Report

Deliverables 2.1.1 – 2.1.6*:* *Static and dynamic data collected from electric charging points, hydrogen stations and other fuels filling stations per participating Member State*

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List of abbreviations

AFI   : Alternative Fuels Infrastructure

AFID   : Alternative Fuels Infrastructure Directive

CNG   : Compressed Natural Gas

CPO   : Charge Point Operator

FCH-JU   : Fuel Cells and Hydrogen Joint Undertaking

GNSS   : Global Navigation Satellite System

HRS   : Hydrogen Refuelling Station

IDRO   : ID Registration Organization

ITS   : Intelligent Transport Systems (directive)

LNG   : Liquefied Natural Gas

LPG   : Liquefied Petroleum Gas

MSP   : Mobility Service Provider

NAP   : National Access Point

PSA   : Program Support Action

1. Introduction

For the successful uptake of sustainable modes of transportation it is essential that there is clear, reliable and up-to-date information for consumers about the location and availability of recharging and refuelling points. These data need to be accessible in an open and non-discriminatory manner to all users. The main objective of *activity 2.1* of the IDACS project is to gather missing data (both static and dynamic) related to the alternative fuels infrastructure for electricity, hydrogen and other fuels (LNG, CNG, LPG and biofuels) so these data can be made available to end users through the National Access Points (NAPs) of the Member States. In activity 2.1. the data as prescribed by the European Commission will be collected by each Member State on a continuous basis via a country specific approach.

2. Purpose of this document

This document aims to present the results of the actual data collection on alternative fuels infrastructure done by the participating Member States between 2019 and 2021. From the start of the project the process and frequency of data collection has been developing at different speeds in the participating Member States and has been combined with work on the provision of these data in DATEX II format through the NAPs, which is covered in activity 2.2.

The results presented in this report concern all fuel tracks covered by the IDACS project and therefore this document presents a combination of multiple deliverables, namely the following:

2.1.1   Static and dynamic data collected from electric charging points per participating Member State;

2.1.2   Static and dynamic data collected from hydrogen stations per participating Member State;

2.1.3   Static and dynamic data collected from LNG filling stations per participating Member State;

2.1.4   Static and dynamic data collected from CNG filling stations per participating Member State;

2.1.5   Static and dynamic data collected from physical LPG filling stations per participating Member State;

2.1.6   Static and dynamic data collected from high blended biofuels per participating Member State.

Deliverable 2.1.0 on a common approach and guidelines for data collection is elaborated by the participating Member States in a separate document.

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3. Methodology

The methodology used for the collection of data presented in this document follows the overall approach as described in the Grant Agreement. This means the following steps were taken by the Consortium members to prepare and conduct the actual collection of data via a country-specific approach:

1. Each of the Member States examined the current situation of data collection and defined how the information can be collected. In some Member States a national or regional database for (one or more of the) alternative fuelling/charging infrastructures, was already in place. The database could act as NAP, or the NAP could draw its information from this database. However, in many Member States this was impossible or not all required (dynamic/static) data was collected and/or the information might be incorrect, incomplete or outdated;[1]
2. This diversity in national situations meant that each country defined how the national data could best be collected and what type of architecture for the NAP was required, and which organization needed to be set-up and maintained;
3. An overall implementation plan was also drawn up that Member States could use for their country-specific implementation plan. This included, for example, activities, resources, time-plan, challenges / risks and mitigation measures;
4. In addition, it was and is an essential step to create broad acceptance and commitment from all relevant alternative fuels sectors. The Member States involved the relevant stakeholders in the country, to secure broad participation and commitment. This could for example consist of market actors like Charge Point Operators (CPOs), Mobility Service Providers (MSPs), alternative fuels operators, public authorities (national, regional and local) and grid-operators.

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[1] Dynamic data can only be collected for charging points which are digitally connected to a central station and cannot be collected from (so called) dumb chargers. Nonetheless, it is market standard that charging equipment provides interfaces for electronic communication and in some of the Member States this is a legal requirement. Therefore, the share of 'dumb' chargers is negligible. The same is true for hydrogen refuelling stations.

4. Deliverable 2.1.1: Data collected from electric charging points

4.1 Objective

This deliverable aims to collect both static and dynamic data on all publicly accessible electric charging points in the participating Member States. The Consortium members are required to collect at least the following data, as laid down in the Grant Agreement:

- *Static data:*
  - Location:
    - GNSS coordinates;
    - Address (street name, zip code, city,…).
  - List of available charge-solutions (Power, Modes);
  - List of available connectors (plugs, sockets, induction plate...);
  - Opening hours, identification and payment methods;
  - Contact info for owner/operator;
  - Full e-mobility code of the charging point (outlet).
- *Dynamic data:*
  - Availability (if the station is operational/ non-operational);
  - Occupation status (free, occupied);
  - Price for ad-hoc charging.

4.2 Overview of data collection per Member State

Status of data collection in 2019

At the start of the project in 2019 the existing situation regarding data collection was analysed and described for each of the participating Member States. The results were laid down in Deliverable 2.1.0. Guideline document For Data Collection and National Access Points. This deliverable is being updated on a regular basis and will be finalized by in December 2021. The table below shows the status in 2019 of the data collection in the participating Member States.

