PREAMBLE

Aim of this document

In order to guarantee the consistency of static data models for electric vehicle charging infrastructures (EVSE), AFIREV has formalised its vision and understanding of technical standards and legislation.

This note will help harmonise the French ecosystem, in particular with mobility operators and Route Planners who are in direct contact with users, as well as the DataGouv organisation which implements the regulatory obligations.

It will therefore enable a French consensus to be built on this crucial issue for users. It will then be up to AFIREV to promote this vision in Europe as well as towards the technical standards (OCPI).

Issue

At present, users notice that data is sometimes incomplete, erroneous, or inaccurate, which does not allow for a satisfactory overall charging service.

To illustrate the great multiplicity of cases, here is a list: petrol stations, roadside EVSE, EVSE on supermarket car parks, on all kinds of commercial car parks, on hotel car parks, on company car parks, as well as on private car parks of companies, condominiums, apartment buildings, "personal" EVSE made accessible to public...

We may be interested in tertiary EVSE located on private land (e.g. a company car park) which are accessible only through control at the car park entrance. Some of these tertiary EVSE may be open to roaming, allowing for example employees and visitors to charge through their contract with their EMP. The questions then become:

- What physical or service barriers will they have to pass in order to start charging?

- Do these private charging stations have to be connected to the ecosystem of the user-accessible charging stations?

- How can an EMP then characterise these charging points and display them appropriately to users?

The complexity is indeed great:

   - On the one hand, these data are transmitted from operator to operator and differences in interpretation can quickly appear
   - On the other hand, the standard currently used by most operators (i.e. OCPI 2.1.1) does not allow to deal properly these cases.
   - Finally, a data scheme has been adopted by the government (6° of Article L. 1115-1 of the Transport Code and Article 13 of Decree No. 2017-26) which reveals discrepancies with technical standards while not always bringing substantial improvements to user information.

The aim of this note is therefore to:

- Converge towards common definitions, describing precisely the multiplicity of cases that can be observed on the French territory. These definitions must then be technically translated into the communication standards used

- Enable EMPs to display this information simply to users.

Outline of the document

In order to answer this question, the document is organised as follows:

1 Firstly, AFIREV studied in detail 3 reference systems:

- The one of uses and of the user

- The technical reference system: the OCPI protocol (version 2.1.1 and 2.2)

- The legislative repository: decrees and DataGouv scheme .

2 In a second stage, AFIREV modelled the problem of "accessibility of an EVSE" in the form of a 2 x 3 matrix in order to have a complete and analytical approach to the subject.

3 In the third and final stage, this matrix was applied to the three reference systems studied in the first part and to the case of roaming.

In order to achieve a synthesis of recommendations for :

- AFIREV members

- OCPI

- State services.

1. State of the art:

1) 1. Users

For users, AFIREV:

1 Differentiate unambiguously between charging stations that are :

- Open to the public > accessible 24/7 without any restriction and therefore "without any discrimination" according to the terminology of the decree,

- From those which are open to the public with certain restrictions

ACOZE: « People do not travel to charge at a charging point that is sometimes open and sometimes not, according to procedures that the user does not control. For these stations, it is actually a question of charging at the destination (EVSE in companies, hotels, shops). »

2 Specify restrictions, if any: temporal, service, legal, physical.

3 Point out to PRMs (persons with reduced mobility) the stations specially designed for them.

1.2 – OCPI standard:

OCPI has become the European standard for communication between technical platforms. It is essential today. All the players in the industry: OEMs, EMPs, CPOs hubs have implemented it. The most widely used version in France is currently version 2.1.1. Operators are gradually migrating to version 2.2.

For operators and the entire profession, this technical standard consequently structures data exchanges between systems.

