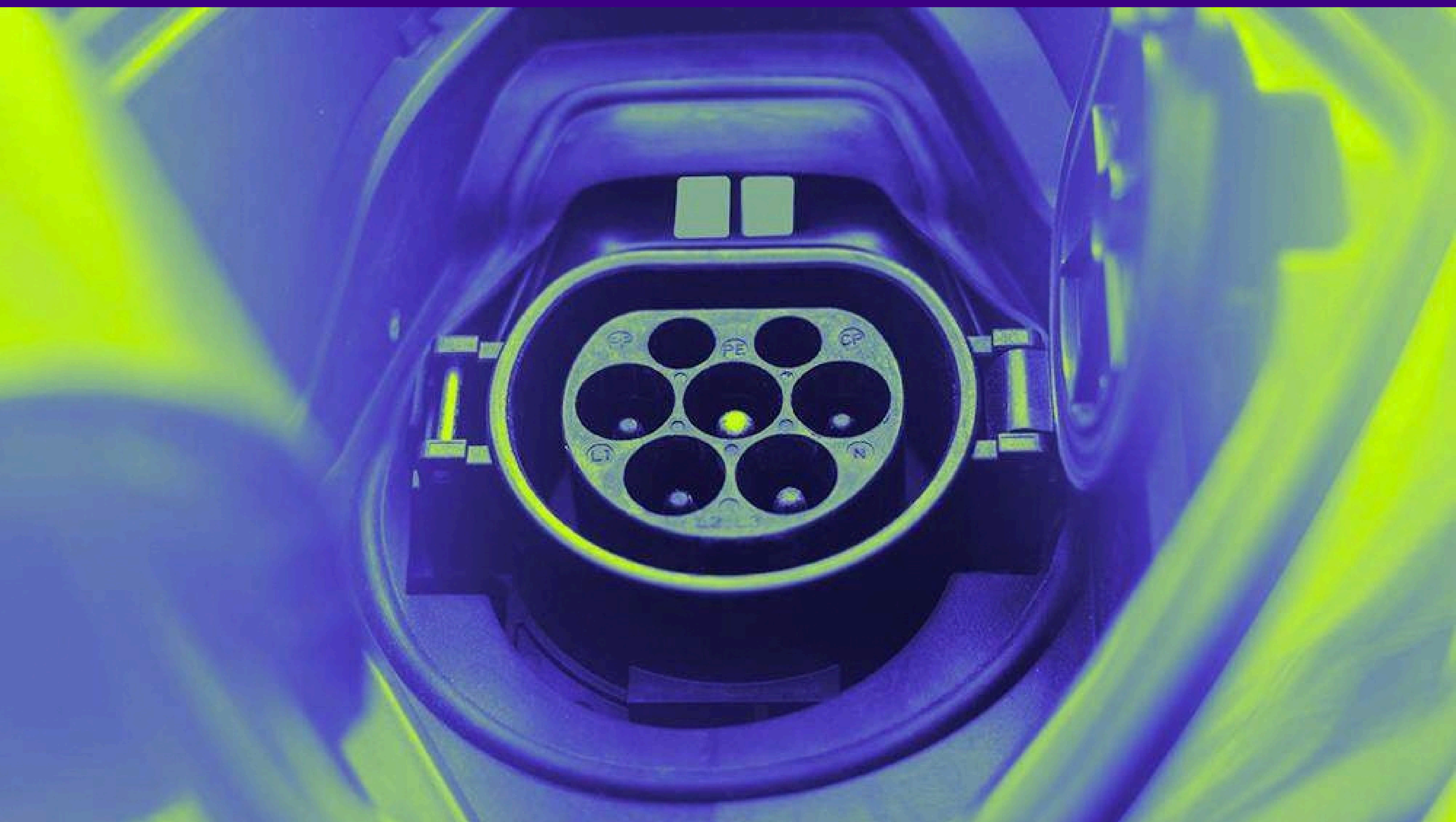




E-Mobility  
Europe



# Enabling Bidirectional Charging Through Market-Driven Strategies in the EU

# Introduction

Bidirectional charging for light-duty vehicles (LDVs) represents a unique opportunity for the EU to unlock demand-side flexibility. By enabling electric vehicles (EVs) to feed energy stored in the battery back into the grid, bidirectional charging can help support the wider integration of variable renewable electricity resources. This technology can, therefore, help reduce the EU's reliance on imported fossil fuels and strengthen energy independence. However, regulatory barriers continue to limit the deployment of bidirectional charging at scale in Europe. E-Mobility Europe calls on the European Commission to remove these barriers and create the conditions for innovation and the development of interoperable solutions.

