts.

Longer-term, resilience means modernization and decarbonization. Both will form the basis of our Strategy on Sustainable and Smart Mobility, which we will publish before the end of the year. We are currently examining the responses received to our public consultation, before finalizing the document.

The strategy will set out the key areas in which we see a need for policy action – either now, or in the near future. These actions will support the sector as it strives to meet the ambition set out in the European Green Deal of cutting transport emissions by 90%, while boosting resilience.

You can expect actions on the transition to sustainable alternative fuels, for example. We will also need to boost the uptake of clean vehicles and alternative fuels. And we want to improve efficiency across the whole transport system, cutting unnecessary emissions wherever we find them.

One sector that has more than proven its worth in recent months is that of road haulage. If we had failed to realise it before, the pandemic underlined how essential lorries and their drivers are for our economy and daily supplies.

This sector needs a modern set of rules, which was the Commission's motivation for proposing a package of

legislative measures – known as Mobility Package I – to improve conditions for drivers. The measures also seek to boost growth and create jobs in many sectors directly dependent on road transport.

The new Mobility Package I rules came into force in August after long and tense negotiations. The objectives of are well known. To find the right balance between: the much-needed clear rules for the road transport sector; the onus on transport to cut its emissions under the Green Deal; and the obligation to establish solid social conditions for drivers on Europe's roads.

In this context we are currently assessing the impact on our climate-neutrality ambition of the new rule making the return of the vehicle to the Member State of establishment compulsory every eight weeks.

We are also looking at the effects on combined transport. We want to make sure that the new rules do not diminish the effectiveness of multimodal freight operations, which are crucial for shifting freight away from the road and onto more sustainable modes of transport.

The parts of Mobility Package I intended to ensure fair competition between operators will start applying at the beginning of 2022. This will give companies time to adapt to the new requirements on stable establishment, cabotage and the posting of drivers.

My top priority is to keep lorries moving and their drivers safe – just as I want to see planes, trains, ships and public transport back to full capacity, with happy and healthy transport workers at the controls, and equally happy and healthy passengers on board. ●

ADINA VĂLEAN

EUROPEAN COMMISSIONER FOR TRANSPORT

We need to seize this opportunity to build back better – to make our transport system more sustainable, more efficient, and more resilient.

A Clear Path to Europe's Hydrogen Future

WRITER: JORGO CHATZIMARKAKIS

The EU is realizing how hydrogen can unlock the door to a climate-neutral Europe. Now it is taking its place as a global leader with its pioneering Hydrogen Strategy - setting ambitious goals and demanding immediate action.



After many years of being considered as a science-fiction fantasy or a niche technology, hydrogen has finally reached the mainstream. Not only are many EU Member States building their long-term climate strategy around hydrogen, but they are also considering it to be a key missing link between different energy sectors. Alongside them, the European Commission has realized the important role hydrogen can play in the energy transition towards a net zero society. This was showcased on 8 July 2020 – a historical day in this respect – as the Commission published its “Powering a climate neutral economy: An EU Strategy for Energy System Integration” and the accompanying communication “A hydrogen strategy for a climate-neutral Europe”. The fact that the European Commission has decided to present a dedicated communication on a hydrogen strategy is testament to the commitment for systemic change away from fossil fuels, and towards electricity and hydrogen in order to achieve the EU’s 2030 and 2050 climate targets.

The EU needs to be the starting point for the development of hydrogen as a global commodity. The world is watching, and we have the opportunity to promote a disruptive industrial revolution that will create new value chains, jobs and boost EU competitiveness globally while promoting and supporting sustainable development goals. With a view to future legislative initiatives, the EU should strive to develop a blueprint for a hydrogen market design that can be replicated by other geographies. In doing this, Europe will become the birthplace of the global hydrogen economy, forming the foundations for a globally traded market.

The EU needs to be the starting point for the development of hydrogen as a global commodity.

Leading the transition

Meeting the EU’s long-term climate and energy goals and realizing the promise of the EU Green Deal means carbon free power, increased energy efficiency and deep decarbonization of industry, transport and buildings. Achieving this will require both renewable hydrogen and low-carbon hydrogen on a large scale. Without hydrogen, the EU will not achieve its decarbonization goals on time. As such, the hydrogen sector is primed to play a key role as an enabler of sector integration and leading the transition to renewable sources by providing a mechanism to flexibly transfer energy across sectors, time and place.

Implementation

In addition to the Hydrogen Strategy, the energy systems integration package already contains many elements of how to use hydrogen in order to couple the power and the gas grids, boosting the new hydrogen reality. The European Hydrogen Strategy is an immediate action in order to produce up to 1,000,000 tons of renewable hydrogen before 2024, the year when this Commission’s mandate ends. Then 10 million tons should be reached before the end of the century. To help the implementation of this strategy, a new instrument has been presented by the Commission: the European Clean Hydrogen Alliance. This gathering of policymakers, civil society and industries is given the task

of coming up with a project pipeline before the end of this year. And this is the new way to tackle energy transition: not to talk about theories in 2050 but to start immediately. The ambition is clear – the hydrogen industry must deliver soon.

In this framework, the industry understands the catalytical role of the COVID-19 crisis and the many possibilities of the post-corona recovery ambition. As climate effects worsen – as seen in the ongoing hot summers and their dramatic consequences – we need to become faster in achieving the Paris Agreement goals. For this reasons, more than 90 CEOs signed a letter to the European Commission underlining their clear readiness and ambition to act on the basis of a blueprint that has been built on the vision of a 2x40 GW initiative, putting hydrogen at the heart of renewable energy before 2030. Of that, 40 GW will be within the EU and another 40 GW outside in the neighboring regions of Ukraine and Northern Africa. This ambition has already become a guiding principle for many industries, leading to clear announcements such as the NorthH2 project with an investment of €15 billion over the next 10 years to build up a capacity of 10 GW in the North Sea, with corresponding electrolyzes onshore and offshore.

The vision for increased HydroGenewables has become concrete – the path is now clear for Europe to realize its hydrogen future. ●

Finding Opportunities in Post-Crisis China

WRITERS: CARLOS LOPEZ, JEAN-MARC TIXHON & LOUIS-PHILIPPE LAMMERTYN

Several months after the COVID-19 peak in China, the country has been working intensively to recover its production capacity in multiple sectors, including hydrogen technologies. However, a significant part of the globe is still under strict measures to overcome the pandemic stage. That leaves one of the most powerful manufacturing capabilities in the world in a challenging situation to reach international consumers while depending significantly on its internal economy to recover.



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Hydrogen mobility and fuel cell industry have been the main sectors to reframe their strategy in the last few months. China's interest in establishing the foundations for a mature H₂ internal market is highlighted with several initiatives that will probably scale up their capacity to fulfill international markets upon recovery of the global economy. For example, their effort was clearly represented by the Notification of Improvement of New Energy Vehicles Popularization (Notification 2020) announced by Chinese authorities in April this year, which provides special subsidies to fuel cell vehicles and industrial production lines intending to improve their commercial models. Moreover, China's Industrial Hub HEBEI approved 43 different hydrogen projects with an estimated investment of 1.2 billion USD. These efforts are also visible at the local scale. Guangzhou, capital of south China's Guangdong Province, has announced a 10 year hydrogen

strategy structured around the construction of an energy industrial system based on hydrogen, with an estimated value of 8,5 billion USD by the end of 2025. Beijing Public Transport Group has also promised to purchase more than 2,500 hydrogen city buses, and other provinces, such as Hebei, have planned to build 30 refueling stations to supply the demand of 4,000 new fuel cell vehicles by 2022.

China's interest in the development of a strong hydrogen market focused on sustainable mobility has triggered the attention of international companies with an opportunity to explore cooperation mechanisms towards technical breakthroughs and investments in a post-crisis scenario. Recently, Toyota signed a joint venture with the Chinese companies Dongfeng, FAW, GAC, BAIC, and Yihuatong for research and development in fuel cell technology, aiming to promote domestic vehicle

consumption. On the other hand, the multinational chemical company Linde and a subsidiary of the China Power International Development Ltd signed a Memorandum of Understanding for the generation of several green hydrogen initiatives in the medium term, including the research and implementation of clean mobility solutions for the Winter Olympics hosted by China in 2022.

These strategic alliances are consolidating a new paradigm in the business relations with China, currently evolving from the traditional mass production at a low-cost perspective to a more complex and dynamic collaboration that is also opening the Chinese market to multiple international players. That is the case with eCap Mobility, a highly recognized German company that has created a partnership with Re-Fire – one of the

1. Hydrogen Refueling station in Shanghai.
Photo: Hincio S.A.

most recognized Chinese fuel cell providers – for the use of innovative clean hydrogen technologies in the maritime transportation sector. The partnership is focusing on a technology transfer model, allowing the two companies to expand their markets beyond their current scope and improve the fuel cell supply chain worldwide.

Developing resilient supply chains

According to our international experts, there are three main opportunities to leverage and strengthen the fuel cell technologies for mobility, and the component's supply chain in China: the increasing global importance of consolidating

international alliances between manufacturers, producers and end-users while keeping the strategic development of the regional markets; the need to improve supply chains and market strategies to consolidate multilateral business agreements; and the price volatility of the non-renewable sources in periods of crisis. All of which highlight the importance of developing sustainable and more economically resilient alternatives for global energy contingencies over time. These foreseeable opportunities for the Chinese market are also aligned with the economic recovery initiatives, especially in Europe, but extended to other regions such as Latin America, North America, and the MENA Region.

First, China's renewed interest towards international strategic alliances to reinforce their hydrogen and fuel cell

markets will still play an important role when positioning as an international technology producer beyond the internal demand. This coincides with European and other regions interest in reactivating their economies through significant investments in renewable energy. For instance, the EU Hydrogen Green Deal and China's recent commitments to Hydrogen for mobility represent a significant opportunity to accelerate hydrogen and fuel cell adoption that jointly considered, increases the feasibility of achieving the energy transition goals in each region.

2. Business meeting between European and Chinese key stakeholders in the hydrogen sector exploring new cooperation mechanisms in 2019. Photo: Hincio S.A.



2

The EU Hydrogen Green Deal and China's recent commitments to Hydrogen for mobility represent a significant opportunity to accelerate hydrogen and fuel cell adoption.



3

Second, despite China's remarkable industrial performance that continues to grow despite the ongoing crisis – with factories such as the Jinhua Project with a future capacity to produce 20,000 fuel cell engines per year – supply chains and go-to-market strategies for hydrogen mobility remain a challenge for Chinese producers even at the internal level. European companies have developed a considerable background in the formulation and implementation of studies and entry-market strategies that have been strongly supported by regulatory frameworks, innovative funds, and market-driven policies to promote the industry locally and internationally. A co-working formula enhancing the Chinese manufacturing capacity and the European market strategies could not only strengthen China's supply chains, but also promote the growth of the global hydrogen market to a more mature stage.

A unique opportunity

Lastly, the COVID-19 economic crisis has demonstrated the price volatility of non-renewable resources. According to the IEA, oil and gas investment were expected to fall by almost one-third at the end of the year after petroleum reached its lowest price in history, falling to negative 37.63\$ in April 2020. This unique macroeconomic situation has reinforced the global interest towards hydrogen and fuel cells, and as mentioned, China and the EU have been taking outstanding steps to consolidate their industrial leadership. The EU has launched its European Hydrogen Strategy and presented the Clean Hydrogen Alliance, which expects a cumulative investment on green hydrogen from €180 to €470 billion by 2050. Adding that to the previously mentioned Chinese Notification 2020, the new Energy Law that classifies hydrogen as a fuel for all types of

vehicles – apart from other new policies linked to hydrogen development – is creating a new playing field where the private sector could take advantage of political support to accept higher risk for their investments and bilateral commercial agreements.

These geopolitical and economic circumstances provide a unique opportunity for businesses and governments in a post-crisis world. Through industrial symbiosis, strengthening supply chains and a move away from traditional linear economic models, China and the world can emerge even stronger than before the COVID-19 pandemic. One thing is clear – it will be hydrogen that fuels the change. ●

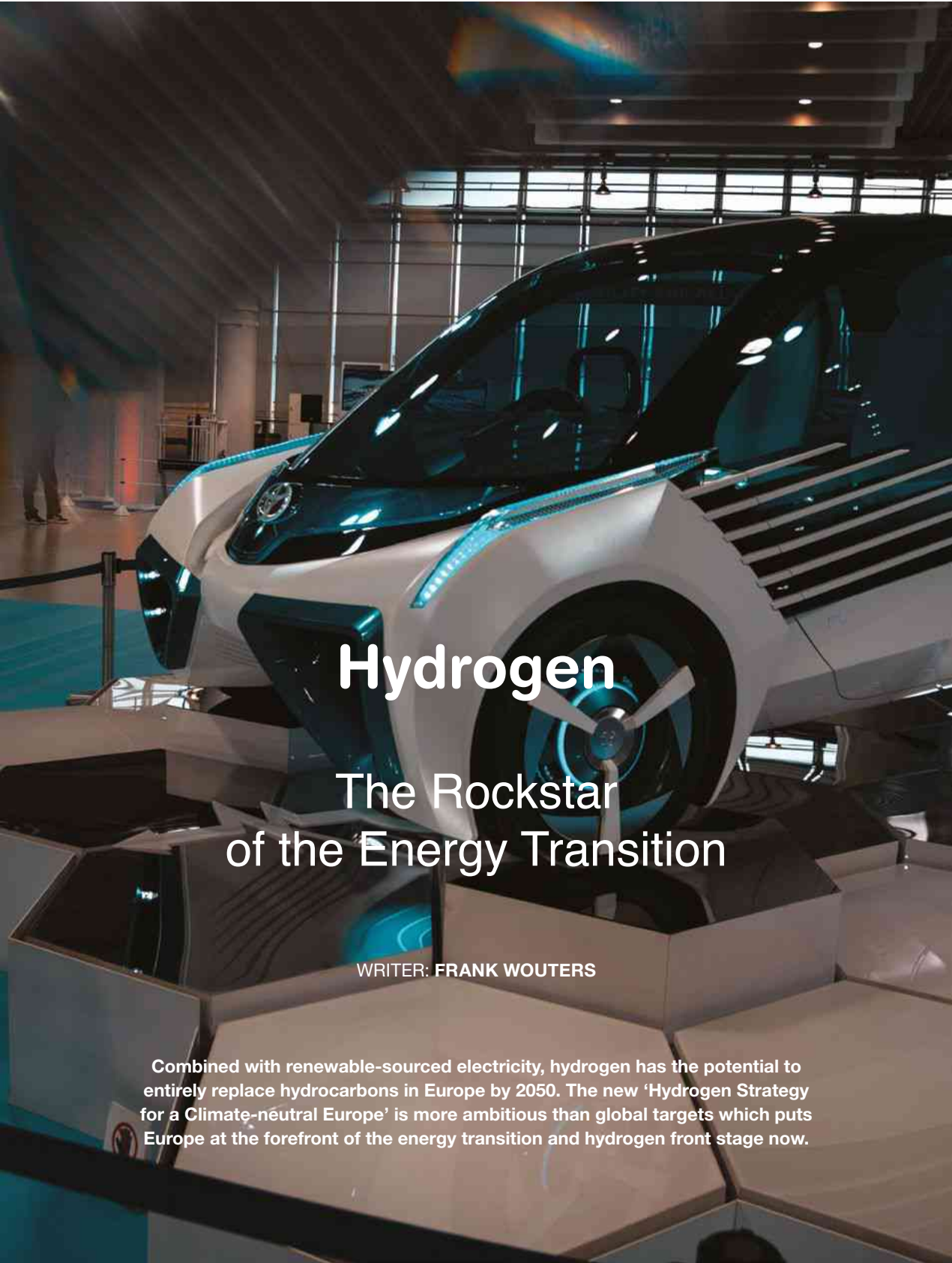
3. Foton Motor fuel cell bus in Beijing, China.
Photo: N509FZ

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Hydrogen

The Rockstar of the Energy Transition

WRITER: FRANK WOUTERS

Combined with renewable-sourced electricity, hydrogen has the potential to entirely replace hydrocarbons in Europe by 2050. The new 'Hydrogen Strategy for a Climate-neutral Europe' is more ambitious than global targets which puts Europe at the forefront of the energy transition and hydrogen front stage now.

