CLEAN MOBILITY’S CHALLENGING ROAD AHEAD

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As European cities hold Mobility Week events across the continent, this special report looks at some of the challenges facing the sustainability drive.

New emission targets, shifting social patterns and advances in technology are set to drastically change the drivers behind the EU’s current mobility system.

Along with measures to increase the use of public transport and alter travel habits, established manufacturers and industry are starting to plan wholesale changes to the products they put on the market.

Incoming Commission President Ursula von der Leyen has also offered up clues to the direction her administration will take during its five-year mandate.
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Electric-battery power is often branded as unsuitable for certain types of transport and vehicles, due to concerns like weight and power ratios. But several new developments ranging from shipping to motorsport are cause for a rethink.

The all-electric revolution is firmly underway in the passenger car sector, where its global market share reached 2% in 2018. Sales records continue to be broken, while e-buses also make progress.

New emissions targets set by EU legislation and a pledge to increase access to charging infrastructure mean that segment of the market looks to have a rosy future.

But the EU’s first foray into regulating heavy vehicle emissions last year reignited a debate about how suitable electric-battery power is for long-haul trucks and even larger vehicles like ships.

International Road Transport Union (IRU) delegate Matthias Maedge told EURACTIV in an interview that many of his association’s members remain “unconvinced” by electric power’s application in their respective areas of interest.

Truck hauliers have not taken the plunge yet on battery models due to lack of options, while taxi operators report loss of earnings due to charge times, Maedge warned.

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Technological developments have helped batteries come on in leaps and bounds though and analysts expect the trend to continue. Economies of scale have also brought costs down significantly.

**QUARRY GIANT**

One sector that has to rely largely on heavy vehicles and machinery is the construction business. But because emission cuts from industries like cement factories and steel producers are a difficult ask, improvements in transport are an attractive option.

Swiss firm eMining operates what has been dubbed the largest electric vehicle in the world, a 45-tonne dump truck used to haul up to 65 tonnes of ore from the top of a limestone quarry downhill to the site’s processing facilities.

The bright-green machine is innovative and perfectly suited to its task, to such an extent that it only needs overnight charging once every three days.

It achieves this seemingly impossible feat by using regenerative braking during its downhill trip, and then using the resulting power to get back up to the summit. Truck manufacturer Kuhn Schweitz estimates that it could save 11-22,000 gallons of diesel every year.

The ‘e-Dumper’ succeeds because of the scenario, but few other quarries have the same uphill-downhill layout and costs are more than twice that of a conventionally-powered machine. That has not stopped eMining planning to introduce another e-Dumper though.

Switzerland’s government provided some funding for the first machine and International Mining opines that EU emission rules could push other countries or even large manufacturers to follow suit.

**SEA SPARKS**

The e-Dumper’s title as the largest electric vehicle is open to interpretation though, once you factor ships into the equation. In August, an EU-funded project came to fruition when the all-electric ferry Ellen made her maiden voyage between two Danish islands.

Weighing 650 tonnes without passengers and vehicles, the ferry will operate its route up to seven times a day, partially recharging its batteries while docked at either end of its voyage.

Reportedly, the ferry contains the largest and most powerful lithium-ion battery pack installed on a ship and the project leaders say that its 40km range far exceeds the top limit previously demonstrated by other vessels.

Ellen is certainly not the first electric-powered ship to enter service, as many boats use batteries to manoeuvre at low speeds in ports and harbours or as backup to diesel engines.

The Danish vessel, however, was designed from the hull up as an all-electric ship and its layout reflects the need to save weight and space. It does not have back-up generators.

As tough new limits on sulphur emissions enter into force as of next year, the project offers a potentially viable alternative for inland or coastal shipping. Ellen’s operators say that it could cut emissions by 2,000 tonnes of CO2 per year too.

**FLYING BATTERIES**

Sceptical outlooks on battery power’s suitability for heavy machinery and shipping are dwarfed by doubts over its application in aviation, particularly given the weight issue.

As public awareness of the sector’s massive environmental impact grows, manufacturers and operators alike are scrambling to try to develop alternatives to the kerosene-fueled engines that power most aircraft.

