

HYLIGHTS

Hydrogen for Transport in Europe

www.HyLights.eu

Regions Eligibility Self Assessment Tool for Hydrogen Projects in Transport

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A Coordination Action to Prepare European and Fuel Cell Demonstration Projects on Transport

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Disclaimer

This document is the result of a collaborative work between HyLights Industry and Institute partners. The results of the research were subsequently elaborated and presented in a coherent manner, which involved extensive stakeholder consultation in locations around the world as well as feedback from the “HyLights” Industry Partners.

The ideas presented in this document were reviewed by certain "HyLights" project partners to ensure broad general agreement with its principal findings and perspectives. However, while a commendable level of consensus has been achieved, this does not mean that every consulted stakeholder or "HyLights" Industry Partner necessarily endorses or agrees with every finding in the document. The producer of this document is the sole responsible for its content and recommendations.

Acknowledgement

This report is one of the deliverables of the 'HyLights' project which is funded by the EU 6th framework programme. HyLights addresses various issues around the preparation of large-scale demonstrations on hydrogen for transport. All deliverables of the HyLights project are available for download at the project website: www.hylights.eu.

Abstract

This report describes the development of a list of criteria and, based on this list, a tool to assess the eligibility of high potential locations for establishing large scale hydrogen demonstration projects for transport. The tool is named '*Regions Eligibility Assessment tool for demonstration projects on hydrogen for transport*'. The report gives an overview of the criteria, indicators to value these criteria, an overview of how to use the tool and templates for applying the tool. The target group of the tool are above all the regions itself that will be enabled to conduct an objective self-assessment of their location, subsequently identifying strengths/weaknesses that could be improved to reach an optimal position.

Note

Within the HyLights project it was decided that the project will not touch potential sensitive information regarding the selection of locations. Therefore the work in this task has been focussed only on developing a tool and not on the assessment and selection of high potential locations.

Table of contents

Table of contents	vii
List of figures	vii
1 INTRODUCTION	8
2 METHODOLOGY: CRITERIA TO ASSESS HIGH POTENTIAL LOCATIONS	10
2.1 Categories	10
2.2 Criteria	13
2.3 Indicators	15
3 VALIDATION AND WEIGHTING	17
Appendix A Detailed overview of criteria	3-19
Appendix B Template for assessment	3-29

List of figures

Figure 2.1 Overview of categories, criteria and indicators.	12
Figure 2.2 Example of overview of categories, criteria and indicators with a description of the indicator and information how to value it	16
Figure 3.1 Indicator summary example (blank)	18

1 Introduction

This report is one of the deliverables within the HyLights project¹ and it describes the development of an assessment framework to identify most relevant locations to establish large demonstration projects for hydrogen vehicles. The framework has been named *Regions Eligibility Self Assessment tool for demonstration projects on hydrogen in transport*. Above all, the tool could be used by the regions themselves to evaluate and foster their competitive position. The tool could also be used by decision makers (e.g. within the Joint Technology Initiative on hydrogen and fuel cells) to make an objective comparison between different locations that are planning to establish demonstration projects. The tool could be used as well by project developers as guideline to determine a location for their demonstration project.

The tool consists of a set of criteria and indicators and a template that gives guidance on how to apply the tool. In the previous months the set of criteria has been developed based on literature research and ECN expertise. Subsequently the criteria have been discussed and improved in discussion with the HyLights Steering Group and the European Commission project officer. The current version of the tool has been finalised after further feedback from the regions through the *European Regions and Municipalities Partnership for Hydrogen and Fuel Cells* (HyRaMP) has been received and incorporated.

The aim of the tool is to facilitate an objective assessment of locations that are willing to establish demonstration projects for hydrogen vehicles. In order to have the most efficient demonstration projects, those locations should be selected first that can contribute most to the further development of the technology. The tool is only developed to assess different locations and benchmark the conditions (favourable/unfavourable) that exist in such locations and it cannot be used to compare or assess the demo projects themselves. As the tool is developed to assess locations, it is not the intention to give a certain “score” (high or low) to a certain location; rather the tool will be used to evaluate the relative advantages or disadvantages of the locations in question. By applying the tool from a regions perspective it would help to identify strengths/weaknesses of the location that could be subsequently further improved towards an optimal competitive position.

¹ HyLights is an FP6 Coordination Action to prepare for European hydrogen and fuel cell demonstration projects, www.hylights.eu.

In the following sections the methodology development and an overview of the criteria will be given (chapter 2) and the criteria will be validated (chapter 3). In the appendix, the criteria are explained in detail (A) and a ready-to-use template is provided to allow application of the tool (B).

2 Methodology: criteria to assess high potential locations

To facilitate the process of assessing locations that are interested to host demonstration projects for hydrogen vehicles, a set of criteria has been developed. An overview of these criteria is presented in figure 2.1. The list of criteria is the result of an interactive process with HyLights partners. After ECN had developed a first overview of relevant criteria the list of criteria has been modified and improved. It was the intention to develop a complete, short and “user-friendly” list of key criteria. Although the first designed overview of criteria showed a strong interrelation between the different criteria, these relations have not been made explicit in the overview that is given in figure 2.1 to avoid the system becoming too complex. The set of criteria is limited to those criteria that are key in defining potential differences between locations; therefore it is not claimed that this set of criteria is a complete overview.