1

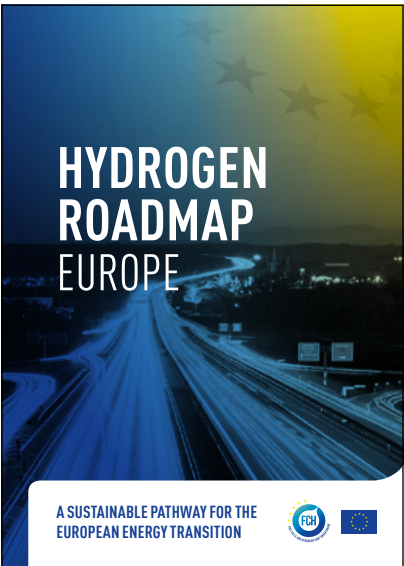
The year 2020 has seen the emergence of hydrogen strategies in many European countries, including Norway, the Netherlands, Austria and Germany, as well as for the European Union as a whole; most importantly, on 8 July 2020, the European Commission, led on this topic by Executive Vice President Frans Timmermans, released the **Hydrogen Strategy for a Climate-neutral Europe** as part of the European Green Deal. The European Hydrogen Strategy refers among other things to the “2x40GW Green Hydrogen Initiative”, issued by Hydrogen Europe, which outlines the role of water electrolysis until 2030, based on the “ambitious scenario 2030” of the “Hydrogen Roadmap Europe” (FCH-JU).

Worth noting: the targeted 80GW of electrolyzer capacity in Europe and neighboring countries is not enough to produce the parallel aim of an additional 10 million tons of hydrogen that Europe is also aiming for by 2030. This is among the most ambitious hydrogen strategies in the world, even more ambitious for example than the Hydrogen Council's strategy, which leads to 18% of all global final energy demand covered by hydrogen by 2050, making it a \$2.5 trillion industry, which is bigger than oil and gas combined. To get there, the Hydrogen Council foresees an installed electrolyzer capacity of 70 GW globally by 2030. The European ambition for Europe alone is bigger than the Hydrogen Council's target for the world, which is a true game changer for hydrogen.

In addition to this public sector development, the private sector is also moving. The pipeline of hydrogen projects has grown substantially according to a report by Wood McKenzie, which notes that the list of potential global investments in electrolyzers planned to be operational by 2030 grew from 3.2GW to 8.2 GW, 57% of those in Europe, over the 6 months to March 2020. And the European electrolyzer manufacturers



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3

Siemens, ThyssenKrupp, NEL and ITM have all announced plans for capacity expansion to at least 1GW per year.

Europe's decarbonized energy system will see the share of electricity in final energy demand grow from currently 21% to 50%. This requires some 2,000 GW of solar and 650 GW of wind power. The question is what would be the remaining 50%, if we finally wean ourselves off fossil fuels? Few things are as capable and versatile as hydrogen, so up to 50%

of all final energy can eventually be covered by hydrogen, which will require an additional volume of green electricity as directly used. A substantial part of hydrocarbons is currently being used as a feedstock in the steel, chemical and refining industries – this is something that hydrogen can replace, but electricity cannot. The epic proportions of such undertaking are mind-blowing, and 30 years is not a long time.

The new-found enthusiasm enticed Frans Timmermans to label hydrogen the “Rockstar of the energy transition”. At the same time, Elon Musk calls fuel cells “fool cells”, much to the amusement of his fan base, also known as *Teslaratis*. Although Timmerman's positive energy, support and some level of hula-hoop are necessary ingredients for such a profound transition, there is a lot of work ahead. The following points lay out the elements of this transition and present some of the perceived controversies.

1. The Toyota FCV Plus Hydrogen Concept car, shown at the 2020 Megaweb Toyota City Showcase in Odaiba, Tokyo. Photo: Maximilian Kafanke.
2. Prof. Dr. Ad van Wijk, Jorgo Chatzimarkakis, *Green Hydrogen for a European Green Deal A 2x40 GW Initiative*, Hydrogen Europe.
3. *Hydrogen Roadmap Europe, A Sustainable Pathway for the European Energy Transition*, FCH-JU.



4



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4. Frans Timmermans, Executive Vice President of the European Commission for the European Green Deal and European Commissioner for Climate Action, labels hydrogen the "Rockstar of the energy transition". Photo: Partij van de Arbeid .

5. Tesla CEO Elon Musk has said of hydrogen fuel cell vehicles, "Success is simply not possible." According to the technology entrepreneur, hydrogen fuel cells are "fool cells", "staggeringly dumb", "mind-bogglingly stupid". Photo: NORAD and USNORTHCOM Public Affairs.

6. ITM Power Solar Hydrogen Station at CEME Essex Conference Centre, UK. Photo: Alister Thorpe.

The never-ending mobility debate

My Twitter feed focuses on the energy transition and is biased towards all things hydrogen. There are many enthusiasts for electric mobility, which is great and understandable, given that local air pollution kills up to 7 million people annually according to WHO estimations, and internal combustion engines have a big role in that... Electric cars, scooters, bikes, buses and trucks are the next evolutionary step in mobility. The electricity for the electric motors can come from onboard batteries, overhead lines, rail tracks or a hydrogen fuel cell. All are great options but here comes the controversy, especially regarding fuel-cell electric vehicles (FCEV's) versus battery electric vehicles (BEV's):

Elon Musk explains that if we have a solar panel, we can directly charge a battery in a car and drive away, whereas there are a few more steps in the hydrogen value chain with associated losses and costs: production of hydrogen, compression, storage, conversion in the fuel ("fool") cell... While this is not untrue, it also does not tell the whole story. If equal charging and refueling infrastructure would be available, and if the cars would cost the same (there

is no reason why that would not be the case if produced at scale), many people would favor the lower weight, longer range and dramatically shorter refueling times of an FCEV over a BEV.

And while the initial cost of building a network of hydrogen refueling stations is higher than achieving the same with electric charging points, the German Fraunhofer Gesellschaft analyzed that there is a tipping point expressed in market penetration, beyond which hydrogen is a cheaper option overall. But why have the debate at all? Of course, one can argue that for any of these options to be successful, a minimum infrastructure level is required, and there may be some competition for that capital in the build-out phase. A slow build-out of one of the two will keep such options more expensive and unaffordable longer. Other than that, there is little merit in this binary debate. Both green hydrogen and green electricity will be available soon, at scales not seen before, for example driven by the fact that Europe is currently converting the natural gas grid to accommodate green hydrogen. And that availability will be for mobility applications to grab. We will have options in the future, like we have now with electricity, gasoline, diesel, LPG and CNG. The difference is that these new options will all be clean.



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Both green hydrogen and green electricity will be available soon, at scales not seen before, for example driven by the fact that Europe is currently converting the natural gas grid to accommodate green hydrogen. And that availability will be for mobility applications to grab. We will have options in the future, like we have now with electricity, gasoline, diesel, LPG and CNG. The difference is that these new options will all be clean.

Conversion efficiency

Another debate that is often seen and heard is the complexity of the hydrogen value chain, with many conversion steps. Of course, physics being physics, with each conversion step we lose some energy. If we then focus on specific cases, for example the electric mobility case described above, we may jump to the conclusion that certain hydrogen routes are not optimal. However, we should never lose sight of the fact that in the future, the energy input into the system will become ever cheaper. With large-scale solar and wind in good locations already below 2 ct/kWh, and steadily moving towards 1 ct/kWh, this changes the paradigm.

The current energy system is built largely on fossil fuels, which always have a cost that cannot be ignored. With a high cost to start with, the prerequisite is to optimize conversion steps along the chain from primary energy to final energy use, not to waste

energy and hence money. However, when the cost of the energy input into the system becomes very small, optimizing the overall system cost is more important than minimizing the losses of all the conversion steps. For example, when comparing direct electricity use vs. the use of hydrogen in a certain application, one should not just look at the production cost and conversion efficiency, but also at system aspects such as storage and transmission, which are much cheaper for hydrogen than for electricity. We have to consider the system in a much more holistic way, and there is a certain complexity in that.

Storage

Storing electricity is not straightforward because it is practically always done through conversion, for example by pumping water up a mountain or chemical reactions in a battery.

Electrochemical batteries are undergoing a dramatic development in terms of production volumes and price decrease, mainly driven by their use in electric vehicles. Many Tesla fans think batteries can do everything we need in the future. And the cheaper they get, we will see more and more of them applied in stationary applications, supporting the grid or in combination with solar. Nonetheless, the feasible use case for batteries is expressed in minutes or hours. Hydrogen, however, can be stored loss-free, much longer and at large scale. This becomes more and more important if we are transforming our energy system entirely based on electricity. Because even if we use electricity for 50% of final energy demand and green hydrogen for the other 50%, the input will be 100% electricity. In that sense, green hydrogen is gaseous electricity.

Let us analyze the seasonal patterns of supply and demand in Europe in a system predominantly built on

a combination of solar and wind. Obviously, the supply of solar energy is much higher in the summer than in the winter, and the bulk of it will come from southern Europe because it is cheaper. While the energy demand for transport or most electricity applications is constant throughout the year, the demand for heating or cooling varies dramatically over the seasons. To cover the winter demand for heating in northern Europe with hydrogen, which is now covered by natural gas, we would need to do two things: transport it from southern Europe to the north, and store surplus summer energy for use in the winter. We are talking about thousands of TWh, which cannot be done with batteries. Like natural gas, hydrogen can be transported in pipelines very effectively and stored underground in bulk. Salt caverns suitable for hydrogen storage are available in many locations in northern Europe, close to the winter demand peak. Of course, electricity can be stored in pumped hydropower like we do now, but the potential for additional



7. Panoramic view of the photovoltaic power station of Carriñena, Zaragoza, Spain. Photo: Diego Delso.

pumped hydro is limited. The bulk of energy storage in the European energy system will therefore be hydrogen in salt caverns.

8. Salt cavern (artificial cavities in underground salt formations, created by the dissolution of rock salt during the mining process). Photo: Guilhem Vellut.





9. Europe has 200,000 km of gas transmission pipelines which could be used for hydrogen transportation. Photo: Vuxi.

9

Cables versus pipelines

Teslaratis know they need to expand the electricity grid to accommodate the 2.5 times increase in the use of electricity. This is a huge, but important undertaking, especially since we are not only increasing the use of electricity, but we are also changing the production locations. European lignite power plants are currently located near the resource in Germany, Greece, Czech Republic, and Kosovo, but the future production will shift to offshore wind in the North Sea, Baltic Sea and Mediterranean, and a lot more solar power in southern Europe. How difficult expanding the grid is can be seen in Germany, where several billion Euro worth of wind power had to be curtailed over the last couple of years due to insufficient grid capacity. Overhead power lines face lengthy permitting procedures and regularly face popular opposition. Ground cables on the other hand are a much more expensive option.

A main advantage of hydrogen, or gaseous electricity, over electrons is that transport is much more cost-effective. For the same investment

amount, a hydrogen pipeline provides a 10-15 times higher capacity than a powerline. Better still, most of the gas infrastructure is already available. Europe has 200,000 km of gas transmission pipelines, and a multitude of that in distribution. Although currently used for natural gas, these pipes can be converted to accommodate hydrogen at very low cost. We can even use offshore gas pipelines, suitable to evacuate large amounts of hydrogen produced in future offshore wind parks and transported to the load centers.

Don't get me wrong, we need to massively invest in the electricity grid to link future supply to demand. But planning that expansion requires careful consideration of the role of gaseous electricity, for which the transmission grid is already available to a large extent. We are ill-advised to think about these two things in isolation.

**

Under the leadership of Frans Timmermans, Executive Vice President of the European Commission, Europe is embarking on an ambitious journey to

make hydrogen a foundation of its future energy system. For obscure reasons, Elon Musk's fanbase (The 'Teslaratis') seem to oppose hydrogen. And sometimes certain environmental NGOs join that choir. The argument against hydrogen nearly always focuses on a specific and narrow use case, such as fuel-cell electric vehicles versus battery electric vehicles, thereby missing the bigger picture, which is that our energy system can be built on 100% electricity, half of which will be turned into hydrogen because it is better, cheaper and more secure to do that – hydrogen will remain the Rockstar of the energy transition for the foreseeable future. ●



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Autonomous Vehicles

Driving the Cities of Tomorrow

WRITER: JACOPO SCUDELLARI

In the last decade driving automation technologies have grown rapidly, presenting new systems that are ready to change current mobility habits around the world. But most of the media hype and industry expectations are inflated – here’s a reality check:

Today the most evolved passenger cars on the automotive market can be classified as Level 2 on the SAE classification (Figure 1), but can’t be considered Autonomous Vehicles (AVs). They have driving assistance systems and can drive alone under certain conditions, but there is still a long road to full automation – with recent fatal crashes serving as a stark reminder.