OCPI 2.1.1

Only two concepts in OCPI 2.1.1 characterise the accessibility of a private station:

- **Opening_times** : (Hours) The times when the EVSEs at the location can be accessed for charging.
    - Twentyfourseven (boolean) or regular_hours (weekday based)
    - exceptional_openings
    - exceptional_closings
- **Charging_when_closed** : (Boolean) indicates if the EVSEs are still charging outside the opening hours of the location. E.g. when the parking garage closes its barriers over night, is it allowed to charge till the next morning? Default: true

As it stands, OCPI 2.1.1 only offers one time restriction. This is insufficient to fully address the problem.

OCPI 2.2

https://github.com/ocpi/ocpi/blob/master/mod_locations.asciidoc

This version of OCPI is much more extensive on accessibility to private stations. Below are the fields directly from the standard that allow it to be addressed:

Location

- **Publish (Boolean):** Defines if a Location may be published on a website or app etc. When this is set to false, only tokens identified in the field: publish_allowed_to are allowed to be shown this Location. When the same location has EVSEs that may be published and may not be published, two 'Locations' should be created.
    - **PublishTokenType:** Defines the set of values that identify a token to which a Location might be published.
- **parking_type:** The general type of parking at the charge point location.
    - ALONG_MOTORWAY: Location on a parking facility/rest area along a motorway, freeway, interstate, highway etc.
    - PARKING_GARAGE: Multistorey car park
    - PARKING_LOT: a cleared area that is intended for parking vehicles, i.e. at super markets, bars, etc.
    - ON_DRIVEWAY: Location is on the driveway of a house/building
    - ON_STREET: Parking in public space along a street
    - UNDERGROUND_GARAGE: Multistorey car park, mainly underground.
- opening_times : idem OCPI 2.1.1
- charging_when_closed : idem OCPI 2.1.1

3

EVSE

- **parking_restrictions**: represents the restriction to the parking spot for different purposes e.g.
    o EV_ONLY: Reserved parking spot for electric vehicles.
    o PLUGGED: Parking is only allowed while plugged in (charging).
    o DISABLED: Reserved parking spot for disabled people with valid ID.
    o CUSTOMERS: Parking spot for customers/guests only, for example in case of a hotel or shop
    o MOTORCYCLES: Parking spot only suitable for (electric) motorcycles or scooters.

For the "parking_restrictions" field, AFIREV specifies that the restrictions may be added and should therefore be considered with an "AND".

1.3 - legislative framework

The decree

On 4th of May 2021, decree n°2017-26 was completed with the following main additions:

- clarification of the definition of a charging infrastructure "open to the public".

A recharge point open to the public is a recharge point, operated by a public or private operator, to which users have access on a non-discriminatory basis.

This non-discriminatory access does not preclude the possibility of imposing certain conditions in terms of authorisation, authentication, usage and payment.

In this context:

a)   the following in particular are considered to be recharge points open to the public:

- a recharge point whose parking space is physically accessible to the public, including on the basis of an authorisation or payment of an entry permit;

- a recharge point attached to a car-sharing system and accessible to third parties, including on the basis of payment for the recharge service.

b)   the following are not considered open to the public:

- a recharge point installed in a private residential building or in a building attached to a private residential building, reserved exclusively for residents;

- a recharge point used exclusively to recharge vehicles in service within a given entity and installed in a building attached to this entity;

- a recharge point installed in a maintenance or repair workshop not accessible to the public.

- interoperability requirements, defined as: the ability of a component or set of components of a system used for charging an electric vehicle to operate with other components or systems of the same purpose without restriction of implementation or access to charging, respecting open standardised interfaces in mechanical, electrical and data exchange protocol terms.

- requirements on the provision of dynamic data and the obligation to publish information in the event of an incident.

« Once dynamic data is available for the operation of a charging infrastructure open to the public referred to in the first paragraph of Article 11 of this decree, the data relating at least to the availability of charging points shall be made available to all users, on an open basis and under non-discriminatory conditions.

"These data are made public and updated under the responsibility of the developer or the person designated by him on the website referred to in Article D. 1115-1 of the Transport Code.

"The obligation is presumed to have been met if these data are transmitted to an interoperability platform as long as the site referred to in the second paragraph is not able to integrate them.