2.1 Categories

The selected criteria are most relevant for an effective, efficient and results driven demonstration project. The role of a demonstration project is described as supporting the further development of hydrogen and fuel cell technologies towards commercialisation. To structure the overview of criteria, they are subdivided in the below mentioned, four categories which are based on the role of a demonstration project.

Early market potential: The early market potential gives an impression about whether market application is possible in the selected location, besides it gives information about future market expansion potential and the chance of survival of the technology in the market after the demonstration phase will come to an end.

Visibility and exposure: For a new technology, like hydrogen technologies for transport, it is of great importance that the technology is exposed and visible to a large audience. It should be showed that the technology is safe and practical in use. Visibility might also trigger interest of politicians and the general public, besides it might set the political agenda and raise/increase funding.

- Learning potential: As the technology is not yet fully developed it is important that demonstration projects foster further technological learning by providing good operation characteristics and a sound and motivated scientific environment that might support industrial actors.
- Environmental aspects: As one of the key drivers for introducing hydrogen technologies is its environmental benefits, it is important so assess the local potential to produce renewable hydrogen.

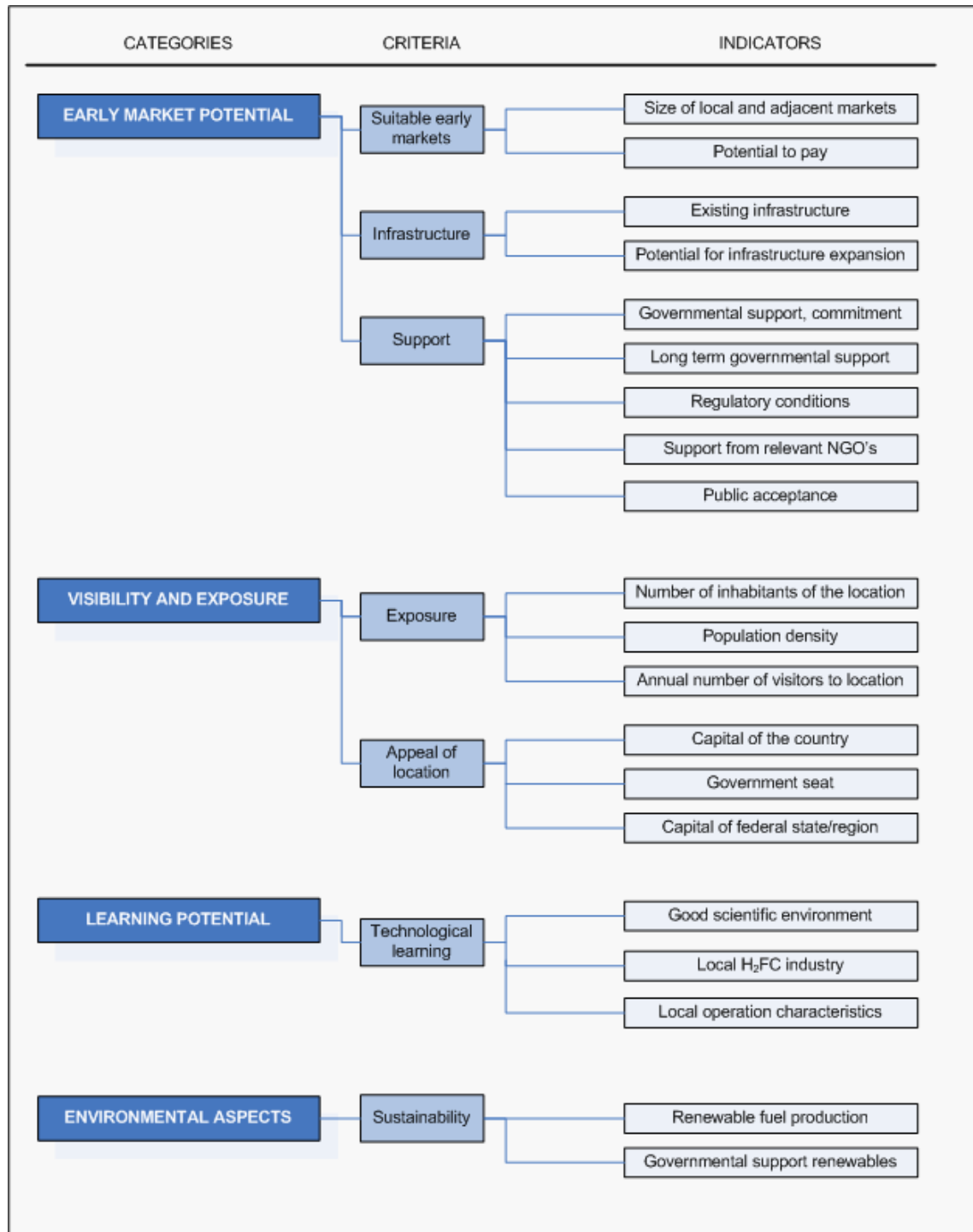


Figure 2.1 Overview of categories, criteria and indicators.

