D2N2 Investment Board – September 2022

Confidentiality Level	Restricted ☐	Controlled ☐	Public ■	Commercially sensitive ☐

Meeting and Date	D2N2 Investment Board – 14th September 2022		
Subject	Project for Approval – Pilot Production Line for Hydrogen Electric Technologies (PProLHET)		
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Papers are provided for:	Approval ■	Discussion ☐	Information ☐

Summary and Recommendations
In December 2021, D2N2 allocated £6.5m million of funding from its Growing Places Fund to deliver low carbon priority projects across the region. In total 7 projects were allocated funding and will all receive awards subject to the approval of a Local Assurance Framework (LAF) compliant Green Book Business Case. The delivery of the fund is managed in line with the D2N2 Local Assurance Framework agreed by the LEP Board, which sets out the compliance requirements in relation to the delivery and approval of projects funded through the Low Carbon Growth Fund. This project being put before the Investment board has now been assessed and is being recommended for consideration and approval based on its full compliance with the LAF. D2N2 will contract with the University of Nottingham and following an approval D2N2 will release £1,200,000 of funding through the Low Carbon Growth Fund.

D2N2 Investment Board

Final Business Case – Project for Decision

Low Carbon Growth Fund

Project Name	Pilot Production Line for Hydrogen Electric Technologies (PProLHET)	Project Applicant	University of Nottingham
Construction Start Date	August 2022	Construction End Date	July 2023
Low Carbon Growth Fund requested	£1,200,000	Total Project cost and Sources of funding	£6.9 million (£2.7m Capital and £3m Revenue) £2.9m – University of Nottingham (Capital) £3m – Multiple Sources (Revenue)
Gross Value Added/ Benefit Cost Ratio	3.39:1	Expected Outputs	713 KT of C02 saved 50 new jobs and 10 safeguarded 150 learners supported

1.0 Project Description

The Pilot Production Line for Hydrogen Electric Technologies (PProLHET) is a new facility based at the University of Nottingham that will accelerate the UK's movement towards the ambitious goals agreed in the Paris Climate Change Agreement and reinforced at COP26. It builds on other recent public investments at the university, including the Driving the Electric Revolution Industrialisation Centre (Midlands), UK Electric Aircraft Propulsion Test Facility and the Power Electronics and Machines Centre, by providing a pilot line for the production of Hydrogen Electric Technologies.

The University's vision is to accelerate the transition of its research in electrification and hydrogen into commercially competitive solutions and to act at scale and with pace to maximise its impact towards reducing carbon emissions.

The university's industrial model is to locate R&D and production close to where the ongoing research delivers rapid translation into the next generation of zero carbon product. By extending its capabilities to provide pre-production and advanced manufacturing of its research to open access, it will fill the gap where companies lack the investment capacity to switch to low carbon technologies or do not have the know-how and skills to transition their products to hydrogen or electric technology and production. By focusing on its research strengths and combining a pipeline of technology with specialised advanced manufacturing capability that can be scaled up, the university will secure and expand the ability of the regional supply chain to remain at the forefront of technology and attract new companies into the region.

In a first phase of the project, the university intends to establish the translation pathway and proof of impact with existing industry partners as early adopters. This will provide evidence for rapid scale-up in the phases that will follow and create the basis for a new industrial scale-up with potential to play a significant role in de-carbonising transport in the region and across the globe.

2.0 Summary of Strategic Case/Fit

D2N2 RGS

PProLHET will make an important contribution to the D2N2 Recovery and Growth Strategy's central vision of creating a green revolution to build a more productive and inclusive economy and is aligned to its three guiding principles of low carbon growth, improving productivity and connectivity and inclusion.

Low Carbon

Low carbon leadership – PProLHET will deliver the first of a kind production facility to enable real technology demonstration underpinned by the technical excellence in the university's Faculty of Engineering. The success of this investment will unlock the further development of a translation centre that specialises in the development of low carbon technologies, helping to deliver the LEP's ambition to lead the most ambitious carbon turnaround in the county.

Enabling key low carbon sites – PProLHET will provide the basis for further investment in a new translation centre at Ratcliffe-on-Soar. The technologies being demonstrated through the project will not only deliver low carbon sites in D2N2 but will be a catalyst for widespread investment in low carbon energy generation and use across multiple sectors and be the focal point for future technological development.