"As soon as an incident recorded by the supervision system affects the use of all or part of a recharging infrastructure open to the public for more than two hours, information on the resulting unavailability is made public and made available to users by all appropriate means by the developer or the person designated by him.

This obligation is presumed to be fulfilled if the information is transmitted to an interoperability platform.

Data scheme from data.gouv

https://schema.data.gouv.fr/etalab/schema-irve/latest/documentation.html#propriete-implantation-station

In 2021, in order to specify the requirements of the decree, an order was published to specify the new data scheme. According to Art. 13 of the decree n° 2021-546 of 4 May 2021, the data to be made available on DataGouv only concern "stations and charging points open to the public". Our analysis will therefore be limited to this scope.

On first analysis, it appears that many fields have been added by DataGouv without always having an obvious link with the existing standards or the data that operators can reasonably collect and maintain. A comparative analysis of the properties that concern our subject are listed below: namely the standardisation of private but publicly accessible station data. A comparison is made with the equivalents in OCPI.

DATA_GOUV	OCPI
implantation_station (mandatory) (string) - "Voirie" : for an on-street EVSE - "Parking public" : for a public car park, (multi-storey, enclosed, etc.) - "Parking privé à usage public" : for a private car park for public use / open car park (e.g. shopping area)	There is a confusion here between the notion of location and the notion of restriction. In OCPI the closest property would be: « Location.parking_type ». "Voirie" would be similar to «ALONG_MOTORWAY », but the other strings are ambiguous:

- "Parking privé réservé à la clientèle" : for a car park reserved for customers and users
- "Station dédiée à la recharge rapide" : for a station dedicated to fast charging, where the duration of use is generally limited to mainly fast charging and where the primary function of the station is charging and not parking.

- the notion of openness to the public must be dealt with elsewhere and unequivocally. It is in fact embedded in the obligation which applies only to stations open to the public
- the notion of restriction must also be dealt with elsewhere: "reserved for customers" and "dedicated to fast charging" are in fact restrictions.

On this point the OCPI model is more relevant.

A possible half-measure: enrich the *OCPI.Location.parking_type* field with : "Public car park, Private car park for public use, Private car park reserved for customers, Dedicated fast charging station".

condition_acces (mandatory) (string):

any access conditions to the station, outside the gauge.

- "Accès libre " in the case of free access without any physical constraint (e.g. no barrier).

- "Accès réservé " in the case of limited/reserved access that requires identification or passage through a barrier. (includes EVSE on the toll motorway network).

This property should not include environmental barriers (e.g. motorway tolls) as this is not in the framework set by law.

In OCPI no equivalence, yet this property is useful in the matrix of cases.

⇨ Propose to OCPI to add an equivalent.

horaires (mandatory) (string) opening range of the station.

- If open continuously, indicate "24/7".

- otherwise indicate the timetable as follows: Mo-Fr 08:00-12:00,Mo-Fr 14:00-18:00,Th 08:00-18:00.

In OCPI there is a strict equivalence with the "opening_times" field in the "Location" module.

accessibilite_pmr (mandatory) (string) Accessibility of the charging point to people with reduced mobility.

- Reserved for PRM (in the case of a signposted charging point reserved for PRM)

- Accessible but not reserved for PRM

- Not accessible

- Accessibility unknown

In OCPI the optional field of the "EVSE" object: ParkingRestriction = "DISABLED" processes the value "Reserved for PRM".

Property OCPI.EVSE.parking.restriction to be used

The other values are accessibility information to be given at the station level.

=> propose to OCPI to add an "accessibility" field.

restriction_gabarit (mandatory) (string) all information relating to access restrictions linked to the size of the vehicles e.g.: maximum height 2m

Not standardised, and therefore not usable.

No OCPI equivalence.

Therefore, Afirev members agree not to fill in this field.

station_deux_roues (mandatory) (boolean) Is the station reserved for two-wheeled vehicles? Indicate "true" if true, "false" if false

In OCPI the optional field of the "EVSE" object: ParkingRestriction = "MOTORCYCLES"

Use this field.

