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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Promotion of e-mobility through buildings policy

1. Introduction

The aim of this report is to inform the European Parliament and the Council on how building policies can contribute to the promotion of electromobility across the European Union according to the requirement in Article 8(2) of the Energy Performance of Buildings Directive (the EPBD)[1].

On 15 December 2021, the Commission adopted a proposal to recast the EPBD[2]. This proposal would introduce a new Article 12 on infrastructure for sustainable mobility which would strengthen and extend the scope of the existing provisions on electromobility.

This report is based on a study commissioned by the European Commission and carried out between January and August 2022[3]. The study examined barriers to, and best practices for, the deployment of recharging infrastructure in buildings. These are presented in this report.

2. Background

Promoting green mobility is a key action in the European Green Deal. Buildings play an important role in transforming the mobility sector by providing the necessary infrastructure for recharging electric cars and electric bicycles. Green mobility is an important component of the EU's strategy to decarbonise the economy and meet its greenhouse gas emissions reductions targets, which are aligned with the European Climate Law[4] that sets a binding target to reduce emissions by 55% by 2030. It is also important to reach the zero pollution ambition of the European Green Deal. The adoption of RepowerEU[5] and the proposed increased targets for renewable energy and energy efficiency have further increased the need to accelerate the installation of recharging infrastructure in residential and non-residential buildings such as homes and offices.

In 2022, the sales of battery electric vehicles (BEVs) reached 12.1% of total passenger car registrations in the EU-27[6]. By the end of 2022, 2.8 million BEVs and 2.4 million Plug-in Hybrid Electric Vehicles (PHEVs) were registered in the EU-27[7]. Sales of electric bikes in the EU-27 increased by around 265% between 2015 and 2021. 20 million e-bikes have been sold in the EU-27 since 2015 (4.8 million in 2021 alone)[8]. The higher climate ambition requires decarbonisation of the transport sector and an increase in the share of renewable energy in the energy system. Private parking facilities that enable decarbonisation (including through the promotion of active and non-active electric mobility and electrification of transport) are therefore crucial. In addition to publicly available recharging stations, for

[1] Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings as amended by Directive 2018/844 of the European Parliament and of the Council. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0031-20210101

[2] COM(2021) 802 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0802&qid=1641802763889

[3] Promotion of e-mobility through buildings policy, final report, October 2022.

[4] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999. https://eur-lex.europa.eu/eli/reg/2021/1119/oj

[5] COM(2022) 230 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483

[6] European Automobile Manufacturers' Association (ACEA).

[7] EU Alternative Fuels Observatory.

[8] Conebi – Confederation of the European Bicycle Industry.

which targets have been proposed in the Alternative Fuels Infrastructure Regulation (AFIR) proposal [9], it is expected that around 60% of all recharging events will take place in private buildings., Building policies will therefore play an important role in the roll-out of recharging infrastructure.

The main key factors affecting the uptake of electric vehicles (EVs) include affordability, convenience and reliability compared to traditional internal combustion engine (ICE) vehicles. Ease of access and characteristics of EV recharging infrastructure have also been identified as key factors for the uptake of electric vehicles. In addition, smart unidirectional and bidirectional charging of EVs can significantly increase the flexibility and cost-effectiveness of the electricity system and contribute to a higher level of variable renewable electricity generation within the energy mix. Moreover, smart charging contributes to the optimisation of electricity grids thanks to flexibility services provided directly by EV users or through aggregators. It will also stimulate innovation and digitalisation in the context of smart homes. For example recharging points, solar panels and other devices can be connected to a building energy management system, and through it further towards suppliers and aggregators, via open standards[10] in order to be able to maximise the use of local and remote renewables and assist the grid in peak and off-peak load management (flexibility). For large buildings, there is also the possibility for peak management not only on grid level but also on building level through a building energy management system.

The EU solar energy strategy [11] notes that EVs can also serve as energy storage devices for the EV owner or user and contribute to increased solar electricity self-consumption when parked within the premises of the owner or user.

Convenience of recharging is one of the principal factors affecting adoption. It can therefore be concluded that energy policies in the building sector can encourage the uptake of EVs by deploying recharging infrastructure in buildings.

