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Resolution of Pre-Contracting Requirements and Recommendations

Project: HyTrEc2

Journal-ID: 38-2-11-16

Dear Project Partners,

I am happy to inform you that the steps towards resolving the pre-contracting requirements and recommendations for your project have now been finalised.

Steering Committee requirements and recommendations from the application's assessment

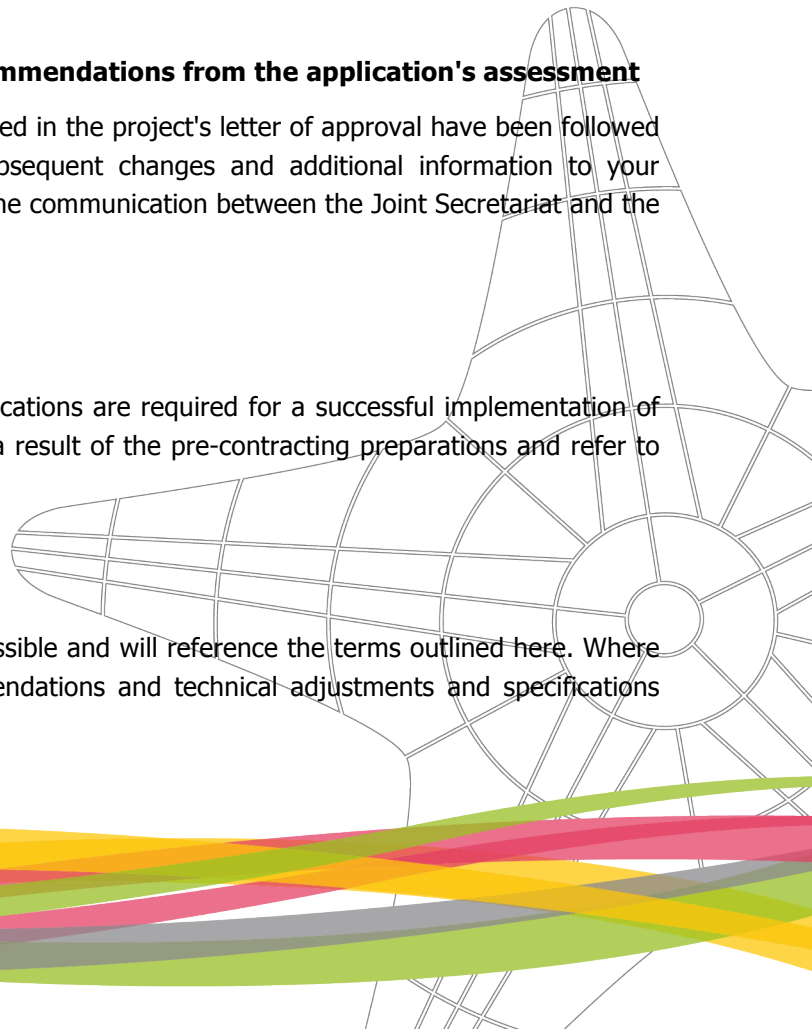
The requirements and recommendations as outlined in the project's letter of approval have been followed up and considered sufficiently by you. The subsequent changes and additional information to your original application are listed below and refer to the communication between the Joint Secretariat and the project as annexed to this letter.

Technical adjustments and specifications

In cases where technical adjustments and specifications are required for a successful implementation of the project they are also listed below. They are a result of the pre-contracting preparations and refer to the same annex as outlined above.

Next steps

The project contract will be issued as soon as possible and will reference the terms outlined here. Where the fulfilment of the requirements and recommendations and technical adjustments and specifications





require updates of your application it will be updated by you in the Online Monitoring System as soon as the system's change module will be available. The changes in the application form need to be accepted by the programme before they become effective. The required updates should not hinder you to start with your project activities. The update will reflect the information which you have submitted and which was subsequently assessed as sufficient by the Joint Secretariat. Please note that you will not be able to start any reporting about your project activities and finances until the application form has been updated effectively.

