

GETTING EUROPEAN BUILDINGS UP-TO-SPEED WITH ELECTRO-MOBILITY

A Bellona Europa position paper on the implementation of the Energy Performance of Buildings Directive

BACKGROUND

As the European Commission embarks on the review of its long-term EU greenhouse gas emission reductions strategy, transport and buildings draw particular attention as they emerge as the two largest non-ETS¹ emitting sectors². European transport today is still almost exclusively fuelled by imported oil, accounts for a quarter of the Union's total emissions and is the only sector whose emissions are still on the rise. In addition to its heavy carbon footprint, conventionally fuelled road transport is responsible for the largest share of NO_x (46% of total EU emissions)³ and is an important contributor to PM emissions, thereby positioning itself in the midst of Europe's air pollution-induced human health crisis. Bellona has, in fact, found that if the heavy yet unaccounted for human health-related costs from conventionally fuelled road transport were to be paid by car manufacturers themselves, we would see a doubling in ICE cars' price tags⁴.

Buildings, on the other hand, are responsible for roughly 40% of the Union's energy consumption and 36% of total CO₂ emissions. In addition, around three quarters of the EU's building stock today is classified as energy inefficient. This, in turn, is exacerbated by European buildings' high average age and exceptionally low renovation rates⁵. Clearly, timely EU and national policy action to tackle emissions from both transport and buildings will be crucial to enabling the Union to meet its climate and air quality objectives, while generating important health and economic benefits for society.

Earlier this year, EU policy makers reached an agreement over new rules governing the energy performance in buildings as part of the revision process of the EU Energy Performance of Buildings Directive (EPBD)⁶. Following the EPBD's publication in the Official Journal of the EU in June 2018, Member States now have 20 months' time to transpose its provisions into national laws. While not immediately obvious, buildings play a key role in stirring the shift towards more sustainable forms of transport, namely electric mobility. This is because the majority (90%) of an electric vehicle's (EV) charging time is spent while parked in buildings: at home overnight or daily at the workplace. In light of this, buildings are central to satisfying EV user needs and to making EVs the preferred

¹ Non-EU Emission Trading System Sectors include transport, buildings, agriculture and waste.

² Transport (excluding aviation and shipping) accounts for 888Mt of CO₂ whereas buildings for 634Mt of CO₂; <http://www.consilium.europa.eu/nl/infographics/non-ets-emissions-by-sector/>

³ Air Quality in Europe – 2016 Report, EEA (November, 2016); <http://www.eea.europa.eu/highlights/stronger-measures-needed>

⁴ Rethinking the cost of conventionally fuelled road transport, Bellona (March, 2017); <http://bellona.org/publication/bellonabrief-rethinking-the-cost-of-conventionally-fueled-road-transport>

