REPORT

of EWG 3 “Legal and Sublegal Framework” for Bidirectional Charging

2024

IMPRINT

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Acknowledgment/Notice

In November 2023, the „Coalition of the Willing on Bidirectional Charging“ (CoW) started its work to lay the foundation for bidirectional charging ecosystems in Europe and facilitate commercial availability of bidirectional charging services by 2025.

This report documents the results of the first year of work of the European Working Group (EWG) EWG 3 “Legal and Sublegal Framework” for bidirectional charging in the Coalition of the Willing. It presents the results of discussion of political and industry representatives from different European Member States and the European level. Representatives from many different companies among the European energy and automotive landscape have come together in the CoW to bring the vision of bidirectional charging to life. They have formulated fields of action and contributions in the joint report of EWG 1 (Car Charging and Aggregators) and EWG 2 (Energy and Grid Topics). Additionally, the national sub-working group WG 3a from car, aggregator, energy and grid industries has put forward fields of action for the German regulatory framework.

The Co-Chairs of EWG 3 “Legal and Sublegal Framework” would like to thank all members of the working group and particularly those contributing to this report.

Date 10/2024

CONTENT

1 INTRODUCTION
WHY BIDIRECTIONAL CHARGING?

Bidirectional charging holds great promises for the integration of electric mobility and the electricity system. To enable a cross-country and cross-sector coordinated development of interoperable solutions in Europe, a first European high level summit on bidirectional charging took place in Berlin on 27.11.2023, hosted by the Federal Minister for Economic Affairs and Climate Action Dr. Robert Habeck. Together with decision-makers from business and politics from several European Member States, the opportunities and prospects of bidirectional charging were discussed. High-ranking representatives from several European countries, regulatory authorities, the European Commission and from the automotive, aggregator and energy industries took part in the European summit. It was agreed that bidirectional charging for the electricity market, grid and system should be commercially available by 2025 in Europe.

Recharging infrastructure holds an exceptional position, linking the domains of mobility and energy. It is both an enabler and a promotor for electromobility and therefore for clean air and reducing carbon dioxide emissions. And, it puts additional pressure on our electricity grid while at the same time allows optimising its use.

Electric vehicles (EVs) can offer a cost-efficient and comfortable mode of transport and can underpin the energy transition, but only under the right conditions.

- The widescale application of smart and bidirectional recharging is one such prerequisite. A widescale application of smart and bidirectional recharging will help stabilise our grids and reduce prices.
- Secondly, driving EVs must be affordable for our inhabitants and our businesses. Again, smart and bidirectional charging holds much potential in this field. The end-user or owner of a vehicle can offer its recharging flexibility to the market and in return receive substantial rewards.

Bidirectional charging contributes in the short term by preparing the whole energy system for utilising EVs for the benefit of the individual user and society as a whole.

As a follow-up to the first European high level summit on bidirectional charging, interested stakeholders have decided to collaborate on the topic in three European working groups (EWGs) and one national sub-working group (WG):

- EWG 1: “Car Charging and Aggregators”
- EWG 2: “Energy and Grid Topics”
- EWG 3: “Legal and Sublegal Framework”
- WG 3a: “Sub-Working Group on the Legal and Sublegal Framework in Germany”

2 PROCESS OF EWG 3

EWG 3 has more than 70 members (as of 01.10.2024) and political and company representatives from several countries: Austria, Belgium, Denmark, France, Germany, Italy, Poland, the Netherlands. France, Germany and the Netherlands have acted as co-chairs of this working group and have hosted monthly meetings with all members, focusing on different topics relevant to the legal and regulatory environment in different European Member States and the recommendations published by ACER in its report “Demand response and other distributed energy resources: what barriers are holding them back? 2023 Market Monitoring Report” (hereafter referred to as the ACER report).

In their joint report, EWG 3 has worked out the key barriers in the legal and regulatory framework for bidirectional charging.

Similarly, industry representatives from EWG 1 on cars and aggregators and EWG 2 on energy and grid industries have identified key hurdles to be addressed in their joint report. In order to overcome obstacles and to have first interoperable products capable of bidirectional charging by 2025 and enable mass market adoption by 2030, EWG 1 and EWG 2 formulated six fields for action:

- incentives for users to participate in bidirectional charging,
- the necessary technical harmonisation,
- the development of EVs, hardware and software capable of bidirectional charging,
- smart and interoperable infrastructure for communication and information exchange,
- non-discriminatory and seamless data transfer,
- and the development of policies to account for battery use in the context of bidirectional charging.

In the report of WG 3a dedicated to the German regulatory framework, industry representatives have put the focus on four central fields for action:

- Definition of a metering concept with a second meter for the temporarily stored electricity in bidirectional EVs.
- Exemption from taxes, levies, surcharges and grid fees for temporarily stored electricity, insofar as this is used preventively to ensure grid serviceability in a trial phase until 2030.
- Application of § 14a EnWG (Energy Industry Act) also for feed-in (two directions) in order to fully utilise the potential for grid-supporting use for curative measures.
- Testing of concepts and associated cost deduction for market-based procurement of preventive grid-supporting services for both distribution and transmission system operators as part of a trial phase until the end of 2030.

2 PROCESS OF EWG 3

The EWG 3 on the “legal and sublegal framework” for bidirectional charging has met eight times since November 2023 in monthly meetings (digitally) and face-to-face meetings in Berlin (see Figure No. 1). The key findings are the following hurdles which remain to be addressed:

- a lack of proper legal framework to allow market access,
- restrictive requirements for providing grid balancing services,
- lack of incentives – both from a customer-oriented policy and incentives for industry to deploy V2G products and services,
- and grid tariffs, which can provide incentives or disincentives for bidirectional charging.

Starting in January 2024, EWG 3 has used Miro as a tool to facilitate their collaboration and participation of all members. The next paragraphs give a short overview of what has been discussed in these meetings and where applicable, the relevant content from Miro has been illustrated to help visualise the process.