Announcing the first AVs before 2020, media and car manufacturers have inflated expectations and generated great enthusiasm around AVs. Yet undoubtedly AVs will have a disruptive impact on the transport system, but for the moment, the technology is too young and uncertain to ensure positive benefits. In fact, autonomous technology is growing faster than the legislation, and even if tests are starting to be carried out around the world, it is not clear how

and by who the transition to AVs should be steered. At the same time, a great awareness about the possible (positive or negative) externalities of this socio-technical transition is rising among planners and public administrations.

Positive and negative effects expected by autonomous vehicles

The wide diffusion of AVs in the mobility system could generate a range of potential effects. First, there are three socio-economic effects presented by the automotive industry as revolutionary: road safety, accessibility and free time. Consider a car driving autonomously and able to “speak” with other vehicles: removing human error would reduce

fatalities; there would be more possibilities for those currently unable to drive; and free up people to do something else during their travel time – like resting or working. Of course, these impacts will depend on the adopted level of the technology and the penetration rate of AVs into the entire car fleet.

On the other hand, there are several potential effects that AVs could generate to the spatial urban dimension that have not been considered enough.

Thanks to radar, lidar and cameras, AVs will be extremely accurate in their movement, radically reducing the space necessary for circulation and parking. Moreover, vehicles could pick up/drop off the users right outside their door, before then parking themselves. Consequently parking spaces could be replaced by a transition area, with

parking transferred to dedicated spaces or structures where land is cheaper, leaving space for new developments, public areas or new green spaces.

However, it’s important to take a long term approach when considering the possible externalities of these benefits, ensuring that their impact doesn’t become a negative one.

AVs will transform riders into users, making travel a useful time to do other activities, reducing its negative value. This effect could generate new sprawling processes and increase average travel distances. Then again, the possibility of cars parking themselves

could generate new traffic full of empty vehicles.

At the same time, if AVs are affordable for everyone, considering also citizens that currently can’t drive (such as elderly, disabled, or young people), their accessibility will improve, but also result in an extreme car dependence and an increase to the total mobility demand.

The diffusion of AVs could also have negative impacts on public transport and non-motorized mobility. For example the modal split of active mobility could be reduced – something that would have negative consequences for health.

It is also necessary to consider how prominent sharing becomes in AV use, because the direction of these impacts will probably depend on it. Today, the idea of ‘Mobility as a Service’ (MaaS) is more widespread, and AVs will play a key role in this new approach. Consequently, the amount of privately-owned cars that are replaced by shared vehicles will be decisive in defining the positive or negative consequences of AVs.

Figure 1: Levels of driving automation. SAE International Releases Updated Visual Chart for Its “Levels of Driving Automation” Standard for Self-Driving Vehicles, SAE International, 2018

Figure 1. SAE J3016™ Levels of driving automation

	SAE Level 0	SAE Level 1	SAE Level 2	SAE Level 3	SAE Level 4	SAE Level 5
What does the human in the driver's seat have to do?	You <u>are</u> driving whenever these driver support features are engaged — even if your feet are off the pedals and you are not steering			You <u>are not</u> driving when these automated driving features are engaged — even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests	These automated driving features will not require you to take over driving	
				You must drive		
These are driver support features			These are automated driving features			
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met		This feature can drive the vehicle under all conditions
	• automatic emergency breaking • Blind spot warning • lane departure warning	• lane centering OR • adaptative cruise control	• lane centering AND • adaptative cruise control at the same time	• traffic jam chauffeur	• local driverless taxi • pedals/steering wheel may or may not be installed	• same as level 4, but feature can drive everywhere in all conditions

For a more complete description, please download a free copy of SAE J3016: www.sae.org/standards/content/j3016_201806/

Turin research project
“steering the spatial
impacts of the diffusion
of autonomous vehicles”

Recently, the scientific community has focused on the role of public administration in relation to the possible effects of the spread of AVs, trying to avoid a passive attitude and taking the lead in this transition.

The research project “Steering the spatial impacts of the diffusion of autonomous vehicles”, led by Politecnico di Torino (Luca Staricco – scientific coordinator, Jacopo Scudellari, Elisabetta Vitale Brovarone, Valentina Rappazzo, Luca Davico), has studied how the introduction of AVs should be regulated in an urban context. The aim was to understand the potential impacts of driverless cars on the urban environment, providing the construction of the most desirable long-term vision, and identifying the transition paths to achieve it. The research was based on the Turin use-case for two reasons: in 2018 the municipality launched a pilot project for testing AV, Figure 2, and



Table 1: Summary description of the second scenario

Item	Scenario 2 (Strong Regulation)
1. Road hierarchy	• Main roads reserved to cut-through traffic (50 km/h) • Local roads reserved to access traffic (20 km/h)
2. Limitations to vehicle circulation	• The main road network creates several home zones, where circulation is limited to shared AVs and residents’ AVs
3. Parking	• On-road car parks totally removed; space freed up for non-motorized mobility and pick up/drop off areas • Multi-story and intermodal parking are distributed along the border of home zone and public transport lines
4. Public transport	• Main public transport lines (trains, metro, tram) are enhanced • Capillary network (buses) is removed inside home zones and replaced by car sharing or automated shuttles
5. Motorized AV and non-motorized sharing system	• Strong supply both inside and outside the home zone
6. Pedestrian areas	• All local roads in home zones are shared spaces
7. Cycling facilities	• Present on each main road while free circulation is permitted inside the home zones
8. Modal split	• Privately owned AVs: moderate decrease • Shared owned AVs: strong increase • Public transport: no change / moderate increase • Cycling: no change / moderate increase • Pedestrians: moderate increase

Figure 2: A panel stating that this public road is being used for testing Autonomous Vehicles. Photo: Jacopo Scudellari

Figure 3: Road hierarchy in Vision 3, Jacopo Scudellari

that Turin is working on of the next Sustainable Urban Mobility Plan, which could include measures for AVs.

The project was based on the back-casting approach, which is generally considered a suitable method to face those arguments characterized by a high level of uncertainty. Unlike forecasting, which tries to predict future development visions considering the current trends, backcasting moves in the opposite direction. It assumes the best future scenario and proceeds backwards in order to define the actions needed to achieve it.

The project involved 69 stakeholders, with expert knowledge on transport, mobility and innovation, bringing together the public and private sector, alongside the civic association, as to validate the entire process.

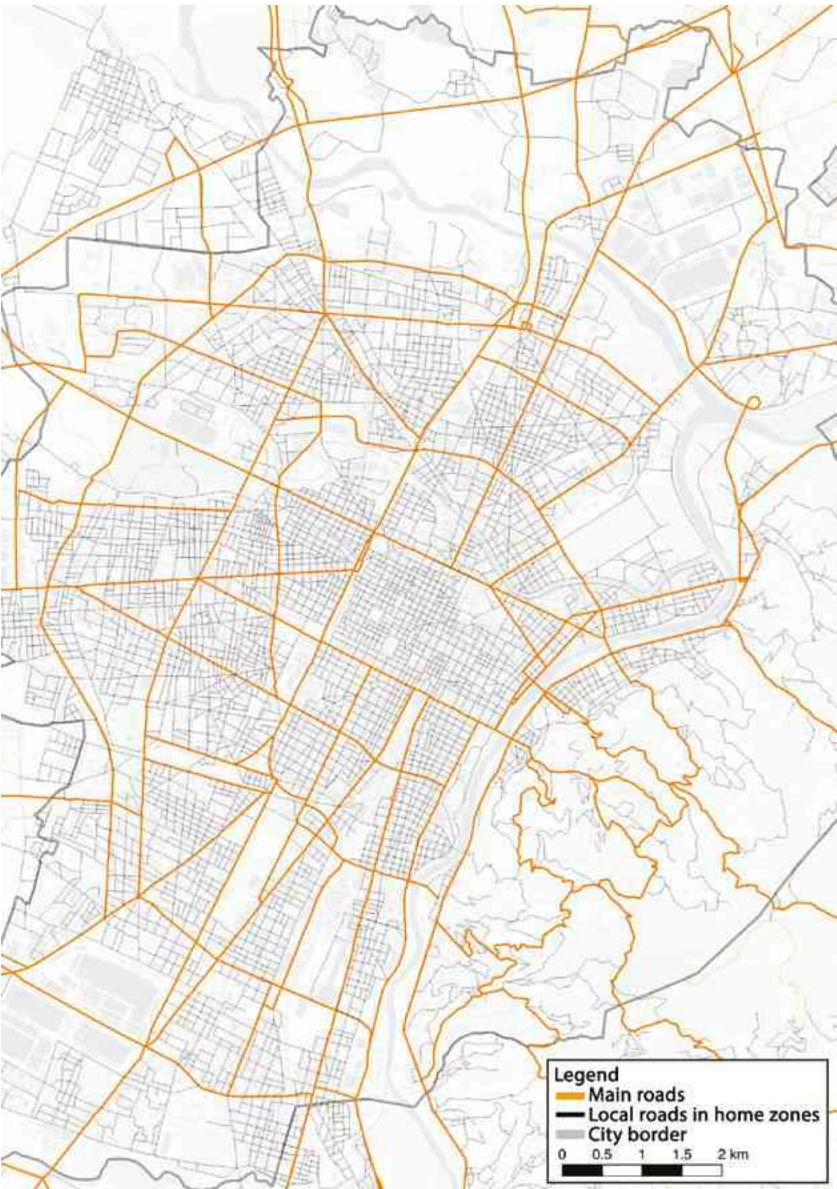
The project is divided into four phases:

Visioning

Three visions have been generated based on a scientific literature review and a think-tank model. All the visions assume a long-term prediction (2050), and that AVs will be fully connected & autonomous (level 5).

- 1. The optimistic and technology-centered, “strong deregulation” scenario
- 2. The pessimistic and superblock model, “strongly regulated” scenario
- 3. The business as usual scenario

They are distinguished by 8 issues as key elements to regulate AV circulation and parking (such as road hierarchy, limitation to vehicle circulation, etc.), as well as to provide other modes of transport and mobility (lanes for public transport, cycling facilities, pedestrian areas, etc.).



3

Desired vision

The participation process (more than 50 in-depth interviews) was useful in identifying the “regulated” scenario as the most advisable of the three visions, Table 1. The second scenario, inspired by the superblock model, traces back to the neighborhood unit and collects two different opinions by the participants. On one hand, those who consider that vehicular traffic should be limited to the main roads, improving the quality and livability of public spaces at the

neighborhood level. On the other hand those who repute the unpredictability of the autonomous circulation on the entire road network and see the main infrastructure as an easier technological solution, Figure 3.

Actions for the future

All the actions suggested during the interviews have been presented in a final workshop. Using the backcasting

method we imagined scenario 2 to be in the year 2050. Thus it was participants were asked "when and what actions would I have had to take in the past to get to this situation today?" The result was a participated timeline strategy (policies, actions, and milestones), collecting more than 45 proposals. Most of the proposed actions were concentrated on the decade 2020-2030, focusing on normative and planning aspects. The participants highlighted the role of testing not only for technology development, but also to better understand the socio-economic implication of AVS.

Road map and policy packaging

In conclusion, the research team has synthesized the workshop results into building the final roadmap for the implementation of the AVs. In total, 33 key actions, table 2, have been distributed into 6 specific policy packages, Figure 4, and subdividing each action in terms of type: policy; technology; and physical transformation of the urban space.

According to the Eltis guideline, the Sustainable Urban Mobility Plan (SUMP) was assumed as the key planning tool to set the strategy towards the desired scenario. The next three decades mark the action that the public administration should implement in order to lead the transition to autonomous mobility and reach the most sustainable vision.

A transition to sustainable cities of tomorrow

Turin could draw huge benefits from the transition to AVs in terms of accessibility, livability and urban quality. However, due to the relevant uncertainty around

autonomous mobility, it's necessary for local public authorities to look ahead and to start immediately leading the transition – avoiding possible negative outcomes. For this reason participants to the research project suggested the need for extended governance, both public and private, in order to better deal with the technological unpredictability and to create a common vision.

The six-policy pathway developed from the research illustrates which mobility measures can be adopted for the transition to AVs. The SUMP is the best planning tool as it focuses not only on the regulation of circulation and parking, but also considers public transport,

sharing mobility, and active mobility. According to UITP, AVs represent a great opportunity for urban mobility only if public transport and sharing systems have an active role – starting from the short term.

Urban and transport policies can steer the transition to autonomous driving, taking us towards the sustainable and livable cities of tomorrow, starting from the cities of the present. ●

