FINAL REPORT OF THE SECOND INNOVATION DEAL "FROM E-MOBILITY TO RECYCLING: THE VIRTUOUS LOOP OF THE ELECTRIC VEHICLE"

THE BACKGROUND

Innovation Deal (ID) is an instrument that can be used at the initiative of innovators and is designed to bring together innovators, national/regional/local authorities in Member States and the European Commission (EC) services in a voluntary, cooperative, open and transparent exercise with aim to study in-depth whether perceived regulatory barriers really exist in the EU legislation or industrial development of Circular Economy. The concept of ID was launched by Commission in May 2016, in the context of the EC communication on a Circular Economy Action Plan (COM (2015)614/2).

An expression of interest for ID within the scope of circular economy was launched in September 2016. In November 2016, the first two IDs pilots were selected (out of 32 proposals), one of which was "From E-Mobility to recycling: the virtuous loop of the electric Vehicle". This pilot ID was selected in close cooperation of relevant Commission services.

THE PROCESS

In March 2018, the Joint Declaration of Intent (JDI) was signed by Commissioners Vella and Moedas and the ID consortium. The ID focuses on propulsion batteries and will assess whether existing EU legal provisions and the transposition to national or regional law hamper the use of batteries in a second-life application or otherwise discriminate any technology that might be necessary for second-life applications.

The ID Consortium consisted of eight partners (stakeholders from 2 Member States – FR and ND, 4 national authorities, 1 regional authority, and 3 innovators). From the EC side, DG RTD (in lead), DG ENV, DG ENER and JRC were in contact for this Innovation Deal.

The JDI followed by the work plan agreed for 18 months that consisted of three tasks. After each stage, the ID consortium produced the reports that have been discussed during the meetings of all partners. The Commission services involved performed the analysis of the ID consortium reports and produced two opinions (18/02/2019 and 05/07/2019 for energy issues only).

- Task 1: the analysis of the barriers from the European and national/regional regulations. This analysis was presented at the meeting with consortium in July 2018.
- Task 2: the proposed solutions to overcome barriers and recommendations for actions. Two meetings took place in September 2018 and in October 2018. The Commission presented a 1st view on February 2019 after internal discussions during the period of October 2018 - February 2019.
- Task 3: draft report from ID consortium on Regulatory barriers for Smart Charging of EVs and second life use of EV batteries, delivered to in May 2019. The Commission analysed the report and provided a 2nd view of the EC on July 2019. The consortium replied to EC comments with a Memorandum in February 2020.

Since the Commission does not provide funding for the ID, all the above reports were produced by the ID consortium on their own expenses and by their own employees or contracted consultants.

The work was organised through exchange of emails and tele-conferences, followed by three Steering Committee meetings to analyse the proposed deliverables. All the final deliverables are enclosed as an Annex to this report.

THE PROBLEM

The purpose of this Innovation Deal (ID) is to contribute to a more environmentally and industrially efficient use of second-life of batteries and the connective positive effects on transport electrification and grid economy balance.

The ID consortium claimed that the current EU legal framework is unclear and unfitted for large-scale use and reuse of electric vehicle (EV) batteries by putting up regulatory barriers that hamper a wide development of vehicle-to-grid services and second life EV battery applications.

To that end, the ID was expected to assess whether existing EU legal provisions and the transposition to national or regional law hinder the use of batteries in a second-life application or otherwise discriminate any technology that might be necessary for second-life applications.

In this context, a number of regulatory frameworks will have to be looked at. They can be grouped as related either to the EU waste legislation or to energy market legislation.

For the waste part:

- Legal uncertainties on the interpretation of the notion of: "waste", "re-use", "same purpose" and the status of "end-of-waste".

- Barriers deriving from potential waste status: Regulation 1013/2006[1] on shipments of waste, Directive n°2006/66/EC[2] ("Batteries Directive"), REACH and Directive 2008/68[3] on the inland transport of dangerous goods.

