



## Elia Group's vision paper on e-mobility identifies three enablers for the adoption of electric vehicles as soon and as widely as possible to achieve a sector transformation with the fastest and greatest CO<sub>2</sub> impact in the coming decade

**BRUSSELS – BERLIN |** In its vision paper “*Accelerating to net-zero: redefining energy and mobility*”, published today, Elia Group describes how better alignment between the power and mobility sectors can deliver societal benefits and push electric mobility to widespread adoption. With transport currently accounting for a quarter of Europe's CO<sub>2</sub> emissions and electric vehicle (EV) technology close to maturity, the mobility sector can make a major difference in a short time. However, successful convergence between the power and mobility sectors can only be achieved if current barriers are removed and additional value streams are unlocked and developed. Elia Group has identified three enablers that can give consumers a superior driving experience while making the power and mobility sectors more sustainable.

### 5 key messages

- In the coming decade, electric mobility will provide the fastest and most impactful lever for abating climate change. If we use this lever intelligently and jointly across the mobility and power sectors, EVs can support the integration of more renewable energy into the power system, which is an essential element on the road to decarbonisation.
- More than 80% of charging will happen at home or at work. Maximum effort needs to be put into providing smart charging infrastructure in these market segments, supplemented with a number of fast charging facilities along major transport routes to overcome range anxiety.
- Compared to uncoordinated (non-optimised) charging, smart charging (electricity price optimisation) will reduce the annual electricity cost for EV drivers by 15 to 30% by 2030 (excluding taxes, levies and grid tariffs).
- Compared to uncoordinated charging, smart charging of the projected 1.5 million EVs in Belgium and 10 million EVs in Germany will reduce the overall CO<sub>2</sub> emissions of the power system by 600,000 tonnes a year and generate around €500 million of additional social welfare by 2030.
- Elia Group has identified three enablers for overcoming existing barriers to EV uptake and unlocking additional value streams: (1) physical and digital infrastructure, (2) open data access and (3) market rules enabling new consumer services.

*In responding to the economic crisis caused by the COVID-19 pandemic, the societal relevance of transitioning to a sustainable, climate-neutral economy has increased even further. By working together on the necessary interfaces, we can make both the power and automotive industries more sustainable while also forging a better customer experience, primarily through digital technologies. This feels like an immense opportunity.*

— Chris Peeters, CEO Elia Group



## Mutual benefits in the interest of society

### EVs are batteries on wheels that provide flexibility to the energy system

For system operators, electric vehicles are more than just a means of getting from A to B. In a renewable world, EVs can contribute to the transition from the current power system, where generation is geared to consumption, to a system where consumption is geared to renewable energy generation. EVs are flexible tools capable of actively participating in electricity markets since their charging times can be aligned with the needs of the power system. In a renewables-based power system that relies heavily on wind and solar generation, access to flexibility is essential since that is what makes it possible to maintain the balance between supply and demand at any given point in time.

### Sector convergence to enhance consumer experience

Being connected to the electricity grid also offers opportunities to enhance the consumer experience by providing additional services (besides charging) that are enabled by open data exchange between system operators, market parties and consumers. Such services could involve integrating the EV battery into a smart house or smart community in order to optimise a broader set of devices, such as solar panels and electrical appliances. However, there are many other unexplored options. Elia Group is keen to work with all relevant stakeholders to develop, enhance and exploit those opportunities.

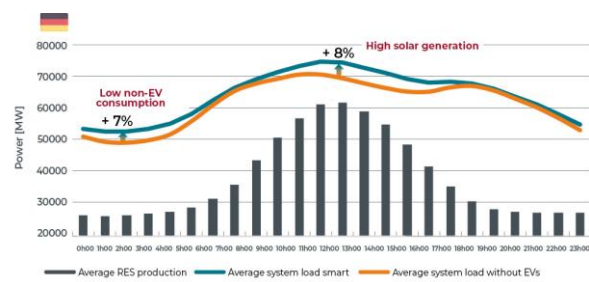
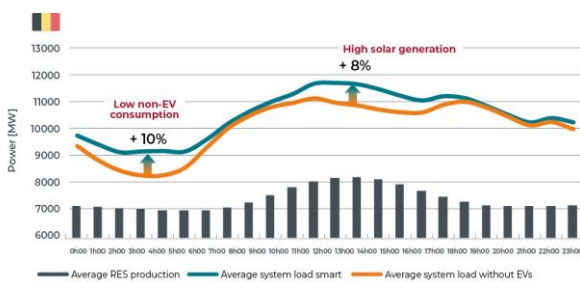
” *Sector convergence is an opportunity for the power and automotive industries to work together on a societal project that will have an immense impact on the successful decarbonisation of our society. By leveraging smart solutions, we can eliminate many of the obstacles currently faced by consumers, delivering a positive customer experience while also redefining the future of mobility and power together.* “

