

PV – EV : A POWERFUL DUO TO MAKE EUROPE DRIVE CLEAN
The three keys for a joint deployment of solar power and electric vehicles

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Electric vehicles (EVs) deployment needs to significantly accelerate in the coming years. However, challenges to its deployment (lack of distribution grid availability, low consumer engagement, challenges to the deployment of the infrastructure during renovation, etc.) show **very close similarities with those posed by the deployment of distributed photovoltaic solar power plants (PVs)**. Therefore any successful solutions should benefit both EV and PV deployment.

The uptake of EVs, together with PVs deployment (mainly via rooftop solutions), opens **an important opportunity for unlocking a European ‘prosumer’ potential**. ‘Prosumer’ refers to a model where individuals manage their own energy supply and consumption. Prosumer models can become a powerful enabler of Renewable Energy Sources (RES) integration, including photovoltaic solar power plants (PV). The joint integration of PV and EV will also have a significant impact on citizen carbon footprint (for their home energy and transport), by ensuring EV charging take place during periods of highest renewable content.

The rapid, massive uptake of EVs has the potential to become both **a flexible asset for grid management and an opportunity for prosumer business models**. EVs will also provide a boost to increasing the cost-effective penetration of renewable energy - like PV - within the electricity system. The combination of EVs, their batteries and smart-charging functionalities as sources of ancillary services for the distribution grid will bring clear benefits, in terms of RES integration, for both individual and collective projects. Electromobility and renewable energy therefore offer a win-win partnership. The benefits of smart and bidirectional charging in regions with high solar capacities are clear: when sun sets and falls, EVs can optimise consumption and grid constraint and avoid polluting at peak times.¹

Recent European legislation, through the ‘Fit for 55’ package, leverages these opportunities, notably in the revision of the Renewable Energy Directive (see our full position [here](#) and [here](#)), but there is still more that can be done to increasingly make cars in Europe run on renewable energy.

Signed by both renewable energy suppliers, charge points operators (CPOs) and other relevant stakeholders, this joint call shows the enthusiasm within the whole industry to explore the synergies between solar electricity and EV charging solutions. To enhance these synergies and solve common challenges between EVs and PV, we recommend:

1. Developing an enabling framework for EV drivers to become prosumers

A significant share of EV drivers (30-50%) charging at home are usually interested in installing PV panels as part of their broad decarbonation objectives and to maximise their contribution to climate change objectives.

¹ For example, in California, a study has shown that “the real strength of grid-integrated vehicles in mitigating the duck curve is in avoiding large system-wide ramping, as seen in figures 3(c) and (d). In the V1G-only case, down-ramping and up-ramping are both mitigated by more than 2 GW/h by 2025. In the case with a mix of V1G and V2G vehicles, however, substantially larger gains are seen. Both down-ramping and up-ramping are substantially mitigated, by almost 7 GW/h, equivalent to avoiding construction of 35 natural gas 600 MW plants for ramping mitigation”. “Clean vehicles as an enabler for a clean electricity grid”, Jonathan Coignard, Samveg Saxena, Jeffery Greenblatt, Dai Wang, 2018

This offer considerable potential for encouraging prosumer behaviour, but in order to realise this potential, an appropriate regulatory and technological framework is needed. To make this a reality, the EU should develop a distributed energy strategy capable of empowering and boosting prosumers with solar PV, battery and EV, and, at the same time, ensure that the electricity distribution grid can connect distributed RES. It should be noted here that the adoption of these distributed loads does not pose a problem for the distribution grids in the short- and medium-term, since the most significant impact will occur principally in very specific areas and at a later stage, when greater investment will be needed.²

Rooftop solar, EVs and other local flexibility resources will only realise their full potential once they are able to also provide grid services via flexibility markets. This will require the full implementation of the Clean Energy Package across Europe. However, because this is not yet the case - despite the deadline expiring - the EU should look into options for applying greater pressure on Member States. A full implementation would allow entry into the next phase, which will see the designing of local flexibility markets, together with the European DSOs, to find appropriate flexibility signals for EV users.

2. Ensuring an enabling framework for solar PV deployment

To support the use of renewable energy in electric mobility, an enabling framework must be build. PPAs contracts must be facilitated, through clear frameworks and financing support – the guidelines on PPAs will be critical here. In addition, the stability of investment signals and market rules will be key.

In addition, permitting still pose significant barriers to solar PV project development. Here, the RED II provisions must be implemented, and the Commission should support the exchange of best practices.

3. Helping transition to needed new skills

With the development of new economic sectors, boosted by EV uptake such as PV industry, the transition to electromobility does not pose a threat but rather an upskilling opportunity for workers. New skills will indeed be needed, both to adapt the manufacturing of vehicles and to install the required infrastructure across Europe. We recommend the launch of a Skills Initiative on Solar installers, in synergy with CP operators and installers, as well as a Distributed Energy Installers Skills Initiative.

From a forward-looking perspective, it will be possible to identify specific initiatives for integrated retrofits.

In highly specific use cases, new approaches could be explored to reduce the installation and integration cost related for the combined installation of Solar PV, Home Storage and V2X charging. Early-stage experience has shown that the integration of AC-DC conversion technologies across the different voltage levels could be a solution for reducing PV and EV integration costs in certain use cases, such as isolated houses or rural areas (up to 30%-50%³). From that perspective, we would suggest identifying how the application cases can be addressed through Horizon Europe or similar calls in the areas of R&I identified above.

² Debunking the myth of the grid as a barrier to e-mobility, Eurelectric 2021
https://cdn.eurelectric.org/media/5275/debunking_the_myth_of_the_grid_as_a_barrier_to_e-mobility_-_final-2021-030-0145-01-e-h-2DEE801C.pdf

³ Calculations made by Dcbel on real pilot home data in England