List of project responses to requirements and recommendations

- In reference to results indicator #3, the partnership has explained what the measurement of reduced CO2 emissions refers to and how it will be calculated.
- The clarification of results indicator #1 is based on similar price reductions of Alternative Fuel vehicles in the past, which the partners feel are possible for this project as well. The calculation will be done by comparing the price of the Electric Vehicles with a range extender at the start and finish of the project; a cost reduction is expected as the result of improving operational efficiency over time.
- Please see Annex 1 for a more in-depth analysis of the project's responses to the SC requirement to clarify the measurement of results indicator #2 as well as the project's responses to the JS recommendations.

If you have any questions please do not hesitate to contact your project advisor.

Kind regards,

Carsten Westerholt

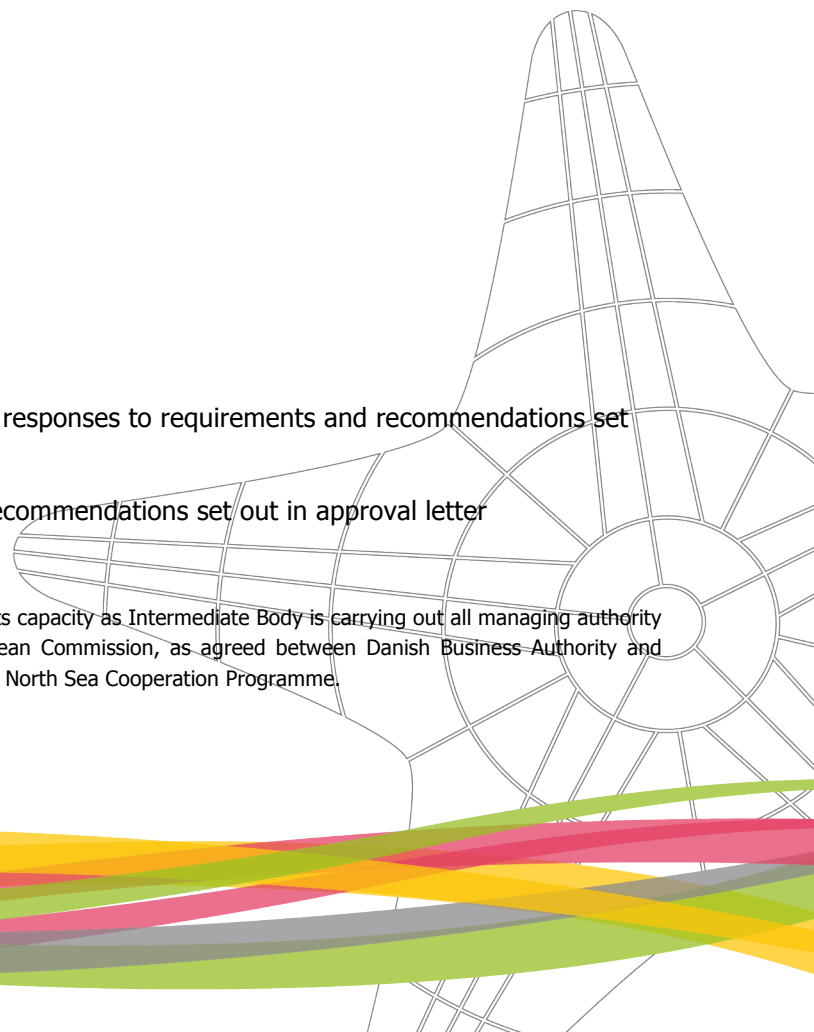
Deputy Head of Secretariat

(via electronic message)

Annex 1: Memo regarding JS analysis of project's responses to requirements and recommendations set out in approval letter

Annex 2: Project response to requirements and recommendations set out in approval letter

The Joint Secretariat of the North Sea Region Programme in its capacity as Intermediate Body is carrying out all managing authority functions, except the formal communication with the European Commission, as agreed between Danish Business Authority and Central Denmark Region in accordance with section 5.3 of the North Sea Cooperation Programme.