Electric Charging Points - 2019

FYI: information stated below is dated from 2019

Country	AT	BE	CZ	ES	FR	GER	GR	HR	HU	LT	LUX	NL	PL	PT	SI
Data collection at national level?	Yes	regional level	Yes		Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Partly
Public, private or public-private	public-private	private	public and		private	public	public and	public and	private	public	public-private	private	public	public	public and
Data publicly available?	Yes	Yes	Yes		Partly	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partly
Static Data:															
- GNSS coordinates	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partly
- Address (street name, zip code, city,…)	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available charge-solutions (power, modes)	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available connectors (plugs, sockets,…)	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Opening hours	Yes, when	Yes, when	Yes		Yes	No	Yes	Yes	Yes	No	Yes	Yes, when	No	Yes	Yes
- Identification and Payment methods	Yes	No	Yes		Yes	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes
- Contact info for owner/operator	Yes	Yes	Yes		Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
- Full e-mobility code of the charging point (outlet)	Yes	No	No		Yes	No	No	No	No	No	Yes	Yes	No	Yes	No
Dynamic Data:															
- Availability (operational / non-operational)	Yes (voluntary)	Yes	No		Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Partly
- Occupation status (free / occupied)	No	Yes	No		Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Partly
- Price for ad-hoc charging	Yes (voluntary)	No	No		No	No	No	No	No	No	No	No	No	No	No

Table 1: Status of data collection in 2019 in IDACS MS on publicly accessible electric charging points

In 2019 approximately 80% of the participating Member States already had some form of data collection on electric charging points in place at the national level. However, looking at the baseline situation in 2019 the following points stood out:

- the collected data did not contain all IDACS data categories, especially dynamic data was not always accessible;
- Member States sometimes collected other data types in addition to the IDACS data categories, such as:
  - type of site (parking, street, shop, etc),
  - detailed access description,
  - parking information (eg. number of parking spaces)
  - Roaming yes/no,
  - type of energy source
  - name of energy product
  - parking information
  - photographs of the charging point station
  - comments from users
- the data quality was not always optimal; data could be incorrect, incomplete or not up to date.
- the data collection could be performed by either a public, public/private or private party;
- the data collection was in many cases not (yet) linked to the NAP.

Since 2019 Member States have made an effort to make more data categories publicly available (especially dynamic categories), increasing data quality and linking collected data to the NAP. In 2019 and 2020 there was no official publication of the DATEX II extension that covers (alternative) fuels infrastructures. As a result, it was not yet possible for Member States to make all data available in DATEXII.

Updated status of data collection in 2021
To monitor the progress in data collection for electric mobility by the Member States the status of data collection was analysed again mid-2021. The table below shows the current status of summer 2021 of the data collection in the participating Member States.

A more detailed overview of the status of data collection per Member State in 2021 can be found in Annex 1.

Electric Charging Points - 2021

Country	AT	BE	CZ	ES	FR	GER	GR	HR	HU	LT	LUX	NL	PL	PT	SI
Data collection at national level?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public, private or public-private	public	private	public and private	public	public and private	public	public and private	public and private	public	public	public-private	private	public	public	public
Data publicly available?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Static Data:															
- GNSS coordinates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Address (street name, zip code, city,…)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available charge-solutions (power, modes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available connectors (plugs, sockets,…)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Opening hours	Yes, when available	Yes, when available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes	Yes, when available	Yes	Yes	Yes
- Identification and Payment methods	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	N/A	No	Yes	Yes	Yes	Yes
- Contact info for owner/operator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
- Full e-mobility code of the charging point (outlet)	Yes	Yes	No	Yes	Yes	No	N/A	No	Yes	No	Yes	Yes	Yes	Yes	No
Dynamic Data:															
- Availability (operational / non-operational)	Yes (voluntary)	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
- Occupation status (free / occupied)	No	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Partly
- Price for ad-hoc charging	Yes (voluntary)	Yes	No	No	No	No	Yes	No	No	N/A	No	Yes	Yes	No	Partly

Table 2: Status of data collection in 2021 in IDACS MS on publicly accessible electric charging points

Where in the baseline situation in 2019 approximately 80% of the participating Member States had some form of data collection on electric charging points, this has grown to 100% during the IDACS project in 2021. Member States that did not yet have data collection at a national level have addressed this from the start of the project and have been looking for a suitable way to appoint a responsible organization or platform. While some Member States have taken the initiative themselves and have started to arrange the data collection through a public organization, other Member States have focused on expanding the data categories or the quality of the data. Based on the harmonized categories and the quality requirements, parties were approached and stakeholders were informed about the goals of the project. In addition, the legal requirements and regulations in some Member States have also been adjusted so that data collection could take place that meet the IDACS standards.

4.3 Lessons learnt

Looking at the current status of data collection on electric charging points in the participating Member States and the progress and improvements made by Member States since 2019 the following main conclusions and learnings can be drawn.