EU policymakers are mulling the idea of a jet-fuel tax and in mid-September, finance ministers started to talk in earnest about reviewing the 15-year-old Energy Taxation Directive. Aviation could find itself hit with a stick if it fails to prepare for the change.

Incentives are already in place or in the pipeline. Heathrow, one of the world’s busiest airports, is offering to waive landing charges to electric planes, while the German government is thinking of scrapping taxes for battery-powered craft.

Industrial giant Airbus is taking note and is even supporting a new electric air race series. Earlier this year, the multinational signed up as Air Race E’s official partner and will provide technical know-how and support to the fledgeling racing series.

It means building a lightweight plane capable of high-speed manoeuvring, which is as safe as conventional aircraft. That job has been entrusted to a team at the University of Nottingham in the UK.

Project leader Richard Glassock revealed that the electric motor will actually produce higher speeds than a conventional engine, while the airplane will be able to operate at the same velocity no matter the altitude.

He acknowledged that the technology is still in its infancy when it comes to large airliners but insisted that he expects batteries to power planes with 200+ seats by the year 2050, as weight comes down and power ratios increase.

“It is predicted that planes of this nature will produce up to 70% less noise, carbon and nitrogen oxide pollution than today’s fuel-based planes.”

Glasscock added that hybrid systems will have a big part to play in the industry. In the meantime, his

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team expects to test fly its e-plane this year, before some of the world's best pilots take to the sky in 2020.

FORMULA ONE’S BATTERY COUSIN

Admittedly, racing planes may be a niche form of entertainment but motorsport is enjoyed by millions of fans around the world. Electric racing is now starting to play catch-up with its long-established forebears like Formula One and the Dakar Rally, as public and manufacturer interest grows.

Formula-E, one such racing series, just completed its fifth season and is growing in popularity and prestige. The championship is held across the world in numerous capital cities and now attracts drivers who have already raced in F1, which is considered the pinnacle of the sport.

It has also helped spur the electric vehicle cause too, by showcasing the technology to millions of onlookers. For the first few years of the sport, for example, the cars were unable to last the entire race distance due to battery limitations.

Drivers would have to stop mid-race to switch cars. But for the last two seasons, battery life has been enough to power cars to the finish line, if the drivers are smart and conserve their power enough.

The biggest names in the automotive industry are getting in on the act too, with the likes of BMW, Mercedes and Porsche all set to be competing against one another as of the next championship.

Motorsport has famously been the testbed for numerous car tech updates, from four-wheel drive and safety measures to regenerative braking and tyre developments. Formula-E appears to be no different.

At the Berlin edition of the championship this year, EURACTIV asked numerous fans if watching F-E had quelled any doubts about range anxiety or engine reliability. The answer was generally a resounding “yes”.

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Transport and mobility policies look set to go into overdrive under the next European Commission, as a heady mix of climate change ambition and competition concerns dictate the direction of travel. This is what the vision looks like.

Incoming Commission President Ursula von der Leyen built support for her candidacy by pledging to put green policies at the heart of her five-year-long mandate. Her nominations for Commissioners have largely reflected that promise.

She has entrusted Dutchman Frans Timmermans with all things climate and he will propose a number of measures during the first 100 days of the Commission, including legislation on climate protection.

“It is great to see the challenge being recognised in the appointment of Timmermans as vice-president for the EU Green Deal. This is a major assignment. Reaching climate-neutrality won’t be easy,” according to policy analyst Annika Herdberg.

“It will require leadership, political will, the ability to build bridges, and taking action across many different sectors, from energy to agriculture, from transport to financing, from industrial processes to buildings,” she added.

But given that transport is one of the few areas of the European economy where emissions continue to rise, it will be of utmost importance that policymaking under her watch makes progress, if the EU is to honour its internal targets and the Paris Agreement.

Decarbonising road transport is a big part of that drive, given that many climate experts consider it a “low-hanging fruit” compared with aviation and shipping, and von der

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Leyen has tasked several members of her prospective team with getting the job done.

In a series of mission letters to her proposed candidates, who still have to secure European Parliament support, the new president outlined measures ranging from energy taxation tweaks and emission cuts to clean power upgrades and infrastructure investment.