3. Provisions on e-mobility in the EPBD

The EPBD in its current form already promotes e-mobility in buildings. Member States were required to transpose its provisions into their national legislation by March 2020. Article 8 EPBD requires Member States to support the uptake of e-mobility by equipping buildings with certain minimum numbers of recharging points and ducting infrastructure. It includes the following obligations for Member States:

- for **non-residential** buildings:
    - for new non-residential buildings and non-residential buildings undergoing major renovation, with more than 10 parking spaces: ensure the installation of at least one recharging point and ducting infrastructure (enabling the later installation of recharging points) for at least one in every five parking spaces (Article 8(2));

[9] COM(2021) 559 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0559
[10] For example through the EC-led ontology SAREF
[11] SWD(2022) 148 final. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0221&from=EN

    - for all non-residential buildings with more than 20 parking spaces: lay down requirements for the installation of a minimum number of recharging points by 1 January 2025 (Article 8(3));
- for new **residential** buildings and residential buildings undergoing major renovation, with more than 10 parking spaces: ensure the installation of ducting infrastructure (enabling the later installation of recharging points) for every parking space (Article 8(5));
- provide for measures to simplify the deployment of recharging points and address possible regulatory barriers, including permitting and approval procedures (Article 8(7));
- consider the need for coherent policies for buildings, soft and green mobility and urban planning (Article 8(8)).

4. Interlinkages with other policies

The Fit for 55 package[12] supports electromobility through a number of legislative proposals.

The main interlinkage with the EPBD is the AFIR proposal which would require Member States to ensure minimum coverage of publicly accessible recharging points dedicated to light- and heavy-duty road transport vehicles on their territory, including on the TEN-T core and comprehensive network[13]. The AFIR would also contain further provisions to ensure that recharging infrastructure is user-friendly, including provisions on payment options, price transparency and consumer information, non-discriminatory practices and smart recharging.

Another important interlinkage is with CO_2 emission performance standards for cars and vans [14] because the CO_2 emission performance standards strongly promote the deployment of zero-emission vehicles. The European Parliament and Council reached a political agreement on the Commission's proposal on 27 October 2022 according to which all new cars and vans in the EU will be zero-emission as from 2035.

The EPBD is also closely interlinked with the proposal to introduce a new Article 20a into the Renewable Energy Directive [15] that would facilitate system integration of renewable electricity via the following requirements:

- transmission and distribution system operators would be required to provide information on the share of renewable energy and the greenhouse gas emissions content of the electricity they supply. This would increase transparency and provide more information to electricity market actors, aggregators, consumers and end-users;
- battery manufacturers would have to make it possible to access information in real time on battery capacity, state of health, state of charge and power set point to battery owners as well as to third parties acting on their behalf;

[12] https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541
[13] Trans-European Transport Network (TEN-T) (europa.eu)
[14] COM(2021)556 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52021PC0556
[15] COM(2021)557 final. https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52021PC0557

- Member States would have to ensure that non-publicly accessible normal power recharging points can support smart charging functionality, which is important for energy system integration;
- Member States would have to ensure that regulatory provisions concerning the use of storage and balancing assets do not discriminate against the participation of small and/or mobile storage systems (EVs and batteries) in the flexibility, balancing and storage services market.

The provisions on e-mobility in the EPBD are also linked to the Electricity Regulation[16] and Electricity Directive [17], the current Energy Efficiency Directive [18] and the recast Energy Efficiency Directive [19] (particularly the provisions on energy savings obligations, public buildings and the public sector) and the proposed extension of the Emissions Trading System (ETS) to road transport [20].

The provisions on bicycle parking infrastructure are closely linked to the European Green Deal and the new EU Urban mobility framework[21].

5. Implementation of the current EPBD e-mobility provisions in EU Member States

The above-mentioned study on which this report is based concluded that, by May 2022, most Member States had transposed the e-mobility provisions in the current EPBD to the minimum extent required but that a few Member States had adopted more stringent measures. Several Member States had introduced additional e-mobility requirements that are not linked to the EPBD (primarily for fire safety measures and bicycle parking spaces).