2.2 Criteria

The seven criteria that have been selected as most relevant for the selection of a location are: suitable markets, hydrogen infrastructure, support, exposure, appeal of the location, technological learning and sustainability. The relevance of these criteria will be described below.

- Suitable early markets:** A location can only be a successful host for a demonstration project if markets exist that are relatively easily accessible and that have the potential to sustain even after a demonstration project has finished. Also the potentials for expansion to new markets is relevant in the light of future commercialisation of the technology. Economic conditions of the local market, like the potential for users to pay for the service is relevant as well.
- Hydrogen infrastructure:** Existing hydrogen infrastructure and the potential to expand this infrastructure determines whether a demonstration project could be relatively cost efficient.
- Support:** Support from governments, industry and other stakeholders is crucial. Governmental commitment and a strong policy framework are necessary for the start-up and the continuation of a demonstration project. Long term commitment and support determines the chances of market success (will the vehicles remain on the streets?). Industry partners should be willing to supply the technology, while public organisations (e.g. NGO's) could support the increase of public acceptance.
- Exposure:** Demonstration projects with a good exposure (visible for many people) will get more attention, which is important for a developing technology. Positive attention might increase public awareness and support, it might set the political agenda and it might support further fund raising.

Final report

Appeal of location: The appeal of a location might also influence the attention the project will get (e.g. from the media and the lay public). An appealing location, like a large capital, might trigger the mind set of people in a positive direction ('if this big, well known city takes this technology serious, than we should do that as well').

Technological learning: As the technology is not yet market mature, more technological development is necessary. Those locations that can foster such a development are in favour. Good locations are those locations with ideal and relevant real world testing conditions (hills, low temperature etc.) and with motivated scientific institutions that could support industrial developments.

Sustainability: Those locations that are most supportive for renewable hydrogen production should be favoured.

Not all indicators are as important as each other, however, it is up to the user of the tool to decide what is more and what is less important. See also chapter 3 about validation and weighting.

2.3 Indicators

For each of the criteria several indicators have been developed. These indicators are necessary to measure and value the criteria. In Appendix A a full list is given of the 4 categories, the subsequent criteria and their indicators. Figure 2.2 gives an example of how the list of Appendix A is designed. For each indicator a description is given as well as an indication of how to value it. To avoid redundancy with the appendix the indicators are not described in this section (see Appendix A).

1. EARLY MARKET POTENTIAL

Criterion 1.1 - Suitable (early) markets

Indicator	Description	Valuation
Indicator 1.1.1 Size of market and size of adjacent markets	The market potential is relevant as the first early markets should be starting points (nuclei) for further market expansion. The size of the current market as well as the size of adjacent markets (that could relatively easily be entered) is therefore relevant.	Indication of market size of location and market size of adjacent locations. The market size is expressed in: The number of conventional passenger cars, vans, public transport busses and fuelling stations registered, active or situated in the location.

Indicator 1.1.2 Potential to pay	For a wealthy location deployment of the first series of (expensive) hydrogen vehicles will be easier. Besides, one could expect that people in such locations are more willing to pay the new technology.	The potential to pay is expressed by the gross domestic (or local) product per capita in euros compared to the average GDP of EU27 (average EU-27 GDP per capita is € 23,700).
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Figure 2.2 Example of overview of categories, criteria and indicators with a description of the indicator and information how to value it

3 Validation and weighting

To make the list of criteria useful for others to apply, a self explaining template has been designed that describes how to assess and attribute values to the different criteria and indicators (the template is presented in Appendix B). Each criterion is subdivided by indicators. The template explains why the indicators are important and how they should be valued. For each location that will be assessed a new template is necessary.

Qualitative and quantitative information is used which was translated in an end-score for each indicator. This score indicates the eligibility of the region for this specific issue. The description (in the template) how to value the indicators is used to assign (+) and (-) signs to each indicator. However, some indicators refer directly to a numeric value instead of a score (for e.g. registered vehicles in a region) that need to be filled in.

After application of the tool, all information can be entered in a separate indicator summary that allows easier review of the aggregated results. The indicator summary is a separate Excel file that is available together with this report. Based on the summary, specific strengths and weaknesses of a location will become apparent depending on the score. Indicators with a positive score (++ or +) imply relative strength, while a negative score (- or -/-) point towards necessary improvement in the respective area. A neutral score (0) is acceptable but the respective region needs to decide whether the indicator requires advancement based on the overall picture for the region. While indicators with a selected score can be influenced, this is only to a certain extent possible for indicators carrying numeric values. An example of the indicator summary is provided in Figure 3.1.