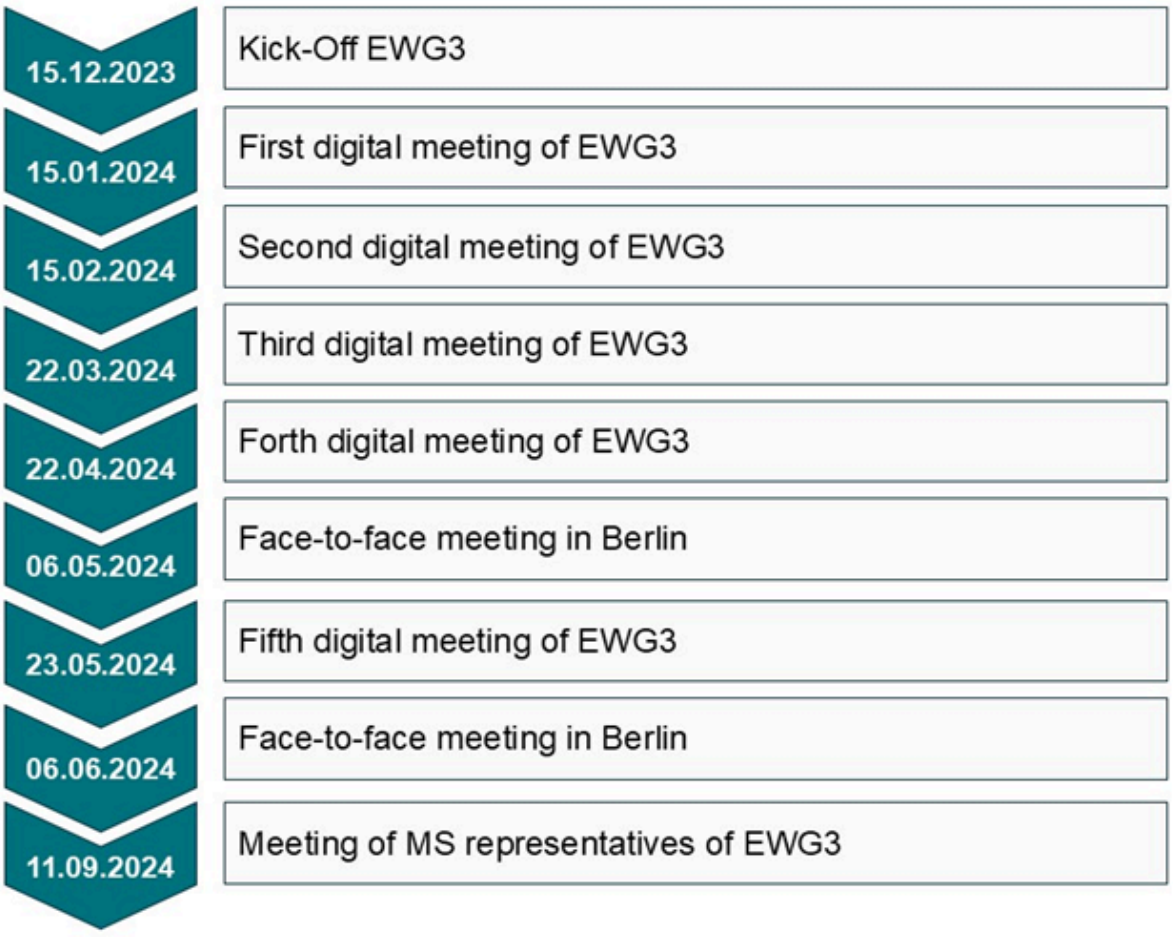

Figure No. 1: Overview of the meetings of EWG 3

2 PROCESS OF EWG 3

15.12.2023. EWG 3 kicked off their work with a short presentation by the national representative from Germany on the working process of the EWGs in general.

15.01.2024. The meeting started with a round of introductions of the EWG 3 members and a summary of the first meeting of EWG 2. Two presentations followed with Energinet introducing the charging case, issues, potentials and grid codes to demonstrate the flexibility potential in parked batteries in Denmark and raising awareness to the fact that the European Commission is in the process of reviewing the Network Code on Requirements for Generators (NC RfG). Secondly, DG Connect of the European Commission presented data standards at the confluence of the mobility and energy sector. In the end, the purpose of the working group has been clarified as sharing information and accelerating the learning time among the participants. The members recognized the importance of collective efforts in shaping the future of electric cars and energy grids. It was highlighted that as part of the challenges faced, legislation must be considered.

15.02.2024. ACER presented their current activities in the field of electromobility and their perspective of the Network Code Requirements for Generators (NC RfG) and introduced the identified barriers for distributed generation. This presentation addressed the revision of EU grid connection codes and focused on bidirectional electric vehicles in the context of ACER's proposed amendments to the NC RfG and provided an overview of the results from the report “Demand response and other distributed energy resources: what barriers are holding them back? 2023 Market Monitoring Report” relevant to Germany.

The ACER Market Monitoring Report identifies and addresses approximately 50 challenges (see annex). The presentation focused on the most pressing ones from ACER’s standpoint and highlighted recommendations for governments, regulators and system operators to remove regulatory barriers and restrictions in the market design for demand response and other distributed energy resources (DER). The reactions and comments from the Member States representatives made it clear how different the preconditions are in each country regarding DER.

2 PROCESS OF EWG 3

22.03.2024. The members discussed the hurdles identified by ACER in their report and presented in the previous meeting. These hurdles and recommendations based on a broad and in-depth study of the European situation were taken as an expert-view supporting the necessity of the work of EWG 3. A vote on the Miro was carried out to prioritise the barriers that should be the future focus of the work of EWG 3, i.e. where assessment and actions to further expand existing legal and sublegal frameworks aligned with deployment/implementation of bidirectional infrastructure. The outcome of the voting identified four ACER hurdles as a priority: lack of proper legal framework to allow market access, lack of incentives, restrictive requirements for providing balancing services, and network tariffs (see Figure No. 2).