– Stefan Kapferer, CEO 50Hertz



## Smart charging benefits

Smart charging shifts the bulk of EV loading to times when electricity prices are lower, overcoming the effects of uncoordinated charging on the evening peak. As shown in the figures below (for Belgium with 1.5 million EVs in 2030 and Germany with 10 million), these times occur (on average) during the night when electricity demand is low (load increase of 7-10%), or during the day when there is a high share of renewables (solar generation) in the system (load increase of 8%). With smart charging, almost no extra EV load is added (on average) to the normal evening electricity peak (between 6 and 8 p.m.).



## Benefits of smart charging for EV drivers

An EV is stationary for more than 90% of the day, while its battery typically needs to charge for two hours only. This creates a window of opportunity to optimise the charging process. It means that the charging can be delayed until later in the day, or even until the next day if the remaining battery capacity is sufficient to perform the trips planned for that day. All these elements combined give EV drivers many opportunities to optimise their charging behaviour and thus reduce their electricity bill.

### Three benefits of smart charging for EV drivers compared to uncoordinated charging

1. Lower total electricity cost for consumers
2. Less CO<sub>2</sub> emitted to provide EVs with electricity
3. More opportunities to provide flexibility



€

€30-€55

Annual consumer gain



5%-10%

Reduction in annual CO<sub>2</sub> emissions

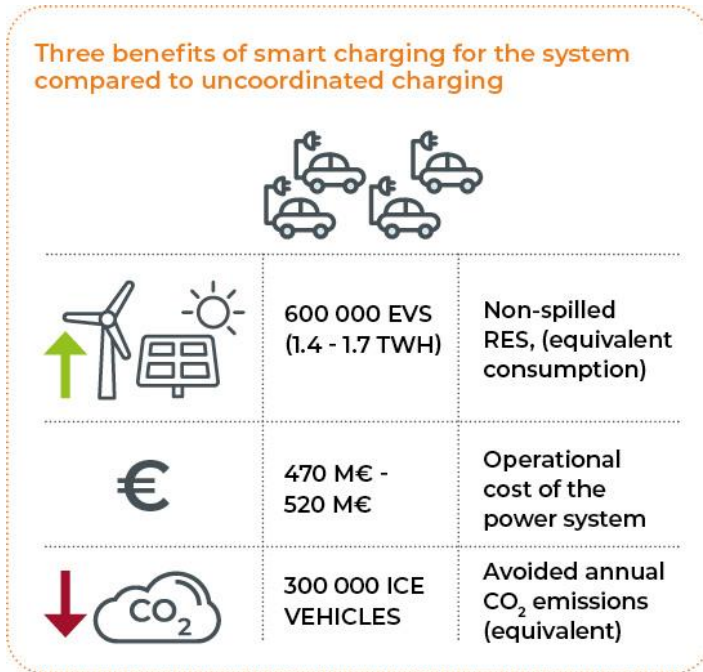
Our studies show that smart charging will reduce the **annual electricity cost** for consumers by between **€30 and €55** by 2030.

**This means a reduction of 15 to 30% in their annual electricity bill.**

Additionally, smart charging will lead to an extra **5 to 10% reduction in CO<sub>2</sub> emissions**. This comes on top of the 70% CO<sub>2</sub> reduction (over the vehicle's life cycle) by switching from diesel or petrol vehicles to electric mobility (according to an April 2020 study by Transport & Environment).



## Benefits of smart charging for the system



Shifting the electricity demand of EVs in a price-driven way creates benefits for the power system as well. A first and very important effect is the decrease in times with an oversupply of renewables (when renewable energy is ramped down since there is insufficient demand for electricity).

By shifting the moment of charging to times with a lot of solar or wind generation, our simulations show that you will **reduce the volume of renewable energy that would otherwise be lost by 1.4 to 1.7 TWh** in 2030, equivalent to the annual consumption of 600,000 EVs.

Smart charging also better aligns the peak load of the power system with the infeed of renewables (wind and solar). As a result, less thermal generation needs to run during the peaks.