Annex 1: Memo regarding JS analysis of project’s responses to requirements and recommendations set out in approval letter

Follow up memo to HyTrEc2 response to approval letter – Call 2

13 December 2016

Sarah Holsen, Project Advisor

The SC approved the HyTrEc2 project (Priority 4), provided they resolved the following: ‘Clarify the measurement of the result indicators’

In the original application, the results were as follows:

| Indicator | Target | Unit | Definition |
|---|--------|---------------------------------|--|
| Reduction in the cost of hydrogen vans, large trucks and other tested vehicles | 25 | Percentage | Drop in the price of hydrogen vans and other vehicles and fuel cells during the project period |
| Number of public sector organisations and transport operators investing in hydrogen vans and other tested vehicles | 18 | Number of organisations | Organisations purchasing or testing hydrogen vans and other tested vehicles |
| CO2 reductions from tested vehicles | 18 | Kilograms per vehicle per month | This figure is the target for every vehicle operational for a month and is the difference between a petro engine and a hydrogen vehicle. |

HyTrEc2’s response to the SC’s requirement was an elaboration and explanation of what is stated in the table above. Here are parts of the partnership’s response that address the SC requirement in order of the three indicators:

- 1) ‘These vehicles are not yet in commercial production but we have seen other Alternative Fuel vehicles reduce in price as they have moved from prototype or an early version of vehicle through the process of commercial manufacture. This is certainly the case with hydrogen buses and a number of electric vehicles and the partners feel that a similar price reduction is possible in this project... Most of the first vehicles to be tested will be through the use of range extenders onto Electric Vehicles (EVs). In this case, we will compare the price of the EV with a range extender at the start and finish of the project. The initial price can be demonstrated in the procurement process that partners will embark upon...One of the major objectives of the project is to observe how they operate within a fleet of vehicles and to improve their operational efficiency. Improving operational efficiency will make the vehicle more attractive to fleet operators and should reduce their cost.’
- 2) ‘As well as promoting the project results to a wide audience, the project partners will work closely with the Hydrogen Fuel Cell Joint Undertaking (FCH-JU) to increase the number of organisations utilising these



products. The FCH-JU is an Executive Agency of the European Union using Horizon 2020 to develop hydrogen as a transport and energy vector. The FCH-JU has just announced a Regional Initiative where it will work with regions and municipalities to identify new products that the regional level is interested in and the HyTrEc2 partners are confident that the hydrogen vehicles tested in this project will be amongst the new products that the FCH-JU and European Regions wish to develop. The aim of this Initiative from the FCH-JU is the production of a Cost Reduction Roadmap for each product and this is what we are in doing in HyTrEc2.'

- 3) '[Reducing vehicle CO2 emissions by 18 kilograms per month] will be done by comparing the emissions of the diesel vehicles replaced by the hydrogen fuel cell vehicles with the emissions from the new vehicles. These tests will be carried out by the Centre of Excellence for Low Carbon and Fuel technologies (Cenex) who will also calculate the amount of kilometres driven and diesel saved. The target figure for the Result indicator is calculated by looking at the average distance a vehicle will travel in a month and making a comparison between the CO2 emissions of a hydrogen fuel cell vehicle with those of a diesel vehicle.'

Of the three explanations/clarifications, #3 is the clearest; the partnership has explained what the measurement of reduced CO2 emissions refers to and how it will be calculated. The clarification of #1 is not as concretely described, but it is better described than in the original application. The indicator for #1 is based on similar price reductions of Alternative Fuel vehicles in the past, which the partners feel are possible for this project as well. The calculation will be done by comparing the price of the Electric Vehicles with a range extender at the start and finish of the project; a cost reduction is expected as the result of improving operational efficiency over time.

The measurement of indicator #2 is the least clearly defined. In their elaboration, the partnership does not describe how they are going to count organisations investing in hydrogen vehicles and other tested vehicles; nor do they explain how they count 'investing in.' This should have been better described. However, because the programme minimum requirement is two results indicators, the clarifications provided for #1 and #3 are sufficient to move forward with the project; a better clarification of indicator #2 should be provided during implementation of the project, and will be monitored through progress report submissions.