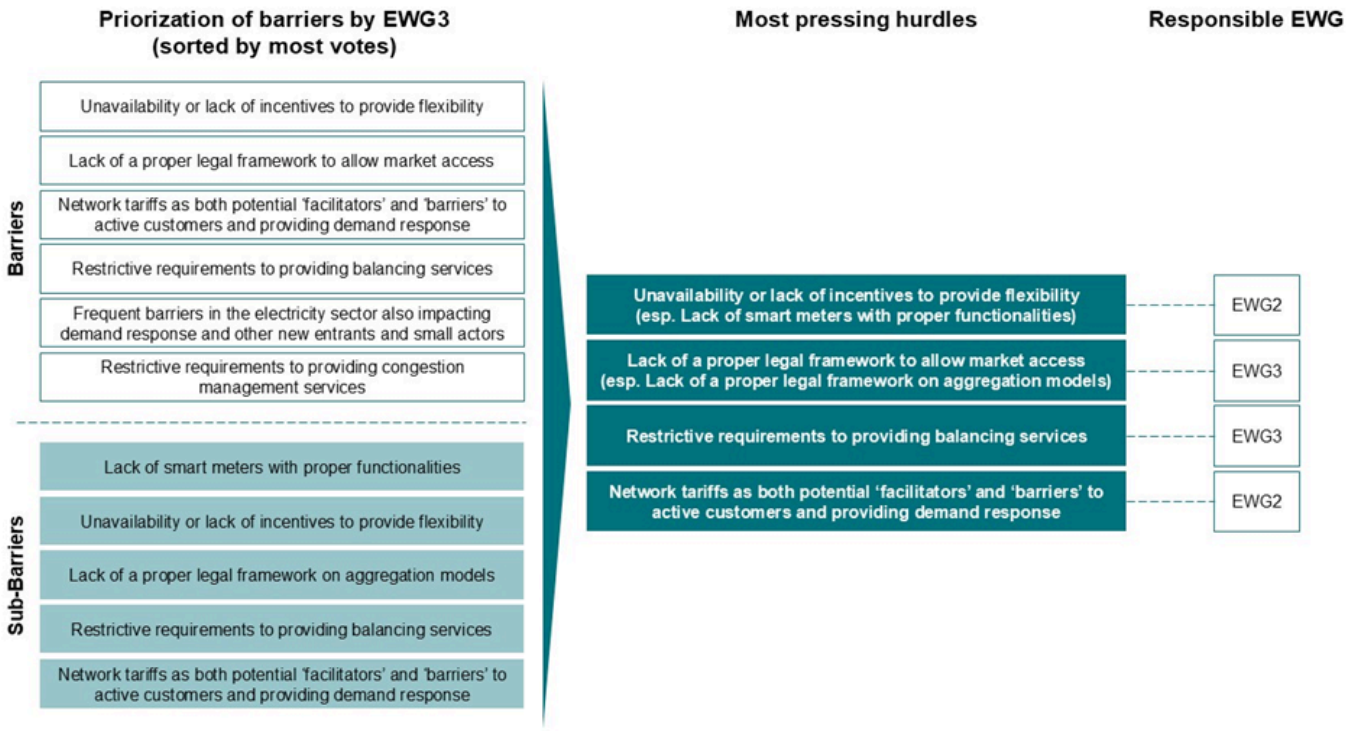

Figure No. 2: Four ACER hurdles as priority for EWG 3

22.04.2024. DG ENER of the European Commission has presented the recent regulatory developments on Demand Response that are relevant and essential for future optimisation of bidirectional charging. In this regard, the future network code on demand response is highlighted, as it will provide harmonised rules for flexibility services by distributed resources such as EV batteries. Moreover, the recent developments on the Alternative Fuels Infrastructure Regulation (AFIR), which establishes the framework for the deployment of the charging infrastructure, were also presented. A regrouping of the questions and ideas of the last EWG 3 monthly

2 PROCESS OF EWG 3

meeting have been presented on the Miro Board, in an attempt to link the questions and ideas to the suitable EWG (see Figure No. 3).