Decarbonising growth – PProLHET will develop hydrogen electric technology, which will be rolled out locally, nationally and internationally, resulting in decarbonisation on a grand scale

Productivity

Employment and skills – Having a make like production facility in D2N2 will provide a place where future technology users can come and be trained in the growth industries of tomorrow. This will deliver high value jobs with a potential to draw more R&D jobs to the region as key R&D organisations will invest in space to house their research and technology close to this one-of-a-kind pioneering facility. TT Electronics, one of the critical companies in the electrical supply chain, has already taken this step with their Advanced Technology Centre being based physically in the same laboratory as PProLHET. Others will undoubtably follow and occupy spaces in the University of Nottingham Innovation Park.

Business growth – The proposed investment gives D2N2 the ability for businesses to experiment in a space that is separate from the day-to-day production environment that lowers risk and eliminates disruption to business as usual. This will enable further investment in the technology with confidence.

Innovation – PProLHET will be a world first facility designed for technology production proof of concept. It will place D2N2 at the centre of global innovation and translation of world leading technology from research excellence into real world production.

Connectivity and Inclusion

Inclusion – The make like production will create jobs at all levels, from technical skills development and shop floor work to knowledge intensive research, design and engineering. The equipment being purchased is a step change to what is currently available in the UK and the integration of this into a production line means that there are new design paradigms being opened by the new manufacturing system.

Integrated infrastructure – PProLHET provides the means for investment in production of motors, power electronics, and energy generation devices to empower low carbon growth for widespread benefits.

Place shaping – Ultimately, this proposed investment will place Nottingham at the epicentre of the green revolution.

National Priorities

PProLHET will support the government's key domestic policy of levelling up the UK by boosting productivity, pay and jobs through the growth of the private sector in a region that has historically underperformed when compared to other parts of the UK economy. It will build on the East Midlands's existing strengths in manufacturing while supporting the transition to a net zero economy and will create new skilled jobs within low carbon industry, stimulating further private sector investment within the region. Specifically, the project will help to deliver the government's second levelling up mission of increasing public investment in R&D outside the Greater Southeast by at least 40% by 2030, while leveraging further private sector investment to stimulate innovation and local productivity growth. It will also support the government's longer-term ambition for the UK to become a global hub of innovation by 2035 and a science superpower as set out within the UK Research and Development Roadmap.

The PProLHET facility will by its nature deliver on the Governments Ten Point Plan for a green industrial revolution by creating new green jobs which will help to accelerate the UK's path to net zero.

Assessors Comments	The project has been demonstrated to align with and have strong strategic fit with D2N2's Recovery and Growth Strategy. It also fits well with the Governments Build back greener agenda and demonstrates best practice in environmental standards whilst enabling growth.

3.0 Summary of Economic Case and expected outcomes

Options Analysis

The project sponsor has set out a detailed options analysis for the project including 4 shortlisted choices:

- Option 1 – Do Nothing - The project sponsor has set out a business-as-usual approach however this would not deliver the future carbon saving technologies and the additional environmental and economic benefits that would come out of this. Therefore this has been discounted.

- Option 2 – Internal Funding – The project applicant doesn't have the funding available at this point in time to fully fund the development. With the available match contribution from the University this would only part fund the facility and not provide equipment capable of fulfilling the outcomes needed. This option has therefore been discounted.
- Option 3 – Industry Funding – the match funding secured is the maximum available through industrial partners. It is not possible to fund the equipment investment by industry as this would inevitably result in a commercial arrangement where industry partners who fund the equipment would expect preferential use of the equipment, negating the access for all policy that would underpin any publicly funded investment.
- Option 4 – Preferred option – This option is a mixture of Public, University and industry finance which creates a funding mixture to enable open access to all interested supply chain partners and delivers the required equipment to deliver all of the anticipated outcomes.

The Economic case also sets out the predicted Benefit Cost Ratio for the project based on current economic inputs and expected outcomes of the intervention. This has been calculated for the project and gives a BCR of 3.39:1 This shows that the intervention delivers Good Value for Money. The assumptions used for the project in terms of sensitivity analysis are all in line with HM Treasury's Green Book standards and present a fair case. The assumptions are well articulated and justified and therefore give an accurate BCR value.