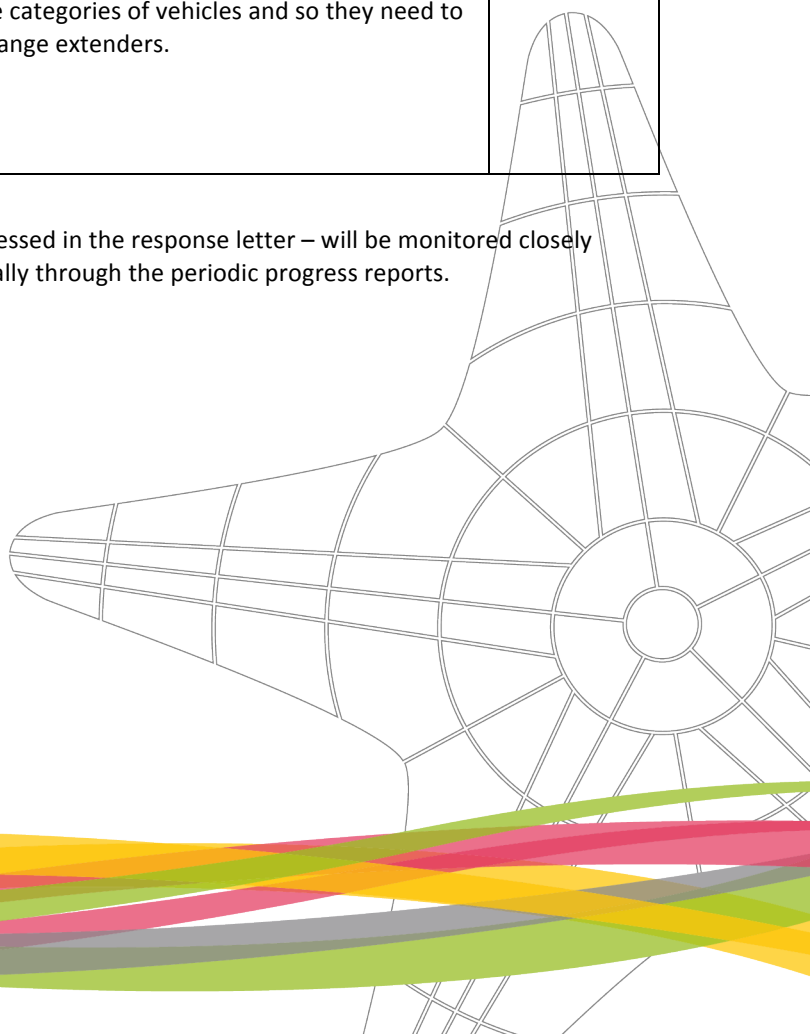
There were also a number of issues that the JS recommended the partners address before kicking off the project. The recommendations, the partnership's response, and whether the response was judged to be acceptable are included in the following table:

| Recommendations | Response | Acceptable? |
|--|--|-------------|
| 1. The further take up of results outside the partnership. | As Lead Partner, Aberdeen City Council has close links with the FCH-JU through the Presidency of the association known as Hydrogen Fuel Cells and Electro-Mobility in European Regions (HyER.) The president has regular meetings with the Executive Director of the FCH-JU and with the Secretary-General of Hydrogen Europe, which is the leading trade association for companies developing hydrogen products in the EU. The FCH-JU has asked Regions and Municipalities to sign a MoU with them so that they can work together to develop new products and bring them to market. It is expected that the local and regional authorities in HyTrEc2 | OK |