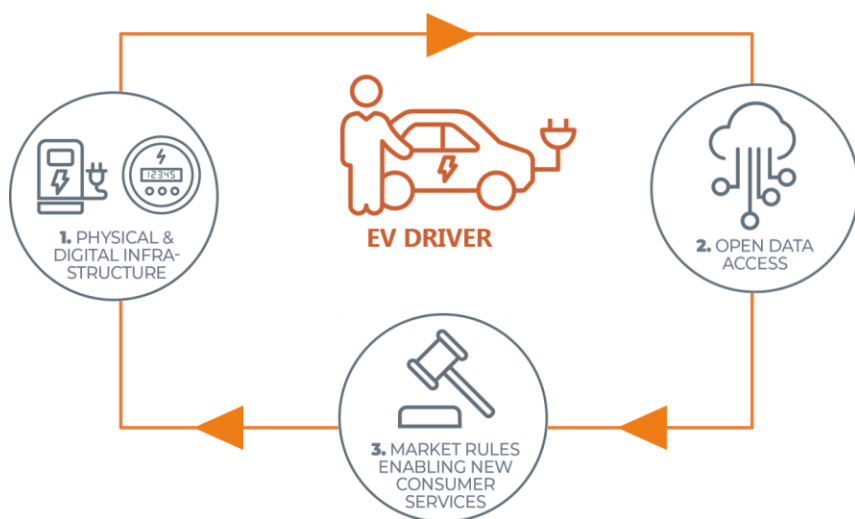
The combination of these two effects means that smart charging of EVs in Belgium and Germany will reduce overall **CO<sub>2</sub> emissions** in the power system by 600,000 tonnes per year in 2030. This is **equivalent to the annual emissions of 300,000 conventional vehicles**.

Finally, smart charging of 11.5 million EVs in Belgium and Germany in 2030 will generate around **€500 million of additional social welfare per year** due to the reduction in power-system operating costs. The reason for this is that the system's peak load aligns better with the infeed of renewables, reducing the activation of other (often more expensive) resources to cover these peaks.



## Three enablers driving comfort and value for consumers

Based on interviews with various types of stakeholders in the mobility and power sectors, and the experience from its first e-mobility use cases, Elia Group has identified **three enablers** that could eliminate many of the obstacles currently facing consumers and would push EVs towards widespread adoption:



### Enabler 1 = Physical & digital infrastructure to improve charging comfort

**More than 80% of charging will happen at home or work.** We need to put maximum effort into providing smart charging infrastructure in these market segments via economic incentives. In the short term, charging infrastructure needs to be supplemented with a (limited) number of fast charging facilities along major transport routes in order to overcome range anxiety and allay any hesitation about switching to EVs. Complement this with the gradual development of charging options for people in urban areas and big cities, and charging infrastructure as a barrier to EV uptake will soon disappear.

**Additionally, charging needs to be smart. This applies not only to charging points but also to digital infrastructure for metering, settlement and data exchange. Enabling smart charging will mean speeding up the rollout of digital meters and affordable charging points that can communicate with other devices.**



## Enabler 2 = Open data access to open up unlimited possibilities for consumer services

To enable new EV services, the grid needs to understand EVs and vice versa. This requires efficient data exchange and communication between all players in the e-mobility value chain and consumers. Providing data and agreeing to a service should become as easy as paying with your mobile banking app.

**The development of digital identities for consumers (citizens) by a trusted government agency is the necessary basis for consumers to share their data easily and securely, and in an open way for everyone who provides services designed to enhance the EV driver experience.**

## Enabler 3 = Market rules enabling new consumer services to exploit EV flexibility

For decades, consumers took their electricity supply for granted and had no influence or control over it. The development of EVs will lead to a change in the relationship between consumers and electricity. However, the regulatory framework as well as the processes and tools available in the power sector are not really adapted to current consumer needs.

Therefore, new approaches to market organisation need to be designed where consumers, either alone or via an intermediate service provider, can optimise their electricity consumption by following certain (price) signals, and benefit accordingly.