Lesson 1: importance of broad acceptance and commitment from stakeholders

For proper data collection it is essential to create broad acceptance and commitment from the relevant alternative fuels sectors. All Member States have involved the relevant stakeholders in their countries to secure broad participation and commitment by approaching industry associations, organizing stakeholder sessions and sharing information from the IDACS project. This consisted of market actors like CPOs and MSPs, public authorities (national, regional and local) and grid-operators. The input and cooperation of these parties is indispensable. Commercial operators who are asked to provide the static and dynamic data on a voluntary basis, do not always agree with all data elements. The sharing of dynamic data is especially sensitive (see also D 2.1.0 chapter 4.5.4 Stakeholder input). Member States have dealt with this in different ways:

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- The choice for the architecture of the NAP. For example, by choosing a register in which the market parties remain the owner of the data. These market parties then can determine the conditions for the use of dynamic data (to a certain extent: this can still be limited by, for example, legislation) .
- Legislation and regulation. By making additional legislation, parties can be obliged to make certain (dynamic) data publicly available.
- Create general conditions for data on the NAP. By creating conditions for the use of the data by third parties, the objections of the operators can be met. For example, by prohibiting in the conditions that dynamic data is stored for analytical purposes.
- Fees for the data. Being able to deliver good quality dynamic data costs money. This can be financed in various ways. One option is to charge a reasonable fee for the data. This gives operators the opportunity to invest in the quality of the data.
- Offer different types of data on the NAP. For example, by making a separation between free data and data for a fee. The data for which a fee is charged can then, for example, have a higher update frequency.

Lesson 2: need for regulations / legislation to enforce data collection

A mandatory framework seems necessary to make all static and dynamic data available to the public. At the national level, it has been shown several times that additional legislation was needed to ensure the data collection to take place.

The data collection requirements as laid down in the relevant Directives (AFID, ITS) do not fully align with the data collection requirements as prescribed in the Grant Agreement. The current ITS directive is less strict about dynamic data (dynamic data is optional) compared to the PSA IDACS project (dynamic data is mandatory). A solution for some Member States was to work on additional legislation in order to also make dynamic data collection mandatory. Another option may be an agreement with the sector organization or another regulatory body to ensure that dynamic data is also covered in the data collection process.

Lesson 3: balancing requirements versus the burden on companies

Dynamic data sharing is complex. First, the dynamic data represents a commercial value for some parties and may contain sensitive information. In addition, it is also a technical challenge: for smaller parties it can be technically demanding to constantly make dynamic data available. Systems of alternative infrastructure operators have their limitations and can process a maximum number of requests per hour. The higher the requirements for update frequency, the higher the burden (cost) for alternative fuels infrastructure operators becomes. A balance should be found and this may differ per country (e.g. depending on the maturity of the market).

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5. Deliverable 2.1.2: Data collected from hydrogen stations

5.1 Objective

This deliverable aims to collect both static and dynamic data on all publicly accessible hydrogen refuelling stations (HRS) in the participating Member States. The Consortium members are required to collect at least the following data, as laid down in the Grant Agreement:

- *Static data:*
    - Location (GNSS coordinates/ street name)
    - Opening hours, identification and payment methods
    - Contact info for owner/operator
- *Dynamic data:*
    - Operational Status (if the station is operational/ non-operational)

5.2 Overview of data collection per Member State

Currently, data collection on HRS is already taking place - mostly on two separate European platforms. Firstly, an application by the company H2 MOBILITY Deutschland GmbH & Co. KG (hereinafter: H2 MOBILITY) called H2.LIVE covers all the required data categories and most of the HRS in Europe. It is available to any end consumer with a smartphone, tablet or via web-browser. Furthermore, H2.Mobility offers an API service for operators (HRS-Connect). Secondly, the "HRS availability system" that has been procured by the Fuel Cells and Hydrogen 2 Joint Undertaking (hereinafter: FCH-JU) has been being rolled out across Europe.

Status of data collection in 2019
At the start of the project in 2019 the data collection via these two data platforms was analysed and described for each of the participating Member States in Deliverable 2.1.0. The table below shows the 2019 status of the data collection on HRS in the participating Member States.

Hydrogen - 2019

Country	AT	BE	CZ	ES	FR	GER	GR	HR	HU	LT	LUX	NL	PL	PT	SI
Static Data:															
- GNSS coordinates	Yes	Yes		Yes		Yes						Yes			
- Address (street name, zip code, city,…)	Yes	Yes		Yes		Yes						Yes			
- Opening hours	Yes	Yes		Yes		Yes						Yes			
- Identification and Payment methods	Yes	Yes		Yes		Yes									
- Contact info for owner/operator	Yes	No		Yes		Yes						Yes			
Dynamic Data:															
- Availability (operational / non-operational)	Yes	Yes		Yes		Yes						Yes			

Table 3: Status of data collection in 2019 in IDACS MS on hydrogen refuelling stations (HRS)

Updated status of data collection in 2021

To monitor the progress in data collection for hydrogen by the Member States the status of data collection was analysed again mid-2021. The table below shows the current status of the data collection in the participating Member States.

A more detailed overview of the status of data collection per Member State in 2021 can be found in Annex 2.

Hydrogen - 2021

Country	AT	BE	CZ	ES	FR	GER	GR	HR	HU	LT	LUX	NL	PL	PT	SI
Data collection at national level?	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes
Public, private or public-private	private	public and private		public	public and private	private						public and public/ private			public
Data publicly available?	Yes	Yes		Yes	Yes	Yes						Yes			
Static Data:															
- GNSS coordinates	Yes	Yes		Yes	Yes	Yes						Yes			
- Address (street name, zip code, city,…)	Yes	Yes		Yes	Yes	Yes						Yes			
- Opening hours	Yes	Yes		Yes	Yes	Yes						Yes			
- Identification and Payment methods	Yes	Yes		Yes	Yes	Yes						Yes			
- Contact info for owner/operator	Yes	Yes		Yes	Yes	Yes						Yes			
Dynamic Data:															
- Availability (operational / non-operational)	Yes	Yes		No	Yes	Yes						Yes			

Table 4: Status of data collection in 2021 in IDACS MS on hydrogen refuelling stations (HRS)

Looking at the situation of data collection for hydrogen not much had changed in 2021 compared to the baseline situation in 2019. Two additional Member States started to collect data at the national level. The main reason for the other Member States not to collect data on hydrogen is simple: the absence of data to be collected. Most of these Member States do not have any hydrogen stations in their country or the first hydrogen stations have only recently been opened.