Summary of Member State transposition of Article 8 EPBD as at May 2022

Transposition of EPBD provisions for new non-residential and new residential buildings and buildings undergoing major renovation with more than 10 parking spaces (Article 8(2) and Article 8(5) EPBD)

- no transposition in 2 Member States, but legislation is planned;
- the minimum required transposition in 18 Member States for Article 8(2) and 16 Member States for Article 8(5);
- a few Member States have adopted more stringent measures on**:**
  - parking space thresholds that trigger the installation of recharging points and/or ducting infrastructure (7 Member States)**;** and

[16] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0943
[17] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L0944
[18] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02012L0027-20210101
[19] COM(2021) 558 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:558:FIN
[20] COM(2021) 551 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0551
[21] COM(2021) 811 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:811:FIN

- recharging points and ducting infrastructure (e.g. a higher rate/number of recharging points per parking space, specific requirements on types of chargers and capacity, and pre-cabling requirements) (9 Member States).

Transposition of requirement for all non-residential buildings with more than 20 parking spaces to have a minimum number of recharging points by 1 January 2025 (Article 8(3) EPBD)

- no transposition or transposition with a narrower scope in 5 Member States;
- the minimum required transposition in 15 Member States;
- 3 Member States have set an earlier deadline than 2025;
- 7 Member States have set more stringent requirements for the minimum number of recharging points to be installed or have also required the installation of ducting infrastructure.

Derogations (Article 8(4) and Article 8(6) EPBD)

- 12 Member States have decided to exercise the Article 8(4) derogation from Article 8(2) and Article 8(3) for small and medium-sized enterprises (SMEs);
- 21 Member States have decided to exercise the Article 8(6) derogations for specific categories of buildings. By far the most common derogation relates to costs exceeding 7% of the cost of the building or major renovation (16 Member States).

Additional requirements on e-mobility in buildings not required by the EPBD

- fire safety measures are in place or being considered in 8 Member States;
- 5 Member States have introduced minimum requirements for bicycle parking spaces.

6. Provisions on e-mobility in the proposal for an EPBD recast

A proposal for an EPBD recast was adopted on 15 December 2021 as part of the 'Fit for 55' package.

According to the impact assessment for the proposal for an EPBD recast[22], the EU's current building stock is not always 'technically fit' for the energy transition and ready to be integrated into a decarbonised and digitalised energy system. In addition, current requirements for new buildings do not seem adequate to address existing barriers to, and support the uptake of, sustainable mobility and to contribute to transport decarbonisation.

The main objectives of the proposed recast are to reduce buildings' greenhouse gas (GHG) emissions and final energy consumption by 2030, and to set a long-term vision for buildings with a view to achieving EU-wide climate neutrality in 2050. Several measures are proposed in order to achieve this: an increased rate and depth of building renovation; improved information on energy performance and sustainability of buildings; and requirements to transform buildings into zero-emission buildings by 2050. Greater financial support, modernisation and system integration (including infrastructure for sustainable mobility) can help deliver on these objectives.

[22] SWD(2021) 454 final.

During the open public consultation on the proposal[23], stakeholders stressed the need for better access to private recharging infrastructure, more ambitious requirements for multifamily buildings undergoing major renovation and simplified procedures for the installation of recharging points. They also emphasised the need for a 'right to plug' that would give tenants and co-owners access to recharging points at home.

The proposal for an EPBD recast addresses these points. It includes new and strengthened provisions on infrastructure for e-mobility and, in order to be consistent with the European Green Deal and the new EU Urban mobility framework, it also includes provisions for bicycle parking infrastructure.

The proposal specifically strengthens the existing provisions on infrastructure for e-mobility by:

- lowering the applicability threshold for new non-residential buildings and non-residential buildings undergoing major renovation to 5 parking spaces (instead of 10) and requiring pre-cabling for each parking space (instead of ducting infrastructure for 1 parking space in 5) so that recharging points for EVs can be installed at a later date;
- introducing a requirement for at least 1 recharging point for every 2 parking spaces in new and renovated office buildings with more than 5 parking spaces;
- installing at least 1 recharging point for every 10 parking spaces for all non-residential buildings with more than 20 parking spaces, independent of any renovation (instead of letting Member States set a minimum number) by 2027;
- requiring pre-cabling in at least half of the parking spaces for buildings owned or occupied by public authorities by 2033;
- requiring at least 1 bicycle parking space for each car parking space in all relevant non-residential buildings[24];
- lowering the threshold of applicability for new residential buildings and residential buildings undergoing major renovations to 3 parking spaces (instead of 10) and requiring pre-cabling instead of ducting infrastructure, as well as 2 bicycle parking spaces per dwelling[25] (e-bikes play an important role in transport decarbonisation because many households and companies can use electric bikes, cargobikes and family bikes instead of less energy-efficient cars);
- requiring Member States to remove regulatory barriers to the deployment of recharging points in all buildings, in particular residential buildings (e.g. the requirement to obtain the consent of the landlord or co-owners to installing an own-use recharging point);
- introducing requirements on smart recharging and, where appropriate, bidirectional recharging;

[23] Annex B of the EPBD IA, SWD(2021) 454 final.
[24] These can easily be equipped with e-(cargo) bike charging points, thus facilitating the shift to this very energy efficient mobility segment.
[25] Provisions specifying recharging points for e-bikes have not been included. Though important for promoting this energy-efficient segment of e-mobility, e-bikes can be recharged from normal plugs of the regular grid for household appliances, which are technically less challenging to install.

- requiring that recharging points are operated based on non-proprietary and non-discriminatory communication protocols and standards;
- requiring Member States to ensure the availability of technical assistance for building owners and tenants who want to install recharging points;
- requiring Member States to provide appropriate financial measures, in particular those targeting vulnerable households, people affected by energy poverty or living in social housing;
- calling on Member States to ensure the accessibility of recharging points for persons with disabilities, where technically feasible.

In addition, in the REPowerEU plan, the Commission proposed an amendment to the EPBD which would oblige all Member States to ensure that any new buildings are 'solar ready', and where possible contain solar energy installations. These rules would apply to all large (>250m2) new or existing buildings by 2027 or 2028 respectively, and to all other new buildings by 2030.

7. Smart charging [26]

Smart charging has a particularly important role to play when it comes to facilitating the uptake of EVs and managing the increased electricity demand that results. The EPBD recast proposal require Member States to ensure that all installed recharging points are capable of smart charging and support commonly agreed open standards.

Smart charging can also facilitate the uptake of variable renewable electricity. Smart recharging functionalities can make it possible to shift charging from expensive peak periods to off-peak periods when energy is cheaper or to periods when renewable energy production reaches a high level. Smart charging can also enable EV users with solar panels in their properties to recharge their vehicles with solar energy. This not only benefits the environment, but also saves them money [27].

8. Bidirectional charging

In addition to managing charging time, bidirectional charging technologies use EVs as decentralised storage devices that can return energy to a building or the grid and provide grid services. Bidirectional charging is a promising technology which however needs to address some challenges, for example by increasing the frequency of charging and discharging, bi-directional charging can impact an EV battery's lifespan. The EPBD proposal would require Member States to ensure that all recharging points are capable of bidirectional charging, where appropriate.

9. Pre-cabling

The EPBD proposal contains requirements for the installation of pre-cabling for parking spaces in new or majorly renovated buildings. Laying pre-cabling during construction or

[26] Smart charging is 'a recharging operation in which the intensity of electricity delivered to the battery is adjusted in real time, based on information received through electronic communication' (Commission proposal for a new definition to be included in the Renewable Energy Directive (Directive (EU) 2018/2001) (COM(2021) 557).

[27] Burger, J., Hildermeier, J., Jahn, A. and Rosenow, J., *The time is now: smart charging of electric vehicles*, Regulatory Assistance Project (RAP), 2022.

renovation creates considerable cost savings and makes it more attractive for an owner or user to install a recharging point.

10. Barriers to the deployment of recharging infrastructure

A number of regulatory, technical/practical and financial barriers to the deployment of recharging infrastructure in buildings have been identified in the aforementioned study.