For the energy part:

For the energy storage and grid integration area, the ID will specifically and only provide recommendations on possible national / regional/ local prevailing regulatory barriers for Smart Charging of EVs and second-life use of EV batteries.

Against this background, the national, regional as well as the local regulatory frameworks relevant for, but not limited to electricity market design, fees applied to storage systems, self-consumption or smart metering will be assessed.

The Innovation Deal was supposed not to provide recommendations on any EU legislative provisions that are currently under revision as a new legislative proposal was at that time in the process of approval by EU institutions.

THE PROPOSALS FOR POSSIBLE ACTIONS AND RECOMMENDATIONS

After identifying regulatory barriers, the ID Consortium suggested possible solutions to overcome the perceived barriers.

I. Most important regulatory barriers for Smart Charging (both during first and second-life use of EV batteries) - Potential solutions

In the context of the Innovation Deal (ID) the consortium presented a study[4] that provides an overview of the most important barriers that hinder Smart Charging and second-life use of EV batteries. It also

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1 Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

2 Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

3 Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

4 Deliverable 2 – Regulatory barriers for Smart Charging of EVs and second life use of EV batteries, Final Report 17-5-2019, pwc - PricewaterhouseCoopers Advisory N.V.

proposes policy recommendations on how these barriers can be addressed on an EU or Member State level.

The study aims to serve as a starting point for the design of a better functioning market and to inform policy makers of the existing regulatory barriers and potential changes needed to stimulate Smart Charging of electric vehicles (EVs), both during first and second-life of the EV batteries.

According to the study, the transport sector is one of the major emitters of GHG and particulate matter. Therefore, policy makers are incentivising the transport sector to move towards more sustainable alternatives like electric vehicles. Within Europe, **Germany, France and The Netherlands** and **Sweden** are frontrunners in terms of their EV-fleet. As a result, these four countries are the focus of this study.

Against this background, the study identified several regulatory barriers need to be addressed to enable optimal use of the potential of Smart Charging. The most important obstacles identified in the Netherlands, Germany, France and Sweden and possible solutions are the following:

1. a) Double energy tax and double charging of variable grid fees: Double energy tax and grid fees for several (or entire) tax/grid fee component(s) while performing bidirectional Smart Charging.

Description of potential solution:

EU solution: Double energy taxes are mainly a result of the lack of a definition of storage, as charging and discharging are defined as consumption and supply, respectively. The proposed definition within the Electricity Directive (recast) does not solve the problem. A structural and harmonized solution would be to implement a European tax regulation providing that bi-directional charging qualify as storage. In that way, it should not trigger energy tax. This can be implemented via (preferably) the Energy Tax Directive.

National solution: i) Storage could also be defined on a national level and made exempt from energy taxes ii) Alternatively, national policy could be issued to facilitate netting for charge points (netting at the charge point), or a provision that states that energy tax is only payable on the net amount of electricity (the balance) charged via a charge point.

b) Tax differences for public v/s private: Due to differences in definitions and tax regimes for public and private charge points, E-drivers may experience losses while performing bidirectional Smart Charging.

Description of potential solution:

The different taxes that apply at different types of charge points could be more harmonized, so charging is taxed at several locations in the same way. Defining the best solution will require additional research to identify which solution will be most beneficial.

EU solution: There are various potential solutions available at a EU level (harmonisation requirement)

National solution: At a national level, there are other potential solutions such as the Dutch example of a lower tariff for public charging stations, or definition of one tax rate for charging of electric vehicles.

2. Procurement of flexibility services by grid operators: It is unclear whether storage may be procured as a service by regional grid operators (i.e., Smart Charging may be deployed or not for flexibility purposes).

Description of potential solution:

EU solution: The Electricity Directive of the clean energy package mentions that Member States should incentivise DSOs to procure flexibility. Still, Member States or/and National Regulator Agencies are yet to define this in their regulatory framework, including incentives for DSOs and appropriate remuneration.

National solution: i) National regulators and policy makers should provide clarity on whether DSOs can procure flexibility, and the costs incurred by DSOs to procure and deploy flex should be incorporated in the reimbursement calculation by regulators, otherwise DSOs will continue to invest in grid expansion instead ii) A flex market at DSO level can be introduced (following the ancillary services market model of TSOs).