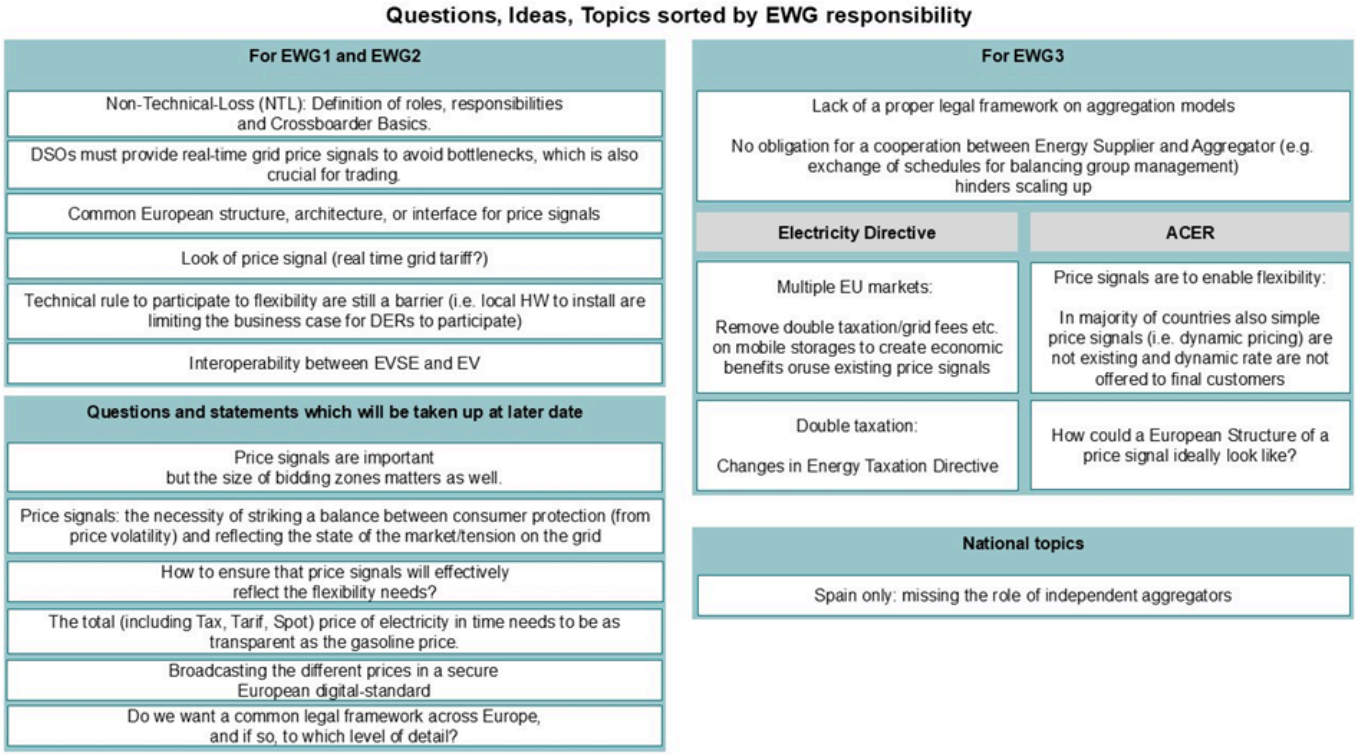

Figure No. 3: Connecting EWG 3 questions and ideas to the suitable EWG

06.05.2024. A face-to-face meeting with all EWGs took place in Berlin under the heading “Bits, Bytes and pieces for allowing market introduction of V2G by 2025 (Part II)”, centered on further advancing the work from EWG 1 and EWG 2 on a set of joint data points and interfaces. This was a follow-up to the Part I meeting that took place in March with EWG 1 and EWG 2 only. ElaadNL presented initial findings of the PwC report “Unlocking EV smart charging to reduce grid congestion – lessons from the Netherlands” (the final report was presented on 12.06.2024 at the Dutch embassy in Berlin, during the Dutch-German Networking Event on bidirectional charging organised by ElaadNL and Agora Verkehrswende).

Federal Minister for Economic Affairs and Climate Action Dr. Robert Habeck provided a welcome address (see Picture No. 1). This was followed by a presentation from DG ENER of the European Commission covering the revised Renewable Energy Directive (RED) and emphasising the provisions on electromobility and links to V2G. BentoNet also held a presentation introducing EU-wide access to grid status data explaining how this might be a key to enable grid-friendly control and V2G services.

2 PROCESS OF EWG 3

Members from EWG 1 and EWG 2, supported by EWG 3, used the occasion to continue the joint work together in groups on the interfaces and use cases for V2G. The meeting concluded with a presentation on Self-Sovereign Identities (SSIs), which can be used for V2G services by fully automated digital services. The SSI Outlook by Elia, TenneT and Energinet illustrated potential future pathways for bidirectional digital systems.

Picture No. 1: Federal Minister for Economic Affairs and Climate Action Dr. Robert Habeck provided a welcome address on 06.05.2024.

23.05.2024. The EWG 3 co-chairs started by giving a short summary of the face-to-face meeting that took place on 06.05.2024. The members then discussed the feasibility of the possible solutions offered in the ACER report for the four most pressing problems for DER. After a voting procedure, there was an agreement on the solutions proposed (see Figure No. 4). However, there was also a shared opinion that these are not sufficiently concrete to guide an implementation and adaptation on regulation. Moreover, clear differences among Member States exist and these dictate current challenges and priorities.

2 PROCESS OF EWG 3

Most pressing hurdles	Possible solutions from ACER report	Comments		
Unavailability or lack of incentives to provide flexibility (esp. Lack of smart meters with proper functionalities)	Member States must define some minimum functionalities for smart meters in their national legislation in line with the Electricity Directive.	Share best practices, like in NL Smart Charging requirements for public domain charging infrastructure	Agreed, but in this situation: what minimum functionalities will then enable V2G across boarders?	Minimum levels could be harmonized in order to achieve a minimum level. The rest should be left to the member states due to the different characteristics and technical requirements
		In the case of already deployed smart meters, define rules for interoperability with CP meters (intra-member state).	guidance from EC how interoperability could be guaranteed potentially solutions could be: 1. joint data pools 2. broadcasted signals or 3. std APIs	smart and bidirectional charging shall be technically feasible also in multi family house and the smart meters shall technically be allowed for that.
Lack of a proper legal framework to allow market access (esp. Lack of a proper legal framework on aggregation models)	For the aggregation model(s) chosen for each electricity market and SO service, Member States must also ensure that their national regulatory framework defines at least the elements included in the Electricity Directive, including non-discriminatory and transparent rules clearly assigning roles and responsibilities to all electricity undertakings and customers and non-discriminatory and transparent rules and procedures for the exchange of data.	Agreed - the non discriminatory part is might being solved differently from state to state on the grid side! At least the roles needs to work across boarders	Aggregation should be designed in such a way that the requirements of the energy grids are taken into account and no artificial simultaneities are created that would result in immense grid expansion	V2G needs access to wholesale markets (volumes of ancillary services markets are too small and prices will crash with growing supply) Aggregators might need dedicated products (e. g. separate tenders in capacity markets) allowing them to scale and become competitive with large power plants. The effect of market actors on grids must be considered and coordination is needed, however, the requirements of one interest group should not override the requirement of others.
		Need for an obligation to exchange data for balancing group management like the "Aggregator-Modell" in Germany for balancing services. This process could be adopted for bidi charging use cases between aggregator and electricity providers. It is important that this should be a standard process with no additional costs.		
Network tariffs as both potential 'facilitators' and 'barriers' to active customers and providing demand response	Member States must ensure that network users are subject to cost-reflective, transparent, and non-discriminatory network charges that account separately for the electricity fed into the grid and the electricity consumed from the grid. And network charges should not discriminate either positively or negatively against energy storage or aggregation and should not create disincentives for self-generation, self-consumption or for participation in demand response.	Grid tariffs should be plannable in order to avoid loss of convenience for customers and to be able to offer smart, comprehensible products.	Grid charges should not be misused as incentive instruments; they are a distribution of costs among customer groups. If one group is favored, the rest are disadvantaged	In Germany, single-meter solutions are planned, which means that all customer consumption, including conventional consumption, is included and cannot be separated in terms of price.	One add on: all parties who add charges like tariffs to this, needs digital standardisation to communicate this in a harmonized way
Restrictive requirements to providing balancing services	Restrictive requirements to providing balancing servicesIt is important to monitor TSOs adherence to the European target model until all procure their balancing energy needs via the EU balancing platforms: monitoring some features of the prequalification process, the product design, and the market structure to procure local balancing products and specific balancing products that may hinder the participation of distributed energy resources and other new actors.	The generation of additional market roles should be avoided. This would further complicate the system and the coordination, data provision, etc.	If we want aggregators to grow, the product designs must be technology-inclusive, not technology-neutral. Aggregators cannot compete with incumbents until their pools have a certain size. Until then, they need seperate tenders.	

Figure No. 4: Four most pressing topics and possible solutions

2 PROCESS OF EWG 3

06.06.2024. In this face-to-face meeting of EWG 1 and EWG 2, “Bits, Bytes and pieces for allowing market introduction of V2G by 2025 (Part III)”, next to other agenda points, there was an active discussion part of EWG 1 and EWG 2 with regard to the hurdles identified by ACER in their report “Demand response and other distributed energy resources: what barriers are holding them back? 2023 Market Monitoring Report”.