5.3 Lessons learnt

Looking at the current status of data collection on HRS in the participating Member States and the progress and improvements made by Member States since 2019 the following main conclusions and learnings can be drawn.

Lesson 1: data aggregation and source dependence

Apart from the two data platforms mentioned in section 5.3., data can be collected on the level of the individual HRS operator. Depending on the number of HRS operators in a country, this may lead to several data sources that may make data collection more burdensome. The two platforms already aggregate data for most HRS in Europe.

Data collection from a platform will always be more efficient, however, Member States will be dependent on the platform they choose. This is of particular importance with regard to the sustainability of financing the data bases. In a pre-market environment, such as hydrogen refuelling for retail, it has to be considered that the existence of such databases may be contingent upon funding. On the one hand for example, throughout most of 2020 the FCH-JU's availability system did not connect any new stations as the new procurement mission was not underway. Consequently, the dataset was not up to date during that time and there was uncertainty about the future financing and whether a new procurement

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mission was going to be launched. On the other hand, an HRS operator operating a data platform, such as H2.LIVE, may go out of business in such a pre-market environment, which might put an end to the platform.

Lesson 2: collection of static data versus dynamic data

As there are two types of data categories, it is advisable to establish two different types of data streams. *Static data* will not need to be refreshed as often and in intervals as short as dynamic data. The location, opening hours, identification and payment methods as well as the owner contact info are not expected to change on a regular basis. The static data can be uploaded to the HRS operator's servers, the server of the FCH-JU's HRS availability system or to H2.LIVE and be collected from there to the NAP.

The technically more challenging part of the data collection concerns the *dynamic data* collection, i.e. real-time signals on the operational status of the HRS (see textbox for details). In particular, not all stations were

> **Dynamic data collection for Hydrogen**
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> The hardware needed to collect dynamic data is made up of decentralised modules (Raspberry Pi Compute Modules, such as the RevPi Core 3 by Kunbus) that are integrated in the HRS in both HRS Connect (H2.LIVE) and the FCH 2 JU's E-HRS-AS. These small industrial computers work as control devices that measure a voltage and identify binary dispenser availability signals (either available or unavailable). HRS Connect is integrated deeper into the station and collects a lot more data than mere availability. These signals are then transmitted via a LAN or Wi-Fi connection to a backend server, e.g. the HRS operator's own servers or the FCH-JU's availability platform. If there is no internet connection in place because the HRS is located in a remote area, separate routers can be installed. The availability signals can be overridden manually by a technician at site in order to set the availability state to the desired status. HRS operators should also have the possibility to this remotely via their servers. This is important as internet connections may fail and HRS operators need to be able to signal to FCEV drivers that they can refuel their vehicles if they know that that is possible.

equipped with computers for automatic data transmission, which meant that they needed to be retrofitted. Nonetheless, the market standard includes such equipment for the monitoring of the proper functioning of the infrastructure..

Lesson 3: Data Quality
Throughout the time of the PSA, the status of the datasets in terms of completeness varied. Not all the data was always available on one of the platforms and different quality criteria were set. This often depended on different rationales of the existence of the data platforms. Whereas the FCH-JU's HRS availability system aimed at providing all HRS in Europe with their hardware solution (see box) to help set common minimum standards for data quality, the H2.LIVE platform took a more 'pragmatic' approach. For example, operators of stations without hardware for the automatic transferral of availability/operationality data have the option to set statuses manually using the H2.LIVE operator app. However, their statuses are not displayed in the FCH-JU's system as this does not comply with the quality standards of this system. In contrast, the rationale of letting HRS operators set their statuses manually is that the customer has at least some information on the operationality of the station and that the station operator has no interest in providing inaccurate information that may frustrate his customers. In the end, both approaches come with a trade-off in terms of data quality: in one case the dataset is less complete (one station without live status), in the other the probability that the live status is incorrect may be higher.

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Lesson 4: Data formats

The main challenge throughout the IDACS project was that even though data was to be made available on the NAP in DATEX II or any other machine-readable format, static and dynamic data on HRS could not be provided on any NAP in DATEX II as specifications of DATEX II v 3.2 were only published during June 2021. The official publication of the extension (part 10 on energy infrastructures) to the standard 16157 had been repeatedly delayed. Even though it was stated to be published in "late spring / early summer", a publication in autumn 2021 seems more likely. Therefore, a conversion of the data could not be undertaken for fears the specification may change. The data of the two different European platforms is made available in the JavaScript Object Notation (JSON) as a file format but there is no standardized communication protocol for HRS data. As many Member States wished to combine placing the data on the NAP with the conversion into DATEX II as this was the most efficient way to comply with the requirements of the Grant Agreement, efforts came to a halt until the DATEX II v 3.2 specifications were published.

