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## Position Paper

# Legislative proposal on In-Vehicle Data: Recommendations on the Access to In-Vehicle Data, Functions and Resources

Key benefits of in-vehicle data availability and key concerns and recommendations of CPOs, EMPs and ROPs

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## What is the problem and why is it a problem at EU level? What should be achieved?

The EU Commission aims at presenting a new legislative draft on the use and access of vehicle data, functions, and resources generated in the EU. The initiative aims to make data more accessible to third parties while giving those generating the data more control over it. BDEW[1] welcomes the Commission's intention to provide greater opportunities for data sharing beyond what is proposed within the Data Act.

The **electrification of vehicles has led to new business models and services**, for instance in the field of public and private charging. However, until today most charge point operators (CPO), e-mobility service providers (EMP) and other stakeholders such as roaming operators (ROP) have no access to in-vehicle data generated by the electric vehicle (EV)/its driver to improve charging events, refine their charging management or develop new services for their customers. There is a **mismatch in data accessibility** between the actors mentioned above and EV manufacturers (OEM) which hinders a level playing field for services and business models.

## What is the value added of action at EU level?

This position paper highlights the **key benefits for and concerns of the CPO and EMP**, which need to be considered when refining the current rules on sharing and accessing in-vehicle data. The annex includes a **list of the most important data points and functions which need to be easily, remotely accessible to third parties operating in the charging infrastructure market.** Each data set and function facilitate transparency and developments by themselves for the stakeholders (see table 1 for an overview) but especially in combination, they provide additional value.

## Key recommendations and concerns of the CPO, EMP and ROP

To address the key aspects outlined below, the BDEW recommends establishing an EU expert group including the relevant stakeholders. First discussions should focus on defining

- a **minimum set of in-vehicle data, functions, and resources** all OEM need to make accessible to third parties,
- **criteria and processes for admissions of third-party applications and a secured uniform access** to EV on-board platforms/in-vehicle data, functions, and resources.

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[1] BDEW represents in Germany the interests of CPO, EMP and ROP as well as power grid operators and energy providers. The BDEW member companies operate more than 85% of Germany's public charging infrastructure.

In-vehicle data are essential information which allow CPO, EMP and other stakeholders such as ROP to improve existing processes and to develop new products and services. **Making the data available to these stakeholders at the will of the EV-driver would facilitate fair market competition.** Currently, only the data holder (in this case, usually the OEM) can use the data for its own products and services or decides which stakeholders receive access. As a result, customers have limited choices when it comes to specific charging services and market innovation is hampered. **Requiring OEM to publish a catalog on the existing in-vehicle data points would be an important step towards greater transparency** and to establish a level playing field that allows fair competition between all stakeholders.

However, publishing a catalog needs to be accompanied by **additional measures to define rules on the actual access** to the in-vehicle data to ensure a fair, non-discriminatory, and easy access by third parties in a secured manner. Of course, before third parties can access the data, those generating it (i.e., the EV driver) need to be able to give their permission in a convenient and user-friendly way. When defining a regulatory framework on the access to in-vehicle data by third parties it is important to consider the following aspects:

- All actors authorized by the EV driver need to have **equal remote access to in-vehicle data, functions, and resources** to ensure a level playing field.
- A **standardized minimum set of in-vehicle data, functions, and resources** all OEM need to make accessible according to the FRAND principle (fair, reasonable and non-discriminatory), is useful to guarantee a level playing field.
- **Safety requirements** to share or access in-vehicle data, functions, and resources **must conform to existing regulation on data privacy and cybersecurity**. Contradictory interpretation needs to be prevented.
- Determining **governance and market rules** on the access to in-vehicle data, functions, and resources in a specific regulation are **useful to increase transparency** and clarity in the market between all stakeholders. Contradictory interpretation needs to be prevented as well as double regulation.
- A **harmonization** of planned regulations and existing regulations is necessary.

## Careful utilization of data

Only as much data should be **provided** as is required for **a user-friendly charging experience. Data protection must be taken into account in accordance with the applicable regulations**. If any data is made available, it needs to be clear for the user *who* will receive the data and *for what* the recipients will use it. At the same time, data should then be made available in a non-discriminatory way: any data released should not be given to any party exclusively so that a level playing field is guaranteed. In line with the provisions of the EU Data Act, these recommendations only apply to data that are available at the manufacturer or party of choice (no obligation to store additional data). Furthermore, EV manufacturers (OEM) or the respective data holder shall not be obliged to disclose data that would result in the disclosure of company confidential data[2], which may prejudice the interest of a company.