Regulatory barriers:

- rules requiring the agreement of landlords/co-owners
- complex and/or lengthy authorisation and permitting procedures
- intervention of Distribution System Operator (DSO)
- separate building permits
- lack of harmonised requirements across regions or municipalities
- multiple competent authorities
- lengthy administrative processes for obtaining power increases in older buildings
- lack of clarity of (or absence of information on) legal requirements
- lack of technical specifications for recharging points
- ambiguous terms (e.g. 'recharging point readiness' and 'available for recharging')
- load balancing
- financial aspects of recharging (e.g. the need to clarify the business model for sharing a recharging point)
- lack of understanding of rights and obligations
- lack of adequate checks or enforcement
- scope of requirements (exclusion of existing buildings)
- absence of rules addressing the needs of HDVs
- excessive fire safety requirements in underground parking of buildings
- extension of public distribution grids inside building parking spaces (block flexibility)
- absence of requirements on smart charger installation
- prohibition on cables attached to chargers in buildings
- prohibition on installing type-2 recharging points in buildings with public access.

Technical/practical barriers:

- insufficient load centre capacity
- insufficient generation and distribution capacity
- shortages in qualified providers
- municipal technical services overwhelmed

- shortage of available technicians
- competition for available parking spaces
- lack of data on housing and driveway stock and parking spaces.

Financial barriers:

- high costs for existing buildings
- high costs for developers in relation to perceived commercial advantage
- poor management of public grants for infrastructure
- recharging infrastructure usually only installed where business case already exists
- lack of business case for recharging points sharing limits users
- lack of business case for installation of recharging points in commercial sites, due to specific load demands.

11. Good practices

The following good practices have been identified:

Good practices

- introducing a right to plug which ensures that a recharging point installation:
  - is at the expense of the person making the request;
  - requires notification rather than approval;
  - can only be refused in a limited and specific set of circumstances (e.g. the co-owner association is already planning an installation or installation is not technically possible);
- facilitating co-owner decisions on shared recharging points: mainly by enabling decisions by a simple majority instead of an absolute majority;
- simplified planning and permission procedures: mainly by exempting recharging infrastructure from planning permission;
- additional policy practices: provision of guidance, information and template agreements to the relevant parties, and training for real estate professionals;
- pre-financing collective infrastructure.

11.1 Right to plug

Several Member States have adopted some variant of a right to plug concept, enabling tenants or owners to install EV recharging infrastructure. In some cases, the rules determining how co-owner associations can decide to install recharging infrastructure for the building have also been simplified.

11.2 Simplified planning and permitting procedures

The installation of recharging points in buildings often requires a permit from the relevant building authorities, as well as intervention by the DSO to connect the infrastructure to the grid. Some Member States have streamlined this process.

11.3 Fire safety

Fire safety measures related to EV charging in buildings are in place or being considered in several Member States. However, since many of these measures are conceived at local level, there is a risk of disparity between them, requiring recharging station developers to each time adapt deployment (site layout, additional fire safety requirements, etc.) to local rules. Moreover, in some municipalities, absent clear fire safety rules, permit applications for the installation of recharging points in buildings are consistently rejected. This lack of clear, harmonised fire safety rules risks slowing down the deployment of recharging points in buildings.

11.4 Bicycle parking spaces

Several Member States have introduced requirements for bicycle parking spaces in parallel with the transposition of the EPBD (although the EPBD does not require this).

12. Considerations for possible policy options for future action

Without prejudice to the current proposal to recast the EPBD and to the outcome of the associated inter-institutional negotiations, the analysis of identified barriers and of legal and policy measures has involved a consideration of the barriers that possible future policy options to promote e-mobility through buildings policy would need to address, and has identified the following possible future policy actions:

- enhance the right to plug;
- develop recommendations and guidance for public authorities to address barriers linked to planning and permitting procedures, as well as to landlord and co-ownership rules;
- ensure future-proof recharging installations;
- facilitate smart charging and (where appropriate) bidirectional charging;
- make use of the benefits of load balancing;
- accelerate the roll-out of recharging infrastructure in existing buildings;
- provide recommendations and guidance for fire safety rules;
- remove barriers to recharging e-bikes including cargobikes;
- enhance technical assistance such as one-stop-shops;
- ensure the necessary workforce availability and skills;
- facilitate the uptake of financing instruments for recharging infrastructure in buildings;
- combine recharging infrastructure with car-sharing to give more people access to that segment of electric mobility.