Lesson 5: Open data

In line with the principles of the European data strategy, access to data should be as free as possible, i.e. it should flow freely for the benefit of businesses, researchers and public administrations. Both data platforms allow the end-consumer free access to their data via their websites (and the H2.LIVE app). The FCH-JU's HRS Availability system also offers access to an open API and therefore grants access to third-party actors to make "derivative works starting from it, such as map-based web apps" as stated in the legal notice. In the case of H2.LIVE, no such open API exists, however as in the case of other HRS operators such requirements can be made part of a procurements or funding criteria.

6. Deliverable 2.1.3 – 2.1.6: Data collected from Other fuels filling stations

6.1 Objective

This deliverable aims to collect static data for LNG, CNG, LPG and highly blended biofuels in the participating Member States. At the outset of the implementation phase the Consortium is required to inform the Commission on which fuels will be collected for which Member States.

The Commission and Consortium agreed to define the other alternative fuels as optional. The interest of the participating Member States in electric driving and in hydrogen as a fuel for transportation is common and strategic, whereas the interest in and focus on other (combustible) alternative fuels differs substantially from country to country. Some Member States already have a strong position in LPG for passenger cars; others focus more on Bio-ethanol, other high-blend Biofuels and/or CNG. Most Member States focus on LNG (and its heavy duty specific infrastructure), but specific for heavy duty vehicles.

Further, the Consortium considers static data for other fuels to be more relevant than the dynamic data (other than that a complete station is out-of-order or not yet opened) when compared to hydrogen and electric, due to short fuelling duration and fast throughput of vehicles (except a slow fuelling variant for CNG).

As laid down in the Grant Agreement, static data for other fuels can include:
- o Location (GNSS coordinates/street name)
- o Opening hours, identification and payment methods
- o Contact info for owner/operator

6.2 Overview of data collection per Member State

At the start of the project the participating Member States agreed on collecting data on LNG and CNG and to consider LPG and high blends as additional. The Commission was informed about this in the Quarterly Progress Report Q2 2020.

Status of data collection in 2019
At the start of the IDACS project in 2019 most Member States were already collecting data on other fuel stations nationally, either by public or by private parties. The majority already shared data on address, opening hours and some on fuel availability and price. However, the other data categories used by Member States varied.

In 2020, a questionnaire was sent out to gain insight into which data exactly were already being collected nationally by the Member States. An overview of the data collection at the time is shown in the table below.

Other Fuels - 2020

FYI: information stated below is dated from 2020 (not 2019 like the other fuel tracks as this was inquired at a later stage during the IDACS project.

Member state	AT	BE	CZ	ES	FR	GE	GR	HR	HU	LT	LU	NL	PL	PT	SI
Data collection at national level?	Yes	Yes	No	Yes		Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No
Public, private or public-private	public-private	public		public		private	private	public				private	public	public	
Data publicly available?	Yes	Yes		Yes		Yes	Yes	Yes				Yes	Yes	Yes	
Static Data:															
- GNSS coordinates	Yes	Yes		Yes		Yes	No	Yes				No	Yes	Yes	
- Address (street name, zip code, city,…)	Yes	Yes		Yes		Yes	Yes	Yes				Yes	Yes	Yes	
- Opening hours	Yes	No		Yes		Yes	Yes	Yes				Yes	Yes	Yes	
- Identification and Payment methods															
- Contact info for owner/operator	Yes	No		Yes		Yes	Yes	No				Yes	Yes	No	
- Fuel availability	Yes	Only CNG/LNG		Yes		Yes	Only CNG, LPG	Only LPG				No	Yes	Yes	

Table 5: Status of data collection in 2020 in IDACS MS on other fuels (LNG, CNG, LPG); note, that the information on payment and identification methods has not been requested in 2020.

Updated status of data collection 2021

The status of data collection for LNG, CNG and LPG was analysed again in June 2021. The table below shows the current status of the data collection in the participating Member States.

A more detailed overview of the status of data collection per Member State in 2021 can be found in Annex 3.

Other Fuels - 2021

Member state	AT	BE	CZ	ES	FR	GE	GR	HR	HU	LT	LU	NL	PL	PT	SI
Data collection at national level?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No
Public, private or public-private	public	private	public	public	private	private	private	public				private	public	public	
Data publicly available?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	
Static Data:															
- GNSS coordinates	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes				No	Yes	Yes	
- Address (street name, zip code, city,…)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	
- Opening hours	Yes	Yes	No	Yes	No	Yes	Yes	Yes				Yes	Yes	Yes	
- Identification and Payment methods	Yes	Yes	No	Yes	Yes	No	No	No				Yes	Yes	Yes	
- Contact info for owner/operator	Yes	No	No	Yes	Yes	Yes	Yes	No				Yes	Yes	Yes	
- Fuel availability	Yes	Only CNG/LNG	Yes	Yes	Yes	Yes	Yes	Only LPG				No	Yes	Yes	

Table 6: Status of data collection in 2021 in IDACS MS on other fuels (LNG, CNG, LPG)

Mid-2021 most Member States collect at least data on GNSS coordinates, address, opening hours and fuel availability and other information, such as fuel prices. Several Member States indicate it could be valuable to make additional data available, such as specific pricing in case of private contracts existence, the various opening hours (daily, during the weekends and holidays), operation status, actual prices.