Most of the data listed below can be provided for example, using the standard ISO 15118-20.

*Table 1: overview about the most important aims and beneficiaries of releasing certain data sets (the order of the given points does not represent any ranking)*

| Aim | Beneficiary | Required data |
|---|---|---|
| **Load optimization, local power grid stabilization** | Distribution system operator (DSO), EV-driver | • Max. charging/discharging power of the EV (differentiated according to AC and DC)<br>• Current EV charging/discharging power (when connecting to the charging point)<br>• Maximum charge/discharge current (differentiated according to AC and DC)<br>• Required energy until target SoC<br>• Available energy until minimum SoC<br>• Energy until maximum SoC |
| **Optimized charge planning / matching of a fitting re-charging point** | EV driver | • Current EV charging/discharging power (when connecting to the charging point)<br>• Maximum charge/discharge current (differentiated according to AC and DC)<br>• Range per kWh / driving consumption<br>• Required energy until target SoC<br>• Available energy until minimum SoC<br>• Energy until maximum SoC |
| **Optimized charging management at a re-charging hub** | CPO | • Remaining time to different SoCs<br>• Charging complete<br>• Max. usable energy of the EV battery<br>• Maximum charge/discharge current (differentiated according to AC and DC)<br>• Charge or discharge performance based on battery temperature<br>• Access to trigger the preconditioning of EV battery |

[2] Company confidential data could be trade secrets or intellecutal property right

| | | |
|---|---|---|
| | | • Required energy until target SoC<br>• Available energy until minimum SoC<br>• Energy until maximum SoC |
| **Improvement and security of charging infrastructure** | CPO,<br>EV driver | • Charging error codes incl. inlet hot<br>• Non-variable EV MAC-address (or EVCCID), unique and stable over lifetime |
| **Higher transparency for the EV drivers** | EV driver | • Current EV charging/discharging power (when connecting to the charging point)<br>• State of Charge (SoC) – real time (during charging)<br>• State of Charge (SoC) – target (set point)<br>• State of Charge (SoC)– maximum/minimum<br>• Remaining time to different SoCs<br>• Charging complete<br>• Max. usable energy of the EV battery<br>• Range per kWh / driving consumption<br>• Charge or discharge performance based on battery temperature<br>• Access to on-board navigation function |
| **Non-discriminatory market competition** | EMP,<br>EV driver | • Access to on-board navigation function |

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## Annex: In-vehicle-data, functions and resources that should be made available to third parties

*Please note: The category "Strength of the benefit" is an estimation and serves as a rough orientation on how strong a positive impact of releasing the respective data set might be for customers.*

| **1. Max. charging/discharging power of the electric vehicle (EV) (differentiated according to AC and DC)** | | |
|---|---|---|
| Who will benefit? | DSO, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | For load management aiming at an optimized integration of vehicle and recharging station into the power grid, the grid connection user needs vehicle data. Local power grid operators will benefit due to improved charging management via the CPO or in private by the customer which can limit stress on the local power grid. In case of power limitation by the DSO, this enables an optimized load management of the site and prevents local power shortages. | |
| EV drivers' benefit | Precondition: a DSO will only regulate the power supply of private recharging points with the grid connection in the low-voltage grid. The customer will have a better decision-making basis according to his/her needs in case of power limitations. Furthermore it increases transparency towards EV driver because maximum charging/discharging power on AC and DC charging stations depends on the characteristics of the EV battery. Planning of longer travels can be optimized, cost and/or time reduction for the driver can be realized. | Strength of the benefit: **++** |
| Difference compared to the status quo | Less stress on the local power grid during EV update if combined with optimized load management; the less pressure there is on the local power grid, the more EVs can charge simultaneously. | |