Items related to payment :

gratuité : Free of charge charging. Indicate "true" if true, "false" if false.

paiement_acte : Pay-as-you-go option (without identification or subscription). Indicate "true" if true, "false" if false

paiement_cb : possibility of payment by bank card (presence of a payment terminal with a BC). Indicate "true" if true, "false" if false.

paiement_autre : possibility of payment by another means (which can be specified in the "observation" field). Indicate "true" if true, "false" if false.

free of charge: specify that it is free of charge for all, because in some cases free of charge can only be for a restricted set of users.

Apart from free access, which should be relegated to another property (e.g. tariff), in OCPI the "Capabilities" field would make it possible, with a few adjustments, to carry most of this information:

paiement_acte : mandatory in France on all EVSE "open to the public", so should be systematically "true". What is the point then?

If imperative: add this value to OCPI and clarify the definition. Isn't it always a CB payment from a mobile phone in France?

Paiement_cb. Corresponding items in OCPI: CHIP_CARD_SUPPORT, CONTACTLESS_CARD_SUPPORT, CREDIT_CARD_PAYABLE, DEBIT_CARD_PAYABLE, PED_TERMINAL

Paiement_autre: use "OCPI.EVSE.capabilities"

Our proposals to ETALAB/Data.Gouv:

- **Implantation_station:** review this notion which currently mixes too many concepts. AFIREV finds the OCPI data model more relevant. A half-measure could be to enrich the OCPI field Location.parking_type with some values brought by DATA.GOUV
- **/!\ condition_access :** in the sense of the AFIREV matrix, which takes up the framework given by the law, motorways are considered open, i.e. condition_acces = {free access}
- **Paiement** : align values with OCPI.capabilities. Deal with the notion of gratuity elsewhere.
- **Paiement_acte** : mandatory in France on all EVSE "open to the public", so should be systematically "true". What is the point then? Recall the definition of Paiement_acte in the documentation

because it still poses interpretation problems. Indeed, the paiemen_acte can be a mobile_payment using a payment portal by bank card (notion to be added?) as well as a paiement_cb from a bank terminal installed on the IRVE. This property must be better defined and structured. In a more global way for the fields related to the payment, AFIREV recommends to Data.Gouv to reproduce the OCPI Capabilities field

- **Restriction_gabarit** : the data is not standardised. Moreover, it is actually a data that should be requested from the road service. Eventually, as regards the length and width of spaces, there is too much heterogeneity and people know neither the width nor the length of their vehicle. This is why the members of AFIREV agree not to fill in this field.
- **Station_deux_roues** : property to be placed within the charging point, managed with OCPIparking_restriction.

Our proposals to OCPI:

AFIREV proposes to evolve OCPI2.2 to cover concepts brought by DataGouv:

- **Accessibility_prm**: introduce an "accessibility" property at the charging station level. This is where the value "Accessible but not PRM only" will need to be managed. As long as this property is not added to OCPI, it will be difficult for the profession to handle this value properly. The value "Reserved for PRM", on the other hand, is well handled by "parking_restrictions = DISABLED".
- **Payment :** Develop the OCPI EVSE.Capabilities field so that it includes the notions of payment_act (to be defined), payment_bc, payment_mobile_App (to be added in DATA.GOUV), payment_other to be standardised.
- Add a field « **accessibility** »
- **enrich the Location.parking_type** field with : "Public car park, Private car park for public use, Private car park reserved for customers, Dedicated fast charging station".
   o **Paid access to the car park:** add a notion of paid access to the car park with new parking_type: for example the notion ACCESS_PAYMENT_REQUIRED for French motorways or car parks with paid entrance barriers.
- **Add a field** similar to Data.Gouv "condition_access".