11.09.2024. After a summer break of the CoW, the Member States representatives of EWG 3 met to discuss the possibility to present the results of EWG 3 in a report. In the aftermath, the EWG 3 co-chairs have taken up the work to plan, write and consolidate such a document.

In short, the topics discussed so far in EWG 3 have been:

- Insights from Denmark and the Netherlands on V2G in their countries: Denmark with highly volatile wind and solar production and the Netherlands with a dense charger network; both wanting to use V2G to exploit the stabilisation potentials for grids and markets
- Network Code on Requirements for Generators (NC RfG)
- Data Standards at the confluence of the mobility and energy sector
- ACER report “Demand response and other distributed energy resources: what barriers are holding them back? 2023 Market Monitoring Report”, the identified 50 barriers, of which four barriers have been prioritised by EWG 3
- Alternative Fuel Infrastructure Regulation (AFIR)
- Renewable Energy Directive (RED III)

3 SUMMARY AND OUTLOOK

The European Working Groups 1 and 2 for automotive, aggregators and energy industries have identified 36 common data points and interfaces which need to be shared to bring vehicle-to-home (V2H) and vehicle-to-grid services (V2G) to life. As a next step, these need to be implemented by industries as of 2025 and the years to come.

The European Working Group 3 on legal and sublegal issues has identified 4 major hurdles and challenges, which need to be addressed by the European Union and its Member States and regulators: a lack of proper legal framework to allow market access, restrictive requirements to providing balancing services, lack of incentives, network tariffs. They also call for accelerated standardisation on European and international level. As a next step, the European and national regulatory environment shall be developed further with a view to enabling and supporting interoperable bidirectional charging solutions.

The Working Group 3a on the regulatory environment for bidirectional charging has proposed adapting the German regulatory and legal framework to simplify and facilitate bidirectional charging.

At the European level, the Commission has issued guidance on implementing bidirectional charging and other decentralised flexibility and storage sources on Art 20 RED III. Some questions, however, still remain to be addressed, standardisation prioritised and a European-wide market to be developed. RED III needs to be transposed into law by Member States and regulatory authorities by May 2025. Further guidance on some of the technically necessary and regulatory essential details are needed.

In parallel, a new network code on demand response will be submitted to the Commission in March 2025 and adopted as implemented act. It will clarify the regulatory framework and request the development of union-wide and national methodologies, including data exchange between system operators, service providers and assets.

The foundations for an interoperable and common European approach have been developed over the last 12 months; it is now up to industries to implement V2H and V2G and bring products and services to markets.

Sharing data across actors, platforms and hubs will be one crucial next step for the next year to come. This will bring further improvement for data validation, standardisation and integration.

3 SUMMARY AND OUTLOOK

The partners in the European Coalition of the Willing on Bidirectional Charging are committed to bringing V2H and V2G to markets in 2025 and are looking forward to continuing the successful cross-country and cross-sector cooperation for bidirectional charging.

We are looking forward to our continued joint work in the European Working Groups of the Coalition of the Willing on Bidirectional Charging in the future.

4 ANNEX
4.1 COUNTRY STATUS REPORTS

Austria

i. Formulated goals in terms of implementation of bidirectional charging

The Federal Ministry for Climate Action has set ambitious targets for the decarbonisation of transport in the Mobility Master Plan 2030[1]. The aim is for all new car registrations to be emission-free by 2030. In order to realise this ambitious goal, it is not only the mere expansion of the charging infrastructure that is relevant, but also the continuous further development of this infrastructure in terms of functionalities such as intelligent and efficient integration into the power grid.

ii. National strategy that can be relevant for the CoW

One of the implementation strategies of the Mobility Masterplan 2030 is the Renewable Energy in Mobility Immediate Action Programme[2]. It describes 41 measures that contribute to the implementation of the Mobility Masterplan 2030. Measure M29 mentions the study on the integration of e-mobility into the electricity system (ZEMPSI), which is to be published in 2024.

iii. What has been done so far

Elektrizitätswirtschaftsgesetz (Electricity Industry Act) – ElWG

The yet to be adopted Elektrizitätswirtschaftsgesetz (ElWG)[3] will implement energy storage (facilities), previously covered only by EU law, in the Austrian energy law. This highlights the crucial role energy storage plays in the success of the energy transition. The legal definitions follow the Directive (EU) 2019/944, defining both energy storage facilities and the act of energy storage. Notably, electric vehicles with bidirectional charging capabilities will also be covered by the definition of energy storage facilities. Depending on the direction of energy flow, these storage facilities (including electric vehicles) will be treated as either consumers or suppliers, with corresponding rights and obligations. Furthermore, the National Regulatory Authority E-Control is free to set time-variable and or load-variable grid usage fees. If implemented, such a fee-design might incentivize the expansion of bidirectional charging.

[1] https://www.bmk.gv.at/themen/mobilitaet/mobilitaetsmasterplan/mmp2030.html
[2] Draft of the ElWG (open for consultation in January and February 2024), https://www.parlament.gv.at/gegenstand/XXVII/ME/310.
[3] https://www.bmk.gv.at/themen/mobilitaet/alternative_verkehrskonzepte/elektromobilitaet/publikationen/sofortprogramm.html

4 ANNEX
4.1 COUNTRY STATUS REPORTS

ZEMPSI

The study[1] aims to provide a comprehensive overview of the integration of zero-emission mobility (ZEM) into the power system, addressing technical, legal, and regulatory aspects while incorporating various stakeholder perspectives. It will deliver the first overall synthesis of the interaction between electromobility and public power grid infrastructure and develop recommendations for future management.

STELE

The goal of STELE[2] is to develop and implement an Austrian platform for the intelligent integration of electromobility into power grids. This platform will align with the Mobility Master Plan 2030 (MMP 2030), the Immediate Action Program for Renewable Energy in Mobility, the Master Plan for Freight Transport 2030, as well as the grid infrastructure plans of electricity network operators.