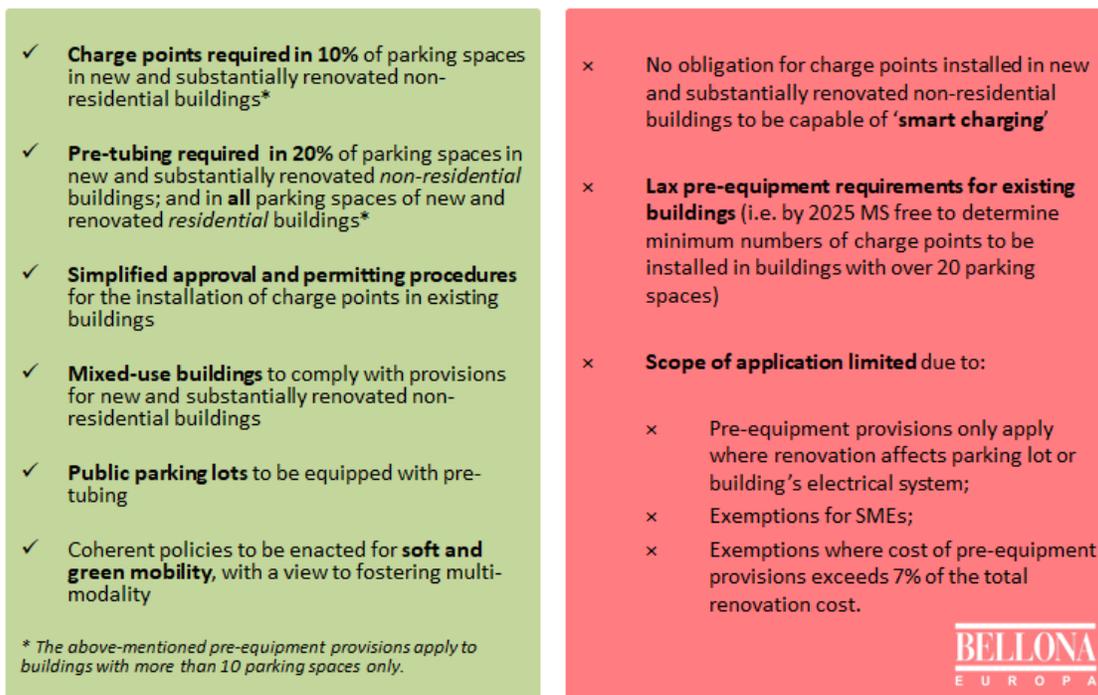
⁵ <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

⁶ <http://bellona.org/news/transport/electric-vehicles/2018-01-newly-agreed-eu-buildings-law-to-require-buildings-readiness-for-electric-vehicles>

choice over ICEs for families and commuters. Importantly, the recently revised EU buildings legislation anticipates the needs of an ever-growing EV fleet, by mandating that buildings be pre-equipped with a minimum level of EV charge points or mere conduits for their cost-effective installation at a later stage. If properly implemented, the EPBD can therefore offer a unique opportunity to boost the energy efficiency of buildings to the benefit of both the environment and consumers' wallets, while paving the way for a zero emission, electro-mobile future.

The EPBD follows and acts to complement the still ongoing implementation of the Alternative Fuels Infrastructure (AFI) Directive⁷, which, among other things, mandates the installation of minimum numbers of charge points in the *public domain* (namely in urban areas and along core European networks), and sets uniform charging connector specifications for both normal- and high-power charging across the Union. While symbolically important for consumers and industry, in practical terms, the new EPBD is set to have marginal implications for electro-mobility infrastructure roll-out. Member States have an opportunity to prevent such an outcome, by embracing an ambitious yet coherent approach to implementation and thereby helping to address persisting consumer anxieties regarding range and interoperability of electric charging infrastructure. By ensuring adequate and future-proof pre-equipping of new and renovated buildings, policy makers can help to meet the mobility needs of tomorrow while adding value to properties. In this regard, this paper provides an analysis of the electro-mobility infrastructure-related obligations, contained in the EPBD's Article 8 (with the positives and negatives summed up in the diagram below), and goes on to provide a number of recommendations targeted at national governments as they prepare for transposition.

WHAT THE EPBD MEANS FOR ELECTRO-MOBILITY?



⁷ Directive 2014/94/EU, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0094&from=EN>

SUMMARY OF RECOMMENDATIONS

Article 8 of the EPBD requires buildings' 'readiness' for electro-mobility, by mandating minimum pre-equipment measures in the parking lots of larger, new and substantially renovated commercial and residential buildings. In light of a mere 1% of EU buildings getting renovated annually, and as a result of extensive, but unjustified exemptions including those granted to SMEs, however, the electro-mobility infrastructure requirements set out in the EPBD will likely have a marginal impact in practice. Bellona urges Member States to take the following policy recommendations into account:

1. Because EVs usually spend 90% of their charging time while parked either at home overnight or daily at the workplace, this provides an ideal setting for smart charging, which in turn can provide important flexibility services to the grid. Equipping buildings with **charge points capable of smart charging** is therefore key to optimising energy use of buildings, and reducing their carbon footprint, while paving the way for a cleaner transport system and lower energy bills for consumers. Member States should therefore ensure that EV users are well informed and incentivised to take part in smart charging schemes via the provision of **time-variable electricity pricing and incentive payments**.
2. The installation of **charge points should be made a key priority for non-residential buildings** such as shopping malls, commercial centres, and offices, in particular, which provide parking spaces that are not limited to a single user – thereby ensuring high visibility and frequent usage of installed infrastructure. Equipping office buildings with charge points is in fact said to lead to a 20-fold increase in the likelihood of EV purchase among employees⁸.
3. Despite requiring the application of pre-tubing in all parking spaces of residential buildings, the EPBD fails the mandate the installation of actual charge points in this category of buildings. Studies show that renters are roughly 3 times less likely to buy an EV than home-owners, even when income levels are the same⁹. To mitigate this discrepancy, Member States should **prioritise the installation of both charge points and pre-tubing in public parking lots and areas concentrating multi-tenant apartment buildings**, thus going beyond requirements set in Article 8.
4. The **extensive installation of pre-tubing¹⁰ is a cost-effective and future-proof measure**, the presence of which helps to bring down costs of installing actual charge points at a later stage by roughly 75%, and whose application should be considered the standard in *all* new and substantially renovated buildings, not only in those with more than 10 parking spaces.
5. The enactment of **'right to the plug' building codes** across all EU Member States is key to increasing the ease with which charge points can be installed in multi-tenant buildings. Member States should therefore put in place measures to guarantee that parking space owners in residential buildings are able to easily install, at their own expense, an electric charge point without any further approval procedure, other than the prior communication to the building co-owners.
6. Adequate pre-equipment of **existing buildings** should not be side-lined as these represent 99% of the EU building stock. Member States should be urged to consider applying the same electro-mobility infrastructure provisions to existing residential and non-residential buildings, as those stipulated for *new and substantially renovated* buildings.
7. Any charging infrastructure installed as a result of the EPBD's transposition should be **compliant with EU charging connector specifications for normal power charging (3.7 – 22 kW)** set out in the AFI Directive, in order to address interoperability concerns and ensure EV users can recharge anywhere in the Union.

⁸ <https://www.energy.gov/eere/articles/survey-says-workplace-charging-growing-popularity-and-impact>

⁹ <http://theconversation.com/apartments-rarely-come-with-access-to-charging-stations-but-electric-vehicles-need-them-100296>

¹⁰ Also referred to as ducting infrastructure or conduits for electric cables, to enable installation of a charge point at a later stage

8. Important synergies can be exploited by urging builders to consider the use of **battery electric construction site machinery and equipment** for the construction and renovation of buildings.

9. Last but not least, meeting EU climate and air quality targets will necessitate behavioural change and a shift towards greater reliance on public-, shared- and soft-mobility modes. In view of this, the revised EPBD rightly urges Member States to consider the need for **coherent policies for buildings, soft and green mobility, and urban planning**. The installation of bike racks in particular should be a requirement for all residential and commercial buildings with available parking spaces, in order to encourage the use of bikes and L-category vehicles for personal transport as well as for public services, such as postal delivery for example.

HOW TO MAXIMISE THE EPBD'S IMPACT ON ELECTRO-MOBILITY UPTAKE

Thanks to rapidly falling battery prices, many studies expect that within the next five to ten years EVs will reach unsubsidised purchase price parity with their conventionally-fuelled counterparts across both the light- and heavy-duty vehicle segments. A recent study by Dutch bank ING goes on to predict that EVs will account for all new car sales in Europe by as early as 2035¹¹. With its legislative proposal for the recast of the EPBD, the Commission signalled its acknowledgment of these trends and sought to align European buildings with the needs of ever growing numbers of EV users. Unsurprisingly, though, the newly introduced 'electro-mobility' provisions of Article 8 have provoked concerns about subsidiarity, cost implications and the risk of further discouraging Europe's already low rates of building renovation¹². As a result, the final outcome of the revision process has left us with a sub-optimal level of ambition, mandating only basic pre-equipment measures be put in place to ensure buildings' 'readiness' for electro-mobility.