Eligibility of			possible values
to host a demonstration project for hydrogen vehicles			
EARLY MARKET POTENTIAL			
Suitable early markets			
Size of local and adjacent markets			
Number of passenger cars:			numeric
Number of vans:			numeric
Number of busses:			numeric
Number of (conventional) fuelling stations:			numeric
Number of passenger cars in adjacent markets:			numeric
Number of vans in adjacent markets:			numeric
Number of busses in adjacent markets:			numeric
Number of fuelling stations in adjacent markets:			numeric
Potential to pay (GDP/capita)			numeric
Hydrogen infrastructure			
Existing infrastructure			++, + or -/-
Potential for infrastructure expansion (# regions)			numeric
Support			
Governmental support, commitment			++, +, 0, - or -/-
Long term governmental support			++, +, 0, - or -/-
Regulatory conditions			
Are vehicles allowed to drive on the road?			+ or -/-
Is it allowed to establish hydrogen fuelling stations?			+ or -/-
Hydrogen fuelling stations within the build-up area allowed?			+ or -
Are regulations consistent within the whole region?			+ or -
Duration for obtaining permits.			++, +, 0, - or -/-
Support from relevant NGO's			+ , 0 or -/-
Public acceptance			+ , 0 or -/-
VISIBILITY AND EXPOSURE			
Exposure			
Number of inhabitants of the location			++, + or 0
Population density			++, +, 0 or -
Annual number of visitors to location			++, +, 0 or -
Appeal of location			
Capital of the country			+ or 0
Capital of federal state/region			+ or 0
Government seat			+ or 0
LEARNING POTENTIAL			
Technological learning			
Good scientific environment			++, + or 0
Local H2FC industry			++, + or 0
Local operation characteristics			+ or 0
ENVIRONMENTAL ASPECTS			
Sustainability			
Renewable fuel production			+ or 0
Governmental support renewables			+ , 0 or -/-

Figure 3.1 Indicator summary example (blank)

Appendix A Detailed overview of criteria

The table below gives a detailed overview of the selected criteria, relevant indicators and a description of how to value the indicators. A concise overview of the criteria is given in figure 2.1.

1. EARLY MARKET POTENTIAL

Criterion 1.1 - Suitable (early) markets		
Indicator	Description	Valuation
Indicator 1.1.1 Size of market and size of adjacent markets	The market potential is relevant as the first early markets should be starting points (nuclei) for further market expansion. The size of the current market as well as the size of adjacent markets (that could relatively easily be entered) is therefore relevant.	Indication of market size of location and market size of adjacent locations. The market size is expressed in: The number of conventional passenger cars, vans, public transport busses and fuelling stations registered, active or situated in the location.
Indicator 1.1.2 Potential to pay	For a wealthy location, deployment of the first series of (expensive) hydrogen vehicles will be easier. Besides, one could expect that people in such locations are more willing to pay for the new technology.	The potential to pay is expressed by the gross domestic (or local) product per capita in euros compared to the average GDP of EU27 (average EU-27 GDP per capita is € 23,700).

Criterion 1.2 - Infrastructure		
Indicator	Description	Valuation

Final report

<p>Indicator 1.2.1 Existing infrastructure</p>	<p>Building new infrastructure might be very expensive. Locations with existing infrastructure (filling stations, pipelines, production facilities, feedstock supply potential) are therefore more attractive for the establishment of the first early markets.</p>	<p>Description of the available infrastructure.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">Sufficient infrastructure available for new market deployment</td> <td style="width: 20%; text-align: center;">++</td> </tr> <tr> <td>Current infrastructure should be extended</td> <td style="text-align: center;">+</td> </tr> <tr> <td>Hardly any infrastructure available</td> <td style="text-align: center;">-/-</td> </tr> </table>	Sufficient infrastructure available for new market deployment	++	Current infrastructure should be extended	+	Hardly any infrastructure available	-/-
Sufficient infrastructure available for new market deployment	++							
Current infrastructure should be extended	+							
Hardly any infrastructure available	-/-							
<p>Indicator 1.2.2 Potential for infrastructure expansion</p>	<p>Surrounding locations with good possibilities for fuel supply can ease the expansion of the hydrogen market which is very constructive for the gradual increase of the number and size of early markets.</p>	<p>Description of the hydrogen supply potential of adjacent locations.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">Number of locations/regions with good fuel supply potential</td> <td style="width: 20%; text-align: center;">#</td> </tr> </table>	Number of locations/regions with good fuel supply potential	#				
Number of locations/regions with good fuel supply potential	#							

<p>Criterion 1.3 - Support</p>		
<p>Indicator</p>	<p>Description</p>	<p>Valuation</p>

<p>Indicator 1.3.1 Governmental support and commitment</p>	<p>For the first early markets governmental support seems to be indispensable. Here support and commitment means not only financial support but the will to cooperate and make the project/early market work.</p>	<p>Description of how the support and commitment of the government is expressed (describe financial support, expressed commitment, actively involved, proactive, raising public awareness).</p> <table> <tr> <td>Commitment</td> <td>++</td> </tr> <tr> <td>⇕</td> <td>+</td> </tr> <tr> <td>Unsure</td> <td>0</td> </tr> <tr> <td>⇕</td> <td>-</td> </tr> <tr> <td>No commitment</td> <td>-/-</td> </tr> </table>	Commitment	++	⇕	+	Unsure	0	⇕	-	No commitment	-/-
Commitment	++											
⇕	+											
Unsure	0											
⇕	-											
No commitment	-/-											
<p>Indicator 1.3.2 Long term governmental support and commitment</p>	<p>Long term governmental support and commitment gives an indication of the chance of survival of the project in future. It also gives an impression of the potential for successful future projects/deployment.</p>	<p>Description of the long term commitment. Include issues like: does the local strategy and vision fit into the national/European strategy and vision, is cooperation with national or European governments foreseen, what kind of long term policy support measures is/will become in place, other relevant indications of expressed commitment.</p> <table> <tr> <td>Commitment</td> <td>++</td> </tr> <tr> <td>⇕</td> <td>+</td> </tr> <tr> <td>Unsure</td> <td>0</td> </tr> <tr> <td>⇕</td> <td>-</td> </tr> <tr> <td>No commitment</td> <td>-/-</td> </tr> </table>	Commitment	++	⇕	+	Unsure	0	⇕	-	No commitment	-/-
Commitment	++											
⇕	+											
Unsure	0											
⇕	-											
No commitment	-/-											