[1] https://www.klimafonds.gv.at/wp-content/uploads/2024/10/6708d5953e1e1_ZEMPSI_Ergebnisbericht.pdf
[2] https://www.linkedin.com/posts/klimafonds_kickoff-stele-stromnetze-activity-7239596113069039616-zLee?utm_source=share&utm_medium=member_desktop

4 ANNEX
4.1 COUNTRY STATUS REPORTS

Denmark

i. Towards a flexible energy system

The EU needs to be ready for a future with a higher degree of fluctuating renewable energy in the energy system. The continued decarbonising of the energy sector will be a key driver in delivering on an EU 2040 climate target and net-zero target in 2050. On this background Denmark considers Vehicle-to-Grid (V2G) to have a certain potential in a smarter more integrated energy system, in terms of balancing the electricity system and contributing to security of supply. We need to utilise this untapped potential across Europe.

ii. What has been done so far

In 2024, about half of all newly sold cars in Denmark have been electric vehicles and the proportion of electric vehicles in the total new sale has been consistently rising month to month. This development has largely been advanced by substantial tax breaks on electric vehicles complemented by subsidies for publicly available recharging stations and tax reimbursements on electricity used in recharging stations. At the same time, Denmark has a high degree of wind and solar energy in the electricity grid. This creates pressure to ensure new flexibility solutions for periods with low energy production from solar and wind.

Furthermore, the Danish electricity system has a high degree of digitization with full rollout of smart meters as well as hourly and quarter-based electricity consumption data available. Most recharging points in Denmark today have the ability to act intelligently, as they can react to prices and offer balancing of their electricity consumption on the electricity markets.

Based on the above conditions, Denmark is taking steps to advance V2G. In February 2024 Denmark adopted an ambitious political agreement on a Utility Digitization Program. One of the objectives of the program is to ensure common standards and an effective market design for V2G in order for market players to offer, for example, flexibility services on the basis of a digital infrastructure. The purpose is to benefit the future's green energy system, citizens and companies.

iii. Recommendations

Denmark encourages the work for common European standards and the development of an overall market design, where market players can offer flexibility services. An adequate framework for utilising V2G is necessary in order to realize the potential of V2G in terms of benefitting grid stability, contributing to security of supply and be a source of revenue for car owners.

4 ANNEX
4.1 COUNTRY STATUS REPORTS

France

i. Formulated goals in terms of implementation of bidirectional charging: Flexibility and energy sufficiency at heart

The energy transition is under way at a fast pace: on the supply side, the significant deployment of renewable energies in addition to nuclear production and the phasing-out of fossil energies will allow the French power system to remain largely low carbon while delivering more low-carbon electricity in the coming years.

It will however render the supply-demand balance less manageable, especially with more intermittent capacities coming into play. On the demand side, the electrification of many uses – industries, residential heating and cooling, transportation, etc. – will alter the demand curve, increasing the load at certain times of the day. These changes emphasize the need for energy sufficiency, while creating opportunities for flexibility.

Some flexibility options, such as large-scale energy storage, can be limited by high costs, slow deployment, or technological constraints. In this context France plans to tap into the resources offered among others by the electrification of vehicles: smart charging and bidirectional charging. France is in the process of identifying potential areas of development for these technologies.

ii. National strategy that can be relevant for the CoW: decarbonization of the transportation sector and support for flexibility resources

The still-in-consultation French strategy for energy and climate (“Stratégie Française Énergie Climat”, SFEC), the road map toward carbon neutrality by 2050, relies on several planning documents, among which the Low-Carbon Nation Strategy (“Stratégie Nationale Bas Carbone”, SNBC) and the Multiannual Energy Plan (“Programmation Pluriannuelle de l’Énergie”, PPE).

This strategy puts forward three main levers of action: Reducing our energy consumption through sufficiency and energy efficiency, producing the electricity we need to meet our consumption in France, decarbonising our energy mix in complement to the electrification of uses.

It also sets ambitious targets for the deployment of electric vehicles as a replacement for combustion engine vehicles, but also promotes modal transfers and green mobility, in order to massively reduce transportation carbon emissions.

4 ANNEX
4.1 COUNTRY STATUS REPORTS

The French strategy acknowledges that energy – and especially electricity – consumption must be better managed. It identifies a cumulative need of several GW of additional flexibility. To achieve this, the goal is to leverage every available demand-side flexibility means to shift consumption during peak generation: encouraging innovative supply offers, developing smart appliances in tertiary buildings, and smart charging for EVs. V2G is also recognized as a flexibility tool which will gradually gain momentum.

The French Multiannual Energy Plan highlights the priority to adapt and expand our grids, in order to connect electric vehicle charging stations. Particular emphasis is placed on the adaptation of electricy grids in order to meet, on the one hand, the acceleration of renewable energy projects, and on the other hand the increasing demand for electricity. The mass adoption of electric vehicles will in particular drive the need to connect adequate and numerous charging stations to the grid.

Concerning those charging points, master plans for the development of charging infrastructures (“schémas directeurs de développement des infrastructures de recharge pour véhicules électriques”, SDIRVE) at local and national level aim to support, coordinate and foster the development of publicly accessible charging stations.

iii. What has been done so far: diverse actions towards smart charging and V2G

More than 90% of electricity meters in France are smart meters. They provide real-time consumption data, allowing DSOs to optimize grid operations, prevent overloads, enable smart charging during off-peak hours, and supporting V2G integration. They are a major asset for the deployment of flexibility, alongside other smart appliances like energy management systems.

The French NRA (“Commission de Régulation de l’Énergie”, CRE) has recently proposed a reform of the network tariffs to adjust the peak and off-peak signals to meet the new needs of the electrical system, especially in terms of supply-demand balance and congestion. These signals can be used by the smart meters to then activate flexibility on demand.

The tax system is regularly revisited, and takes more and more into account smart charging and V2G. For instance, in 2024, the tax credit supporting the installation of new EV charging stations is now targeting controllable charging stations specifically.

4 ANNEX
4.1 COUNTRY STATUS REPORTS

Several small-scale projects bringing together some players in electric mobility have been conducted to study the interactions between the public electricity distribution network, charging stations and electric vehicles. Their goal was to demonstrate the potential of V2G and to report on the technical and economical conditions which are to be met. Other initiatives in V2G and smart charging exist, such as a regulatory sandbox introduced in 2019 in which companies are authorised to circumvent some regulations in order to allow for innovation.

iv. Recommendations: a more harmonized European framework

France recognizes that a common regulatory framework should be found in order to allow for the development of V2G in Europe. For instance, the tax systems should be coherently applied throughout member states.

France also encourages the development of common European standards and interoperable systems, and welcomes the implementation of the Electricity Market Design and the upcoming discussions on the network code on demand response.