Electric charge points in non-residential buildings: central to boosting visibility and encouraging a switch to EVs

Normal power charging (3.7 to 22 kW) at home overnight or at the workplace is essential to satisfying EV user charging needs. In fact, research shows that 3 hours of normal power charging suffice to replenish the energy consumed during the average 60 kilometres driven by an EV per day¹³. What is more, the costs of installing electric charging infrastructure are significantly lower if made in connection with the construction of new buildings or where buildings are undergoing major renovations. Because of this the EPBD prioritises electric charging infrastructure requirements in this category of buildings. More specifically, for new and renovated non-residential buildings (i.e. shopping malls and offices) with more than 10 parking spaces, the EPBD requires the installation of one charge point per 10 parking spaces. Such larger commercial buildings are often more frequented than residential buildings, and provide publicly accessible parking spaces. Ensuring high visibility of installed charging points is key to raising public awareness and can aid a rapid normalisation of EV transport options. In fact, data from a US department of Energy suggests that employees having a charging point installed at work are up to 20 times more likely to buy an EV¹⁴. Where applicable, Member States should therefore consider going beyond the 10% pre-equipment requirement, which should serve as a mere minimum.

¹¹ <https://www.ing.nl/zakelijk/kennis-over-de-economie/uw-sector/automotive/electric-car-threatens-european-car-industry.html>

¹² Roughly 1% of the EU's total buildings stock gets renovated on an annual basis: <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

¹³ http://www.trt.it/wp/wp-content/uploads/2012/12/driving-and-parking-patterns-final_online.pdf

¹⁴ <https://www.energy.gov/eere/articles/survey-says-workplace-charging-growing-popularity-and-impact>

Smart and interoperable charging infrastructure: key pre-condition to enabling a smooth and cost-effective shift to electro-mobility

Smart charging, the ability of the charging infrastructure to control the charging process in reaction to price signals and grid capacity, is key to making EVs a valuable asset to the electricity grid while helping to optimise the energy use of buildings. Regrettably, however, the EPBD fails to mandate charge points' 'smartness'. By taking advantage of variable charging tariffs, EV users stand to benefit from reduced household electricity bills and lowered total cost of EV ownership. According to latest research the costs of implementing smart charging can be more than offset by the value created by connected EVs providing services to the network operator. By 2030, the smart charging benefits per EV would be around EUR 100 per year¹⁵.

In order to reap the full benefits of EVs, Member States should go beyond the requirements laid out in Article 8, by setting binding requirements for the installation of *smart* charge points. EV users should be well informed and incentivised to take part in smart charging schemes via the provision of time-variable electricity pricing and incentive payments. Such approaches would require homes to be fitted with smart meters, which in turn present benefits to households by providing them with detailed information of their energy consumption. Failure to ensure that installed charge points are capable of smart charging would entail high costs of strengthening the grid to accommodate the growing need for electricity use from a higher penetration of EVs, which in turn would be shouldered by all consumers in the form of higher energy bills. What is more, Member States should ensure that any installed infrastructure as a result of the EPBD's transposition is compliant with normal power charging connector specifications as laid out in the AFI Directive, so as to address consumer concerns with regards to interoperability and ensure EV charging is possible anywhere in the Union.