Final report

<p>Indicator 1.3.3 Regulatory conditions</p>	<p>Is the deployment of the technology supported (not hindered) by regulation? Are vehicles allowed to drive on the streets and is it allowed to build a sufficient number of hydrogen filling stations? Are regulations consistent over the whole region? Can permits be obtained easily and quickly?</p>	<p>Are vehicles allowed to drive on the road?</p> <table border="1"> <tr> <td>Yes</td> <td>+</td> </tr> <tr> <td>No</td> <td>-/-</td> </tr> </table> <p>Is it allowed to build hydrogen fuelling stations within the built-up area?</p> <table border="1"> <tr> <td>Yes</td> <td>+</td> </tr> <tr> <td>No</td> <td>-</td> </tr> </table> <p>Is it allowed to establish hydrogen fuelling stations?</p> <table border="1"> <tr> <td>Yes</td> <td>+</td> </tr> <tr> <td>No</td> <td>-/-</td> </tr> </table> <p>Are regulations consistent within the whole region?</p> <table border="1"> <tr> <td>Yes</td> <td>+</td> </tr> <tr> <td>No</td> <td>-</td> </tr> </table> <p>Duration for obtaining permits:</p> <table border="1"> <tr> <td>< 4 months</td> <td>++</td> </tr> <tr> <td>4-6 months</td> <td>+</td> </tr> <tr> <td>7-12 months</td> <td>0</td> </tr> <tr> <td>13-18 months</td> <td>-</td> </tr> <tr> <td>> 18 months</td> <td>-/-</td> </tr> </table>	Yes	+	No	-/-	Yes	+	No	-	Yes	+	No	-/-	Yes	+	No	-	< 4 months	++	4-6 months	+	7-12 months	0	13-18 months	-	> 18 months	-/-
Yes	+																											
No	-/-																											
Yes	+																											
No	-																											
Yes	+																											
No	-/-																											
Yes	+																											
No	-																											
< 4 months	++																											
4-6 months	+																											
7-12 months	0																											
13-18 months	-																											
> 18 months	-/-																											

<p>Indicator 1.3.4 Support from relevant NGO's</p>	<p>A project will be most efficient if it gets support from society. Therefore support from relevant NGO's is relevant.</p>	<p>The support from NGO's expressed in written form.</p> <table border="1"> <tr> <td>Clear indication of support</td> <td>+</td> </tr> <tr> <td>No information</td> <td>0</td> </tr> <tr> <td>Clear lack of support</td> <td>-/-</td> </tr> </table>	Clear indication of support	+	No information	0	Clear lack of support	-/-
Clear indication of support	+							
No information	0							
Clear lack of support	-/-							
<p>Indicator 1.3.5 Public acceptance</p>	<p>A project will be most efficient if it gets support from society. Therefore public acceptance is relevant.</p>	<p>Conclusions from performed studies on public acceptance.</p> <table border="1"> <tr> <td>Clear indication of acceptance</td> <td>+</td> </tr> <tr> <td>No information</td> <td>0</td> </tr> <tr> <td>Clear lack of acceptance</td> <td>-/-</td> </tr> </table>	Clear indication of acceptance	+	No information	0	Clear lack of acceptance	-/-
Clear indication of acceptance	+							
No information	0							
Clear lack of acceptance	-/-							