| | | |
|--|--|---------------|
| | will sign this MoU. Partners also work actively at the national level through their national Hydrogen Associations. | |
| 2. Monitoring and implementation of the commercialisation and further development of business cases. | | Not addressed |
| 3. From the description provided in section 1.4.3, it is expected that companies will be involved in work package no. 5 supply chain development and training. However, their contribution and involvement could have been further elaborated. | There are two ways in which SMEs will be involved. Most partners have close links with SMEs in the hydrogen and related sectors so that discussions about opportunities arising from the project can be discussed. The SME training aspect is also critical so that maintenance of vehicle and other tasks can be carried out in an efficient manner. | OK |
| 4. Provisional plans for risk management are not expressed in great detail. | <p>In terms of this project, risk should be differentiated between technical risk and commercial risk. The project deals mainly with technical risk so that the operational efficiency of the vehicles or the equipment can be significantly improved and comparable with the vehicles that have been replaced. The project will prepare business cases for the vehicles and equipment so that they are 'market ready.' This removes the problem with commercial risk.</p> <p>These are ranked in order of risk and there is some correlation between the first two activities as it is important to have an effective production and storage system so that vehicles can be refuelled. It should be stated that the innovative methods of refuelling will be tested in conjunction with tried and tested production methods to ensure continuity of supply.</p> | OK |
| 5. Concerning the indicated time plan, no contingency provisions are addressed. | The Partners are developing new products and improving their operational efficiency and this must be done within the time plan set out. Problems with operational efficiency can delay projects. However, the project is set up in a way so that while the Work Packages are inter-related, the project does not depend on one Work Package before another begins. This should reduce the need for Contingency Planning but clearly with new technological innovation progress needs to be closely monitored so that contingency plans are put into place if the predicted results are not achieved. | OK |
| 6. In addition, the transnational approach could have been further elaborated within the description of the work packages and in the annex as | The transnational approach is similar to the one followed by projects funded by the FCH-JU and FP7/Horizon 2020 projects. The aim is to create an EU market in these vehicles and through close links with the supply chain to create a Centre of Excellence in the North Sea Region. The project | OK |

| | | |
|--|---|-----------|
| <p>these parts were clearer in other parts of the application.</p> | <p>involves the operational efficiency of vehicles and novel green hydrogen production and storage techniques. This can only be achieved by the creation of a transnational supply chain.</p> <p>The vehicles will be tested within partner regions but the results will be shared within the partnership and the Dissemination Strategy will ensure that the project results are shared on a wider transnational canvass. We intend to work closely with other EU funded projects that are working in the same area so that the transnational approach can be intensified.</p> | |
| <p>7. The work package description also lacks a description of how the partnership will address and implement the results.</p> | <p>None of the Partners come to the project without extensive experience in the development of hydrogen as a transport and energy vector. The Higher Education partners will use the results to develop further their research and teaching programmes while the local authorities involved view the results as important steps towards the creation of a hydrogen economy in their Regions and Centres of Excellence within the North Sea Region.</p> | <p>OK</p> |
| <p>8. The information provided in the annex suggests that project beneficiaries are not claiming the cost of the vehicle as part of their Interreg costs. However, it seems that they are suggesting costs for the retrofitting of cars, vans and large trucks in section C.10 - Specialist equipment. This discrepancy needs to be clarified.</p> | <p>The Partnership can clarify that the costs involved in the project will be through retrofitting vehicles so that they are dual use vehicles. The original purchase price will be met by the partners who will then retrofit the vehicle. This reflects the state of the market in these types of vehicles. The application form states that hydrogen vehicles are not available for these categories of vehicles and so they need to be adapted with range extenders.</p> | <p>OK</p> |

All of the above – in particular #2, which was not addressed in the response letter – will be monitored closely throughout the implementation of the project, especially through the periodic progress reports.





Annex 2: Project response to requirements and recommendations set out in approval letter

HYTREC2 FURTHER INFORMATION IN RESPONSE TO TECHICAL ASSESSMENT AND STEERING COMMITTEE DISCUSSIONS.