A number of Commissioners, including the eventual economy, energy and transport chiefs, will be expected to work on an update to the Energy Taxation Directive, which dates back to 2003 and is largely considered outdated.

“EU rules on energy taxation no longer deliver the same positive contribution as when they first came into force,” according to a Commission analysis published in September.

Clean mobility advocates want the EU executive to use an in-depth review to create a level-playing field in Europe. The Centre on Regulation in Europe (CERRE) has called for “an EU-wide approach to additional levies on airplane tickets or kerosene fuel taxes”, for example.

**SURGING FORTUNES**

New analysis by environmental group Transport & Environment estimates that carmakers could sell up to one million electric vehicles in Europe next year, thanks to a mix of changing public opinion and looming EU targets.

The auto industry is struggling to meet CO2 reduction benchmarks for 2021 and must now start planning for even more ambitious goals set for 2030, which were recently brokered by EU negotiators.

If the analysis is correct, then it would cement Europe’s place as the world’s second-largest EV market after China. That potential has prompted Brussels officials to try and capture more of the EV supply chain in order to maximise payoffs. That is where batteries come in.

Asia currently dominates the production side of things but the EU has its sights on taking a big slice of the pie. Commission estimates say the industry could be worth €250bln each year by 2025 if the right conditions are put in place.

Attracting investment is the name of the game, as estimates say the EU will need at least ten large-scale battery factories or ‘gigafactories’ just to support domestic demand. The ultimate goal is to also export components and hardware.

To that end, the EU executive launched the European Battery Alliance in 2017. Initially envisaged as an ‘Airbus for batteries’, the scheme has evolved into something that more resembles a sector-specific industrial policy.

EU industry chief Elżbieta Bieńkowska said during the early days of the Alliance that “we want to provide a framework that includes secure access to raw materials, support for technological innovation and consistent rules on battery production”.

Consistent rules are somewhat lacking at the moment, as work is still ongoing on defining standards for environmentally-sound batteries.

Commission Vice-President Maroš Šefčovič wants EU batteries “to be the greenest batteries in the world”, given that competing on price with Asia will be a hard ask. The Slovak diplomat is set to stay heavily involved with the Alliance when he starts his new duties under von der Leyen.

Šefčovič has been tasked with the “interinstitutional relations and foresight” portfolio, which will include focusing on “long-term trends and identify[ing] areas in which policy, research and technological developments are most likely to drive societal, economic and environmental progress”, according to his mission letter.

That means coordinating the Commission’s work on batteries and drawing up a yearly “foresight report”, which should feed back into the EU executive’s work.

Existing rules will almost certainly need review, in particular the 2006’s Battery Directive. In April this year, a Commission analysis said it had “delivered positive results in terms of a better environment, the promotion of recycling and better functioning of the internal market for batteries and recycled materials”.

However, the stock-take concluded that there are “limitations in some legal provisions or their implementation prevent the Directive from fully delivering on its objectives”, particularly for collecting and recovering materials from used batteries.

EURACTIV understands that a review of the directive could kick off in the second half of 2020, under the German presidency of the EU Council. The legislation itself obligates the Commission to do so before the end of that year.

In terms of what needs to change, the Commission evaluation points out that the current rules are not flexible enough to take into account “technical and social changes” and that further collection and recycling requirements are needed.

“An estimated 56.7% of all waste portable batteries are not collected, annually. This amount is significant enough to jeopardise the achievement of the directive’s environmental protection objectives,” it concludes.

With raw materials at a premium and demand for electric vehicles and grid battery storage set to increase, how the EU organises its collection and recycling framework could well prove crucial to its ambitious global market aspirations.
Sefcovic foresees ‘an Airbus for batteries, for 5G, AI, green tech’

By Sam Morgan | EURACTIV.com

In one of his first interviews since getting the nod to serve another five years in the European Commission, Maroš Šefčovič talked about his new job, industrial policy and the “global mega-trends” the EU should lead heading into the next decade.