2. VISIBILITY AND EXPOSURE

Criterion 2.1 - Exposure										
Indicator	Description	Valuation								
Indicator 2.1.1 Number of inhabitants of the location (city or region)	The number of inhabitants gives an impression of how many people might be able to see or experience the new technology.	Number of inhabitants. <table border="1"> <tr> <td>> 1 million</td> <td>++</td> </tr> <tr> <td>0.5 - 1 million</td> <td>+</td> </tr> <tr> <td>< 500.000</td> <td>0</td> </tr> </table>	> 1 million	++	0.5 - 1 million	+	< 500.000	0		
> 1 million	++									
0.5 - 1 million	+									
< 500.000	0									
Indicator 2.1.2 Annual number of visitors to location	The number of visitors to a location (region/city) also gives an indication of the exposure level of the new technology.	The number of people that visit the location on an annual basis. <table border="1"> <tr> <td>> 10 million</td> <td>++</td> </tr> <tr> <td>5 – 10 million</td> <td>+</td> </tr> <tr> <td>1 – 5 million</td> <td>0</td> </tr> <tr> <td>< 1 million</td> <td>-</td> </tr> </table>	> 10 million	++	5 – 10 million	+	1 – 5 million	0	< 1 million	-
> 10 million	++									
5 – 10 million	+									
1 – 5 million	0									
< 1 million	-									
Indicator 2.1.3 Population density	The way hydrogen vehicles are used determines in some way the exposure. For example application in urban areas has a larger exposure than application in rural areas.	Description of the population density of the region/area where the vehicles are mainly used expressed in number of inhabitants per square kilometre. <table border="1"> <tr> <td>> 3,000 /km²</td> <td>++</td> </tr> <tr> <td>2,000–3,000 /km²</td> <td>+</td> </tr> <tr> <td>1,000- 2,000 /km²</td> <td>0</td> </tr> <tr> <td>< 1,000 /km²</td> <td>-</td> </tr> </table>	> 3,000 /km ²	++	2,000–3,000 /km ²	+	1,000- 2,000 /km ²	0	< 1,000 /km ²	-
> 3,000 /km ²	++									
2,000–3,000 /km ²	+									
1,000- 2,000 /km ²	0									
< 1,000 /km ²	-									

Criterion 2.2 - Appeal of the location				
Indicator	Description	Valuation		
Indicator 2.2.1 Capital of country	The national capital is often one of the most appealing cities/locations in a country.	Project/market deployed in capital? Yes <table border="1"><tr><td>+</td></tr></table> No <table border="1"><tr><td>0</td></tr></table>	+	0
+				
0				
Indicator 2.2.2 Seat of national government	In some countries the government is not seated in the capital. In those cases the 'political capital' could be appealing as well.	Project/market deployed in political capital? Yes <table border="1"><tr><td>+</td></tr></table> No <table border="1"><tr><td>0</td></tr></table>	+	0
+				
0				
Indicator 2.2.3 Capital of federal state/region	Depending on the administrative districts of the country, the capital of a federal state or a region is a location of economical and political significance.	Project/market deployed in federal state capital/region capital? Yes <table border="1"><tr><td>+</td></tr></table> No <table border="1"><tr><td>0</td></tr></table>	+	0
+				
0				

3. LEARNING POTENTIAL

Criterion 3.1 - Technological learning								
Indicator	Description	Valuation						
Indicator 3.1.1 Good scientific environment	The existence of local scientific institutions (like universities with relevant expertise) might have a positive contribution to the development of the technology.	<p>Description of local scientific environment in terms of relevant universities, laboratories etc.</p> <table border="1"> <tr> <td>Active involvement of local scientific institutions</td> <td>++</td> </tr> <tr> <td>Existing relevant scientific institutions</td> <td>+</td> </tr> <tr> <td>No scientific environment</td> <td>0</td> </tr> </table>	Active involvement of local scientific institutions	++	Existing relevant scientific institutions	+	No scientific environment	0
Active involvement of local scientific institutions	++							
Existing relevant scientific institutions	+							
No scientific environment	0							
Indicator 3.1.2 Existence of hydrogen fuel cell related businesses	The existence of local business environment or supply industry from the hydrogen fuel cell sector might have a positive influence and support for demonstrations projects.	<p>Description of relevant companies active in the hydrogen fuel cell sector.</p> <table border="1"> <tr> <td>Networking activities of local hydrogen businesses</td> <td>++</td> </tr> <tr> <td>Existing relevant businesses from the sector</td> <td>+</td> </tr> <tr> <td>No hydrogen related business activities</td> <td>0</td> </tr> </table>	Networking activities of local hydrogen businesses	++	Existing relevant businesses from the sector	+	No hydrogen related business activities	0
Networking activities of local hydrogen businesses	++							
Existing relevant businesses from the sector	+							
No hydrogen related business activities	0							

<p>Indicator 3.1.3 Local operation characteristics.</p>	<p>If the technology is deployed under challenging local operation conditions (operation in colder climates, mountainous regions) new learning effects could be expected.</p>	<p>Description of the added value of the local operation conditions compared to current or past demonstration projects and related to the current technological challenges.</p> <p>Convincing description <table border="1"><tr><td>+</td></tr></table></p> <p>Unclear <table border="1"><tr><td>0</td></tr></table></p>	+	0
+				
0				

4. ENVIRONMENTAL ASPECTS

Criterion 4.1 - Sustainability					
Indicator	Description	Valuation			
Indicator 4.1.1 Potential for renewable hydrogen production	A high potential for renewable hydrogen production could foster the development and application of such fuels.	Description of potential for renewable hydrogen production based on relevant studies. Clear local potential <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>+</td></tr></table> Unclear <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>0</td></tr></table>	+	0	
+					
0					
Indicator 4.1.2 Governmental support for renewables	Specific governmental (local or national government) support for the production of renewable hydrogen.	Description of how the support and commitment of the government is expressed in relation to the production of renewable hydrogen. Convincing description <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>+</td></tr></table> Unclear <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>0</td></tr></table> No commitment <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-/-</td></tr></table>	+	0	-/-
+					
0					
-/-					

Appendix B Template for assessment

The table below is the template that could be used for assessment of the locations.