Extensive application of pre-tubing: a future-proof solution to minimise costs

Given the rapid pace of EV- and charging technology advancement, any lock-in to existing technologies must be avoided at all cost. Pre-tubing, i.e. conduits for electric cables, to enable the effortless installation of charge points at a later stage, are less likely to become outdated over time as opposed to actual charge points. The pre-equipment of buildings' parking spaces with conduits as well as guaranteeing sufficient electricity supply to the building sites are in fact the two key pre-conditions to enabling a smooth and cost-effective installation of EV charge points. In recognition of this, the new EPBD requires that at least a fifth of parking spaces in *commercial buildings* are pre-equipped with pre-tubing. Given that a number of Member States are already applying similar measures¹⁶ as stipulated in Article 8, and have shown to be supportive of more ambitious pre-tubing obligations in non-residential buildings¹⁷, Bellona urges national governments to consider going beyond the final provisions set.

In new and renovated *residential* buildings with more than 10 parking spaces, on the other hand, the EPBD requires that *every* parking space be equipped with pre-tubing. The installation of pre-tubing comes at a minimal cost when compared to the total cost of constructing or renovating a building, and can enable up to 75% cost

¹⁵ <https://www.camecon.com/news/transition-e-mobility-help-revitalise-europes-growth-reduce-air-pollution-challenges-remain-along-way/>

¹⁶ France, Austria, Spain and Italy have all adopted national building codes which require a range of measures from pre-tubing, to installation of actual charge points, and 'right to the plug' rules in various scopes of application.

¹⁷ The Council REV 2 proposal (11 April 2017) provides for the pre-tubing in every parking space while the final version only provides for the pre-equipment of at least one in every five parking spaces

savings during later installation of actual charge points in apartment and office buildings. To put things into perspective, according to European Commission estimates, the costs of implementing even the more ambitious pre-equipment requirements of its initial legislative proposal would be EUR 3500 for residential buildings and EUR 2500 for office buildings¹⁸, in comparison with the average renovation costs of ca. EUR 240 000 and EUR 180 000 respectively¹⁹.

Evidently, the extensive application of pre-tubing is a cost-effective measure to keep charge point installation costs low. Therefore, it is unjustifiable that only tenants and co-owners of the largest residential and commercial buildings should benefit from such an advantage. While in the case of a single family house with 1-2 parking spaces, the choice can be left to the owners, it should be reasonable for pre-tubing on every parking spot to become the standard even in smaller residential multi-tenant buildings.

Data from the US Department of Transportation shows that even when disposing of similar income levels, renters are roughly 3 times less likely to buy an EV than home-owners²⁰. To mitigate this discrepancy, Member States should prioritise the installation of charge points and pre-tubing in public parking lots and areas concentrating multi-tenant apartment buildings. Positively, the EPBD already stipulates that newly built and substantially renovated public parking lots shall be equipped with pre-tubing. This measure is crucial given cities' growing concerns with health-damaging air pollution levels and goes hand-in-hand with measures aimed at promoting zero emissions mobility, such as tackling congestion and enforcing low emission zones.

Making 'right to the plug' the norm

In addition, Member States will have to ensure the simplification of permitting and approval procedures for the installation of charge points in all residential and non-residential buildings. Today, long and uncertain approval procedures act as a major barrier for owners and tenants to install charge points in existing multi-tenant residential and commercial buildings. Notably, the ability for individuals and/or companies to install recharging points on their parking space, either owned or rented, is often limited by the necessity to get an agreement from the lessor and/or co-owners to intervene in the building or parking lot. This results in complex procedures and long lead times, de facto hampering individuals and companies from installing charging infrastructure and switching to EVs. Member States are best suited to define the rules to rectify these hurdles, and 'right to the plug' building codes have already been successfully implemented in various EU countries including Spain, France and Portugal. Bellona strongly urges Member States to guarantee that parking space owners in residential and non-residential buildings are seamlessly able to install, at their own expense, an EV charge point without any further approval or procedure, other than the prior communication to the building co-owners. Not least, the enactment of such 'right to the plug' building codes will be key to enabling users to make full use of pre-tubing provisions, through the ability to smoothly install an EV charge point.