8 out of 15 Member States collect data at national level, either by a ministry or by public parties. The data is in most cases publicly available via a website. The current situation in France is unknown. The data may not be complete in all Member States. For example, not all Member States collect data on all fuel types (CNG, LNG and LPG) and not all fuel distributors have shared their data nationally.

6.3 Lessons learnt

Looking at the current status of data collection on other fuels in the participating Member States and the progress and improvements made by Member States since 2019 the following main conclusions and lessons learnt can be drawn.

Lesson 1: involve sector organizations for data collection

As mentioned in 4.3, it is important to get commitment from stakeholders and to involve different parties. In addition to those findings, we have seen that the other fuels market can be fragmented with many small players. Therefore it can be helpful to involve sector organizations, in order to collect the data for a large group of fuel distributors. For small fuel distributors, it can be difficult and costly to frequently update the shared data. It would be easier to make one party responsible for the data quality and updating, such as a sector organization. This party can also ensure that a full set of data, from all fuel distributors involved, is made available. They can stimulate and facilitate fuel distributors to share their data. This can work especially well if a party is officially allocated and/or budgeted for this task.

Lesson 2: stimulate and enforce data collection

As noted with the other fuel tracks, a mandatory framework seems necessary to make all (static) data available. Legislation can be supportive in reaching this goal. For these findings we refer to 4.3. Furthermore, it has turned out that for data collection on a national level to be successful, larger incentives are needed. There is a number of reasons why the data are not collected on a national level yet, or the data are not complete in many member states: the data collection for other fuels is not mandatory (yet), fuel distributors already share their data on their own platforms and it has turned out to be difficult and costly to collect a complete set of good quality data. Furthermore, the individual fuel distributors feel that they do not immediately benefit from sharing their data nationally. Therefore, a different or larger incentive is needed to successfully collect these data.

Annexes – Detailed overview data collection

Annex 1 – Electric Charging Points

2021

Member State	AT	BE	CZ	ES	FR	GER	GR	HR
Is there data collection at the national level?	yes	Yes	Yes, only static data	Yes, static data only	Yes	Yes, static data only	Yes, only for static data. Online data are partially available through private organisations	Yes, only static data (Ministry of Industry and Trade) not contains all attributes, see bellow
Which organisation collects the data?	E-Control, Autrian Regulator for Electricity and Gas	Eco-Movement	Ministry of Industry and Trade (public organization) + private organizations witch are key players	Ministry for the Ecological Transition and Demographic Challenge	1) Open data data.gouv.fr 2) GIREVE, private organisation	Federal Grid Agency (Bundesnetzagentur, BNetzA)	Hellenic Ministry of Insfrastructure, Transport and Networks (public organization)	Data are collecting Ministry of Industry and Trade (public organization) and some big private
Is it a public, private op public/private organisation?	public	private organisation	public and private	Public organisation	1) Public 2) Private		Both	public and private
What was the start date of this data collection?	2019	before IDACS		2021	before IDACS		2019	before IDACS
Is the data publicly available?	Yes	Yes	Yes	No	1) Yes 2) No	Yes	Yes	Yes
- If yes, where is the data made available?	with the publicly available charging point register launched by E-Control: www.ladestellen.at	Via Eco-Movement (https://www.eco-movement.com/developers/)	The data collected by the Ministry of industry nad trade (MIT) can be downloaded as a Excel sheet. The Excel sheet is yearly updated.		1) data.gouv.fr 2) N/A	The data collected by the Federal Grid Agency can be downloaded as a Excel sheet. The Excel sheet is monthly updated.	Temporary are not available online, as a dedicated portal is prepared at the moment by the Greek Ministry of Transport. The data are collected and can be made	The data collected by the Ministry of industry nad trade (MIT) can be downloaded as a Excel sheet. The Excel sheet is yearly updated.
Static Data:								
- GNSS coordinates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No / Yes - public / private data
- Address (street name, zip code, city,...)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes / Yes
- Available charge-solutions (power, modes)	Yes (voluntary)	Yes	Yes	Yes	Yes	Yes	Yes	No / Yes
- Available connectors (plugs, sockets, induction plate..)	Yes (voluntary)	Yes	Yes	Yes	Yes	Yes	Yes	No / Yes
- Opening hours	Yes (voluntary)	Yes, if available	Yes	Yes	Yes	No	Yes	No / Yes
- Identification and Payment methods	Yes (voluntary)	Yes	Yes	No	Yes	No	Yes	No / Yes
- Contact info for owner/operator	Yes	Yes	Yes	Yes	Yes	Name of CPO	Yes	No / Yes
- Full e-mobility code of the charging point (outlet)	Yes	Yes	No	Yes	Yes	No	N/A	No / No
Dynamic Data:								
- Availability (operational / non-operational)	Yes (voluntary)	Yes	No	No	1) No 2) Yes, if connected to GIREVE	No	Yes	No / No
- Occupation status (free / occupied)	Not yet (expected 1/2022)	Yes	No	No	1) No 2) Yes, if connected to GIREVE	No	Yes	No / No
- Price for ad-hoc charging	Yes (voluntary)	Yes, if available	No	No	No	No	Yes	No / No
- If other information is available, please specify	Roaming yes/no, electricity disclosure , parking information, detailed access description, type of vehicle station is fitting for (all voluntary)	If a chargingpoint is public, semi-public (company), or private	x	CPO name, brand name, owner name, type of location (street, underground parking...), location facilities.	CPO name, Brand name, owner name, type of site (parking, street, shop, etc), accessibility, number of parking spaces, current type	Public Key of the energy meter, used for encrypted transmission of meter data	Last check-in to the charging point. Photographs of the charging point station, directions, comments from clients	
What is the update frequency for the static data?	First registration of the location must take place 2 weeks after start of operation. The frequency for notifications of further data is still to be defined in an ordinance.	On a daily base		Every time some change occurs, it is necessary to update it within a week.	1) unknown 2) average 10 days (quality check)			
What is the update frequency for the dynamic data?	Will be real-tim	At least every 5 minutes (>90% of availability is in real-time)		'Every time some change occurs.	1) N/A 2) Realtime			