The ultimate goal should be a system in which EV drivers and fleets can switch between vehicles, chargers and aggregators without losing access to bidirectional charging or the flexibility services that it enables. However, the industry cautions against premature mandates for bidirectional charging interoperability. The market is still developing, and rigid requirements could restrict innovation and delay deployment while harmonisation frameworks remain immature. The EU should instead allow the market to mature and support the development of diverse solutions that offer consumers choice. As adoption grows, a market-driven approach should lead towards mandatory multiparty interoperability. The timeline for this will be dictated by the national implementation of the updated Network Code on Requirements for Generators (RfG NC 2.0), currently tabled for adoption.

## **E-Mobility Europe's five recommendations for enabling bidirectional charging:**

- The Commission should amend the proposal for the Network Code on Requirements for Generators to ensure that both system-certification and asset-certification approaches are treated equally for deploying bidirectional charging-capable assets.
- The Commission should ensure adoption of open communication standards and protocols widely used by the industry.
- The Commission should establish a roadmap together with relevant industry stakeholders toward multiparty interoperability based on harmonised testing.
- The double taxation of bidirectional charging should be eliminated through an amendment of the Energy Taxation Directive.
- Member States should accelerate deployment of smart meters in line with the targets and measures set in the existing EU policy framework.



## 1) What is bidirectional charging, and why does it matter?

Europe's energy transition is driven by the dual imperatives of decarbonisation and energy security. Bidirectional charging can help deliver both by transforming EVs into active participants in the energy system. Connected EVs can function as decentralised energy resources (DERs). They can adjust their charge rate or discharge stored electricity in response to grid signals. This flexibility can help integrate renewable electricity when it is abundant, balance supply and demand, support frequency regulation and alleviate local network congestion while accelerating grid investments.

According to the Fraunhofer Institute, bidirectional charging technology could save the EU energy system €22 billion annually by 2040[1]. At scale, bidirectional charging could also reduce reliance on fossil-fuel peaker plants and imported gas, while increasing the use of domestically generated wind and solar power.

Technological progress is gradually improving the conditions for market uptake, although progress varies across Member States. Realising this potential requires more than technological readiness. Several regulatory barriers remain. To address them, a regulatory environment that supports innovation, removes market barriers and enables interoperable solutions is required. The EU should prioritise creating the conditions for market actors to innovate and prioritise a regulatory framework rooted in the reality of the EU grid governance as it stands today.

## 2) Bidirectional charging is a source of collaboration within the ecosystem

Bidirectional charging technology creates a collaborative network where each stakeholder plays a distinct yet interconnected role. At its centre, EV drivers use EVs and can provide demand-side flexibility by sharing relevant data with third parties. These operators can offer services, such as grid-responsive charging. Aggregators bundle the flexibility from multiple EVs, making it viable for grid operators to use it for grid balancing, whether for congestion management or frequency balancing. European legislators regulate grid governance and charging infrastructure and promote EV adoption, while, along with national regulators, they set overarching standards for communication, interoperability, data access, and market fairness. Together, these stakeholders create a system where EVs not only consume energy but also act as DERs.

[1] The Fraunhofer Institute, [https://www.transportenvironment.org/uploads/files/2024\\_10\\_Study\\_V2G\\_EU-Potential\\_Final.pdf](https://www.transportenvironment.org/uploads/files/2024_10_Study_V2G_EU-Potential_Final.pdf).



### 3) Existing projects

Several proprietary solutions for bidirectional charging are already being deployed across Europe. These projects show how bidirectional charging can move from theoretical setups to commercial offers to transform energy systems and mobility.

In Germany, BMW Group and E.ON launched a commercial offer for bidirectional charging, enabling BMW EV owners to feed electricity back into the grid using 11 kW bidirectional chargers and smart metering. Customers receive financial compensation for grid services, while algorithms ensure that battery health and mobility needs are met. This could potentially offset the costs of up to 14,000 kilometres of annual driving. Similarly, Mercedes-Benz and The Mobility House have launched a partnership to integrate smart and bidirectional charging for home use starting in 2026.

France became the first European country to commercially enable bidirectional charging for private EV owners in 2024, through a partnership between Renault Group, Mobilize, and The Mobility House. EV batteries are aggregated to trade electricity on energy markets, providing grid-balancing benefits and energy credits to participants.

In the Netherlands, Renault Group, We Drive Solar, and local grid operators have rolled out a commercial service for bidirectional charging that allows EVs to store and feed energy back to the grid during peak hours, reducing household costs and supporting renewable integration. Moreover, the city of Utrecht hosts the world's largest vehicle-to-grid (V2G) plaza with 350 plugs and over 2,000 solar panels. It also hosts Europe's first large-scale V2G car-sharing service, managed by MyWheels. This initiative alone could supply around 10% of the flexibility needed to balance solar and wind energy in the region.