Minimising the excessive exemptions

What is more, the new directive allows for a number of exemptions (i.e. building types or circumstances where the new rules would not apply) which act to further narrow down the scope. One such example is the exemption

¹⁸ Referring to residential and office buildings with more than 10 parking spaces

¹⁹ http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU%282016%29587326_EN.pdf

²⁰ <http://theconversation.com/apartments-rarely-come-with-access-to-charging-stations-but-electric-vehicles-need-them-100296>

of SMEs from applying electro-mobility provisions. As per [EU definition](#), SMEs cover enterprises of <250 staff and <EUR 50 m turnover, which means that roughly [99.8% of all enterprises](#) will be rendered exempt from the EPBD's electro-mobility obligations. Among these will be most supermarkets and shopping malls, which in turn will deprive a significant proportion of customers and employees from access to electric charging. Given that the EPBD already ensures that charge point provisions only apply to buildings with more than 10 parking spaces, this limits the rationale for also exempting most European enterprises. Bellona therefore urges Member States to consider applying exemptions only to *small and micro-sized enterprises*, whereby small enterprises have <50 staff and < EUR 10 m turnover; and micro-sized have <10 staff and < EUR 2 m turnover²¹. Indeed, only 45 000 enterprises in the EU-28 are subject to the directive as it stands, compared to approximately 265 000 if Medium enterprises were to be included²². In terms of employees, widening the scope increases those who stand to benefit from access to charging points from roughly 1/3rd of EU-28 employees to roughly half the Union's workers.

Don't forget about existing (non-renovated) buildings

Importantly, the above-mentioned charge point and pre-tubing obligations will have to be applied by 2020 to newly-built and substantially renovated buildings, which only account for roughly 1% of the total EU building stock annually. Given the low turnover of the EU building stock due to their long lifetimes and the limited rate of major renovation, addressing existing buildings will be key. For existing buildings, the agreed EPBD provisions appear to only mandate 'optional' pre-equipment obligations applicable from 2025 onwards. In other words, Member States are granted the freedom of determining the minimum number of charge points to be installed in buildings with over 20 parking spaces, leaving the meaning of 'minimum numbers' open to national interpretation. Member States should be urged to consider the EV infrastructure provisions stipulated for new and substantially renovated buildings as the absolute minimum requirement for its existing residential and non-residential buildings stock. On a positive note, the revised EPBD strives to raise building renovation rates to 3%, which is key to enabling timely deployment of charging infrastructure.

Exploiting synergies with electric construction site machinery

In a majority of European cities, construction sites make up a large share of overall emissions of both CO₂ and air pollutants, while also contributing to noise pollution and disruption. In Oslo for example, construction machinery accounts for 18% of total CO₂ emissions, while in Germany construction machinery emissions exceed those originating from domestic air and rail travel combined²³. In spite of that, construction emissions remain inadequately addressed via EU legislation. Construction manufacturers show support for transitioning towards zero emission machinery and equipment, yet highlight the need to create market demand²⁴. The ducting infrastructure provisions of the EPBD provide greater rationale for builders to consider electric options for the construction machinery and exploit synergies, given that newly built- and substantially renovated buildings shall have to comply with charging infrastructure requirements as soon as the directive enters into force.

²¹ European Commission Recommendation 2003/361/EC, EU definition of SME, http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

²² <https://publications.europa.eu/en/publication-detail/-/publication/0b7b64b6-ca80-11e7-8e69-01aa75ed71a1/language-en>

²³ *Zero Emission Construction Sites: The possibilities and barriers of electric construction machinery*, Bellona (May, 2018),

<http://bellona.org/publication/zero-emission-construction-sites-the-possibilities-and-barriers-of-electric-construction-machinery-factsheet>

²⁴ <http://bellona.org/news/transport/electric-vehicles/2018-05-bellona-event-in-european-parliament-highlights-the-need-to-address-construction-site-emissions-within-the-clean-vehicles-directive>