Electric Charging Points - 20 21

Member State	HU	LT	LUX	NL	PL	PT	SI
Is there data collection at the national level?	Just on voluntary base	Yes (only LRA and municipal owned charging points)	yes	Yes	Yes	Yes	Yes
Which organisation collects the data?	Hungarian Public Roads will be responsible for this activity but regulation is not yet introduced. NAP is operated by a public organisation	LRA	Chargy - operator of the public charging infrastructure	Eco-Movement	Ofiice of Technical Inspection - UDT (public)	MOBI.E,S.A. (public company)	Ministry of Infrastructure in partnership with NAP operator - National Traffic Management
Is it a public, private op public/private organisation?		public		private	Public		Public entitty
What was the start date of this data collection?		before IDACS		before IDACS	2019		2021
Is the data publicly available?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- If yes, where is the data made available?	via the Hungarian NAP portal https://napportal.kozut.hu/hu/	www.trafficinfo.lt	api is published in the open data portal (https://data.public.lu/fr/organizations/chargy/) and displayed in the national georportal (http://g-	Via Eco-Movement (https://www.eco-movement.com/developers/)	Consumers receive information via EIPA website. The raw data procured by UDT is availible free of charge and can be also to create other websites or apps by Yes	https://www.mobie.pt/en/re demobie/procurar-posto	At NAP - www.nap.si
Static Data:		Yes					
- GNSS coordinates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Address (street name, zip code, city,...)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available charge-solutions (power, modes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Available connectors (plugs, sockets, induction plate..)	Yes	Yes	Yes	Yes	Yes	Yes	Yes.
- Opening hours	Yes, currently optional	N/A	Yes	Yes, if available	Yes	Yes	Yes.
- Identification and Payment methods	Yes	N/A	No	Yes	Yes	Yes	Yes
- Contact info for owner/operator	Yes	Yes	No	Yes	Yes	Yes	Yes.
- Full e-mobility code of the charging point (outlet)	Yes, currently optional	No	Yes	Yes	Yes	Yes	Yes
Dynamic Data:							
- Availability (operational / non-operational)	Not yet introduced	Yes	Yes	Yes	Yes	Yes	Yes
- Occupation status (free / occupied)	Not yet introduced	Yes	yes	Yes	Yes	Yes	Partly (some CPO's are not yet willing to share data. New AFI Act will adress this isue).
- Price for ad-hoc charging	Not yet introduced	N/A	No	Yes, if available	Yes	No	Partly ((some CPO's are not yet willing to share data. New AFI Act will adress this isue).
- If other information is available, please specify							All data categories in complience with IDACS project. Additional sets of data will be mandatory according to AFIR
What is the update frequency for the static data?	wiil be specified by regulation			Realtime, (< 1 min)	The operator of the public recharging station are obliged to report to the register using the electronic form information on: 1) the company name of the operator of the public charging station / natural gas station, the address of its registered office and its contact details; 2) the type of infrastructure; 3) the coordinates of the public charging station The data must be provided at the latest on the date of commencement of the provision of charging services or natural gas refuelling services and each time the data change	Daily	Real time.
What is the update frequency for the dynamic data?	wiil be specified by regulation			Realtime, (< 1 min)	The operator of the public charging station is obliged to communicate on:	Every minute	Rea time.

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Annex 2 – Hydrogen

2021

Member State	AT	BE	CZ	ES	FR	GER	GR	HR
Is there data collection at the national level?	Yes	Yes (EU level)	No - no open public stations (first is under construction)	There is a system to collect H2 data at national level, but there are still no operational public H2 stations.	Yes	Yes	No	No
Which organisation collects the data?	OMV	H2Mobility E-HRS-AS	Ministry of Industry and Trade	Ministry for the Ecological Transition and Demographic Challenge.		H2 MOBILITY Deutschland GmbH & Co. KG (HRS operator)		
Is it a public, private op public/private organisation?	private	Private and public/private		Public organisation.		private		
What was the start date of this data collection?	before IDACS					before IDACS		
Is the data publicly available?	Yes	Yes		Yes	Yes	Yes		
- If yes, where is the data made available?		E-HRS-AS (https://h2-map.eu/api/v1/doc/)		It will be available on a website from the Ministry: https://geoportalgasolineras.		On the German NAP, the app H2 MOBILITY provide and their website		
Static Data:								
- GNSS coordinates	Yes	Yes		Yes	Yes	Yes		
- Address (street name, zip code, city,…)	Yes	Yes		Yes	Yes	Yes		
- Opening hours	Yes	Yes		Yes	Yes	Yes		
- Payment methods	Yes	Yes		Yes	Yes	Yes		
- Contact info for owner/operator	Yes	Yes		Yes	Yes	Yes		
Dynamic Data:								
- Availability	Yes	Yes		No	Yes	Yes		
- If other information is available, please specify						Future stations, last refilling, source of funding		
What is the update frequency for the static data?						on change		
What is the update frequency for the dynamic data?				There is no system forseen to collect dynamic data.		1 to 5 minutes		