Economic incentives need to be well calibrated to scale up V2G deployment.

Finally, acceptability will be key to ensure a large adoption of the technology. In this view, proper communication must be made in order to address common concerns of citizens, such as battery aging, the perceived loss of control over the charge level, etc.

4 ANNEX
4.1 COUNTRY STATUS REPORTS

Germany

i. Formulated goals in terms of implementation of bidirectional charging

The Federal Ministry for Economic Affairs and Climate Action aims at achieving market availability of vehicle to home (v2h) and vehicle to grid services (v2g) by 2025 and reach the number of 15 million battery electric vehicles by 2030.

ii. National strategy that can be relevant for the CoW

The national strategy for charging infrastructure ("Masterplan Ladeinfrastruktur") comprises 68 measures and aims at having 1 million publicly accessible charging points as of 2030.
https://www.bundesregierung.de/breg-en/news/charging-infrastructure-master-plan-2135836

iii. What has been done so far

Recent developments and examples of progress at national level
As of January 2024, the national regulatory authority (NRA) has put into place a new regulatory regime. § 14a of the Energy Industry Act (EnWG) is an emergency instrument for grid operators to proactively prevent critical grid situations by reducing the power consumption of controllable consumer devices. In return for this control, the owners of these devices pay a reduced grid fee which also should promote grid friendly charging behavior.

Customers can choose between three options for reducing the grid fee: a flat-rate reduction (module 1), a proportional reduction (module 2) or a combination of module 1 with a time-variable grid fee (module 3). Module 1 is the standard solution; the other variants must be explicitly selected. In return, the distribution grid operator may reduce the maximum load to 4.2 kW at peak load times (for maximum 2 hours per day). Depending on the chosen option, the grid fees are reduced on average by 60 % to 85% for the customer.

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All electricity suppliers must offer their customers variable electricity tariffs from 2025. Also from 2025 onwards, the technical equipment “smart steering device” (“Steuerbox”) based on the German Smart Meter Gateway Technology as defined by the Federal Office for Information Security (BSI) will be commercially available in Germany.

The recent changes to the German Renewable Energy Act in 2024 (EEG, “Solarpaket”) open up the possibility of storing and marketing of electricity from the grid in a battery PV system. To do so, additional metering devices need to be installed, depending on the number of decentralized solar units, home storage systems, heat pumps and/or (bidirectional) wallboxes.
Previously the user had lost his right to EEG compensation if gray electricity from the grid was mixed with self-generated PV electricity in the battery. The new regulations also apply to bidirectional charging. In order to be implemented in practice, the regulations still require further elaboration through the NRA.

The Energy Finance Act (EnFG) introduced for the first time exemptions from some electricity components (CHP surcharge, offshore grid allocation) for electricity storage-and thus for bidirectional charging. In order to remove only the buffered quantity from the aforementioned allocations and not the entire procured quantity, a netting logic was introduced in § 21 EnFG: The amount purchased at the connection point should be offset against the quantity injected. This balancing logic ensures that double loading of the same kWh with CHP surcharge and offshore grid allocation is reliably avoided.

Furthermore, a simplification of the tax regime for bidirectional charging has been introduced in April 2024. It ensures that electricity in the vehicle to home or vehicle to business use case is not accounted for as a “electricity supplier” and therefore electricity tax does not have to be accounted any more.

As a result of the Coalition of the willing on bidirectional charging, a set of approximately 40 data points has been discussed by car, aggregator and energy industries which are the basis for providing v2h and v2g services as of 2025.
The very first v2h services have already reached a level of commercial market availability in 2024.

iv. Recommendations and lessons-learned

The participants of the Coalition of the willing recommend to prioritize the following regulatory reforms. The key points for further action are:

- **Legal framework for v2g and grid fees: Exemption from taxes, levies, surcharges, and grid fees** for stored electricity, provided that it is used preventively to ensure grid serviceability during a trial phase until the end of 2030 to ensure a fast ramp-up of bidirectional charging technology. Recommendation:
  - Change of the Electricity tax law (electricity tax),
  - Change of the EnWG (concession fee),
  - Introduction of a new module (“module 4”) for V2G applications in §14a EnWG (grid fees),
- **The proposed amendment to § 14a of the Energy Industry Act (EnWG) to allow power limitations in critical grid situations regardless of the direction (consumption and feed-back into the grid),** instead of just limiting the consumption as it currently still is the case. This means that not only can electricity consumption be reduced, but the feed-in of electricity can also be limited to ensure the stability of the power grid. This expansion aims to prevent grid bottlenecks and ensure grid stability.
- **V2g for balancing services: Test of concepts and recognition of associated costs** in the market-based procurement of preventive grid services for distribution and transmission system operators.Implementation via a trial phase (sand-box environmnet) until 31 December 2030, which also includes the ability of the regulatory authority to recognise costs for any necessary procurement of grid-supporting services from decentral flexibilities during the trial phase.
- **Incentives and simplified measurement: Establishment of a v2g measurement concept** developed and published by the national electricty industry association and standardisation association “VDE”, which has been already confirmed by the participating distribution grid operators. This concept entails the installation of a second meter for the stored electricity. https://www.vde.com/resource/blob/2322542/8c4409de40eb1e69555cfc7e075fd781/vde-fnn-hinweis-speicher-v7-1-data.pdf

These measures would establish efficient regulation of bidirectional charging and thus enable an important use case for grid-friendly operation.

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The Netherlands

Electric vehicles (EVs) can provide a cost-effective and comfortable mode of transportation, contributing significantly to the energy transition—but only under the right conditions.

A key requirement for this is the widespread implementation of smart and bi-directional charging. Without it, our power grids may become unstable.

For EVs to be viable, they must be affordable for both residents and businesses. Here, smart and bi-directional charging can also play a crucial role. Vehicle owners can leverage their charging flexibility in the market and receive substantial rewards in return.

i. An Open Market to Meet User Needs

Bi-directional charging connects various stakeholders in mobility, infrastructure, and energy sectors. This results in a diverse range of actors interested in its development and benefits. The Netherlands promotes an open market that facilitates a smooth flow of energy and data. Various functions within the system, such as aggregation and end-user interaction, can be managed by multiple participants, while respecting the control each actor has over their resources.