| **2. Current EV charging/discharging power (when connecting to the charging point)** | | |
|---|---|---|
| Who will benefit? | CPO, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Due to the charging curve of an EV, the EV charging power decreases with an increasing state of charge (SoC). The information on the current EV charging power contributes to the improvement of charging management via the CPO. Prospectively the information of current discharging power is relevant to support bidirectional charging. | |
| EV drivers' benefit | Can be used to increase transparency towards the EV driver (e.g., charging power is reduced due to grid-serving charging management or towards the end of the charging process).<br>Enables higher billing transparency if the displayed charging power is lower than the actual charging power. | Strength of the benefit:<br>**++** |
| Difference compared to the status quo | EMP can provide information on charging/discharging power to the EV driver in real-time/live. | |

| **3. State of Charge (SoC) – real time (during charging)** | | |
|---|---|---|
| Who will benefit? | EV driver (partly also CPO, EMP) | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | SoC during driving: EMPs and CPOs could make charging offers to the customer if the EV driver explicitly agrees to the data transfer when it is requested. The EV driver needs to have decision-making authority.<br>SoC as the status quo of the EV battery when connected to the EVSE facilitates in combination with other information (e.g., EV charging power) estimations on the charging duration and enables a better communication between CPO/EMP and EV driver. | |
| EV drivers' benefit | Increases transparency for the EV driver (information about when charging will be necessary). | Strength of the benefit: |

| | | |
|---|---|---|
| | If the SoC can be made available to other parties than the OEM, the customer/driver can benefit from more offers by various EMPs and CPOs. | ++ |
| Difference compared to the status quo | EMP (currently, only OEM or CPO) can provide information on SoC to the EV-driver in real-time/live. | |

| **4. State of Charge (SoC) – target (set point)** | | |
|---|---|---|
| Who will benefit? | EV driver (partly also CPO, EMP) | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | The SoC set point means the pre-setting of the EV driver how full he/she wants to charge the EV battery. EMPs and CPOs could make charging offers to the customer if the EV driver explicitly agrees to the data transfer when it is requested. The EV driver needs to have decision-making authority.<br>It facilitates in combination with other information (e.g., EV charging power) the charging management/planning. | |
| EV drivers' benefit | Increases transparency for the EV driver ("reminder" about set point and possibility to re-set).<br>If the SoC can be made available to other parties than the OEM, the EV driver can benefit from more offers by various EMPs and CPOs. | Strength of the benefit:<br>+ |
| Difference compared to the status quo | The provision of this data point increases the convenience for the EV driver because he can be informed about setting a SoC target by CPO or EMP. | |

| 5. State of Charge (SoC) – maximum/minimum | | |
|---|---|---|
| Who will benefit? | EV driver (partly also CPO, EMP) | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | The battery maximum/minimum SoC means the relative SoC below or above which the battery is never drawn while smart charging and vehicle-to-grid. EMPs and CPOs could make charging offers to the customer if the EV driver explicitly agrees to the data transfer when it is requested. The EV driver needs to have decision-making authority.<br>It facilitates in combination with other information (e.g., EV charging power) the charging management as well as estimations on the charging duration. | |
| EV drivers' benefit | Increases transparency for the EV driver ("reminder" about max./min. SoC) and offers a higher incentive to use smart charging or V2G. | Strength of the benefit:<br>**+** |
| Difference compared to the status quo | The provision of this data point enables interested market operators to offer EV drivers smart charging services. Currently, this information is only accessible for OEM. | |

| 6. Remaining time to different SoCs | | |
|---|---|---|
| Who will benefit? | EV driver (partly also CPO, EMP) | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | EMPs and CPOs can anticipate the duration and speed of the charging process, which could be used for reservation planning. | |
| EV drivers' benefit | Increases transparency for the EV driver (when will the charging process be finished). | Strength of the benefit:<br>**+++** |

| | | |
|---|---|---|
| | If used for reservation planning, the EV driver gets additional information about when he/she will be able to charge. | |
| Difference compared to the status quo | Data Point is provided directly from the vehicle and not, as is the case today, as a calculated value from the charging station. Therefore, the information is more accurate for the EV driver. | |