1. Introduction

This note is a response to the observations made in the Technical Assessment and Steering Committee discussions. The note begins with a summary of the issues to be addressed. These include:-

- Clarify the measurement of the result indicators.
- Explain the further take-up of results outside the Partnership
- Involvement of SMEs in Work Package 5.
- Greater detail of risk management measures.
- Contingency plans for individual time plan.
- Further elaboration of the transnational approach.
- How the partnership will implement the results.
- Clarification of costs involved in retrofitting.

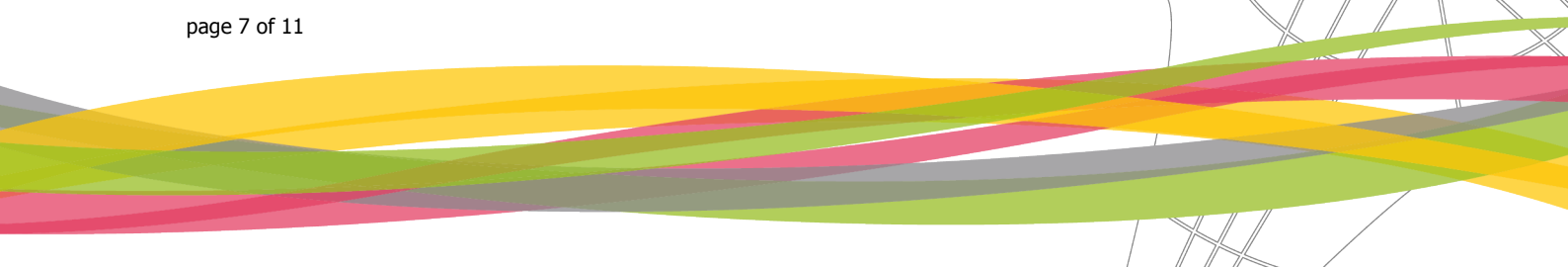
2. Result Indicators

The present Result Indicators were the result of lengthy discussions between the Joint Secretariat, the then UK Contact Point and the HyTrEc2 partners.

We will now explain the thinking between each Result Indicator and finish by looking at the ways in which the three Indicators will interact.

Reduction in the cost of hydrogen vans, large trucks and other tested vehicles.

This Result Indicator indicates a 25% reduction in the cost of the vehicles during the project period. These vehicles are not yet in commercial production but we have seen other Alternative Fuel vehicles reduce in price as they have moved from prototype or an early version of vehicle through the process of commercial manufacture. This is certainly the case with hydrogen buses and a number of electric vehicles and the partners feel that a similar price reduction is possible in this project.





Most of the first vehicles to be tested will be through the use of range extenders onto Electric Vehicles (EVs). In this case, we will compare the price of the EV with a range extender at the start and finish of the project. The initial price can be demonstrated in the procurement process that partners will embark upon.

One of the major objectives of the project is to observe how they operate within a fleet of vehicles and to improve their operational efficiency. Improving operational efficiency will make the vehicle more attractive to fleet operators and should reduce their cost.

Number of the public sector organisations and transport operators investing in hydrogen vans and other tested vehicles.

The Result Indicator suggests that 18 public sector or transport operators will be testing and operating hydrogen vans and other hydrogen vehicles at the end of the project. It is important that other public sector organisations and transport operators invest in hydrogen vehicles if they are going to proceed to commercialisation. As well as promoting the project results to a wide audience, the project partners will work closely with the Hydrogen Fuel Cell Joint Undertaking (FCH-JU) to increase the number of organisation utilising these products. The FCH-JU is an Executive Agency of the European Union using Horizon 2020 to develop hydrogen as a transport and energy vector. The FCH-JU has just announced a Regional Initiative where it will work with regions and municipalities to identify new products that the regional level is interested in and the HyTrEc2 partners are confident that the hydrogen vehicles tested in this project will be amongst the new products that the FCH-JU and European Regions wish to develop. The aim of this Initiative from the FCH-JU is to production of a Cost Reduction Roadmap for each product and this is what we are in doing in HyTrEc2

CO2 emissions reduction from tested vehicles

This Result indicator aims to reduce vehicle CO2 emissions by 18 kilograms per month. This will be done by comparing the emissions of the diesel vehicles replaced by the hydrogen fuel cell vehicles with the emissions from the new vehicles. These tests will be carried out by the Centre of Excellence for Low Carbon and Fuel technologies (Cenex) who will also calculate the amount of kilometres driven and diesel saved. The target figure for the Result indicator is calculated by looking at the average distance a



vehicle will travel in a month and making a comparison between the CO2 emissions of a hydrogen fuel cell vehicle with those of a diesel vehicle.