The Netherlands encourages the introduction of user-friendly and scalable bi-directional charging solutions. Regardless of how stakeholders interact, the end-user or vehicle owner should remain at the forefront, determining the charging profile and services that best suit their needs.

ii. Progress in the Netherlands

Approximately one in five recharging stations in Europe is located in the Netherlands. Nearly all of these stations are equipped with data connections, linked to smart meters, and utilize the OCPP protocol for communication with management systems.

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Our innovative electromobility sector sees great potential in the large-scale implementation of smart and bi-directional charging. According to our national EV questionnaire from 2024, public awareness and support for bi-directional charging are already high, with nearly 50% of respondents expressing interest in using this technology at home.

In collaboration with relevant public and private entities, including grid operators, we have launched a national program called “Smart Charging for Everyone.” This initiative benefits all stakeholders:

- End-users enjoy reliable and affordable charging.
- Charge point operators can provide new flexibility services.
- Grid operators will experience reduced demand during peak hours and other flexibility offerings.

Our goal is for 60% of all charging sessions to be smart by the end of 2026, moving beyond isolated pilots to create an effective and equitable system.

Key components of this program include:

- A testing program for reliable smart charging across various recharging stations and vehicle combinations.
- A national label for recharging stations ready for smart charging.
- Developing government contracts that mandate the use of smart charging.

By 2025, we will establish an interdepartmental action plan to address national barriers related to bi-directional charging.

iii. European Cooperation on Bi-Directional Charging

Our coalition aims to expedite the large-scale introduction of bi-directional charging by identifying and addressing key obstacles. Some challenges need to be tackled at the national level, while others require European or international cooperation. The Netherlands proposes a collaborative effort on the following topics:

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Harmonisation of Recharging Infrastructure and Vehicle Specifications

Although significant progress has been made in the EU-wide implementation of communication protocols connecting various system resources, further efforts are needed. All stakeholders should enhance development, support, and standardization of communication protocols that facilitate data exchange among vehicles, recharging stations, management systems, and service providers.

Equally crucial is the harmonization of vehicle specifications and documentation regarding their smart and bi-directional charging capabilities. Standardized specifications will enable end-users to enjoy reliable charging experiences across different vehicle and infrastructure combinations. Clear documentation on the suitability of electric vehicles for smart and bi-directional charging will empower residents and businesses to make informed vehicle choices.

Enhancing Interaction with End-Users

Current testing and application of bi-directional charging have primarily focused on technological development and resource connectivity. While these are foundational, the true potential of bi-directional charging will only be realised when end-users can benefit directly. This means they should lead their bi-directional charging sessions.

Especially when bi-directional charging is done at publicly accessible recharging stations the interaction with the end-user is often lacking. Charge point operators and owners of recharging stations will want to offer bi-directional charging based on energy market and grid operator needs, but can hardly interact with the end-user that has its own requirements. Meanwhile, electromobility service providers do have contact with end users but lack the ability to manage charging sessions effectively. To address this, involved parties should evaluate and possibly enhance current market models to improve user interaction and satisfaction.

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4.2 LIST OF BARRIERS TO BIDIRECTIONAL CHARGING (ACER REPORT 2023)

List of identified barriers in the ACER report "Demand response and other distributed energy resources: what barriers are holding them back?" as discussed by EWG 3 on 22.03.2024 and thereafter:

1	Lack of a proper legal framework to allow market access	3.11	Long procurement lead time and long balancing capacity contracts
1.1	Main roles and responsibilities of new actors not defined	3.12	Symmetric balancing capacity products
1.2	Market access restricted due to lack of legal eligibility	3.13	Restrictions in the price settlement rule of balancing energy
1.3	Legal eligibility to participate in day-ahead and intraday markets	3.14	Non-contracted balancing energy bids not allowed
1.4	Legal eligibility to provide balancing services	3.15	Balancing energy gate closure times before intraday cross-zonal gate closure time
1.5	Legal eligibility to provide congestion management services for TSOs and DSOs	3.16	Participation of distributed energy resources in balancing services
1.6	Lack of a proper legal framework on aggregation models	4	Restrictive requirements to providing congestion management services
1.7	Lack of access to final customer data	4.1	TSOs congestion management
1.8	Ownership of recharging points for electric vehicles and storage facilities by system operators	4.2	DSOs congestion management
1.9	Restrictions on trade on day-ahead and intraday markets	5	Restrictive requirements to participating in capacity mechanisms and interruptibility schemes
2	Unavailability or lack of incentives to provide flexibility	5.1	Design features of capacity mechanisms discouraging participation of distributed energy resources
2.1	Lack of smart meters with proper functionalities	5.2	Capacity contracted of distributed energy resources in capacity mechanisms
2.2	Absence of price signals	5.3	Interruptibility schemes only open to large industrial loads
2.3	Low energy component	6	Limited competitive pressure in the retail market
2.4	Absence of time-differentiated network tariffs	7	Retail price interventions
2.5	Absence of retail electricity contracts with time-differentiation	8	Frequent barriers in the electricity sector also impacting demand response and other new entrants and small actors
2.6	Lack of national measures to mobilise flexibility	8.1	Insufficient cross-zonal transmission capacity
3	Restrictive requirements to providing balancing services	8.2	Bidding zones not reflecting structural congestions
3.1	Non-market based balancing services	8.3	Limited competitive pressure and/or liquidity in wholesale electricity market
3.2	Restrictions in market-based balancing services	8.4	Complex, lengthy, and discriminatory administrative and financial requirements
3.3	Constraints in the prequalification process	8.5	Lack of incentives to consider non-wire alternatives
3.4	Large minimum eligible capacity	8.6	Scope for improving transparency, cost-reflectivity, and non-discrimination in network tariffs
3.5	Protracted minimum delivery period	9	Network tariffs as both potential 'facilitators' and 'barriers' to active customers and providing demand response
3.6	Unregulated duration or long prequalification process	9.1	Differentiation in network charges for active and non active customers
3.7	Distributed energy resources prequalified for balancing services	9.2	Incentivising 'behind-the-meter' energy storage and explicit demand response via network charges
3.8	Product design and market structure not aligned with the EU target model	9.3	Differentiation in taxes and levies between active and non-active customers
3.9	Large minimum bid size	9.4	Exemptions, discounts, and other differentiations in network tariffs for specific consumers
3.10	Long validity period of balancing energy bids	9.5	Network tariff basis to activate end users' flexibility

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