Figure 4: Policy packages and actions towards the Vision 3

Table 2: List of the 33 actions subdivided for policy packages

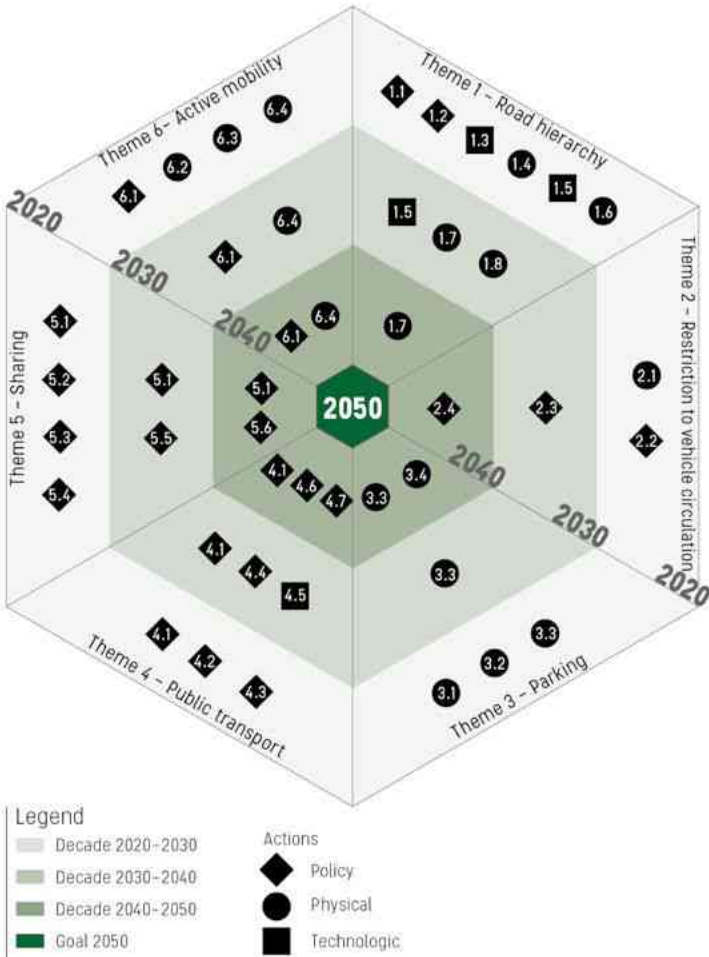


Table 2: List of the 33 actions subdivided for policy packages

Policy packages 1 – Road hierarchy	
1.1	Classify the roads (main roads, local roads) and identify the main thoroughfare networks and the superblocks
1.2	Identify target areas (including main and local roads) to promote AV tests in real urban environment
1.3	Provide test areas with the technological infrastructure for connection (V2I)
1.4	Ensure road maintenance of test areas to ease the circulation of Avs
1.5	Provide main roads with V2I connection infrastructure
1.6	Ensure maintenance of the main road network to ease the circulation of Avs
1.7	Provide local roads with V2I connection infrastructure
1.8	Ensure maintenance of the local road network to ease the circulation of Avs
Policy packages 2 – Restriction to vehicle circulation	
2.1	Design superblocks as 30 km/h zones through traffic calming elements
2.2	Enhance limitations to private car traffic in the central restricted traffic zone
2.3	Ban private cars from the central restricted traffic zone
2.4	Transform superblocks in restricted traffic zones where circulation of private cars is prohibited
Policy packages 3 – Parking	
3.1	Reduce parking space for private cars and increase parking lots for shared vehicles
3.2	Develop new park&ride facilities
3.3	Build multi-storey parking structures along the main road network
3.4	Eliminate everywhere on-street parking
Policy packages 4 – Public transport	
4.1	Promote the use of public transport (incentives, communication campaigns, etc.)
4.2	Reorganise the public transport network (trams on main roads, buses on local roads)
4.3	Promote automation tests on public transport means along the main road network
4.4	Boost autonomous trams along the main road network
4.5	Integrate local public transport and car sharing in a MaaS system on the main road network
4.6	Remove bus lines inside the superblocks and provide small autonomous shuttles in larger superblocks
4.7	Integrate public transport in a MaaS system on the whole road network
Policy packages 5 – Sharing	
5.1	Promote the use of sharing services (incentives, communication campaigns, etc.)
5.2	Enhance sharing services (fleet, spatial coverage, etc.)
5.3	Support the renewal of the car sharing fleet with new ADAS
5.4	Promote automation tests on car s-haring along the main road network
5.5	Boost shared AVs along the main road network
5.6	Integrate sharing facilities in a MaaS system on the local road network
Policy packages 6 – Active mobility	
6.1	Promote active mobility (incentives, communication campaigns, etc.)
6.2	Develop a cycling network on the whole main road network
6.3	Expand and improve pedestrian paths and areas
6.4	Improve liveability and quality of public space in local roads

What Is One Thing You Will Do Differently as a Result of Covid-19?

This summer REVOLVE Magazine asked its readers to tell us about their ideas and feelings during and after the lockdown period. Everybody has been impacted by Covid-19 and each of us has changed our understanding of mobility and how we get around. This was an extraordinary time, allowing us to reflect internally and on our relationships with others, as well as: our current behaviours; our past habits; things that we've taken for granted; and things that we'd like to do differently.

Here are two of the contributors who really touched the REVOLVE team with their will to embrace change. The top 5 is available on www.revolve.media

#1 Casimir Legrand

Reclaiming the street from the overbearing car.

National lockdown measures and the consequent shift to working from home have drastically altered the demand for road space. Reduced vehicular traffic has enticed people, myself included, to take up walking, running, or cycling, but within a new arena—a serene and rarefied space—otherwise known as the street, reclaimed from the overbearing car.

As restrictions are gradually eased, it would be wonderful if road space in our neighbourhoods could be permanently reallocated for pedestrians and cyclists to occupy and enjoy. For instance, back in May, the Mayor of London unveiled the “London Streetspace” program that has transformed London’s streets to accommodate a ten-fold increase in cycling and a five-fold increase in walking. Active mobility programs such

as London’s have made us realize how dominated we have become by cars and how this simple fix can offer us affordable and healthy recreation, while contributing to the alleviation of pressure on public transport systems and improvement in air quality.

Reclaiming space is a starting point for establishing complete neighbourhoods, best encapsulated in the vision of a 15-minute city. This concept, outlined by Carlos Moreno, Paris urbanist and professor at The Sorbonne, describes an urban way of life in which all residents would be able to achieve most of their needs and access essential services within a short walk or bike ride. The permanent reallocation of road space would simultaneously curb climate change, while making cities in our new normal more attractive places to live. ●

#2 Eleanor Smith

Step on the breaks and look at the view.

The one change that I would like to see after the lockdown period is one that requires me to work on myself. It is no easy task as I have been faced with the challenge for years and I never quite seem to be able to crack it. COVID-19 forced me to change my life in several ways. It is a life lesson, which will help me lead a more balanced life.

I tend to be over-ambitious with my time. My passions pull me in different directions, and it can be a struggle to give myself enough rest. I was so busy before COVID-19 struck, that I was often only home in time for a late supper and bed. At the weekend, I would be out in nature as much as possible, somewhere with horses.

Then COVID-19 happened, my weekly volunteering with the Red Cross stopped, my office closed, the horse that I was riding was put out to pasture for the summer. I found myself at home more than ever, with five days of home office a week. That was new. I also launched my own solo communications company.

I had to build myself a new every day. I enjoyed being more at home and in charge of my day. I loved the challenge of juggling both of my professional careers during a crisis. This crisis taught me more about myself and has given me a peak at a possible future life.

I have learned that I cannot do it all. That I can overwork at home too, spending hours staring into a screen without giving myself a break. I know that I need to rest, meditate, eat, and sleep enough and regularly. I cannot do it all, all the time. I need to look after my mental and physical health. Things come and go in phases and I have learned to go more with the flow. I have to say “no” especially to myself, and although I know that it is a life lesson that I will have to keep learning over and over again, the current COVID-19 situation helped me to step on the breaks and look at the view. ●



Electric Vehicles Are Superstars for Decarbonizing Europe

WRITER: DIEGO GARCÍA CARVAJAL

A series of signals from different stakeholders subtly hint at the need for an acceleration in the decarbonization of the European economy in order to comply with the 2015 Paris Agreement: the UK government and the European Parliament announced a climate emergency last year, the European Commission is proposing to raise the 2030 GHG emissions reduction targets, and NGOs continue to advocate for more ambitious decarbonization targets.

Road transport, which accounted for 20% of CO₂ emissions in 2015, is ready to make a significant contribution to the effort through increased use of electric vehicles (EVs) that emit three times less CO₂ than a combustion engine vehicle, when measured from ‘well-to-wheel’. The replacement of fossil fuel vehicles by EVs can also occur quite rapidly, considering the relatively short lifetime of cars.

In addition to generating much lower CO₂ emissions and improving urban air quality through zero particles emissions, EVs are currently the best available road mobility technology because:

- They are between 2.5 and 5 times more energy efficient than other clean technologies

- The total cost of ownership is typically lower than a conventional car
- They offer short-time storage capacity to both the electricity grid and end users (“vehicle-to-home” or “vehicle-to-building”)

The European Copper Institute proposes to have 150kW chargers installed every 60 km along the Core European Road Network

However, the shift to electric vehicles can only occur if consumers are aware of their benefits, offered a wide range of models, and provided with the right charging infrastructure.

The “right infrastructure” includes: (1) installation of 150kW chargers along highways, (2) installation of chargers

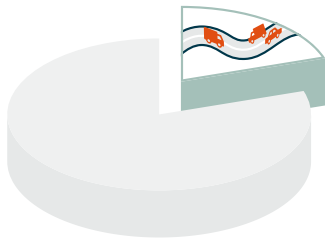
in existing residential buildings, and (3) deployment of urban public charging points for consumers without access to off-street parking.

The most recent intermediate car models have an autonomy of about 400 km, more than enough for everyday use. Most early adopters already have an off-street parking space to install a charger, either at home or at their workplace. An increase in the density of EV charging infrastructure is required to remove concerns about longer journeys. Therefore, the European Copper Institute proposes to have 150kW chargers installed every 60 km along the Core European Road Network. This will ensure all European countries provide enough infrastructure for EVs.

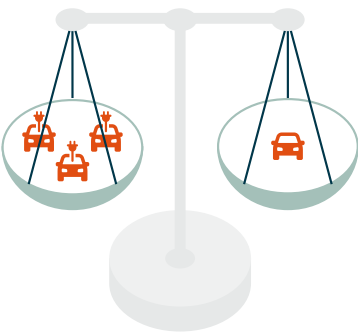
For EV users living in residential buildings with off-street parking, including the “Right-to-Plug” in national regulation will be a positive move. By so doing, a resident who wishes to install a charging point in the parking area of his building will only need to provide prior notification to the building community as a prerequisite for such an installation.

Since two thirds of cars in Europe are parked overnight in public areas (on street and car parks), the deployment

Road transport accounts for 20% of CO₂ emissions in the EU (2015)



CO₂ emissions of EVs are 3 times less than combustion engines



of public charging infrastructure is crucial to encourage the shift to electric vehicles. For this purpose, it will be useful to have public tenders awarded before 2025 to install wireless charging points in at least 20% of public parking spaces. Cities will greet wireless charging with enthusiasm since it will avoid the proliferation of charging poles. Consumers also support wireless: no need to worry about cables or apps, the vehicle will manage the charging process by itself – in other words: “Park & Forget”.

A swift implementation of these proposals for electrification of road transport will definitely ease the path to decarbonization for the European economy. ●

Complete benefits of full EVs only realized if the “Right Infrastructure” exists



Installation of 150kW chargers along highways (e.g. every 60 km along Core European Road Network)



Easy installation of chargers in existing residential buildings (“Right to Plug” in national regulations)



Deployment of urban public charging points (wireless charging points in public parking places)



European Copper Institute
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DECARB EUROPE



Electric Vehicles

Copper plays an increasing role in the development of electrified transportation and the integration of energy storage.

Learn how copper is essential for our future on pp. 52-53.

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VIEWS

Transport of Tomorrow

Over the last century the possibilities of human transportation have changed beyond our wildest dreams. But with cities becoming over-crowded and with vital environmental targets to meet, new solutions are needed. From cable cars across the Mexico City skyline, to driverless buses on the streets of London - discover the innovations from around the world that are re-imagining how we get from A to B.

Switzerland

The world's longest tunnel - passing under the Swiss-Italian alpine border - opened 4 September 2020. Switzerland's "project of the century" will enable travel from Zurich to Milan in just three hours, and is another step towards a trans-European rail route - connecting the North Sea and the Mediterranean.

Photo: AlpTransit



▲ **USA** 70% of U.S. traffic consists of people driving alone. The Lit Motors C1 is an electric self-balancing scooter/car crossoveraiming to reduce traffic. Photo: Intel Free Press.



▼ **The Netherlands** The PAL-V Liberty is the first flying car production model. The Liberty is a combination of a car and an autogiro, or gyroplane. Photo : PAL-V.

▲ **France** The "Lili" prototype from Advanced Aerodynamic Vessels make the most of aerodynamics and rely on the air to lighten the weight of the boat and thus go faster (up to 60 knots or over 110 km/h) whilst using less fuel. Photo: Jean-Pierre Bazard.





▼ Ecatepec de Morelos, Mexico

The Mexicable cable car line is 4.8 kilometers (3.0 mi) long with a traveling time of 17 minutes, down from the hour-long commute using ground-level transportation. It operates 184 cars, each with a capacity of 10 passengers. The predicted volume is 3,000 passengers per hour and 29,000 passengers per day. The Mexicable has brought some urban renewal to areas served by its stations: streetlights were installed, roads were paved, and about 50 murals were commissioned along the route.

Photo: Presidencia de la República Mexicana



▲ Nevada, USA Virgin Hyperloop One XP-1 test pod at the DevLoop test site in Nevada. Photo: Virgin Hyperloop One.



▲ Nevada, USA Hyperloop One's 500-meter Development Loop (DevLoop). Photo: Virgin Hyperloop One.

▼ Dubai, UAE DP World Cargospeed, enabled by Virgin Hyperloop One technology, will transport high-priority, time-sensitive cargo around the world. Concept image: DP World & Virgin Hyperloop One



▼ USA + Japan

Maryland officials participated in a test ride at SC MAGLEV Center, Yamanashi Prefecture, Japan. Maryland is exploring a future partnership with Japan to build a Baltimore-Washington line.

Photo: Steve Kwak / State of Maryland





▲ **Luxemburg** Volvo 79 Electric Hybrid from AVL (Ville de Luxembourg) at a fast charging station at Central Station in Luxembourg. Photo: GilPe



▲ **Seattle, USA** RapidRide lines are faster because they service fewer stops, make extensive use of transit signal priority to preempt traffic lights, and use special lanes to bypass traffic. Photo: Oran Viriyncy

▼ **China** EHang is preparing to launch what it hopes is the world's first autonomous air taxi service. The Ehang 184 is capable of reaching over 100km/h (with a limited range of 16 km). Photo: Alex Butterfield





▼ Air travel

Airbus has revealed three concepts for the world's first zero-emission commercial aircraft which could enter service by 2035. All three of the aircraft concepts, which rely on hydrogen as a fuel, are to be put through their paces to explore and mature the design and layout their future zero-emission plane.

Concept image: Airbus



▲ **Tallinn, Estonia** Tallinn has introduced a short shuttle route operated by driverless buses. The shuttle, like all public transport in the city, is free of charge for its residents. Photo: Aron Urb



▼ **Morgantown, USA** America's one and only personal rapid transit (PRT) system connects the three Morgantown campuses of West Virginia University and the city's downtown area. The driverless system was a government-funded experiment which opened in 1975. Like all PRT systems, stations are built on sidings, which allows vehicles to bypass stations and enables express trips between any two station pairs. Photo: Jae69376 (above), Antony-22 (below)



▼ **Greenwich, UK** UK's Transport Research Laboratory is conducting a driverless pod trial. The shuttle is a repurposed Ultra Pod, already in operation at London's Heathrow Airport. Photo: Spsmiler





▲ Switzerland

Following in the footsteps of the previous Snap and microSnap concepts, RinSpeed's MetroSnap Concept is a driverless "modular mobility system" that features a skateboard chassis as well as swappable passenger and cargo pods.