3. Explain the further take up of results outside the Partnership.

If business cases are to be made for vehicles tested in the project, results must be taken up outside the Partnership. An early task for the project will be to identify work being done in other projects which could be funded predominantly by the Hydrogen Fuel Cell Joint Undertaking (FCH-JU), but also projects run by DG MOVE, the TEN-T and Connecting Europe Facility, the Life Programme and other INTERREG programmes.

While we would expect HyTrEc2 partners would operate some of the first vehicles to have range extenders fitted, more vehicles will be funded in other projects as the HYTrEc2 project continues. It is important that HYTrEc2 liaises closely with these projects and that projects share results. The vehicles will only become market ready and move towards commercialisation if there are a growing number of these vehicles in operation and if operational efficiency is being improved.

The project shares three major aims of the FCH-JU:-

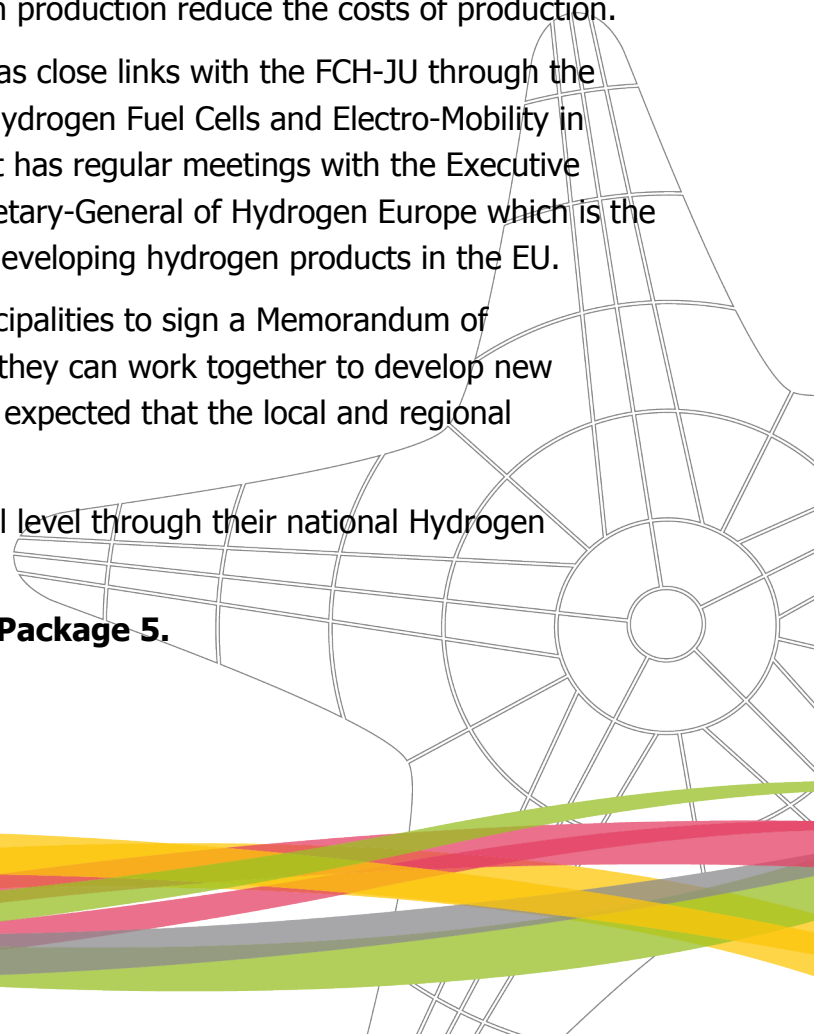
- Improve the efficiency of fuel cells.
- Reduce the costs of fuel cells
- Improve the efficiency of hydrogen production reduce the costs of production.