For operators who have not yet implemented OCPI 2.2, AFIREV proposes an extension of OCPI 2.1 with the fields "Location.parking_type", "EVSE.parking_restrictions" and an enrichment of "EVSE.capabilities" with the new values as proposed for OCPI 2.2.

2 – Accessibility to charging points

AFIREV has sought to characterise the accessibility to charging stations. To this end, AFIREV members agree on two "barriers" that must necessarily be passed before recharging:

- **the physical or legal barrier** which controls the physical access to the station, and answers the question: am I able to park my vehicle next to the charging station?

- **the technical barrier** which controls access to the service, and answers the question: am I authorised to launch a charging session at this station where I have parked my vehicle?

2.1 - Physical or legal barrier: location and time.

Do I have physical or legal access to the charging pool?

AFIREV has listed 3 cases:

- **Open**: it is a charging point accessible to all (no physical or legal barrier) and at all times (24/24 and 7/7) - e.g.: paid entry car parks, motorways etc. To remain in the spirit of the law, the conditions of payment to access the charging point are not taken into account here (toll, parking, access to the car park...)

- **Partially open**: sometimes a physical or legal barrier prevents access to the zone. The condition of opening of the barrier may be linked to opening hours - e.g. supermarkets, or to conditions - e.g. hotel

- **Closed**: charging points intended for private use with a systematic physical or legal barrier to access it. For example, a "reserved for municipal police" sign is a case of "legal" closure. Under certain discriminatory access conditions these stations can be made accessible to some - e.g. guests of companies in private car parks, ministry car parks, shared private charging points.

2.2 – Technical barriers: access to the charging service.

Am I allowed to start the charging session? And how do I start it?

AFIREV has listed 2 cases:

- **Without conditions**: for example, a charging station with a fee-for-service, or a free charging station accessible to all. This is therefore the case for all charging stations open to the public, i.e. "to which users have non-discriminatory access. Non-discriminatory access does not preclude the imposition of certain conditions in terms of authentication, use and payment."

- **With conditions**: access is discriminatory: the user belongs to a private list of users (e.g. hotel guests, or if the user visits the company and is allowed to recharge in its car park).

2.3 - Case matrix

By intersecting these different cases we obtain the case matrix. To illustrate each of the intersections, examples are given hereunder.

		Physical barrier		
		Open	Partially open	Closed
Technical barrier	**no condition**	Petrol stations, roadside stations, supermarkets, (paid or not) public car parks	Supermarkets, Hotels, some shops…	X
	with condition	X	Supermarkets, Hotels, Shops, car park for company visitors, private EVSE open to sharing	Only for employees, home charging, private property

Legend:

Charge while travelling

Charge at arrival

Case impossible

3 – Application.

In this last part, which will bring its share of proposals, the matrix will be successively applied to the framework defined by the Law, then submitted to OCPI and finally applied to the Data.Gouv data model.

3.1 - According to the law :

As a reminder, the law specifies that a recharging infrastructure open to the public "characterises a recharging infrastructure [...] located on the public domain or on a private domain, to which users have non-discriminatory access. Non-discriminatory access does not prohibit the imposition of certain conditions in terms of authentication, use and payment.

		Physical barrier		
		Open	Partially open	Closed
Technical barrier	**no condition**	Petrol stations, roadside stations, supermarkets, (paid or not) public car parks	Supermarkets, Hotels, some shops…	X
	with condition	X	Supermarkets, Hotels, Shops, car park for company visitors, private EVSE open to sharing	Only for employees, home charging, private property

Thus in this matrix: the infrastructures open to the public, in the sense of the law, are those inside the rectangle.

		Physical barrier		
		Open	Partially open	Closed
Technical barrier	**no condition**	Roaming is mandatory	Roaming mandatory	X
	with condition	X	Roaming optional	X

Transposing the law to roaming obligations, above are the stations for which roaming is mandatory.

