

## **Report to Partnership Meeting 15 November 2019**

### **RESEARCH AND STRATEGY DELIVERY**

#### **OHM G-PaTRA: Wick-Thurso Feasibility: Battery Train**

##### **Purpose of the Report**

To inform the Board on progress to study the outline business case for running a battery powered train service between Wick and Thurso.

This project is part funded by G-PaTRA.

##### **Background and Project Overview**

G-PaTRA (Green Passenger Transport in Rural Areas) involves a consortium of partners across six North Sea region countries (UK, Netherlands, Belgium, Germany, Norway and Denmark) led by Robert Gordon's University.

The key objectives of the project are to:

1. Enhance the capacity for authorities to reduce CO<sub>2</sub> from remote, rural and Island transport by embedding more zero emission vehicles in rural transport systems and improving, optimising and better integrating available passenger resources.
2. Identify green, innovative, integrated transport services and new organisational and ownership models to allow transport operators to deliver on the project aims of providing a sustainable rural public transport network.

HITRANS is leading Work Package 3 which seeks to accelerate the use of Zero Emission vehicles and vessels. This will involve the implementation of a specific lighthouse project and two business case studies. The lighthouse project involves a new scheduled bus route using an electric bus within the Moray area of the Cairngorm National Park. This lighthouse project will be used to demonstrate and evaluate innovative low carbon transport solutions in a rural context. In addition to this HITRANS will also undertake two case studies which will develop a strategy for refuelling cell vehicles from renewables.

##### **Goals of Project**

1. Reduced greenhouse gas emissions
2. Enhanced access, mobility and social inclusion
3. Reduced per passenger subsidy costs
4. Modal shift

Other innovative projects will be trialled by the project partners, each addressing one or more of the project's aims.

Rather than addressing a specific issue in a specific locality, each pilot will contribute to a transnational understanding of the:  
wider rural public transport supply chain  
inter-relationship between the four goals and the most effective combination of pilot interventions.

The project will develop indicators to quantify the impact of pilot projects against *business as usual*. Provisionally, the four primary indicators could be:

- CO2/ passenger km
- Passenger numbers (as a proxy for mobility, access and social inclusion)
- Subsidy/passenger journey
- Modal share.

G-PaTRA will consider the barriers to, and opportunities for, scaling up pilot interventions across Europe. Guidance will be produced in order to maximize transferrable innovation.

## **Study**

The consultant was asked to look at the feasibility of running additional Wick-Thurso shuttles using a battery powered Class 230 from Vivarail, as tested recently on the Bo'ness and Kinneil Railway. Wick is a centre of renewable electricity and could supply power as required. Range, charging infrastructure and maintenance will need to be considered, as well as performance. It is envisaged that this service runs in addition to existing ScotRail 158s rather than substitute for them. Technical data for the unit is available from Vivarail.

The report will be used to help inform the business case for a potential trial.

## **Required Study Outputs**

1. Emissions saved vice DMU operation
2. Operating costs
3. Maintenance costs
4. Pathing
5. Infrastructure requirements
6. Performance data

## **Draft Study: Systra Conclusions**

This report has considered the issues surrounding the introduction of a battery train service between Thurso and Wick. The operation of such a service would provide the opportunity to use trains supplied by VivaRail to provide practical experience of using a technology that is likely to have some role in the operation of the rural rail services in a zero carbon environment, whilst also improving connectivity in Caithness.

There are number of strengths and weaknesses of these proposals which we summarise below:

### *Strengths*

The proposal has a number of strengths including the following:

- The potential for genuinely zero carbon emissions through the use of 100% renewable electricity.
- The service would need only 13 passengers per day abstracted from car before it made a positive contribution to carbon emissions, even if running on the current Scottish Grid mix of electricity.
- Battery trains have a lower day to day operating cost than the equivalent diesel trains, potentially improving the viability of rural services more generally
- The route being considered is relatively isolated from the rest of the rail network making it suitable to test new modes of operation
- Local economic activity will be supported by train maintenance being undertaken in Wick rather than Inverness.

### *Weaknesses*

The proposal does however have number of weaknesses:

- The service has significant set up costs to provide maintenance and charging infrastructure at Wick
- The capital / leasing costs of the train are high, both the high purchase cost of the train and charging equipment and the relatively short lifespan of the Class 230 train used as a reference vehicle, meaning its costs have to be recovered over a shorter period of use.

### *Recommendation*

Based on the above we recommend that if a Thurso – Wick battery train is to be pursued then it should be done so on the basis of acting as proof-of-concept with a view to battery technology having a wider role across railways in Scotland, treating the investment required as a research and development exercise, albeit one with significant benefits to the economy and environment in Caithness. It may also be appropriate to consider other locations where battery technology could be used, for example on services around Inverness.

### **Next Steps**

Further discussion will follow with the consultant, train builders Vivarail and other stakeholders to finalise the report.

## **RISK REGISTER**

### RTS Delivery

Impact – RTS compliant, connectivity, local services

### Policy

Impact – Mode shift, decarbonisation

### Financial

Impact – Appraisal work is fully funded

Equality

Impact – Improved access to network

**Recommendation**

1. Members and Advisors are recommended to note the report.

**Report by:** Frank Roach  
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**Date:** 4<sup>th</sup> November 2019