Assessors Comments	The economic case sets out a good list of options that were investigated for the project and an understanding of how the current project has been decided based on evidence. The Benefit Cost Ratio demonstrates that the project will deliver High Value for Money and is a good investment for the LEP.

4.0 Summary of Commercial Case

The purpose of the Commercial Case is to assess the best way of delivering the preferred Anaerobic Digestion and carbon capture solution and setting out the structure of the arrangements.

i. Market Analysis

The market analysis conducted for this project shows a strong market demand for this project and that the facility when completed should be utilised by numerous companies to advance their technology offering. Although there is a strong market demand for the project and the technology pieces being put in place, the nature of Research and Development dictates that the private sector will not be able to deliver this facility to make it commercially viable. The Covid 19 pandemic has

exacerbated this inability from industry to invest directly in this style of facility due to constraints on profits and revenue through the crisis.

The University has a wide range of partners and potential users for the project that they have engaged with about this project. The supply chain and OEMs in the aerospace industry have indicated their intention to reorientate their production towards greener delivery.

ii. Delivery Arrangements

The delivery arrangements for the project are outlined in section 6.0

iii. Procurement

The project sponsor has set out the procurement route for the project and will engage with specialist suppliers to deliver the specific equipment required for the commercialisation facility. The University has appropriate experience professionally in delivering these types of projects and is therefore more than qualified to deliver on this. The procurement process will be OJEU compliant.

iv. Finance

As stated previously this project is not commercially viable due to the effects of the Covid 19 pandemic and the nature of the facility being provided. The University has also stated that the total cost of the facility exceeds their available capital to deliver this project at this present time. This therefore provides the justification of Low Carbon Growth Funding from D2N2.

Assessors Comments	The submitted business case gives clear indications for the need for funding and D2N2's intervention to enable the demonstrator project. The commercial case also sets out the plans for procurement which are well established to ensure best value for the project.

5.0 Summary of Financial Case

Assessment of Risk

Within the supporting information provided with the Business Case, are Risk Registers for the delivery and installation of the equipment. The principal risks that are of particular relevance to the requested D2N2 funding are summarised as;

i. Tender returns– The University has already received quotes for the majority of items included within the project however there is a possibility

that some outstanding items may not be able to deliver at the costs required for the project.

ii. Supply issues – Suppliers may not be able to deliver to the timescales quoted in initial tenders due to supply chain issues. Reassurance over delivery timescales will be factored in as a key criteria in decision making over the remaining tenders.

Subsidy Control

The project sponsor has sought legal advice from Pinsent Masons on the eligibility of acceptance of the D2N2 Low Carbon Growth Fund grant. The advice has been taken out on the premise of receipt of £1.2m of funding from the LEP and the advice states that the funding will not provide a subsidy should it fit multiple criteria which align to the way in which the University will use this grant. Due to the nature of this project facilitating Independent and Collaborative research the grant will not class as subsidy.

Assessors Comments	The financial case sets out a good level of risk management with well thought out mitigations should the issues arise. The project sponsor has taken external subsidy control advice and this informs a good case for funding and should give the LEP the reassurances needed to grant funding.

6.0 Summary of Management Case

The Management Case sets out the governance arrangements for the delivery, monitoring and evaluation of the Hydrogen Fuelled Waste collection project.

i. Governance and Management arrangements.
The business case sets out the teams who will oversee the project and the management of the development. This includes all of the appropriate bodies that would be expected of this type of application and has a strong focus towards procurement. Formal processes and systems have been implemented and the team intends to meet on a consistent basis to keep up to speed with the project and ensure it is delivering to the timescales set out in this business case.

ii. Programme Plan
The project sponsor has provided a detailed plan of all works that will take place for the project, and this can be split into five distinct phases:

- Phase 1 – Tender preparation initiated – August 2022
- Phase 2 – Tenders formally launched – October 2022
- Phase 3 - Contracts Issued – December 2022
- Phase 4 – Installation Commences – July 2023
- Phase 5 – Facility Launch – October 2023

iii. Risk Management

The project sponsor has outlined a detailed list of risks for the project around Economic, Regulatory, Policy, Technical, Environmental, commercial and financial risks. These have all been rated based on their probability and impacts to the scheme should they arise. The project sponsor has also set out a list of mitigations which can be used should the project encounter any of the risks identified.

iv. Monitoring and Evaluation

The project management board which has been previously aforementioned will meet on a fortnightly basis to review the project and the progress and performance of the scheme. The Board has identified KPI's which are measurable for the project to ensure that this is a success. These KPI's will be interlinked in to the D2N2 funding agreement to ensure that we are getting value from our investment and will be linked directly to a grant clawback agreement should these not be achieved.