3. Lack of coordination between Smart Charging initiatives and the DSO: Lack of coordination between the Smart Charging initiatives and the DSO can lead to congestion within the regional grid because the DSO is unable to plan properly. Even if data is shared with the DSO, the authentication mechanism is unclear.

Description of potential solution:

EU solution to coordination issue: The prioritisation of flexibility can happen via a central flexibility market where each party (i.e., Supplier, DSO or TSO) procures flexibility based on when they need it i.e., following the country market structure & gate closures of their own markets. However, the DSO should have transparency/access to data around flexibility procurement before it is deployed, in order to plan for congestion management effectively.

4. Grid connection costs: No incentive to roll-out Smart Charging infrastructure due to higher grid connection costs for higher capacities.

Description of potential solution:

National solution (more suitable than EU solution given large grid fee structure differences):

i) The grid costs could for a larger part be based on the actual consumption instead of the capacity of the connection.

ii) Change tendering requirements to reward parties that install high capacity connections in order to offer Smart Charging solutions.

iii) Grid costs could also be more reflective of the grid stabilizing services that a facility or device provides. In France, there is a clause that states that devices and facilities that allow shifting energy consumption from peak to off-peak periods (in order to limit peak power consumption), have to be taken into account for the choice of the appropriate capacity connection. However, it is unclear how exactly this clause is implemented i.e., there is no structural solution stating that the prices should be lowered for such connection points.

5. Netting rule: Missing incentive (due to the netting rule) to optimise own consumption behind the meter using the battery of an electric vehicle.

Description of potential solution:

National solution: To incentivize optimizing behind the meter, the benefit from storing self-produced electricity for later use should be higher than the benefit from netting. There are several potential solutions to this issue: (1) feed in tariff scheme; (2) Only netting the tax component.

Additional comments on the PWC Report

Following the study presented by the consortium, the European Commission requested a review of the study with regard to the amended Directive on the common rules for the internal market for electricity, for which the political agreement was reached in December 2018. Afterwards several amendments (including on definitions) have been proposed by the Commission services.

It was asked the report should answer the questions:

- which obstacles does an EV-user (or charge point owner/operator) face when he wants to smart charge or trade flexibility from his vehicle individually or through an aggregator?
- what could legislation/regulation do to overcome these barriers?

and took into account the following comments:

i. An Analysis on the state of bi-directional charging

ii. An analysis on the technical/ manufacturing barriers related to communication of the "state of charge" of Batteries in the EVs

iii. Analysis of barriers to deployment of Public Key Infrastructure and possible consequences- if that was not agreed or solved at EU wide level

iv. Pages 30-31- remuneration schemes for the DSOs and "net metering schemes"

The consortium replied to the above additional questions with the attached "Memorandum" answering DG ENER questions[5].

The Commission services involved considered the "Memorandum" as reflecting predominantly only the perspective of automotive industry and lacking systemic aspects.

II. Legal and regulatory barriers to the reuse of EV batteries in post-vehicle applications

The ID consortium report "ASSESSMENT OF LEGAL AND REGULATORY BARRIERS TO THE OPTIMIZATION OF EV BATTERIES LIFE CYCLE"[6] presents the opinion of innovators on the possible barriers for the second-life of batteries, due to the relevant provisions in the current EU legal framework.

The consortium considers that the current regulatory framework is unclear and unfitted to large-scale use and reuse of EV batteries. In consortium views, the Waste Framework Directive (2008/98/EC, as amended) and the Batteries Directive (2006/66/EC, as amended), do not address the main barriers identified for the development of second-life batteries. The consortium suggests that these barriers are removed in the process of revision of Batteries Directive.

II.1 Legal uncertainties on the interpretation of the notion of "*waste*"

According to the innovators, the fact that end-users return a used EV battery pack to a car dealer or to another collection point defined by the producer shall not be sufficient for the battery to qualify as a waste. Such interpretation should be more clearly confirmed and stabilized by national authorities and the European Commission, in order to promote the re-use of first-life batteries.