These projects demonstrate the early opportunities offered by bidirectional charging technology. However, they do not cater to interoperability and are not yet commercially viable or scalable. This is largely due to the absence of supporting incentive schemes and an EU regulatory framework that would enable mass deployment in the short to medium term.

### 4) Regulatory framework today

The EU has already taken important steps toward enabling bidirectional charging. The adoption of the ISO 15118-20 standard in the Alternative Fuels Infrastructure Regulation (AFIR) delegated act harmonises communication between EVs and the charging infrastructure, putting the communication protocol for bidirectional charging in place. The standard will apply from 1 January 2027 to all new or renovated charging stations, regardless of whether they are public or private, and whether they provide AC or DC charging. It will be a key enabler of interoperability and user convenience. To ensure consistent implementation across the Union, the AFIR review should define certified use-cases, EU-level technical guidance, and designate national authorities to monitor compliance and report progress.



In addition, the AFIR should be complemented by an amendment in the Automotive Omnibus requiring the adoption of the ISO 15118-20 standard in vehicles that are labelled as 'smart and bidirectional charging ready'. This should follow an adequate transitional timeline to allow industries to adapt.

Furthermore, the revised Renewable Energy Directive III (RED III), Battery Regulation, and the Data Act introduce requirements for data sharing on the state of health and state of charge of EV batteries. However, divergent national implementations of RED III risk fragmenting the Single Market, undermining the harmonisation of data sharing for automakers and complicating the deployment of bidirectional charging.

Market-driven strategies cannot work without harmonised definitions across the EU regulatory framework. Today, the understanding of roles and definitions of bidirectional charging varies, whereas the industry needs to speak the same language. To address this issue, the European Commission's expert groups have worked to align common definitions for smart and bidirectional charging across the EU regulatory framework. A cohesive, EU-wide approach is essential to ensure seamless integration and maximise the benefits of this technology.

## 5)What is still missing?

### *i)Bridging EVs and the grid*

Grid network codes are not yet harmonised across the EU, resulting in fragmented grid connection rules across Member States. This has led to separate and impractical certification frameworks for EVs and EV charging infrastructure (EVSE) in each Member State, hindering compliance with grid connection requirements across borders and undermining the Single Market. This approach caused inevitable hardware changes and compliance costs for European manufacturers, undermining economies of scale and European industrial competitiveness.

In this context, the proposal from the EU Agency for the Cooperation of Energy Regulators (ACER) for the revision of Requirements for Generators (RfG) and Demand Response (DR) Network Codes is a critical regulatory building block for enabling bidirectional charging. Under the proposed update of the RfG NC 2.0, a separate certification for EVs and the EVSE is established for the purpose of bidirectional charging. This approach embeds interoperability for bidirectional charging from the outset across the design, manufacturing, and certification of both EVs and EVSEs. Under this framework, EVs and EVSEs must independently meet grid network code requirements, without joint testing. However, further harmonisation is needed. The proposal for the update of RfG NC 2.0 is accompanied by a V2G Technical Annex which outlines the certification pathway for EVs and EVSEs. A harmonised, EU-wide certification framework has been developed only for EVs, while the EVSE manufacturers are expected to certify their products in each Member State separately according to national certification schemes.

E-Mobility Europe urges the European Commission to amend the RfG NC 2.0 proposal to ensure that both system-certification and asset-certification approaches are treated equally for deploying bidirectional charging-capable assets in Europe. This would avoid mandating a single pathway and instead support a flexible framework, alongside efforts to harmonise grid certification requirements for EVSEs.



Such an approach would ensure adaptability until a single, EU-wide framework can be established.

Under the framework envisioned by the European Commission, products certified in one Member State will often require recertification in another. This not only contradicts the basic principles of the Single Market but also increases hardware and software development costs, hindering cross-border scaling of demand response, and raising the cost of the energy transition. While ACER's proposed network code on DR partially addresses the lack of harmonisation for grid response, E-Mobility Europe recommends that the European Commission promote demand response interoperability aligned with reasonable commercial terms and conditions with EV and residential battery OEMs.

Finally, multiparty interoperability should be the policy endpoint for bidirectional charging-capable assets when the market is ready, and all necessary elements are in place. In practice, this means that users should not be locked into closed bilateral configurations. Over time, an EV certified for bidirectional charging should be able to operate with different compatible chargers and aggregators across the Single Market, subject to harmonised requirements. This would prevent the emergence of isolated vendor ecosystems and reduce the need for costly Member State-specific product variants.

### E-Mobility Europe's recommendations:

1

The European Commission should amend the proposal for updating the network code on Requirements for Generators to ensure that both system-certification and asset-certification approaches are treated equally for deploying bidirectional charging-capable assets in Europe.

2

The European Commission should establish a roadmap together with relevant industry stakeholders toward multiparty interoperability based on harmonised testing.