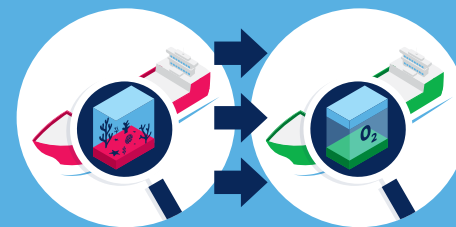
Concept image: RinSpeed



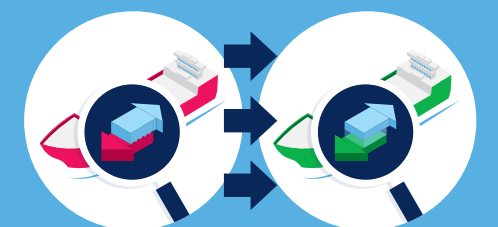
AIRCOAT

FLYING ON WATER

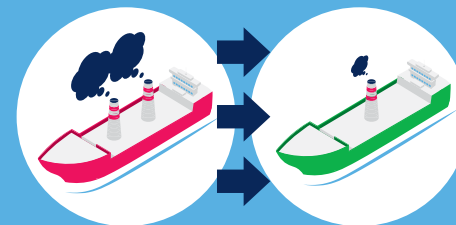
The AIRCOAT project promotes a ground-breaking passive air lubrication technology with a high potential to revolutionise the ship-coating sector by reducing energy consumption and ship emissions



REDUCING BIOFOULING



REDUCING FRICTIONAL RESISTANCE



REDUCING EMISSIONS



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The AIRCOAT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 764553.

✉ info@aircoat.eu

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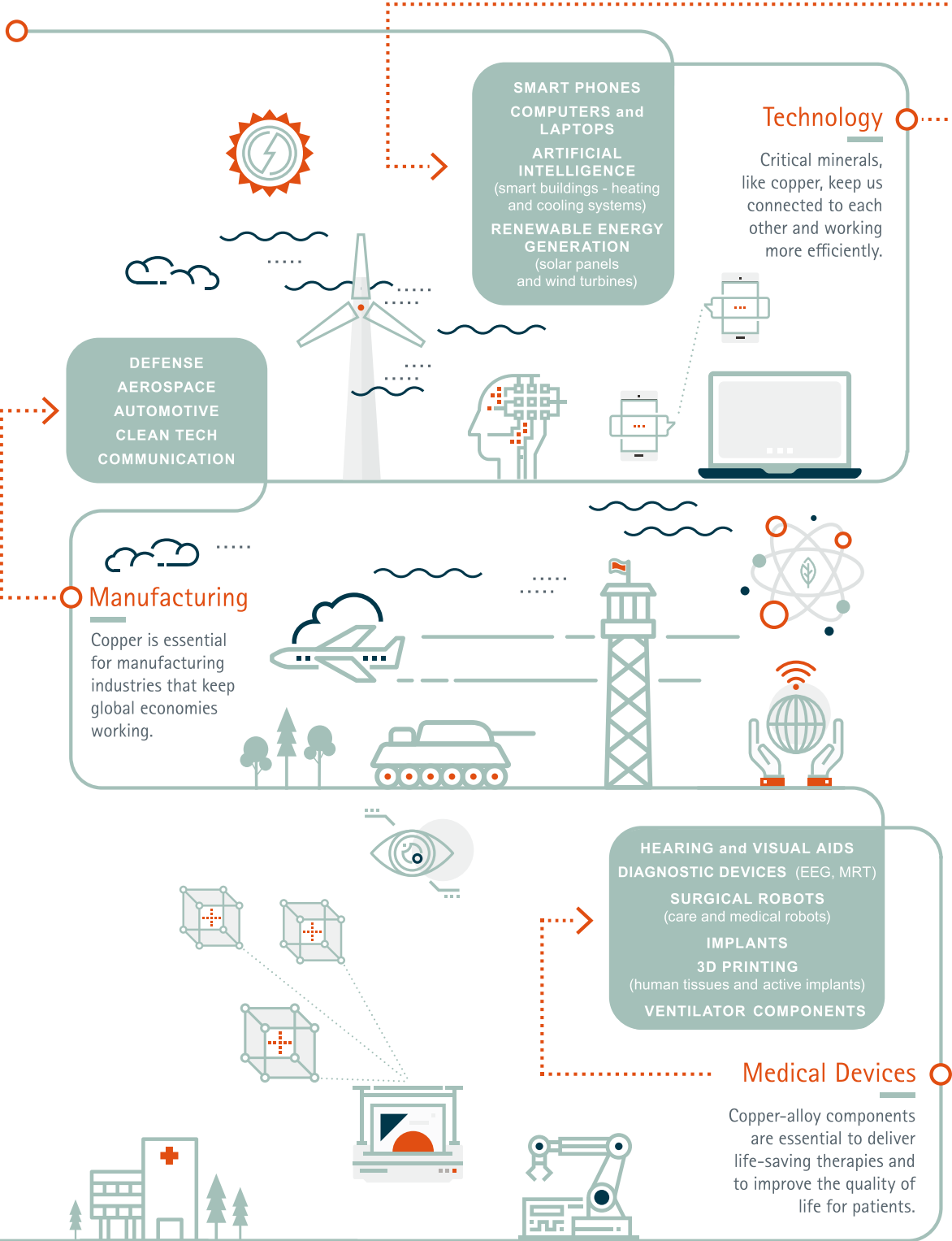
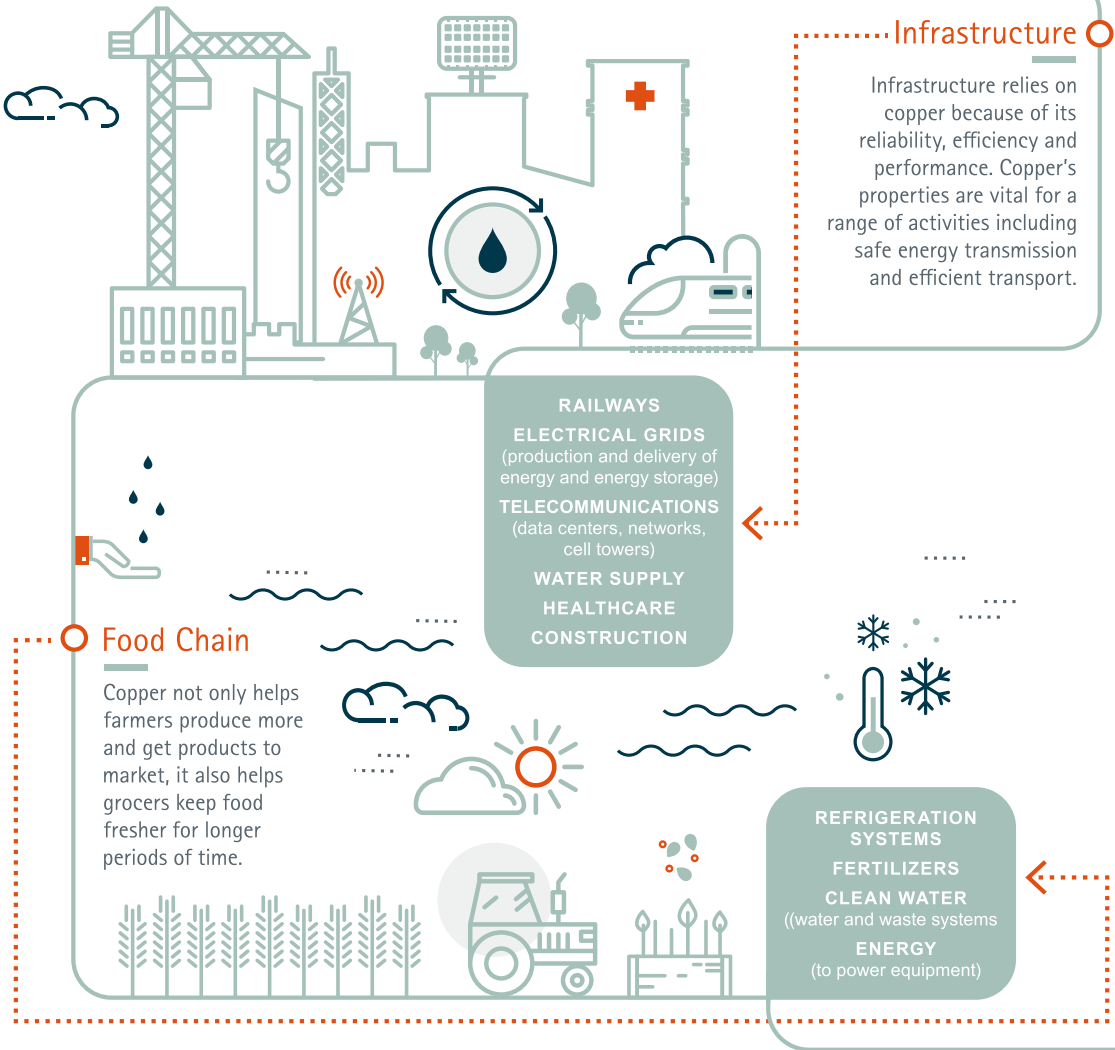
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A Brief History of Slow Food

WRITER: JACK COULTON

The general concept of slow food as an alternative to fast food is easy to understand and vaguely familiar for most people. Yet the organization of the same name, which operates in 160 countries, is less high profile, at least outside of its native Italy.

How did it all begin, and how did Slow Food evolve from its origins as a protest against the spread of fast food in Italy to the vast, multifaceted worldwide network it is today?

1. Market stall at Cheese 2015 event.
Photo: SlowFood.



Our story begins in Rome, in March 1986, where the first McDonald’s in the country opened near the famous Spanish Steps. The event was met with widespread protests from all corners of society involving thousands of people. In a symbolic action, one man decided to feed the protesters with plates of pasta, and a movement was born. His name was Carlo Petrini, a journalist from Bra, in the northwestern Piedmont region, and through his determination and zeal the nascent Slow Food organization started to spread.

The process was initially informal, through word-of-mouth, phone calls (the internet was still a distant dream), the Arci network (the Italian Recreational and Cultural Association, the largest non-religious association in the country), and Il Gambero Rosso, a food insert of the newspaper Il Manifesto. In November 1987 the Slow Food Manifesto, written by Petrini’s close friend and comrade Folco Portinari, was first published. The movement officially became international two years later, in December 1989, when the Slow Food Manifesto for an International Movement for the Defense of and Right to Pleasure was signed at the Opéra Comique in Paris by leading Italian cultural figures such as Dario Fo and representatives from 14 other countries .

With its origins as a literary cultural movement, the next step for Slow Food was to set up a publishing arm—Slow Food Editore—and release its first book, Osterie d’Italia (1990), a guide to the slowest restaurants in the country. It has been published annually ever since, becoming a solid reference point for all those interested in a dining experience that reflects local food traditions. National associations were set up in Germany and Switzerland in 1992 and 1993 respectively, as the organization took root and continued its spread within Italy.

The Ark of Taste

The next major step in the Slow Food story comes in 1996, when the first edition of Salone del Gusto was held in Turin, a biennial international fair dedicated to small-scale food producers producing high-quality products reflecting their local culinary traditions. The event was also the occasion for the launch of a flagship project, the Ark of Taste, a global catalog of unique foods (including fruit and vegetable varieties, animal breeds, cheeses, breads and more) at risk of extinction due to the small number of people safeguarding their continued production. As Petrini said at the time, it took human societies thousands of years to develop this rich diversity of food cultures, and it could all be lost within a few generations unless action is taken to save them. To date, the Ark contains over 5200 products from 150 countries.

Being an Italian association, it should come as no surprise that Slow Food has a particularly strong relationship with the world of cheese. Another biennial event dedicated to it, simply called Cheese, was first held in 1997 in Bra, the hometown of the movement, and attracts hundreds of thousands of visitors. Over the years, Cheese has become a vanguard for the defense of raw milk cheese and all the biodiversity it represents: the plants of pastures; the different local animal breeds that graze on these pastures; and even the microbial life in the milk which is destroyed by pasteurization. As a testament to its success, it was able to impose a strict “raw milk cheese only” rule in 2017,



2. Cheese 2019 event. Photo: Alessandro Vargiu.
3. Mani in pasta, collaborative pasta making workshop. Photo: Alessandro Vargiu.
4. Dogon Somé, Mali. Photo: Paola Viesi.
5. Lesachtal bread, Austria. Photo: Wolfgang Hummer.
6. Rimbas black pepper, Malaysia. Photo: Alberto Peroli.



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which would have been unthinkable 20 years previous—there simply wouldn’t have been enough producers.

At the second edition of Salone del Gusto in 1998 Slow Food invited some of the leading names in global gastronomy to attend the movement’s concurrent International Congress. The list included legendary French winemaker Paul Pontallier, the founder of the American Brewers Association Charlie Papazian, and superstar Spanish chef Ferran Adrià, as well as the incumbent Prime Minister of Italy Massimo D’Alena. All contributed to the legitimization and political recognition of Slow Food’s work and values.



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A United Nations of local producers

The next year another flagship project was launched, an extension of the Ark of Taste which goes several steps further in guaranteeing the survival and success of small-scale quality food products: the Slow Food Presidia. These projects—at time of writing there are 590 spread across 74 countries—were Slow Food’s first foray into the production process itself, putting the Slow Food philosophy on agriculture and biodiversity into

practice. This involves training activities to improve the quality and sustainability of the production chain, promoting these foods both in their local areas and at Slow Food events, and creating a platform for producers to interact with like-minded folk across the world. And, of course, telling their stories.

Through ongoing advocacy work around the globe by its staff based in Bra, Slow Food went about finding small-scale food producers hard at work protecting their local gastronomic heritage in every continent, often in isolated areas and with limited knowledge



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of an important and inspiring reality: that they were not alone, that in fact there were millions of people just like them, all united by their adherence to the principles of Slow Food. Out of this growing network came the idea for an event to bring these small-scale producers together, physically, for a sort of ‘United Nations of farmers’. That event was Terra Madre, first held in 2004, where 5000 delegates from 130 different countries all came together for a festival of cultural and gastronomic diversity in Turin: this was the living antithesis of the playing-field-leveling globalization of fast food, where a McDonald’s is the same bland burger no matter where or when you buy it.

The next generation of slow foodies

It was in the same year that Slow Food launched perhaps its most ambitious project yet, and one that has since taken on a life of its own: the University of Gastronomic Sciences. The world’s first learning institute dedicated entirely to the study of food and food culture, was founded in Pollenzo, a small town close to Bra. Since it first opened its doors the University has welcomed over 3000 students from countries all over the world, and, as Carlo Petrini intended, these alumni have gone on to become ambassadors for the Slow Food movement in their hometowns and countries.