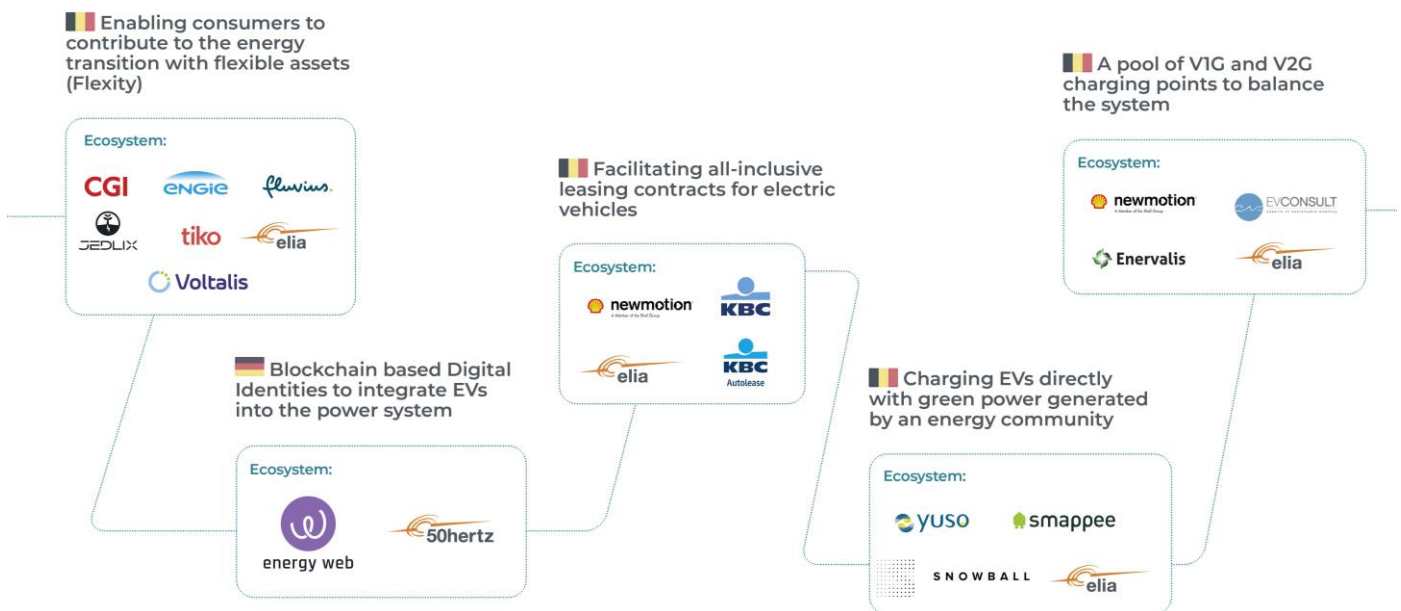
**By means of smart charging algorithms, consumers will receive market signals that enable their EVs to adapt both to user preferences and to the conditions of the power system (= increasing consumption when there is excess renewable energy and reducing consumption when the grid is overloaded, thus mitigating congestion in the (local) grid).**

Advanced smart charging strategies, taking into account both the match between RES supply and demand and the avoidance of local congestion, are a prerequisite for large-scale EV deployment in order to keep the power grid stable and to ensure a charging experience that is not hampered by congestion.



## Co-creating to set things in motion

Co-development and innovation are critically important to making fast progress in e-mobility. To contribute to the actual development and deployment of the three enablers for EV uptake, Elia Group has reached out to stakeholders across the mobility and power sectors in recent months with a view to setting up pilot projects. Some proofs of concept have already been delivered, some are ongoing and many more have yet to be launched.



To unlock even more benefits, Elia Group invites all stakeholders to work together on a smart charging solution that takes both components into account, i.e. the match between RES supply and demand and the avoidance of local congestion. The Group's IO.Energy (Internet of Energy) ecosystems in Belgium and Germany provide a great platform for co-developing and testing new smart charging initiatives, as well as other ideas promoting the integration of EVs into the power system.

To find out more, visit [www.ioenergy.eu](http://www.ioenergy.eu)

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The Elia Group's vision paper "Accelerating to net-zero: redefining energy and mobility" can be found on the Elia Group website: [www.eliagroup.eu](http://www.eliagroup.eu)



## About Elia Group

### One of Europe's top five players

Elia Group is active in electricity transmission. We ensure that production and consumption are balanced around the clock, supplying 30 million end users with electricity. With subsidiaries in Belgium (Elia) and northeast Germany (50Hertz), we operate 19,271 km of high-voltage connections. As such, our group is one of Europe's top 5. With a reliability level of 99.999%, we give society a robust power grid, which is important for socio-economic prosperity. We also aspire to be a catalyst for a successful energy transition towards a reliable, sustainable and affordable energy system.

### We make the energy transition happen

By expanding international high-voltage connections and integrating ever-increasing amounts of renewable energy production, Elia Group promotes both the integration of the European energy market and the decarbonisation of our society. Elia Group is also innovating its operational systems and developing market products so that new technologies and market parties can access our grid, thus making the energy transition happen.

### In the interest of society

As a key player in the energy system, Elia Group is committed to working in the interest of society. We respond to the rapidly changing energy mix, i.e. the increase in renewable energy, and constantly adapt our transmission grid. We also ensure that investments are made on time and within budget, with a maximum focus on safety. When we carry out our projects, we manage stakeholders proactively by establishing two-way communication with all affected parties very early on in the development process. We also offer our expertise to our sector and relevant authorities to build the energy system of the future.

### International focus

In addition to its activities as a transmission system operator, the Group provides various consulting services to international customers through its subsidiary Elia Grid International (EGI). Elia is also part of the Nemo Link consortium that is operating the first subsea electrical interconnector between Belgium and the UK.

The Group operates under the legal entity Elia System Operator, a listed company whose core shareholder is the municipal holding company Publi-T.