3.2 – According to OCPI

OCPI 2.1.1 is insufficient to adequately characterise each of the cases proposed in the case matrix. Two solutions are available to operators:

- Adapt OCPI 2.1.1 with certain properties introduced in version 2.2 which allow the different cases to be characterised appropriately;
- Migrate to OCPI 2.2OCPI 2.1.1

- Migrer sur OCPI 2.2

OCPI 2.2 allows the characterisation of each case:

To summarise:

Technical barriers:

- « sans condition » if EVSE.parking_restrictions = null
- « avec conditions » if EVSE.parking_restrictions = CUSTOMERS

Physical barriers:

- « ouvert » if Location.publish = true AND EVSE.parking_restrictions not used AND Location.opening_times.twentyfourseven = true
- « partiellement ouvert » if Location.opening_times.twentyfourseven = false OR EVSE.parking_restrictions = CUSTOMERS
  parking_type can be filled in to better categorise the case.
- « fermé » if Location.publish = false

Recommendation:

- The open + unconditional case must be made very clear to users: there is no physical or legal barrier, nor any conditions for starting a charging station.

- The notion of physical barrier must be better characterised by introducing a physical_barrier field which will allow to warn the user of the obstacles he may find when he wants to park his vehicle.

- The property Location.publish = "false" characterises "closed" stations, i.e. for which it is physically or legally impossible to park there.

3.3 – According to Data.gouv

The different data in the Data.gouv scheme: https://schema.data.gouv.fr/etalab/schema-irve/latest/documentation.html

To summarise:

Station open to the public according to the law: the developer must communicate the data only for stations open to the public (in the sense of the decree) and therefore for which condition_acces = {open access}

When a roaming identifier is transmitted (id_pdc_roaming or id_station_roaming), the station is open to roaming. When the station is not open to roaming: id_pdc_roaming = 'not relevant' or id_station_roaming = 'not relevant' .

Technical barriers :

- "unconditional" if condition_access = {open access}

- with conditions" if condition_access = {restricted access} .

Physical barriers :

- "open" if schedule = {24/7} AND condition_access = {open access}

- "partially open" if

- schedule = {24/7} AND access condition = {reserved access}
- OR schedule = {specified times}

- Closed" is not relevant for DATA.GOUV

FINAL CONCLUSIONS

In the course of six working groups bringing together French experts in the field of electric vehicle charging, AFIREV has drawn up this note, which should serve as an implementation guide for professionals in the field of electric vehicle charging. In summary of the study, the following points should be noted.

For users

- That they must have access to uniform and clear information throughout the territory. It is essential for the user to understand at a glance whether the station is accessible 24/7 without any barriers. Thus, the case of physical barrier = "open" + technical barrier = "unconditional" must be made unambiguous on all navigation systems.

- In other cases, users must be told very explicitly what barriers or restrictions they will have to overcome before they can start a charging session.

For operators

- OCPI 2.2 has an adequate data model to address our problem. It is necessary to have a shared understanding so that the implementation is uniform throughout France.

- In order to harmonise OCPI with the Data.Gouv vision, certain values should be added to the existing properties of the OCPI 2.2 data model. See paragraph AFIREV proposals to OCPI in chapter 1.3

- For OCPI 2.1.1 implementations, there is an intermediate solution which would be to add the appropriate fields to OCPI 2.1.1

For Data.Gouv

- The industry and the government should encourage the efforts of operators who prioritise the implementation of this standard. To encourage the implementation of OCPI 2.2, Data.Gouv should be as close as possible to the formalism of OCPI so as not to add complexity to the data models and not to add unnecessary and time-consuming work to the industry, which is facing many significant challenges.

- In order to harmonise Data.Gouv with the data model, some properties of the data scheme should be reviewed. See AFIREV's proposals to Data.Gouv in Chapter 1.3

And finally, for Europe

Electric vehicle charging should not have no borders in Europe. At present, each country has its own specific data scheme, i.e. one NAP per country. This is unbearable for a European operator and incomprehensible for European travellers.   The AFIREV strongly promote to harmonise government data models at European level, drawing as much inspiration as possible from the technical standard, which is OCPI.