Maroš Šefčovič is a Slovak diplomat who is currently a vice-president of the European Commission, in charge of the Energy Union. In September, he was nominated to lead up interinstitutional relations and foresight in the next EU executive.

He spoke to EURACTIV’s Sam Morgan on the sidelines of the latest European Battery Alliance stakeholders meeting in Brussels.

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In terms of existing EU legislation, what rules need to be changed or tweaked to get the most out of the European Battery Alliance and tap fully into that particular multi-billion euro market?

I think the next big thing is going to be standardisation of batteries. We're already working with authorities like CEN-CENELEC and we want to make sure that all the great work done by our researchers will be reflected in the new norms and standards. They are going to put European batteries in a top category, as the cleanest, greenest.

That's their unique selling point? Europe's batteries are the best quality?

When I talk to citizens, especially young people, they want the whole story when they're buying an electric car. Renewable energy, sustainable materials like steel, and of course sustainable batteries. They also want to have the positive feeling of having a battery connected to a smart grid, so they can help the promotion of intermittent energies like solar and wind. They also want to sell the electricity back during peak hours. Having this complex story requires software and design standards: batteries have to be fit for reuse and industrial recycling, so you don't have to open up these packs with hammers to get materials out. This is what we're intensively looking at. When we talk about Europe in the future, we have to be talking about only the most sustainable batteries on our market.

If standardisation is your jumping-off point, is it fair to say the Battery Directive is your endpoint?

Yes, for collecting and recycling. It could be one of several pieces of legislation because we are also looking at what would be the most efficient way to legislate and enforce. Clearly, from a legal point of view, that would be important. It should be our ambition to push for how we do things as the global international standard.

During your current mandate, you've dedicated a lot of time to battery as well as space policy. Given the technological crossovers between the two and the hunt for raw materials, is it encouraging to see 'space' given more space in the new Commission?

I think that we did a lot on space over the last five years. We really pushed Galileo to the next frontier, I would say. We'll need it too when we're thinking about self-driving and autonomous vehicles. The fact that Galileo is ten times more precise than GPS is going to help. Copernicus, of course, is considered by the scientific community as the best available Earth observation infrastructure in the...
world. Indeed, for prospecting raw materials it has an application but it also contributes to the tough story of climate change. It is at least making the case for clean mobility stronger. The world is a different place to five years ago, financial institutions, the industry and policy-makers are all going for clean and smart solutions now.

The Commission has to submit a long-term industrial strategy by the end of the year. How prominently should the Battery Alliance feature and should it actually be a template for the broader strategy? Is it right to call the Alliance a mini-industrial plan of its own?

That’s definitely the ambition that we’re presenting right now. There is a tight schedule, as the president-elect [Ursula von der Leyen] made several commitments on what we want to do in the first 100 days. This is definitely one of them.

So we will definitely use the second part of my portfolio, ‘Foresight’, where the president-elect was quite clear in making the point that I have a lot of knowledge already linked to the Joint Research Centre (JRC) and our in-house think-tanks. So we can be very strong there. We can use it in a way that can help the competitiveness of the European economy but we have to be much more practical. We have to work with scenarios, be clear in which technological mega-trends we want to lead.

By 2030, Europe will be at the top table with a strong industry. That is going to be one of the serious discussions we’ll have when the new Commission starts: on which mega-trends we want to focus. The EBA could be a good example of how to create this industrial pact. As we did an ‘Airbus’ for batteries, we can do the same approach for 5G, artificial intelligence, clean and green tech, and other areas where we want to be strong. We need strong cooperation between industrial actors, a proper legal framework, support for innovation, financial instruments and institutional support. You can do miracles in a very short period of time.

So the mega-trends issue is all about focusing on what Europe can and should do?

The top priorities for the next Commission include the Green Deal, which will help us ensure we’re the first climate-neutral continent. That means automotive, maritime, aviation, smart grids, clean buildings. We can be strong on industrial recycling, clean technology. Countries in Africa, Southeast Asia are very much interested in all that because they know if they want to go through economic development they can’t repeat our fossil fuel path. They have to focus on these new technologies.
Outer-space prospecting aims to boost EU’s battery plans

By Sam Morgan | EURACTIV.com

Space policy and efforts to boost electric vehicle uptake share a somewhat unusual link, beyond connected cars and global positioning systems: procuring raw materials could soon be made easier via satellites.