As Lead Partner, Aberdeen City Council has close links with the FCH-JU through the Presidency of the Association known as Hydrogen Fuel Cells and Electro-Mobility in European Regions (HyER.) The President has regular meetings with the Executive Director of the FCH-JU and with the Secretary-General of Hydrogen Europe which is the leading trade association for companies developing hydrogen products in the EU.

The FCH-JU has asked Regions and Municipalities to sign a Memorandum of Understanding (MoU) with them so that they can work together to develop new products and bring them to market. It is expected that the local and regional authorities in HyTrEc2 will sign this MoU.

Partners also work actively at the national level through their national Hydrogen Associations.

4. Involvement of SMEs in Work Package 5.





The development of supply chains is critical to the dependability and reliability of hydrogen fuel cell vehicles. Mature supply chains increase the operability of vehicles as parts are more reliable and skilled staff more readily available. It is important that SMEs are closely involved so that a wider number of companies join the supply chain and competition is enhanced. There are two ways in which SMEs will be involved. Most partners have close links with SMEs in the hydrogen and related sectors so that discussions about opportunities arising from the project can be discussed. The SME training aspect is also critical so that maintenance of vehicle and other tasks can be carried out in an efficient manner.

5. Greater detail of risk management measures.

There are three major components to the project:-

- Operational efficiency of the vehicles
- Innovative methods of production, storage and distribution
- Supply chain and training.

In terms of this project, risk should be differentiated between technical risk and commercial risk. The project deals mainly with technical risk so that the operational efficiency of the vehicles or the equipment can be significantly improved and comparable with the vehicles that have been replaced. The project will prepare business cases for the vehicles and equipment so that they are 'market ready.' This removes the problem with commercial risk.

These are ranked in order of risk and there is some correlation between the first two activities as it is important to have an effective production and storage system so that vehicles can be refuelled. It should be stated that the innovative methods of refuelling will be tested in conjunction with tried and tested production methods to ensure continuity of supply.

6. Contingency plans for individual time plan.

The Partners are developing new products and improving their operational efficiency and this must be done within the time plan set out. Problems with operational efficiency can delay projects. However, the project is set up in a way so that while the



Work Packages are inter-related, the project does not depend on one Work Package before another begins. This should reduce the need for Contingency Planning but clearly with new technological innovation progress needs to be closely monitored so that contingency plans are put into place if the predicted results are not achieved.

7. Further elaboration of the transnational approach.

The transnational approach is similar to the one followed by projects funded by the FCH-JU and FP7/Horizon 2020 projects. The aim is to create an EU market in these vehicles and through close links with the supply chain to create a Centre of Excellence in the North Sea Region. The project involves the operational efficiency of vehicles and novel green hydrogen production and storage techniques. This can only be achieved by the creation of a transnational supply chain.

The vehicles will be tested within partner regions but the results will be shared within the partnership and the Dissemination Strategy will ensure that the project results are shared on a wider transnational canvass. We intend to work closely with other EU funded projects that are working in the same area so that the transnational approach can be intensified.

8. How the partnership will implement the results.

None of the Partners come to the project without extensive experience in the development of hydrogen as a transport and energy vector. The Higher Education partners will use the results to develop further their research and teaching programmes while the local authorities involved view the results as important steps towards the creation of a hydrogen economy in their Regions and Centres of Excellence within the North Sea Region.

9. Clarification of costs involved in retrofitting.

The Partnership can clarify that the costs involved in the project will be through retrofitting vehicles so that they are dual use vehicles. The original purchase price will be met by the partners who will then retrofit the vehicle. This reflects the state of the market in these types of vehicles. The application form states that hydrogen vehicles are not available for these categories of vehicles and so they need to be adapted with range extenders.