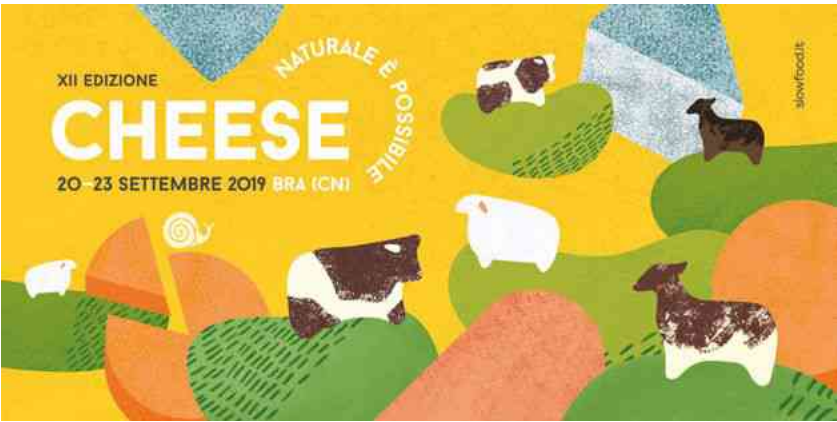
Beyond the land, Slow Food also took to the seas in 2004 with the inauguration of Slow Fish in Genoa, dedicated to sustainable fishing and coastal communities, becoming another biennial event. All three of these main events (Salone del Gusto, Cheese and Slow Fish) are characterized by a multitude of activities, centered around a central marketplace where visitors have the opportunity to buy food products

directly from the producers. This is a key principle of the Slow Food philosophy – cutting out the middlemen between food producers and consumers. What all the foods on sale at Slow Food events have in common, as Petrini says, is that they are good, clean and fair, a concept explored in his 2005 book of the same name (published, naturally, by Slow Food Editore).

- 7. Cheese 2019. Photo: Alessandro Vargiu.
- 8. Cheese 2019. Photo: Davide Greco.
- 9. Cooking workshop at Slow Fish 2017. Photo: Alessandro Vargiu.
- 10. Fish trap weaving demonstration at Slow Fish 2019. Photo: Alessandro Vargiu.
- 11, 12, 13. Promo banners for Slow Foods’ three main events: Terra Madre, Cheese and Slow Fish. Images: Undesign.it



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A global phenomenon

From there, the expansion of international events becomes so rapid and far-reaching that it would be difficult to single out the most significant moments, but there are two projects worthy of mention. The first is the Cooks' Alliance, launched in 2009, which counts over a thousand members globally, all of whom are restaurateurs upholding the Slow Food philosophy in their kitchens, often through the use of Ark of Taste or Presidia ingredients. The second are the 10,000 Gardens in Africa (currently a third of the way towards its target, with 3333 gardens established across 34 countries so far), which aim to ensure the continued self-sufficiency and food sovereignty of local communities which are all-too-often the target of land-grabbing and expropriation.

As with any movement, Slow Food has had to adapt and evolve in order to survive and thrive throughout its 34-year existence, and while Petrini is still President of Slow Food International, the torch has been passed on to a



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number of leaders who oversee the day-to-day activities of the network around the world. These include: Sun Qun, the General Secretary of Slow Food in China; Edie Mukiibi, Vice-President of Slow Food and spearhead of all the movement's activities in East Africa, particularly his native Uganda; Serena Milano, who leads the Slow

Food Foundation for Biodiversity; and Dali Nolasco Cruz, a Nahua woman who serves on the advisory board of the Indigenous Terra Madre network. There are hundreds of others like them, spread far and wide, but all united by a common vision of food culture which can be defined quite simply by two words: Slow Food. ●



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13. Didactic space of the importance of bees and pollinating insects to the survival of the ecosystem. Photo: Alessandro Vargiu.

14. Tofu making workshop at Terra Madre 2018. Photo: Alessandro Vargiu.

15. Workshop at Slow Food Nations, Denver 2019. Photo: Slow Food USA.

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Smart and Green Public Services in Euro-Mediterranean Cities

WRITER: MICHAEL KARNER

By 2050, 68% of the global population is expected to live in urban areas. Designing more sustainable cities will therefore be crucial over the decades to come. To respond to this global challenge, the “smart city” concept seeks to understand how digital technologies can help to optimize the environmental footprint of urban areas, including that of public services. In this article, we zoom in on the efforts of the Interreg MED Green Growth Community to develop green and smart public services in Euro-Mediterranean cities.

What is a smart city?

“A smart city is a place where traditional networks and services are made more efficient with the use of digital and tel-ecomunication technologies for the benefit of its inhabitants and business. A smart city goes beyond the use of information and communication technologies (ICT) for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.”

Smart cities strive to reduce resource inputs by harnessing digital technologies to develop intelligent solutions in terms of energy, housing, water management, waste and mobility. As innovation laboratories, they can also induce behavioral shifts towards more sustainable lifestyles and approaches among urban populations.

Alongside the EU Green Deal, numerous EU-wide efforts to boost smart cities are underway. For instance, the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) promotes integrated solutions for urban challenges related to energy, mobility, transport and ICT. Supported by the European Commission, it gathers cities, industry, small business (SMEs), banks, research and others, and is currently running the “Join, Boost, Sustain” Declaration and campaign for EU public administrations to support the emergence of a “European way of digital transformation in cities and communities”.

Within the Smart City concept, increasing the capacity of municipal authorities and other actors is a cornerstone of the provision of smart and green public services. This requires new competences, know-how and resources



among public administrations. On the data side, disaggregated data is necessary to adequately portray local urban realities and link their opportunities and challenges to the targets set out by the EU Green Deal and SDGs. On the human side, this city-led approach is necessarily citizen-centric and citizen-driven. Indeed, the open innovation ecosystems that smart cities strive to create rely on the ethical and socially responsible access, use, sharing and management of data. For instance, digitalization can present new solutions for the remote monitoring of air and water pollution, or optimizing resource use in urban spaces. Expanding the reach of this concept in the European countries bordering the Mediterranean is also one of the objectives of the Interreg MED Green Growth Community.

- 1. The Media-Tic green building in Barcelona, Spain. Photo: Open University of Catalonia.
- 2. Solar powered streetlight. Photo: Florentino Velasquez Floro.
- 3. Pneumatic waste collection system, Vitoria-Gasteiz, Spain. Photo: Basotxerri.
- 4. TWG infographic. Image: REVOLVE
- 5. Automatic display of air pollution data as a percentage of the health limit value, Hungary. Photo: Globetrotter19
- 6. Barcelona Smart City Tour.



Smart cities in the Euro-Mediterranean

The Interreg MED transnational European Cooperation Programme for the Mediterranean area drives regional cooperation in the EU states that border the Mediterranean Sea. Its Interreg MED Programme’s Green Growth Community (GGC) counts several projects that are applying the Smart City concept to specific sectors such as energy efficiency in public infrastructure and urban mobility.

The GGC focuses on green growth, the circular economy, the sound management of natural resources, enhancing cross-sectoral innovation and promoting green jobs and social justice through an integrated and territorially-based cooperation approach. It consists of 14 projects connecting 165 partners from 13 countries in the Mediterranean working on agrifood, eco-innovation, smart cities, waste management and green growth finance. The Union for the Mediterranean (UfM) labelled the Green Growth Community in October 2019, acknowledging its potential to advance cooperation in the transition

to a green and circular economy and to deliver concrete benefits to the Mediterranean region. Through its Green Growth Capitalisation Platform, the GGC currently supports its projects in their communication and capitalization efforts to increase their impact at the policy level and ensure their potential transfer and replication into other territories.

One of the foci of the GGC is Smart Cities, in particular the provision of

smart and green public services by public administrations. This involves capturing and analyzing data to inform the process of delivering smart and green public services coupled with increased resource efficiency, sustainability, social inclusiveness and citizen well-being. The following GGC projects are contributing to the design and implementation of smart and green public services in the Interreg MED Green Growth Community’s target countries.

GREEN AND SMART PUBLIC SERVICES



ESMARTCITY
Enabling Smarter City in
the MED Area through
Networking

esmartcity.interreg-med.eu

kalogeras@isi.gr

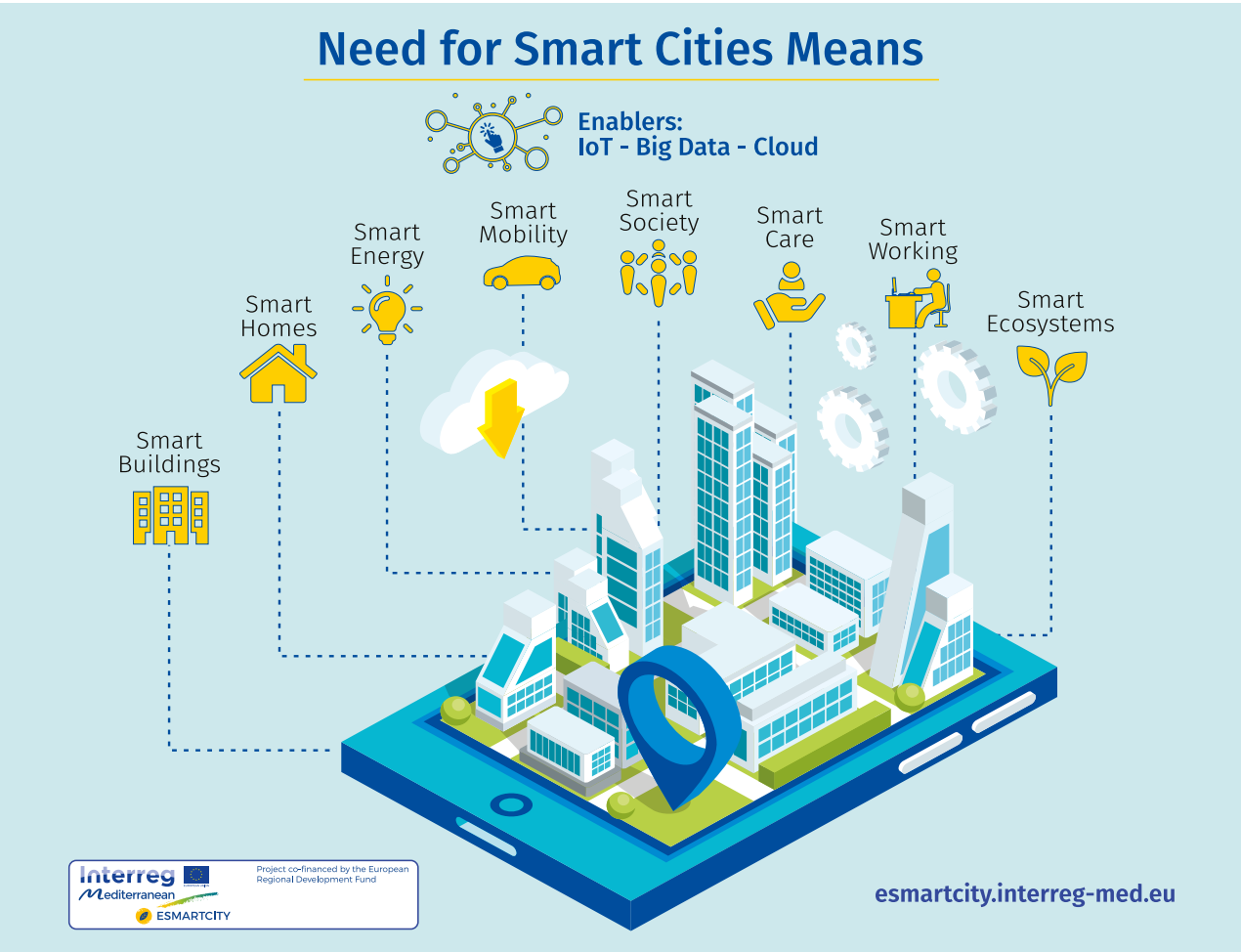
Countries: Bosnia and Herzegovina (East-Sarajevo), France (Lyon), Greece (Mesolongi, Patras, Pyrgos), Italy (Pescara, Milan), Portugal (Palmela, Setúbal, Sesimbra) and Spain (Huétor-Tájar, Agrón)

The ESMARTCITY project used digital, energy-saving technologies to increase the energy efficiency of urban

infrastructure, specifically public lighting and public buildings. About 35 TWh of electricity is consumed by over 56 million streetlights in Europe. Due to their inefficiency, numerous municipal bills are devoted to covering the energy cost of public lighting alone. Public buildings are the second main energy consumer for European municipalities. Overall, buildings consume around 40% of European energy consumption and account for 36% of the EU's CO₂ emissions. To tackle these challenges, ESMARTCITY raised awareness among public authorities concerning solutions to increase the energy efficiency of their public infrastructure. This involved the adoption of open data practices to allow for energy consumption data analysis, while streamlining public procurement

procedures for public administrations to adopt energy efficient solutions more easily. ESMARTCITY recently shared policy recommendations for local and public administrations in its Green Paper for Innovation Policy Change. The project promotes innovation based on the Smart City concept in Mediterranean cities. The digital solutions that it promotes have the potential to improve the quality of public services delivered to citizens while reducing their environmental impacts and stimulating the creation of green jobs and more sustainable urban lifestyles.

7. Source: ESMARTCITY Project.
8. Source: ESMARTCITY Project.



GREEN MIND
Green and Smart Mobility
Industry Innovation

greenmind.interreg-med.eu

chiara.franceschini@siproferrara.com

Countries: Bosnia and Herzegovina (Sarajevo), Croatia (Istria and Split-Dalmatia regions), France (Provence Alpes Côte d’Azur region), Greece (Thessaloniki), Italy (Ferrara), Spain (Andalusia region)

The Smart Cities concept is intimately linked to digital and product and service design innovation. In this regard, the GGC GREEN MIND project promoted the innovation capacities of public and private bodies in the green and smart mobility industry. GREEN MIND supported transnational clusters and agencies (composed of businesses, research organizations and public authorities) in improving the access to market opportunities of small and medium enterprises

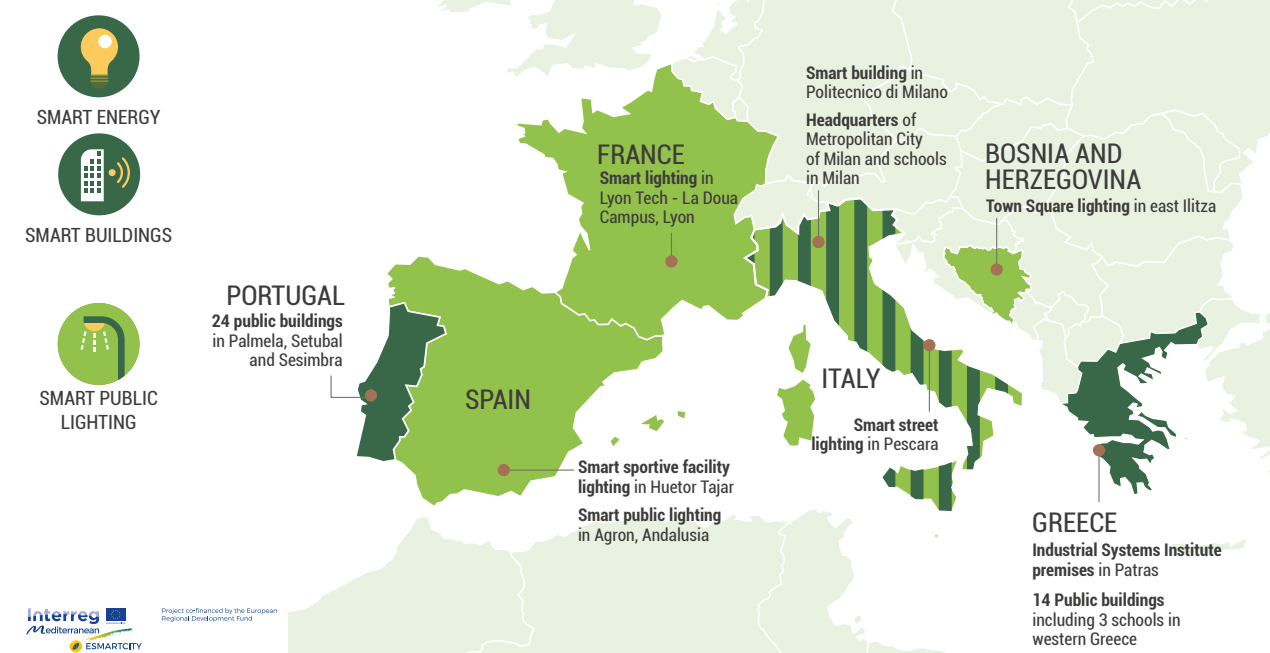
(SMEs) within the expanding eco-mobility sector. GREEN MIND developed and tested three pilot services to strengthen SMEs’ competitiveness and innovation capacities. It reinforced their market positioning by helping them to identify business opportunities, supported them in accessing public funding and matched them with relevant partners to engage in regional and transnational cooperation between businesses, research bodies and authorities.