| **7. Charging complete** | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | EMPs and CPOs can use the exact information e.g., for load management or incentives for the EV driver to leave the charging spot; may also be used for fair blocking fees (CPOs and EMPs can determine the exact time when the charging process was completed).<br>Information facilitates the charging management/planning. | |
| EV drivers' benefit | Increases transparency for the EV driver (charging process finished) | Strength of the benefit:<br>**+++** |
| Difference compared to the status quo | Currently, CPO and EMP only get the information that the charging process was stopped but not whether it was successful. The reason for stopping the charging process is not known. Providing the described data point would increase the transparency. | |

| **8. Max. usable energy of the EV battery** | |
|---|---|
| Who will benefit? | CPO, potentially DSO, EV driver |
| Utilization of the data / function / resource by | Information contributes to the improvement of the charging management via the CPO.<br>Can be utilized as information for bi-directional and grid-serving charging. |

| | | |
|---|---|---|
| different stakeholders and resulting benefit | | |
| EV drivers' benefit | Enabling load management e.g., in V2G appliances<br><br>Indicator for potential battery degradation if max. usable energy of EV battery de-creases over time | Strength of the benefit:<br><br>**+** |
| Difference compared to the status quo | Currently, this information is only accessible for OEM. | |

| **9. Range per kWh / driving consumption** | | |
|---|---|---|
| Who will benefit? | EMP, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Information (both live and average for e. g. past 100 km) facilitates range prediction and allows particularly EMP to suggest respective charging stops to EV driver. | |
| EV drivers' benefit | Information facilitates range prediction and allows particularly EMP to suggest re-spective charging stops to EV driver, e.g., via their routing service. Facilitates route planning. | Strength of the benefit:<br><br>**+++** |
| Difference compared to the status quo | Currently, this information is only accessible for OEM. | |

| **10. Charge or discharge performance based on battery temperature** | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Can be used for information of EV driver with which performance the battery can charge based on battery temperature. | |
| EV drivers' benefit | can increase the transparency for the EV driver, why the max. EV charging power cannot be used (e.g., EV battery is too cold). Potentially faster charging process. | Strength of the benefit: **+** |
| Difference compared to the status quo | Currently, this information is only accessible for OEM and can therefore only be displayed in the car itself. For CPO and EMP it is not possible to display this information in their apps for EV driver. | |

| **11. Charging error codes incl. inlet hot** | | |
|---|---|---|
| Who will benefit? | CPO, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | CPOs can improve the quality of the charging infrastructure and develop solutions to improve the interoperability between EV and EVSE.<br>If combined with EV MAC-address or other identifier: detection if certain charging errors (e.g., unintended stop of a charging session, start of charging session fails) are connected to a specific EV model and if there may be systematic errors. | |
| EV drivers' benefit | Increases transparency and information for the EV driver (e.g., need to re-start the charging process or whether certain parts of the vehicle need to be repaired). It must be ensured that the codes are presented in a user-friendly, readable way to be | Strength of the benefit: **+++** |

| | | |
|---|---|---|
| | easily understood by the EV driver. Additionally, sorting error codes according to importance/severance could make the amount of information more manageable for the EV user. | |
| Difference compared to the status quo | The CPO can assign an error in the loading process the charging station or the vehicle and, if necessary, more precisely identify vehicle-related errors. | |

| **12. Non-variable EV MAC-address (or EVCCID), unique and stable over lifetime** | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Fraud detection in case that the charging station is offline.<br><br>If combined with error codes: detection which EV models may be prone to certain charging errors so as to improve the charging experience overall. | |
| EV drivers' benefit | Continuously improving charging experience for users due to the detection and subsequent solving of electric vehicle-specific issues and errors which form the major cause of charging errors.<br><br>Fraud detection, e.g. in the case of theft identification in the charging network.<br><br>User should be able to decide whether the EV MAC-address is randomized or not.<br><br>- The default should be a randomized EV MAC-address, which allows for anonymity. In this case, the vehicle needs to transmit the information that the EV MAC address is randomized. | Strength of the benefit:<br><br>**++** |

| | | |
|---|---|---|
| | - The customer should be able to switch off the randomized MAC-address in order to benefit, e.g., from charging during offline times or Autocharge. | |
| Difference compared to the status quo | The customer will be able to choose whether they remain anonymous or that they can be tracked and benefit from additional offers. CPO and EMP receive an information about an EV MAC being randomized when a recharging station is used but offline. | |