LOCATION: (name of location) (description of location if relevant)

1. EARLY MARKET POTENTIAL

Criterion 1.1 - Suitable (early) markets	
Indicator	Valuation
Indicator 1.1.1 Size of market and size of adjacent markets	(General description of the market)
Indication of market size of location and market size of adjacent locations. The market size is expressed in: The number of conventional passenger cars, vans, public transport busses and fuelling stations registered, active or situated in the location.	Market size Number of passenger cars: (#) Number of vans: (#) Number of public transport busses: (#) Number of fuelling stations: (#) Size of adjacent market Number of passenger cars: (#) Number of vans: (#) Number of public transport busses: (#) Number of fuelling stations: (#)

Final report

Indicator 1.1.2 Potential to pay	(General description)
The potential to pay is expressed by the gross domestic (or local) product per capita in euros compared to the average GDP of EU27.	GDP/capita: € Average EU-27 GDP per capita: € 23,700

Criterion 1.2 - Infrastructure	
Indicator	Valuation
Indicator 1.2.1 Existing infrastructure	(General description)
Description of the available hydrogen infrastructure.	<p>Sufficient infrastructure available for new market deployment <input type="checkbox"/> ++ (mark correct answer)</p> <p>Current infrastructure should be extended <input type="checkbox"/> +</p> <p>Hardly any infrastructure available <input type="checkbox"/> -/-</p>
Indicator 1.2.2 Potential for infrastructure expansion	(General description)

Description of the hydrogen supply potential of adjacent locations.	Number of locations/regions with good fuel supply potential <input style="width: 30px; height: 20px; border: 1px solid black;" type="text"/> # (give the number)
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Criterion 1.3 - Support	
Indicator	Valuation
Indicator 1.3.1 Governmental support and commitment	(General description)
Description of how the support and commitment of the government is expressed (describe financial support, expressed commitment, actively involved, proactive, raising public awareness).	Commitment <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> ++ (mark correct answer) ⇕ <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> + Unsure <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> 0 ⇕ <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> - No commitment <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> -/-
Indicator 1.3.2 Long term governmental support and commitment	(General description)
Description of the long term commitment. Include issues like: does the local strategy and vision fit into the national/European strategy and vision, is cooperation with national or European governments foreseen, what kind of long term policy support measures is/will become in place, other relevant indications of expressed commitment.	Commitment <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> ++ (mark correct answer) ⇕ <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> + Unsure <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> 0 ⇕ <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> - No commitment <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> -/-

Final report

<p>Indicator 1.3.3 Regulatory conditions</p>	<p>(General description)</p>
	<p>Are vehicles allowed to drive on the road?</p> <p>Yes <input type="checkbox"/>+ (mark correct answer)</p> <p>No <input type="checkbox"/>-/-</p> <p>Is it allowed to establish hydrogen fuelling stations?</p> <p>Yes <input type="checkbox"/>+ (mark correct answer)</p> <p>No <input type="checkbox"/>-/-</p> <p>Is it allowed to build hydrogen fuelling stations within the built-up area?</p> <p>Yes <input type="checkbox"/>+ (mark correct answer)</p> <p>No <input type="checkbox"/>-</p> <p>Are regulations consistent within the whole region?</p> <p>Yes <input type="checkbox"/>+ (mark correct answer)</p> <p>No <input type="checkbox"/>-</p> <p>Duration for obtaining permits:</p> <p>< 4 months <input type="checkbox"/>++ (mark correct answer)</p> <p>4-6 months <input type="checkbox"/>+</p> <p>7-12 months <input type="checkbox"/>0</p> <p>13-18 months <input type="checkbox"/>-</p> <p>> 18 months <input type="checkbox"/>-/-</p>
<p>Indicator 1.3.4 Support from relevant NGO's</p>	<p>(General description)</p>

<p>The support from NGO's expressed in written form.</p>	<p>Clear indication of support <input type="checkbox"/> + (mark correct answer)</p> <p>No information <input type="checkbox"/> 0</p> <p>Clear lack of support <input type="checkbox"/> -/-</p>
<p>Indicator 1.3.5 Public acceptance</p>	<p>(General description)</p>
<p>Conclusions from performed studies on public acceptance.</p>	<p>Clear indication of acceptance <input type="checkbox"/> + (mark correct answer)</p> <p>No information <input type="checkbox"/> 0</p> <p>Clear lack of acceptance <input type="checkbox"/> -/-</p>