### *ii) Deploying smart meters*

Another area of concern is the slow and inconsistent rollout of smart meters across Member States. Smart meters are essential for enabling bidirectional charging. To address this, the Member States should not only ensure that new charging infrastructure complies with requirements under the Energy Performance of Buildings Directive (EPBD) regarding bidirectional capability of EVSE but also set binding targets for smart meter deployment in compliance with the Electrification Action Plan. Member States should swiftly deploy smart meters or, where relevant, replace existing meters with smart meters by 2030, in alignment with the Electricity Directive. Ideally, the interface between smart meters and connected assets should also be harmonised to minimise barriers to entry. The same applies to the implementation of grid signals, which is currently highly fragmented.



## E-Mobility Europe's recommendation:

Member States should accelerate deployment of smart meters in line with the targets and measures set in the existing EU policy framework.

### *iii) Strengthening communication for bidirectional charging*

The EU has established a framework for EV battery data-sharing under the RED III, the Data Act accompanied by the Commission's guidance, the Batteries Regulation, AFIR and Euro 7. This regulatory framework notably mandates transparency on EV battery health and state of charge status. While it strengthens communication between charge point operators (CPOs), aggregators, and flexibility service providers, its inconsistent implementation across Member States risks fragmenting the Single Market. To address this challenge, the EU co-legislators should ensure EU-wide enforcement, eliminate regulatory disparities, and create a cohesive framework that supports the scalable, cross-border integration of bidirectional charging technology.

The EU must ensure the adoption of open communication protocols such as OCPP and OCPI. These protocols are widely used in the industry and will help increase interoperability over time. The Commission should monitor relevant international harmonisation activities as a reference point for mandating bidirectional charging. A mandate should only be put into force, once, giving the industry sufficient transition time for development and industrialisation.

## E-Mobility Europe's recommendation:

The European Commission should ensure the adoption of open common communication standards and protocols widely used by the industry.

### *iv) Establishing consumer-centric rules for bidirectional charging*

Finally, the EU regulatory framework should ensure that it incentivises EV owners and fleet operators to participate in bidirectional charging. Aside from inflated electricity prices due to excessive taxes and levies, the double taxation of bidirectional charging is another significant barrier to its widespread adoption. This unfairly penalises consumers and undermines the economic appeal of participating in flexibility markets. In several Member States, electricity drawn from the grid to charge an EV and later reinjected back into the grid could be subject to value-added tax (VAT) and energy taxes twice: once when initially consumed and again when fed back. This redundant taxation is a barrier to the deployment of bidirectional charging technology. The EU should therefore take decisive action to harmonise tax rules across Member States.



A good example comes from Germany. In November 2025, the German Parliament amended the Energy Industry Act (EnWG) to remove the double taxation of bidirectional charging. By treating electricity from EV batteries as storage electricity in the energy law, bidirectional charging has become economically viable in Germany as of 2026. This reform unlocks the energy storage potential of more than 2 million EVs in the country. Other Member States where the double taxation of bidirectional charging still occurs should follow the German example. Removing double taxation would mark a significant step towards enhancing grid flexibility and renewable energy integration into the energy system.

Furthermore, the European Commission should amend the Electricity Directive to explicitly recognise EV drivers participating in smart and bidirectional charging schemes as demand-side flexibility providers, not as electricity producers, suppliers, or traders. This legal clarification should be binding for all Member States and consistently reflected in national laws. By doing so, EV drivers would be exempted from unnecessary generation licensing, supply obligations, or balancing responsibility requirements, which are often disproportionate to their role and scale.

### E-Mobility Europe's recommendations:

1

**The double taxation of bidirectional charging should be eliminated through an amendment of the Energy Taxation Directive.**

2

**The Electricity Directive should be amended to explicitly recognise EV drivers participating in demand-side flexibility as demand-side flexibility providers to remove disproportionate requirements imposed on them.**

### Conclusion: Maintaining the leadership of the EU in bidirectional charging

Europe currently stands at the forefront of bidirectional charging technology, leading in both development and real-world deployment. With pioneering projects in Germany, France, and the Netherlands, the EU has demonstrated the technical and commercial viability of bidirectional charging. However, maintaining and expanding this leadership requires a forward-looking EU regulatory framework and market-driven strategies.

The EU should create a regulatory environment that encourages innovation while enabling companies to scale bidirectional charging technology. This means removing existing regulatory barriers such as fragmented regulations, lack of implementation of the existing EU regulatory framework, inconsistent incentives, and grid access challenges. Mass-scale adoption of bidirectional charging in Europe will largely depend on combining early market-driven proprietary deployment with a clear pathway toward multiparty interoperability. This will ensure that EV drivers, fleets, charging infrastructure manufacturers, aggregators and grid operators can participate in a scalable, competitive and consumer-friendly flexibility market.



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