Therefore, it is proposed that the Commission (i) effectively uses the possibility to clarify the notion of "waste"[7] and (ii) takes into account in that definition circular business models in which a material or an object is transferred from one holder to another holder without the intention to discard but to re-use.

In particular, the innovators consider that a first-life battery should not qualify as a waste when the producer (or producer of the EV) intends to ensure its re-use for specific purposes, which fit with the battery capacity and design (such as stationary / multipack / new storage system).

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5 M*emorandum answering DG ENER questions*

6 Deliverable 1 – ID consortium report on – ASSESSMENT OF LEGAL AND REGULATORY BARRIERS TO THE OPTIMIZATION OF EV BATTERIES LIFE CYCLE – Part II.2

7 Article 3(1) of the Waste Framework Directive 2008/68/EC

II.2 Legal uncertainties on the interpretation of the notion of "*re-use*"

Innovators consider that in case of second-life batteries, there are still uncertainties on the interpretation of the notions of "re-use" and "same purpose" which are already used by the EU legislation on waste[8].

The main problem is the lack of criteria to define what "the same purpose" is. If this notion were to be strictly applied, it could be considered that the definition of "re-use" could not apply to several use-cases identified in the report that the use of an EV battery or battery pack is no more the same as soon as it leaves the car.

Therefore, the innovators propose as for the notion of waste, the interpretation to be given to the notions of "re-use" and "same purpose" should be more clearly confirmed and stabilized, in order to promote the re-use of first-life batteries, taking into account the fact that a battery has the same purpose, namely the storage and delivery of electrical power, whether it is used in electric vehicle or in a power storage system.

Moreover, Article 7 of the End-of-life vehicles (ELV) Directive[9] states that "Member States shall take the necessary measures to encourage the reuse of components which are suitable for reuse", reuse being defined, under Article 2(6) of that Directive, as "any operation by which components of end-of life vehicles are used for the same purpose for which they were conceived".

In the absence of such clarifications, some public authorities may consider that spare parts/components (including battery) originating from an ELV should automatically qualify as waste.

II.3 Legal uncertainties on the status of "end-of-waste"

Article 6(1) of the Waste Framework Directive states that certain specified wastes shall cease to be waste when they have undergone a recovery operation and comply with specific criteria to be developed, at EU or national level, in accordance with the following conditions:

1. the substance or object is commonly used for specific purposes;

2. a market or demand exists for such a substance or object;

3. the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and

4. the use of the substance or object will not lead to overall adverse environmental or human health impacts.

The position of the Innovators is that second-life batteries should not be regarded as waste, regarding both their "use" and condition of reuse for same or similar purpose.

However, the third condition to be met for EoW also provides that "the object *meets the existing legislation and standards applicable to products*".

This means that the product, to reach "EoW status", should comply with the legislation applicable to products, including the legislation pertaining to chemical substances (in particular, REACH). It should be noted that this condition may, in many cases, proves difficult to meet (technically and/or economically unfeasible) for second-life products that were designed and manufactured a number of years before.

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[8] Article 3(13) of the Waste Framework Directive as "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived"

[9] Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles

Innovators propose harmonized EU criteria for EV batteries should be defined at EU level[10] in order *(i)* to allow a level playing field and strengthen the internal market for such second-life products and *(ii)* avoid situations where a second-life battery would be considered as a product in one Member State but still considered as waste in another Member State[11];

If the status of "end-of-waste" were not to be applied to second-life batteries, the activities carried out on such batteries would be subject to waste legislation requirements, which would significantly impede the development of these second-life batteries, creating additional administrative burden and financial costs, in particular in case of transboundary shipment.

II.4 Barriers deriving from potential waste status

II.4.1 Barriers deriving from Regulation 1013/2006 on shipments of waste

If second-life batteries were considered as waste (*quod non*), the transport of such batteries from one country to another would be subject to the Waste Shipment Regulation, which would add significant burdens according to the Innovators.