Developing smarter and green mobility is a core target of the EU Green Deal. Transport accounts for 25% of the EU’s greenhouse gas emissions, which should be reduced by 90% by 2050 according to the EU Green Deal. GREEN MIND contributed to the further expansion of eco-mobility by fostering economic competitiveness and innovation, thereby supporting the transition to a green economy in the EU. This sector is rapidly shifting due to continuous technological innovation and increasingly stringent environmental policies, leading to increased demand for green and smart mobility products and services provided both

by public and private actors. This is a compelling market opportunity for SMEs, which nonetheless require the type of support provided by GREEN MIND in this complex, transversal industry that spans numerous sectors, including the ICT, transport, logistics, energy and automotive industries.

By providing market intelligence, public funding screening and B2B matchmaking to mobility SMEs within its transnational innovation network, GREEN MIND allowed new linkages to emerge between urban authorities and innovative SMEs in the Euro-Mediterranean region. The project’s tested services and knowledge were also transferred to other clusters, ensuring joint learning, knowledge sharing and capacity building processes. Finally, a policy support programme is disseminating GREEN MIND’s results based on the Smart Specialisation Strategies of the regions involved. This transfer and take up program increased the capacity of Mediterranean clusters participating in the project to deliver smart, eco-mobile solutions at the transnational level.

E-SMARTCITY PROJECT FOCUSES ON



GRASPINNO

Transnational model, strategies & decision support for innovative clusters & business networks towards green growth

graspinno.interreg-med.eu
graspinno.eu

ystephanedes@upatras.g

Target Countries: Bosnia Herzegovina, Cyprus, France, Greece, Italy, Slovenia, Spain

From 2016 to 2019, GRASPINNO provided innovative green e-procurement solutions to support energy savings and the efficient refurbishment of public buildings. The project improved the capacity of public authorities to manage the energy efficiency of public buildings and to strengthen the capacity of small and medium enterprises (SMEs) to enter the green energy market. Indeed, mainstreaming solutions for energy efficiency in the built environment is key to achieving the targets of the EU Green Deal and the EU Circular Economy Action Plan. 80% of the EU's buildings in 2050 already exist now, which is why boosting their energy efficiency and supplying them through renewable energy sources is an essential step towards achieving the targets of these European frameworks.

GRASPINNO ensured the transfer of smart, low-cost and sustainable solutions to public authorities and SMEs in the entire MED region. Working together with public and private stakeholders, the project tested its methodology on 13 pilots within 28 public buildings located in 5 countries, achieving a total reduction in energy consumption of approximately 10%. It is noteworthy that GRASPINNO'S methodology is replicable to other kinds of buildings, and not only public ones. GRASPINNO also

created an online platform to centralise the information needed by both public authorities when preparing a public procurement process and for SMEs to showcase their green energy products and solutions. It comprises three tools for green public procurement:

1. A database that assists public authorities in setting green energy requirements within their procurements and allows SMEs to propose solutions to meet these targets;
2. An electronic Green Public Procurement (eGPP) Support Tool that offers public authorities an easy way to collect green specifications that can inform the tender preparation process;
3. A Life Cycle Cost (LCC) Calculating Tool, which attributes an economic value to products and services relevant to the circular economy in the public sector. The platform supports public authorities in planning and managing the green public procurement process, and in publishing and awarding calls for tenders according to the rules of each country. SMEs can also search for tenders and insert their green products and services into the eGPP platform.

The Green Growth Community supported a broad range of actors from the public and private sectors in working and innovating together for more energy efficient and eco-mobile Mediterranean cities. Read more about the Interreg Green Growth working groups on eco-innovation and smart cities by delving into their White Papers:

- **GGC White Paper 2** – Towards circular towns and cities: promoting green and smart public services within Mediterranean municipalities to move towards a circular economy
- **GGC White Paper 4** – Fit for a circular future: promoting competitiveness and innovation of Mediterranean SMEs for a circular economy

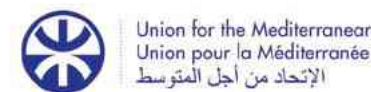
Join the community

Learn more about the Interreg MED Green Growth project and join our Green Growth Capitalisation Community. ●



Project co-financed by the European Regional Development Fund

A project labelled by the UfM



THE MED GREEN GROWTH COMMUNITY

Promoting sustainable growth in the Mediterranean and beyond:

- Empowering and connecting Green Growth actors
- Producing knowledge on Green Growth
- Capitalising, and replicating our project results
- Informing national and EU Green Growth and Circular Economy legal and policy frameworks
- Forging collaborations and fomenting synergies between Green Growth networks, institutions and programmes.

Visit our website:

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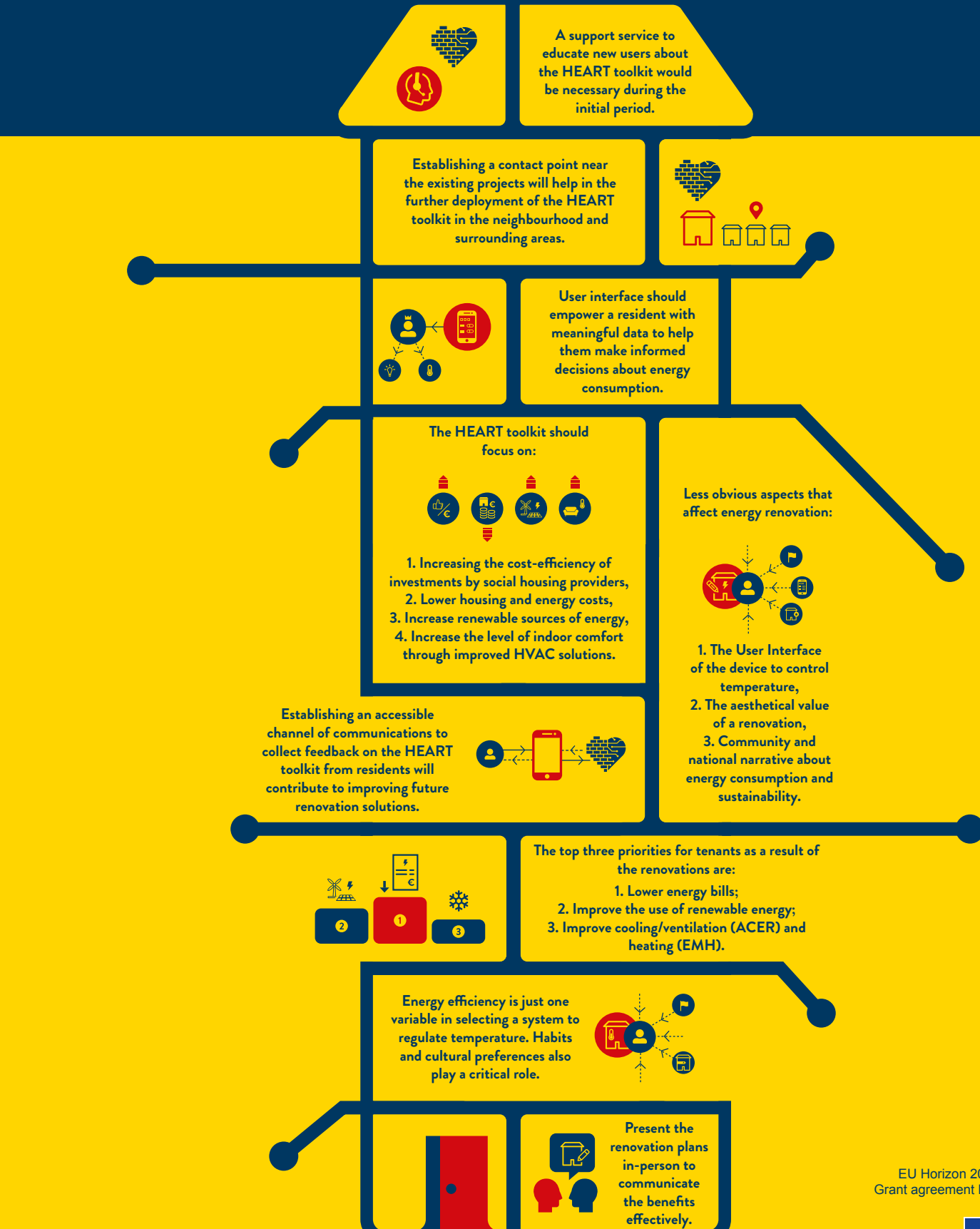
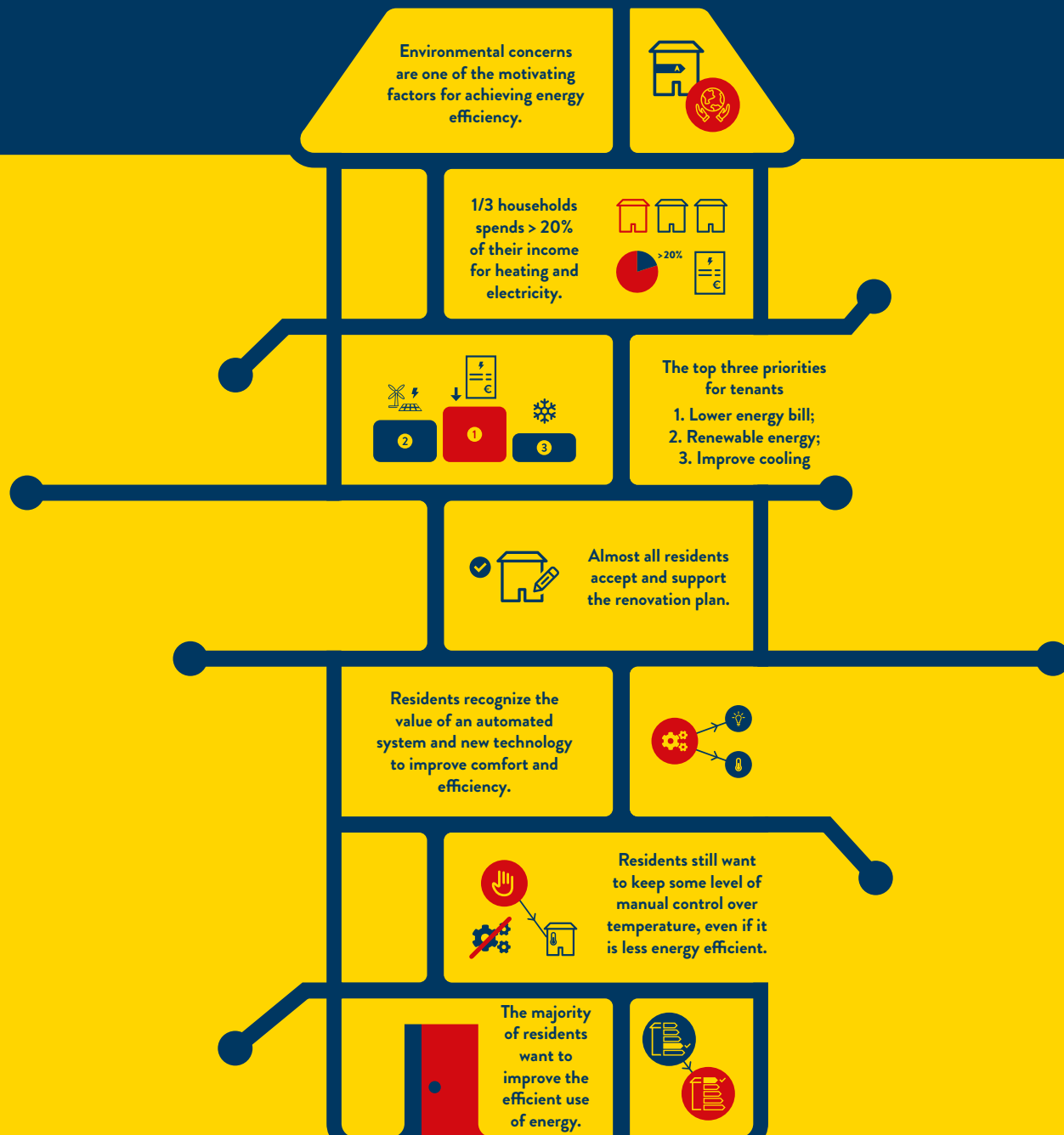