| **13. Inclusion in on-board navigation system** | | |
|---|---|---|
| Who will benefit? | CPO/EMP/routing provider, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Allowing third parties such as EMPs and CPOs to include their charging points in the on-board navigation system contributes to a level-playing-field. Since currently only OEMs have access, they may preselect or favour certain decisions within the system without being noticeable to other parties (such as e.g. selection of charging stations). | |
| EV drivers' benefit | Display of all charging points (free of discrimination), not only those of a specific EMP.<br><br>EV drivers may choose between different routing options and/or service levels from various parties which may give them, e.g., financial benefits. In combination with the in-vehicle data explained above, the EV driver could also improve his charge planning for long distance trips. | Strength of the benefit:<br><br>**+++** |
| Difference compared to the status quo | Fair market/level playing field: Most car manufacturers do not include all charging stations and do therefore not provide the optimal charging experience. | |

| 14. Access to trigger the preconditioning of EV battery | | |
|---|---|---|
| Who will benefit? | CPO/EMP/routing provider, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Both the EV driver and CPO are interested in an optimized charging session that is as short as possible. This can be achieved by a preconditioned battery at the beginning of the charging session. Prospectively, the CPO/EMP/routing provider or the EV driver should be allowed access to optimizing arrival at the charging stop with optimized battery conditions by triggering a message incl. a suggested charging location and route to the vehicle (incl. battery preconditioning function of the EV battery). | |
| EV drivers' benefit | For users to achieve the optimal charging experience on a technical level regardless of the CPO and EMP, indirect access to the preconditioning function (via route planning data) needs to be provided. | Strength of the benefit: ++ |
| Difference compared to the status quo | At the moment, this function is only accessible for OEM (due to warranty issues), so OEM can act as gatekeepers. By granting indirect access to this function (via routing information to the next charging station), this function can also be offered to EV driver by CPOs and EMPs. | |

| 15. Maximum charge/discharge current (differentiated according to AC and DC) | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Planning of charging / discharging<br>The EV driver needs to have decision-making authority. | |
| EV drivers' benefit | Information about performance of charging/discharging that increases transparency towards EV driver because maximum charge/discharge current on AC and DC charging stations depends on the characteristics of the EV battery. | Strength of the benefit: ++ |

| | |
|---|---|
| Difference compared to the status quo | The provision of this data point would increase transparency because the charging curve of the car can be predicted more precisely. |

| **16. Required energy until target SoC** | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver, DSO | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Planning of Charging time and duration<br><br>The EV driver needs to have decision-making authority. | |
| EV drivers' benefit | Increases transparency for the EV driver ("reminder" about the required energy until target SoC but also about the target point and possibility to re-set).<br>If the information on the required energy can be made available to other parties than the OEM, the EV driver can benefit from more offers by various EMPs and CPOs with regard to smart charging. | Strength of the benefit:<br><br>**+++** |
| Difference compared to the status quo | New data point for smart charging functionality | |

| **17. Available energy until minimum SoC** | |
|---|---|
| Who will benefit? | CPO, EMP, EV driver, DSO |
| Utilization of the data / function / resource by | Planning of discharging duration and energy to be able to use<br><br>The EV driver needs to have decision-making authority. |

| | | |
|---|---|---|
| different stakeholders and resulting benefit | | |
| EV drivers' benefit | Increases transparency for the EV driver (information about how much energy is available to the minimum SoC) and informs about how much energy is available for V2G and V2H applications, making them more attractive/easier for EV driver to use. | Strength of the benefit: **+++** |
| Difference compared to the status quo | New data point for V2G functionality | |

| **18. Energy until maximum SoC** | | |
|---|---|---|
| Who will benefit? | CPO, EMP, EV driver, DSO | |
| Utilization of the data / function / resource by different stakeholders and resulting benefit | Planning of charging capabilities, which can also be used for later discharging<br>The EV driver needs to have decision-making authority. | |
| EV drivers' benefit | Increases transparency for the EV driver (information about how much energy is lacks to the maximum SoC) and informs about the energy that can be charged additionally for smart charging and V2G/V2H applications, making them more attractive/ easier for EV driver to use. | Strength of the benefit: **++** |
| Difference compared to the status quo | New data point for smart charging functionality | |