They suggest that although the heart of the Innovation Deal is the re-use of batteries, this is also the opportunity to address, in the context of the revision of the Batteries Directive, some difficulties faced in the recycling phase, namely waste classification difficulties and costs deriving from the Waste Shipment Regulation.

II.4.2 Barriers deriving from Directive n°2006/66/EC[12] ("Batteries Directive")

Innovators identify a number of issues that should also be addressed in view of the revision of the Batteries Directive:

a) Lack of any clear provision concerning the "re-use"

b) Registration of producers

c) Barriers deriving from the extended producer responsibility

II.4.3 Barriers deriving from REACH Regulation[13]

Innovators consider that the batteries or their components have already been placed on the European market a first time (REACH definition of "placing on the market") before a potential future authorization, their further re-use as articles should not be impacted.

In the case of a restriction or if the substance is subject to the POP Regulation[14], an exemption should be requested so that the restriction does not apply to products which have already been placed on the market/are already in use and which are destined for reuse. If no exemption is granted, reuse (and even recycling) will be prohibited and the disposal of batteries will be mandatory.

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[10] The efficient functioning of waste markets in the European Union, legislative and policy options, final report, Arcadis and Trinomics, 2016; see p. 51 and following.

[11] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation, January 2018.

[12] Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

[13] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

[14] Regulation n° 850/2004 on Persistent Organic Pollutant (POP)

In any case, for both restriction and authorization, the supplier of the re-used battery will have to ensure traceability on substance information.

II.4.4 Barriers deriving from Directive 2008/68[15] on the inland transport of dangerous goods

Directive 2008/68/CE makes an explicit reference to ADR[16]. In practice, the implementation of ADR, and most notably the use of a specific ADR packaging for the transportation of lithium batteries requires a number of additional logistics operations, leading to significant additional logistics costs and related environmental impacts (i.e. additional transport operations and/or packaging waste). Innovators suggest this issue should be further analysed and discussed.

CONCLUSIONS AND NEXT STEPS

I. Legal and regulatory barriers to value EV batteries as electricity storage devices

The Commission services take note of the arguments that the consortium put forward (e.g. on double energy tax, incentives for smart charging at home, etc.). These arguments seem to be predominantly reflecting the positions and interests of automotive industry and not reflecting all aspects that have to be considered by the Commission. For example, with regard to double energy tax and double charging of variable grid fees, there is difference between private and public charging for the electric vehicle (EV). The Commission services will further analyse the arguments and positions of the ID consortium and discuss them with a broader range of relevant stakeholders. If this analysis shows that an action at EU level is needed the Commission may take appropriate actions to address the alleged regulatory barriers in particular in the context of possible future legislative framework for batteries.

Moreover, Innovators should not overlook possibilities offered by other fora, such as the European Battery Alliance, or to push for most favourable rules at national level. DG ENER expressed its interest in playing facilitator's role wherever appropriate as well as intervene whenever national approach will go against the letter or spirit of the agreed legal provisions.

DG ENER also recommends the ID Consortium to follow the revision of the Environmental and Energy Aid Guidelines to ensure the rules are fit for the new role of storage in energy system.

II. Legal and regulatory barriers to the reuse of EV batteries in post-vehicle applications

The Commission services recognise that a thorough EU policy analysis in the area addressed by the innovators is needed. The ID report will be used as an input in the process of Impact Assessment for the new regulatory framework on batteries that the Commission is preparing.

Annexes:

- Deliverable 1 – ID consortium report on – *ASSESSMENT OF LEGAL AND REGULATORY BARRIERS TO THE OPTIMIZATION OF EV BATTERIES LIFE CYCLE*.
- Deliverable 2 – *Regulatory barriers for Smart Charging of EVs and second life use of EV batteries, Final Report 17-5-2019, pwc - PricewaterhouseCoopers Advisory N.V.*
- "M*emorandum" answering DG ENER questions.*

[15] Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.

[16] European Agreement concerning the International Carriage of Dangerous Goods by Road