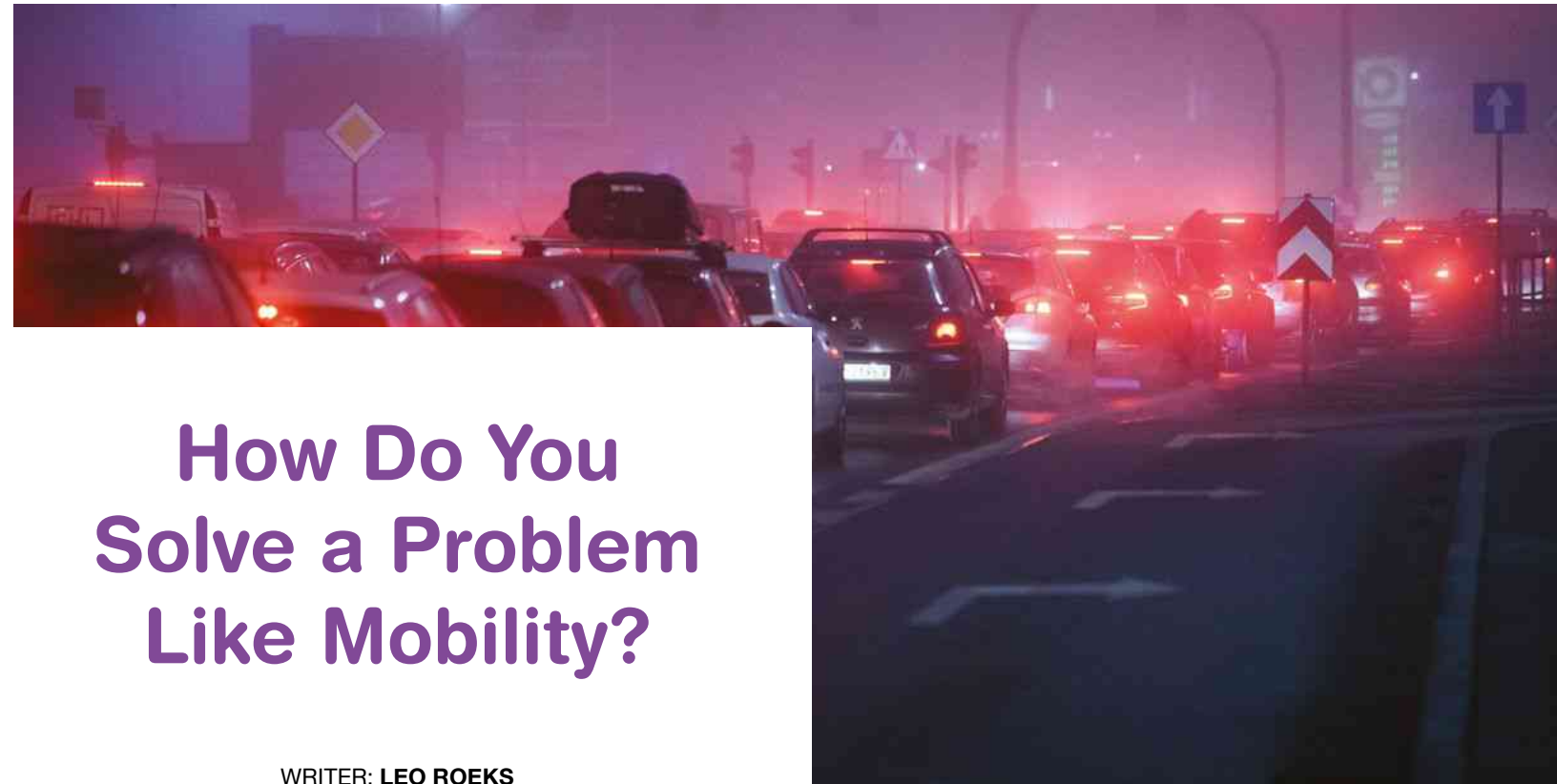
RESIDENT'S SATISFACTION AND ACCEPTANCE OF THE PLANNED RENOVATION



HEART

Based on a survey in the two Heart demo cases in France and Italy conducted among the residents of social and public housing before the renovation works (N=23). The survey was prepared for Deliverable 9.9 - Evaluation of building users' acceptance and satisfaction - I, March 2020.





How Do You Solve a Problem Like Mobility?

WRITER: LEO ROEKS

It is difficult to paint a coherent, all-encompassing picture of mobility. This is in the nature of things: mobility is a process that changes every day, takes on various forms - with different emphases in different contexts. Any status-quo already carries its expiry date within itself. This makes the crucial question - what will tomorrow's traffic look like? - a challenging one to answer.



While there is no definitive path to what our future mobility may look like, what exists are guidelines for action and ideas at various levels. The most important being that everyone can already do something today. We are not stuck in a traffic jam - we are the traffic jam. The traffic of tomorrow is not something abstract that will simply be there sometime in the distant future. The traffic of the future is already here right now - in us. Each individual can already make a decision today on how they want to be mobile. Whether they use public transport more often or take advantage of the tax breaks when buying an electric car, whether he gets his bicycle out of the basement or asks his landlord to install a wallbox for recharging electric cars, everyone has the opportunity to influence tomorrow's infrastructure already, today - even if it's only being more aware of how much space an SUV takes up in a parking lot.

This also applies at the political level. One can be governed or decide to take part in the decisive decisions for the immediate environment - in initiatives, at council meetings or through letters to the local newspaper or statements in social media. What is important and already starting to make the change is the existence of an awareness of change, a feeling for one's own role in the multimodal game of transport and the will to take action.

Rethinking traffic for the community

All of this is the opposite of egoism, and thus a departure from the 'higher, faster, further' approach to mobility that has been used so far. Up to now, we have built wider motorways, erected more multi-story car parks and directed the 'green wave' of traffic lights towards the internal combustion engine - allegedly in order to cope with traffic and to ensure free movement for supposedly free citizens. But the result of this game of hare and hedgehog is clear: more roads create more traffic, enslaving us even more in our selfish tin shells instead of getting to the root of the evil and rethinking traffic in the sense of the community of all citizens.

1. Bike parking lot, Amsterdam, The Netherlands.
Photo: Jordi Moncasi.

2. Charging point for electric car, Munich, Deutschland.
Photo: Marc Heckner.

3. Smog and heavy traffic at night, Kraków, Poland.
Photo: Jacek Dylag.

4. Photo: Mika Baumeister.



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We are no longer in ancient Greece or in a canton of Switzerland, where all citizens met at certain intervals in the marketplace to vote directly on the basic lines and details of community policy. We are used to having our interests represented by representatives in the municipalities, the states and at the federal level. These representatives therefore have particular importance and responsibility with regard to the mobility concepts of tomorrow.

Starting a new dialogue on mobility

In this regard, it is important to shine a light on the holistic transport concepts which are, so to speak, at the micro level and can generally be implemented on an ad hoc basis without major financial effort. The same applies to the individual: what is critical is the awareness of the need for change in the citizens' immediate living environment. The famous pop-up bicycle lanes are only a small, relatively easy example, but these rather symbolic changes should not be the only ones. On both a large and small scale, a coherent overall concept is the crux of the matter for sustainable development. Developing this overall concept in dialogue with the citizens in their role as voters, consumers, drivers, retailers or recreational sportsmen and women is a challenging, but at the same time achievable task at the local political level. The obstacles will be great, interests will have to be weighed up against each other and contradictory demands will have to be moderated, but on closer inspection that is the core of every policy - even in the marketplace of Athens or Appenzell-Innerrhoden. And despite all the difficult concomitant phenomena, in the end a newly designed traffic world can emerge in cities and communities, making life on and along the roads much more livable than it is at the moment. With a little pathos and



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patience can lead to the emergence of a new form of public welfare that is no longer just subject to the demands of car traffic, but that also raises the serious question of how the interests of all road users can best be represented in the cityscape.

We cannot wait for a mobility miracle

The clock is ticking. As described above, the crystal ball science of looking into the future is fraught with all sorts of risks, but once you get away from any shaky predictions, the realization is that it is the now that will shape the future. There is no reason not to start the change today. There is no point in waiting for technical progress, for groundbreaking inventions and successful economic solutions - what is possible today can change the world just as much as the successful application of hydrogen as a source of propulsion or the digitalization

of inner cities. There is no reason to wait for a paradisiacal future of mobility and simply continue as before until then. On the contrary, only if we start thinking here and now about how we want to be mobile tomorrow can we create structures that can integrate new developments.

The car-friendly city was not built in a day. Before it materialized there were clever and less clever concepts, discussions and lectures - why don't we do it again in the same way, but this time with different premises that focus on people and not machines? Traffic flows do not always need a computer program to control them. In many cases, common sense is enough. Anyone who wants to reduce the classic, motor-driven individual traffic in city centers can increase the frequency of public

5, 6. Temporary bicycle lanes in Switzerland. Photos: Rue d'Avenir Suisse



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transport, as well as the parking fees and pedestrianized zones. If you want to encourage cyclists, you can give them more safe spaces within the cityscape. And those who make the roads leading into the city narrower and at the same time make the arterial roads more spacious, automatically create a mobility environment in which the decision as to which means of transport to use is not immediately the private car.

A fearless future

All this need not be set in stone. If there is one thing we have learned from the digital culture of the internet and start-ups over the last twenty years, it is a healthy attitude towards mistakes and failures. Nor will tomorrow's transport

policy be perfect; it will give birth to mistakes and apply inappropriate solutions in the wrong areas. In doing so, it will merely continue what classic transport policy has been doing for decades, from ghost bridges and motorways that were never built to the failed car toll in Germany, which cost taxpayers hundreds of millions of euros. So why should not an enlightened, forward-looking mobility policy also have the right to make mistakes? After all, the central objective is to create an environment worth living in, in which the balance between economic requirements, technological innovation, public welfare and sustainability is, if not achieved, then at least aspired to.

This problem will not solve itself, but by fearlessly facing the future, we can again reinvent the wheel of mobility. ●

7. Amsterdam, like many Dutch cities, is well known for being bicycle friendly. Bicycles are used by all socio-economic groups because of their convenience, Amsterdam's small size, the 400 km of bike paths, the flat terrain, and the arguable inconvenience of driving an automobile: driving a car is discouraged, parking fees are expensive, and many streets are closed to cars or are one-way for motor vehicle traffic. Photo: Alfredo Borba.

There is no reason to wait for a paradisiacal future of mobility and simply continue as before until then.



Public Transport Is Always There for Us

Now Let's Build It Back Better - Together

WRITER: MOHAMED MEZGHANI

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2020 has been defined by the Covid-19 pandemic and the impact it has had on all our lives – the world has faced a lot of uncertainty.

Many sectors have been impacted in unprecedented ways by this ongoing outbreak and a great deal of change has taken place in the cities we call home. But the main message from our sector has remained strong: public transport is always there.

It may have faced many complex challenges over the last few months, but the positive case for public transport in our cities is stronger than ever.

Many of you will be experiencing a new normal to your working day. As a digital-only world has replaced the standard office environment, our idea of community is changing. Public transport is its own community, with every passenger and every worker as a part of that family. For those working on the association-side of the sector, it's a community that thrives on face-to-face networking. Now, with the changes to working life, it's more important than ever to make the already positive case for public transport even clearer and encourage people back into that community.

When the lockdown began many local networks ran on reduced services. This led to a decrease in farebox revenues (in some cities the initial reduction in patronage was more than 90%) and also to increased costs needed to disinfect and implement new safety measures in public transport vehicles and infrastructure. Now passengers are returning, but there's still work to do. UITP has always recognised the positive role public transport plays in our lives. But perhaps now, during this global pandemic, the world is seeing just how vital it has become.

Guardians of mobility

Despite the restriction of movement in states around the world, essential workers needed to get to and from their place of work. Those in the medical profession, those working in the rescue services, those providing essential care - public transport helped them do that. It never left them.

Then there were those who needed to get their groceries, those who needed access to education, to healthcare, or to visit the elderly or the infirm.

It was a challenge, but buses, trams and trains kept moving.

And those working in public transport became our Guardians of Mobility. It was an honour for UITP and our international membership to honour them and salute their dedication, commitment and resilience in what have been uncertain times.

Even with all the change the pandemic has brought, and continues to bring, the support and positive attitudes we have seen within our community still remain.

- 1. In a continued effort to COVID-proof public transportation, the MTA has installed mask dispensers at the entrance to city buses. The MTA plans to roll out the pilot across every borough on more than 20 routes and 400 buses by the end of August. Photo: Marc A. Hermann / MTA New York City Transit
- 2. Bus passenger with mask and gloves in Budapest. Photo: UITP.
- 3. Seats labelled out-of-use to support social distancing on a Transport for Wales train during the 2020 Covid-19 outbreak. Photo: Alex Liivet



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Public transport is vital for urban living

However, in order to limit the social, economic and financial consequences of COVID-19, exceptional measures still need to be adopted. Public transport should be high on the agenda of government financial rescue packages as it must not only survive, but thrive and build back better. Public transport is vital for our cities – it’s vital to good urban living.

At UITP, we work with more than 1800 members to advance public transport. The UITP team is made up of a wide variety of urban mobility experts, based around the world working tirelessly to monitor the impact on our sector - producing detailed and informative research along the way.

We believe that moving people together is the only way to make our cities more liveable. The answer is certainly never more private, single-use car journeys.

Now that restrictions on movement have been lifted in certain cities we

have seen the return of some of those who may have stopped using their local networks during the restrictions.

Encouraging mobility

Research tells us that transmission on public transport is low. At UITP, this is the kind of information and advice that we are constantly sharing with our members and the general public. Through publications, in interviews and via UTIP’s digital platforms our work has seen a lot of engagement and it’s always encouraging.

But more needs to be done to encourage people to return to public transport.

The wearing of masks must become mandatory on board all networks. We’ve seen this become commonplace in many cities, but some still choose to encourage physical distancing instead, or alongside the wearing of masks. But physical distancing on board mass transport is not good for sustainable mobility, as it still encourages people to avoid it and travel by car.

4. MTA worker cleans a city bus.
Photo: Marc A. Hermann / MTA New York City Transit

5. Advertising space on the back of a Brazilian bus reminding citizen to wear the mask in public places.
Photo: Marcos

6. New York City Transit installed vending machines offering personal protection equipment (masks, sanitizer, gloves) in subway stations.
Photo: Marc A. Hermann / MTA New York City Transit



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Furthermore imposing physical distancing on public transport vehicles would mean operating them at a reduced capacity. Public transport authorities, operators and associations have worked around the clock (literally through the night) to make public transport modes clean, safe and comfortable for those who are using it during the pandemic and beyond. Surveys and empirical research show that public transport is a safe place. Now we must persuade people to come back and use it, not put them off.

Looking to the future

At the beginning of the pandemic, we spoke about the public transport sector surviving and thriving. To make this possible public transport must receive the necessary support and financing. Already it enables people to get education, reach employment and connect with one another, while also delivering on climate action and making our lives healthier.

But still it can do so much more.

At UITP, our focus is on what the future can look like. How do we come out of this stronger than before? How do we build back better? Alongside UITP’s global membership, we’re focusing the conversation on making the sector better than ever before. With a focus on better mobility, comes better cities for everyone.

Let’s build back better - together. ●

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