2. VISIBILITY AND EXPOSURE

Criterion 2.1 - Exposure													
Indicator	Valuation												
Indicator 2.1.1 Number of inhabitants of the location (city or region)	(General description)												
Number of inhabitants.	<table border="0"> <tr> <td>> 1 million</td> <td>++</td> <td>(mark correct answer)</td> </tr> <tr> <td>0.5 - 1 million</td> <td>+</td> <td></td> </tr> <tr> <td>< 500.000</td> <td>0</td> <td></td> </tr> </table>	> 1 million	++	(mark correct answer)	0.5 - 1 million	+		< 500.000	0				
> 1 million	++	(mark correct answer)											
0.5 - 1 million	+												
< 500.000	0												
Indicator 2.1.3 Population density	(General description)												
Description of the population density of the region/area where the vehicles are mainly used expressed in number of inhabitants per square kilometre.	<table border="0"> <tr> <td>> 3,000 /km²</td> <td>++</td> <td>(mark correct answer)</td> </tr> <tr> <td>2,000–3,000 /km²</td> <td>+</td> <td></td> </tr> <tr> <td>1,000- 2,000 /km²</td> <td>0</td> <td></td> </tr> <tr> <td>< 1,000 /km²</td> <td>-</td> <td></td> </tr> </table>	> 3,000 /km ²	++	(mark correct answer)	2,000–3,000 /km ²	+		1,000- 2,000 /km ²	0		< 1,000 /km ²	-	
> 3,000 /km ²	++	(mark correct answer)											
2,000–3,000 /km ²	+												
1,000- 2,000 /km ²	0												
< 1,000 /km ²	-												
Indicator 2.1.2 Annual number of visitors to location	(General description)												

The number of people that visit the location on an annual basis.	> 10 million <input type="checkbox"/> ++ (mark correct answer) 5 – 10 million <input type="checkbox"/> + 1 – 5 million <input type="checkbox"/> 0 < 1 million <input type="checkbox"/> -
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Criterion 2.2 - Appeal of the location	
Indicator	Valuation
Indicator 2.2.1 Capital of country	(General description)
Project/market deployed in capital?	Yes <input type="checkbox"/> + (mark correct answer) No <input type="checkbox"/> 0
Indicator 2.2.2 Seat of national government	(General description)
Project/market deployed in political capital?	Yes <input type="checkbox"/> + (mark correct answer) No <input type="checkbox"/> 0
Indicator 2.2.3 Capital of federal state/region	(General description)
Project/market deployed in federal state/region capital?	Yes <input type="checkbox"/> + (mark correct answer) No <input type="checkbox"/> 0

3. LEARNING POTENTIAL

Criterion 3.1 - Technological learning

Indicator	Valuation												
Indicator 3.1.1 Good scientific environment	(General description)												
Description of local scientific environment in terms of relevant universities, laboratories etc.	<table border="1"> <tr> <td>Active involvement of local scientific institutions</td> <td>++</td> <td>(mark correct answer)</td> <td></td> </tr> <tr> <td>Existing relevant scientific institutions</td> <td>+</td> <td></td> <td></td> </tr> <tr> <td>Else/unclear</td> <td>0</td> <td></td> <td></td> </tr> </table>	Active involvement of local scientific institutions	++	(mark correct answer)		Existing relevant scientific institutions	+			Else/unclear	0		
Active involvement of local scientific institutions	++	(mark correct answer)											
Existing relevant scientific institutions	+												
Else/unclear	0												
Indicator 3.1.2 Existence of local businesses from the hydrogen fuel cell sector	(General description)												
Description of local scientific environment in terms of relevant universities, laboratories etc.	<table border="1"> <tr> <td>Active involvement of local scientific institutions</td> <td>++</td> <td>(mark correct answer)</td> <td></td> </tr> <tr> <td>Existing relevant scientific institutions</td> <td>+</td> <td></td> <td></td> </tr> <tr> <td>Else/unclear</td> <td>0</td> <td></td> <td></td> </tr> </table>	Active involvement of local scientific institutions	++	(mark correct answer)		Existing relevant scientific institutions	+			Else/unclear	0		
Active involvement of local scientific institutions	++	(mark correct answer)											
Existing relevant scientific institutions	+												
Else/unclear	0												

<p>Indicator 3.1.3 Local operation characteristics</p>	<p>(General description)</p>				
<p>Description of the added value of the local operation conditions compared to current or past demonstration projects and related to the current technological challenges.</p>	<table border="1"><tr><td>Convincing description</td><td>+ (mark correct answer)</td></tr><tr><td>Unclear</td><td>0</td></tr></table>	Convincing description	+ (mark correct answer)	Unclear	0
Convincing description	+ (mark correct answer)				
Unclear	0				

Final report

4. ENVIRONMENTAL ASPECTS

Criterion 4.1 - Sustainability										
Indicator	Valuation									
Indicator 4.1.1 Potential for renewable hydrogen production	(General description)									
Description of potential for renewable hydrogen production based on relevant studies.	<table border="1"> <tr> <td>Clear local potential</td> <td>+</td> <td>(mark correct answer)</td> </tr> <tr> <td>Unclear</td> <td>0</td> <td></td> </tr> </table>	Clear local potential	+	(mark correct answer)	Unclear	0				
Clear local potential	+	(mark correct answer)								
Unclear	0									
Indicator 4.1.2 Governmental support for renewables	(General description)									
Description of how the support and commitment of the government is expressed in relation to the production of renewable hydrogen.	<table border="1"> <tr> <td>Convincing description</td> <td>+</td> <td>(mark correct answer)</td> </tr> <tr> <td>Unclear</td> <td>0</td> <td></td> </tr> <tr> <td>No commitment</td> <td>-/-</td> <td></td> </tr> </table>	Convincing description	+	(mark correct answer)	Unclear	0		No commitment	-/-	
Convincing description	+	(mark correct answer)								
Unclear	0									
No commitment	-/-									