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Readiness Indicators to electric bus deployment



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Readiness Indicators to electric bus deployment

The eBussed project Thematic Working Group 1 (TWG1) has addressed the task of identifying possible Readiness Indicators (RI) to introduce electric buses in each specific region.

This article summarises the methodological work carried out, the systematization of identified RI by categories, with some conclusions and future steps.

Methodology

Readiness indicators are meant to assist public and private stakeholders in assessing the present conditions of their region concerning the introduction of electric buses and the provision of related infrastructure. Within the eBussed project's thematic working group 1, we began by defining those indicators.

Some help comes from Stefan K. Johansen who, in his Master Thesis "E-Mobility Maturity Model: Measuring E-Mobility Readiness of Countries" believes that with the creation of such a model, countries, companies and researchers alike can contribute with substantial value to the environment by being able to measure progress within a given scope. Key success factors of e-mobility were divided into five distinct categories, where each category forms a parameter for the evaluation of the overall maturity.

Next, the categories adopted during the identification and evaluation of Drivers and Barriers to e-bus deployment, carried out by this same working group (see Thematic Article n. 10 "Drivers and Barriers to electric bus deployment") were considered.

It was resolved that readiness indicators (RI) should be related to the ex-ante situation in every region, i.e. before e-bus deployment or fleet diversification/ innovation: as a general approach, the partners agreed to try and identify at least 4-5 main Readiness Indicators for each category plus some others to be added for specified categories, using a top-down method.

¹ Stefan K. Johansen "E-Mobility Maturity Model: Measuring E-Mobility Readiness of Countries", January 2018 <https://www.jstor.org/stable/26268761?seq=1>

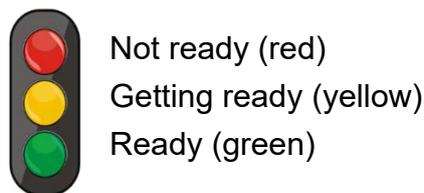
² <https://www.interregeurope.eu/ebussed/thematic-articles>

³ <https://wriroscities.org/sites/default/files/barriers-to-adopting-electric-buses.pdf>

The thematic working group prepared a spreadsheet including a description of the indicators, presence/absence (Y/N) of the relevant criteria and further details. A logical link was established between the Barriers and Drivers identified earlier and the Readiness Indicators. In addition, the structure established in the research document “Barriers-to-adopting-electric-buses” published by WRIROSSCITIES.org in 2019 was considered.

The aim was to arrive at a final “compact” structure of an analytical framework for Drivers & Barriers. The spreadsheet capitalizes upon the indications derived from the Status Quo reports and prepared by the project partners, similar to what was done when identifying Drivers and Barriers. The initial layout was jointly reviewed, found useful and coherent with the scope of identifying and documenting Readiness Indicators as proposed. In addition to the logical link kept between the Barriers and Drivers and the RIs, an additional link was also provided between an RI and relevant stakeholders.

As readiness cannot be defined as yes or no, but rather a development in stages, it was recognized that it would be useful to set some criteria to be fulfilled when establishing the level of readiness. A semaphore-type indication was chosen with three columns indicating:



A choice between the three options requires to be supported by an explanation given in an ad-hoc column which was added to this purpose. The list of RI should be kept simple. Those indicators are not relevant to identify the region’s readiness level were removed. The question of how to transfer the theoretical model into the practical application has been examined. Considerations would need to be made about what should be green, yellow and red, to possibly establish some sort of indicative thresholds or priorities.

An additional column was inserted to reflect the categories applied in Johansen’s “Maturity Model”. After a thorough review of literature, field studies and discussions between partners in the working group, the following categories of RI have been selected⁴:

1. Government policies and investment
2. Charging infrastructure construction and operation / Energy Production & Distribution

⁴ This categorisation partially reflects the list of factors indicated in the E-Mobility Maturity Model indicated in the earlier footnote n. 1.

3. Business models and maintenance service system
4. Consumer and other awareness education
5. Operation scope and environmental benefits / Other features

42 readiness indicators were defined as follows:

- oo category
- oo maturity parameters
- oo drivers
- oo barriers
- oo readiness indicator n.
- oo criteria
- oo description
- oo when red → not ready yet
- oo when yellow or green → details needed to justify
- oo stakeholders involved

Work progress and results

After three eBussed project partners, namely Livorno (IT), South Transdanubia (HU) and Utrecht (NL) have filled in the spreadsheet, a final layout has been decided. Results of the test application (numbers refer to the number of Readiness Indicators for each category and level of readiness) are indicated in the following Figure 1. It was resolved to keep the indicator count as in the above table, without any attempt to establish indices by category or an overall index, as they were not recognised to be of significant usefulness.

Partner	Level of readiness	Number of Indicators for each of the 5 Categories				
		1. Government policies and investment	2. Charging infrastructure construction & operation / Energy Production & Distribution	3. Business models and maintenance service system	4. Consumer and other awareness education	5. Operation scope and environmental benefits / Other features
Livorno		4	3	2	0	0
		2	1	0	0	1
		2	1	1	0	5
South Transdanubia		2	0	0	0	2
		1	1	1	1	0
		8	7	8	2	6
Utrecht		2	0	0	1	0
		1	1	1	1	5
		8	2	5	1	3

Fig. 1 Readiness-Indicator Survey in test-regions