2021 (continued)

Member State	HU	LT	LUX	NL	PL	PT	SI
Is there data collection at the national level?	No, first filling station was opened recently	No	No, no station operational at the moment	Yes	No		Yes, but at the moment there is no hydrogen AFI in
Which organisation collects the data?				H2.Live|H2.MAP			Ministry of Infrastructure in partnership with NAP operator - National Traffic Management Centre
Is it a public, private op public/private organisation?				Private|Public/Private			Public entity.
What was the start date of this data collection?				2019			
Is the data publicly available?				Yes			/
- If yes, where is the data made available?				Public available in map format via H2.LIVE app and H2.MAP. Raw data for			/
Static Data:							
- GNSS coordinates				Yes			/
- Address (street name, zip code, city,…)				Yes			/
- Opening hours				Yes			/
- Payment methods				Yes			/
- Contact info for owner/operator				Yes			/
Dynamic Data:							/
- Availability				Yes			/
- If other information is available, please specify				350/700 Bar			/
What is the update frequency for the static data?				Based upon changes provided by operator.			/
What is the update frequency for the dynamic data?				Most stations every 5 minutes, some stations manually.			/

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Annex 3 – Other Fuels

2021

Member State	AT	BE	CZ	ES	FR	GER	GR	HR
Is there data collection at the national level?	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Which organisation collects the data?	E-Control	Gas.be	Ministry of Industry and Trade	Ministry for the Ecological Transition and Demographic Challenge		Zukunft Gas GmbH; gibgas medien GmbH	Fysikon (Natural Gas Distributor for Mobility)	Ministry of Environment and Energy of the Republic of Croatia
Is it a public, private op public/private organisation?	public	Private sector organisation	public	Public organisation		private	Private organisation	Public
What was the start date of this data collection?	before IDACS	2020	before IDACS	before IDACS		before IDACS	2020	before IDACS
Is the data publicly available?	Yes	Yes	Yes	Yes		Yes	Yes	Yes
- If yes, where is the data made available?	Available on website www.spritpreisrechner.at	Available on NAP https://www.transportdata.be/organization/gas-be	Now available on a website from the Ministry	Now available on a website from the Ministry: https://geoportalgasolineras.es/#/Inicio		On their websites/apps	https://www.fisikon.gr/diktyo-pratirion/?lang=en	https://www.min-go.hr/#/
- GNSS coordinates	Yes	Yes	No	Yes		Yes	Yes	Yes
- Address (street name, zip code, city,...)	Yes	Yes	Yes	Yes		Yes	Yes	Yes
- Opening hours	Yes	Yes	No	Yes		Yes	Yes	Yes
- Payment methods	Yes	Yes	No	Yes		No	No	Yes
- Contact info for owner/operator	Yes	No	No	Yes		Yes	Yes	No
- Fuel availability (CNG, LNG, LPG)	Yes	Yes	Yes	Yes		CNG, LNG, sometimes LPG	Yes	Yes
- If other information is available, please specify	Price	Operator / Time Zone	date of commissioning			share of biogas; refuelling options for buses or HDVs; comparative prices for petrol and diesel		Additional Infrastructure Information (Car Wash, ATM, WC, Currency exchange, Restaurant,Coffee shop, Toilet for the disabled, Baby changing area, Shower,Children's playground / playroom, Hotel / Motel, Parking for buses, Place for pets)
What is the update frequency for the static data?	upon change	3 months	upon change	5 minutes		unknown		

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2021 (continued)

Member State	HU	LT	LUX	NL	PL	PT	SI
Is there data collection at the national level?	No active participation in OF IDACS	No	Yes	Yes	Yes	Yes	Not yet, estimated in 2022.
Which organisation collects the data?				Various fuel suppliers	Ofiice of Technical Inspection - UDT (public)	DGEG - Directorate General for Energy and Geology	/
Is it a public, private op public/private organisation?				Private	Public	Public	/
What was the start date of this data collection?				2019	2019	before IDACS	/
Is the data publicly available?			No, november 2021	Yes	Yes	Yes	/
- If yes, where is the data made available?			will be made available here https://data.public.lu/	various websites and an app	Available on website https://eipa.udt.gov.pl/	Available on the websitehttps://precoscombust iveis.dgeg.gov.pt .	/
- GNSS coordinates			Yes	No	Yes	Yes	/
- Address (street name, zip code, city,…)			Yes	Yes	Yes	Yes	/
- Opening hours			Yes	Yes	Yes	Yes	/
- Payment methods			Yes	Yes	Yes	Yes	/
- Contact info for owner/operator			Yes	Yes	Yes	Yes	/
- Fuel availability (CNG, LNG, LPG)			CNG, LNG, LPG	CNG, LNG, LPG	CNG, LNG	CNG, LNG, LPG	/
- If other information is available, please specify					price, max output, CNG connectors, LNG fuel types	services available, type of station, etc	/
What is the update frequency for the static data?			upon change	unknown	1 hour	every time operators change information (e.g. fuel prices) on their filling stations	/