One million electric vehicles will be sold in the European Union alone next year, according to fresh estimates, while 50% of new car sales globally will be EVs by 2032.

Depending on how costs evolve, nearly three-quarters of the world’s cars could be electric-powered by 2050. That means the EU will need batteries and lots of them.

Domestic carmakers are set to make investments in the technology worth some €145 billion and Brussels has big plans to tap into a battery market that could eventually be worth €250 billion per year.

European batteries will struggle to compete on price with their Asian equivalents so the idea is to follow the organic food industry’s lead and offer consumers the green option. That means production facilities running on clean power and raw materials being sustainable.

Guaranteeing the latter is no easy feat given a whole host of environmental and social considerations. The World Economic Forum cites negligence and human rights abuses in the Democratic Republic of Congo, toxic spills in Latin America and air pollution in China.

A certification label for raw materials is currently in the works, with one EU project hoping to wrap

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up work by 2021. It intends to take into account every part of the supply chain from prospecting and mining, to refining and manufacturing.

“When we talk about Europe in the future, we have to be talking about only the most sustainable batteries on our market,” European Commission Vice-President Maroš Šefčovič told EURACTIV in an interview.

“The next big thing is going to be standardisation of batteries. We’re already working with authorities like CEN-CENELEC and we want to make sure that all the great work done by our researchers is reflected in the new norms and standards,” the Slovak official added.

Vital battery components like cobalt, lithium and nickel are not only available outside the EU though. During a regular meeting of the bloc’s Battery Alliance, Šefčovič said talks are advanced on exploiting a lithium mine in Spain, as well as other sites in Finland and Poland.

An elegant solution to concerns over how third-party countries source their materials is to capture the supply chain domestically, where EU rules hold full sway.

The Kaustinen lithium mine in Finland is Europe’s largest deposit and could reportedly produce materials for 10 years. There are also nickel and graphite deposits in the area.

Kaustinen’s resources were actually discovered in the 1950s but interest has only peaked recently thanks to growing demand, as the costs are significant. Estimates say €250 million will be needed to produce 25GWh of battery capacity.

Environmental groups want there to be less focus on sourcing new materials though and for the EU to devote more attention to recycling.

Julia Poliscanova, a clean vehicles expert with Transport & Environment, told EURACTIV that “all cobalt, lithium and nickel found in batteries on the EU market should be fully recycled and used to produce more batteries instead of mining virgin material”.

Battery recycling will be on the next Commission’s radar. Šefčovič admitted in the interview that revising EU rules is on the cards and that “batteries have to be fit for reuse and industrial recycling, so you don’t have to open up these packs with hammers to get materials out”.

**EYE IN THE SKY**

For now, one of the next steps is to find new sites and increase domestic supply. Commission analysis estimates that recycling and “additional mining activities” could meet 15% of EU electric vehicle demand by 2030.

That is where space policy comes in, as the bloc’s Earth-observation satellite system, Copernicus, can be used in the prospecting side of the process.

The RawMatCop Programme aims to do just that, by providing training and sharing expertise. Its mission statement says that “Copernicus satellite acquisitions can greatly contribute [...] through free access to high-quality geospatial information.”

As well as helping to identify new sites, Copernicus is also being trialled as a policing tool. RawMatCop teamed up with the UN’s Environment Programme to observe illegal gold mining in Colombia and track its effects.

“Such activities create a spirit of low acceptance for mining industries in the nation and worldwide,” according to the project website. The point of mapping the mining’s impact is also to help local communities who are often impacted by the activities.

When asked about space-based applications, Šefčovič replied that “indeed, for prospecting raw materials it has an application but it also contributes to the tough story of climate change. It is, at least, making the case for clean mobility stronger.”

Copernicus will go from strength-to-strength according to space policy analysts contacted by EURACTIV, who cited several high profile cases lately where national governments requested its services to manage natural disasters.

Portugal, Sweden and even countries as far away as Bolivia have all called on the service to track wildfires and assist firefighting efforts.