Assessors Comments	The management case is well thought out and presents a good level of detail about how the project sponsor will ensure that the programme runs to the initial timescales set out in this business case. The project sponsor has brought in an appropriate team of individuals to manage this and ensure delivery of the outcomes is also factored in to all decisions.

7.0 Assessors and Officers Recommendation

The following recommendations are proposed as a condition of any award of Getting Building Fund from D2N2 LEP to this project;

i. A profile of drawdown of Low Carbon Growth Funding and outputs

Getting Building Fund Checklist

1. A detailed 'Green Book' compliant business case has been completed detailing the project and its alignment to the 5-case model. 'The Checklist[1]' published by HM Treasury is a useful one-page guidance paper.	*The University of Nottingham have prepared a green book compliant business case which aligns to the standards set out by HM Treasury.*
2. A VFM assessment must be completed. This VFM assessment will be independently assessed by D2N2 and must show an overall score of 'High'.	*The project sponsor has provided a Benefit Cost Ratio Analysis for the project which gives a BCR score of 3.39:1, this satisfies D2N2s threshold on Value for Money*
3. Details confirming that all planning consents have been granted and that all pre start conditions have been met.	*No planning consent is required for the project as the project is wholly contained within the Aerospace Technology Centre at the University's Jubilee Campus.*
4. Confirmation that any Section 106 or other agreements have been entered into.	*Not applicable to this development*
5. Confirmation of the results of the procurement exercise detailing: -the tenders received (along with detailed costs) -the tender accepted (along with timescales/conditions)	*The project will follow an open OJEU compliant tendering process and all equipment will be aligned to these standards. The University has sought expertise of procurement professionals who have over 20 years industry experience in the procurement of technical equipment suited to this project.*
6. Details of the construction contract to be entered into by the promoter detailing: -start date -completion date -liquidated damages/cost over runs	*The project will not enter a construction contract due to its nature, but the procurement process has been outlined and can be split into the following phases:* - Phase 1 – Tender Process Launched - Phase 2 - Contracts Issued - Phase 3 – Installation Commences - Phase 4 – Facility Launch
7. Confirmation that the promoter will be responsible for any variations to the contract price and that once entered into, the contract will be completed in line with	*The University of Nottingham have confirmed that they will be responsible for any cost overruns in the project.*

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/190603/Green_Book_guidance_checklist_for_assessing_business_cases.pdf

the details submitted. The promoter should submit a separate letter appended to the Business Case which confirms this from their Financial Director or equivalent.	
8. Confirmation that the project has been designed to RIBA stage 4 or its equivalent.	*Not Applicable to this development*
9. Details of any outstanding points preventing/delaying the start-up of the construction contract.	*The project needs to fully work through the procurement process before final contracts are signed but this will be monitored by the LEP and Accountable Body.*
10. Details of any changes for the project form the initial EOI and OBC submissions with reasoning behind these changes. Including an updated viability report as submitted in point 5 of the OBC.	*The project does not have any significant changes from the EOI process*
11. Confirmation that all funding is now in place with details of the sources of funding, please include letters from third party funders confirming any conditions and timescales.	*The University of Nottingham has confirmed the match funding of £2.9m for the project has been agreed. The Revenue contributions to the project have also been confirmed.*
12. Confirmation that all land/legal agreements have been completed and are in the control of the promoter to deliver the entire project	*The University owns the freehold and all permissions for the project.*
13. A phasing plan identifying the start and completion elements of the project along with costs associated with each phase and the outputs/outcomes that will be delivered on a quarterly basis.	*The project sponsor has provided details of when the project phases will start and finish for the scheme. Outcomes are profiled for the LEP to monitor on an ongoing basis.*
14. An updated risk register identifying the key risks and the project manager responsible. The risk register needs to be scored and include a mitigation plan.	*A risk register has been prepared by the project sponsor and has set out mitigations which will solve any issues that may arise.*