Jean-Claude Juncker’s industry chief, Elżbieta Bienkowska, told EURACTIV that she agrees the satellite system will only increase in importance given the added focus of the next Commission on climate policy.

The Commission has proposed an increased war chest for space policy under the next long-term budget, setting aside around €16 billion for satellite development and maintenance.

According to a financial breakdown, Copernicus is set to get €5.8 billion and global positioning system Galileo €9.7 billion.

It will be up to Bienkowska’s successor to pilot EU space policy into the next decade, utilising the services of a new directorate-general dedicated solely to defence and space matters.

Currently that is set to be France’s Sylvie Goulard but members of the European Parliament decided this week that she will have to answer more questions about her past activities before they give her the green light.
It is now nearly two years since the European Batteries Alliance was established. The project was initiated by the European Commission and EU member states at the highest political levels with the aim of establishing a complete European batteries value chain for electric vehicles, from mining to recycling.

It is one of the Juncker Commission’s most ambitious projects and brings together stakeholder groups acting within or surrounding the batteries value chain.

Given the urgency of addressing climate change in mobility, but also the need to close the gap between EU industry and the market-leading battery producers outside Europe, there is a need to act in a timely, efficient and targeted manner.

From 2025 onwards, according to the European Commission, Europe could capture a battery market of up to €250 billion – per year! This would

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require at least 10 to 20 large-scale battery cell production facilities. Let’s be clear: the EV and batteries revolution will come. The question is where the batteries value chain will be located. Will Europe or other regions benefit from this market opportunity?

We have seen a strategic action plan being published, comprising a wide range of activities and concrete actions covering raw materials to batteries production and recycling. Industrial consortia and partnerships are up and running; a wide range of R&D projects have been kicked off with access to finance for actors within the batteries value chain. Significant investments have been made, and production sites are already in operation or expected to start operating within the short to medium term.

The batteries value chain with its individual production stages is capital intensive. Access to finance is crucial. Any actor within this value chain requires planning security as long-term investments must be made until 2030 and beyond. Planning security goes hand in hand with predictability. And this is closely linked to consistency in the regulatory framework. Industry and investors need to be certain that the regulatory framework allows raw materials to be produced and batteries to be assembled. There must be a thriving batteries and automotive industry as well as other industries to eventually re-use batteries as well as recycling industries for end of life recovery.

Raw materials going into EV batteries play a critical role. Maintaining and promoting European raw materials production is important from various perspectives.

- It ensures that we avoid dependencies on imports from regions outside Europe.
- It also guarantees that these raw materials are produced under the highest environmental and social standards.
- We maintain highly qualified and well-paid jobs in Europe and contribute significantly to Europe’s GDP.

It influences the overall emission performance of an electrical vehicle significantly. European metals production is known to be highly energy efficient and linked to a lower carbon footprint.

Take nickel, for example. It is one of the main components of current and future EV battery technology. The European nickel industry is however facing challenges, such as growing global competition especially from producers in China. For many years our industry has known how to address these issues and how to remain competitive – by being innovative, energy and resource efficient and continually improving our processes. But there are inconsistencies in the regulatory framework which make it increasingly difficult for raw materials producers, to compete and maintain production in Europe. Two examples:

- While Europe has a significant demand for battery raw materials, there is an increasing risk of some of these substances being considered as substances of very high concern, even though they have a track record of being safe when produced, used and recycled. Disproportionate regulatory risk management that does not sufficiently take into account societal benefits of the use of these substances could be the consequence.

- Production of raw materials such as nickel is energy intensive, even though companies are continuously improving their energy efficiency. There is a risk that companies in the EU lose their global competitiveness due to emission trading costs in Europe, and a lacking compensation of indirect costs through increased electricity prices.

We want to continue producing these raw materials in Europe, and this should also be in the interest of regulators and other actors in the value chain. What European nickel producers need now is a consistent regulatory framework based on principles of sound science, risk-based approaches, full life cycle thinking and impact assessments. This allows us to continue production and to contribute to a sustainable European batteries value chain. A value-chain that is critical to helping tackle climate change in a way that keeps jobs and know-how within the EU.